Bristol City Council

River Avon Flood Risk Management Strategy

Statement to Inform an Appropriate Assessment

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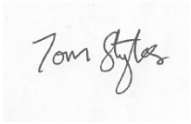
		Signature			
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Contents

Figures

Figure 2. European Sites within 10km of the proposed site.

Appendices

Appendix A

Habitats Regulations Assessment Procedure

1 Introduction

1.1 Background

Bristol City Council (BCC) has commissioned Ove Arup and Partners Ltd. (Arup) to undertake an update to the Habitats Regulations Assessment (HRA) previously prepared by AECOM[1] for the River Avon Tidal Flood Risk Management Strategy ("the Strategy") following the amendments to the Strategy and with regards to recent case law[2] (Section 1.5).

An update to the Strategy has been undertaken to acknowledge the interaction between both tidal and fluvial flood risk in Bristol and the need for flood defences given the potential for flood events resulting from an increase in water level of both or either systems.

This report considers the changes to the River Avon Flood Risk Management Strategy ("the amended Strategy") as a result of the flood risk modelling undertaken by Arup and provides an update as part of the Strategic Environmental Assessment (SEA) Addendum. This report contains figures on habitat loss and the footprint of defences based on best-available information as part of the amended Strategy.

This Statement to Inform an Appropriate Assessment (SIAA) is completed as part of the HRA process, in compliance with the requirements of the Conservation of Habitats and Species Regulations 2017 (as amended); hereafter referred to as the "Habitats Regulations".

This SIAA provides an independent report to inform BCC and Natural England (NE) with sufficient information to support the development of the strategic case for the amended Strategy, with regards to the Habitats Regulations.

1.2 Purpose of this Document

This document has been prepared by Arup to inform the assessment of the potential for effects on European Sites from the implementation of the proposed works, as required by Regulation 63 of the Habitats Regulations.

This SIAA therefore follows the consultation process required by Regulation 76 of the Habitats Regulations.

[1] AECOM, 2017. River Avon Tidal Flood Risk Management Strategy Report to Inform a Habitats Regulations Assessment: No Likely Significant Effects Report, Bristol City Council. September 2017.
[2] People Over Wind, Case C323/17 European Court of Justice, 12th April 2018.

1.3 Structure of this Report

This report uses the following structure:

- Section 2 provides information on the proposed works (the 'project') including the environmental baseline and a description of the development;
- Section 3 provides information on the data and methodology used in the assessment;
- Section 4 provides information on the European Sites that are considered within the assessment;
- Section 5 provides a screening assessment for the potential pathways for effects;
- Section 6 provides the appropriate assessment of the likelihood of adverse effects occurring with mitigation measures and the residual effects;
- Section 7 provides proposals for monitoring; and
- Section 8 provides a summary and conclusions.

1.4 The HRA Process

Regulation 63 of the Habitats Regulations requires a 'competent authority' to undertake an 'appropriate assessment' of any plan or project (alone or in-combination with other plans and projects) which is likely to have a significant effect on the features or a European Site unless the project is directly connected with the management of the site. Considering the conclusions of the assessment, the competent authority may proceed with or consent to the plan or project only after having ascertained that it will not adversely affect the integrity of the European Site. European Sites include Special Areas of Conservations (SACs) and Special Protection Areas (SPAs). UK Government policy requires proposed and candidate SACs and SPAs to be treated as European Sites along with wetlands designated under the Convention on Wetlands of International Importance (Ramsar Sites).

All plans and projects, including those identified for enhancement work without requiring planning permission, should identify any possible effects early in the plan/project making process and then either alter the plan/project to avoid them or introduce mitigation measures to the point where no adverse effects remain. The 'competent authority' shall agree to the plan or project only after having ascertained that it will not adversely affect the integrity of the site or sites concerned. In coming to a conclusion, the competent authority must consult with the Statutory Nature Conservation Organisation, in this case NE, and have regard to their comments. They may also consult the general public if considered appropriate.

The assessment of a project under the Habitats Regulations can be split into discrete sections as shown in Appendix A and with regards to Tyldesley[3].

[3] Tyldesley, D. (2011). Assessing Projects under the Habitats Directive: Guidance for Competent Authorities. Bangor: Countryside Council for Wales

Stage 1 is the assessment of the likelihood of a plan or project having a significant effect on the features of a European Site. This is the trigger for the need for an Appropriate Assessment as set out in Regulation 61(1). The Appropriate Assessment (Stage 2) is the detailed consideration of the potential effects of the plan or project in relation to the conservation objectives for the features of the European Site(s) to determine if there is likely to be an adverse effect on the integrity of the site (i.e. an effect that would compromise the site meeting its conservation objectives). Providing it can be demonstrated that with appropriate mitigation measures the plan or project would not give rise to an adverse effect on the integrity of a European Site, the plan or project can proceed. Where this cannot be demonstrated or there is uncertainty, the assessment would then need to consider if there were any other alternatives to the plan or project (Stage 3) that would not give rise to adverse effects on the integrity of the European Site. If there are no alternatives, Stage 4 would then consider if there are any Imperative Reasons of Overriding Public Interest (IROPI), only at this stage can Compensatory Measures be considered. It is very unusual for plans for projects to be considered in Stages 3 or 4.

1.5 Mitigation

With regards to recent case law (People Over Wind and Sweetman v Coillte Teoranta[2]), the inclusion of plainly established and uncontroversial mitigation during Stage 1 is no longer considered appropriate. Mitigation, as considered by the Centre Européen de Coopération Juridique (CECJ) in regard to the case law[2], is interpreted to mean measures that are intended to avoid or reduce the harmful effects of the envisaged project on the site concerned.

Consequently, any project which identifies an impact on a European Site and where avoidance and mitigation is applicable will need to address these measures during Stage 2 Appropriate Assessment.

2 Project Description

2.1 Site Description

The amended Strategy is proposed primarily along the edges of the tidal River Avon, which runs through Bristol city. The western extent occurs at Shirehampton and Sea Mills, with works then from New Cut upstream to approximately around St. Anne's (Figure 1).

The proposed works occur primarily along the edge of the river channel, both landward and into the river channel itself. Works within the river channel may involve impacts to estuarine habitats including mudflats and saltmarsh. The total length of existing flood defences amended within this amended Strategy is approximately 15.8km; riparian defences amount to approximately 10.3km.

At this stage of the amended Strategy, baseline ecological surveys have not been undertaken.

2.2 Proposed Works Description

Following an optioneering stage, Option D1 was reached[4] (Figure 1). Following the inclusion of both fluvial and tidal flows as part of the amended Strategy the following flood defences have been identified:

- road raising at Cumberland Basin Road where it meets the Portway by a maximum of 1.1m and the installation of a floodgate across the road;
- reinforced concrete wall along Cumberland Basin Road to the Entrance Lock (a reduced length to that previously proposed);
- replacement of downstream lock gates at Entrance Lock (as opposed to the replacement of the upstream lock gates as per AECOM's proposal);
- flood defences in front of existing defences around the western extent of Entrance Lock ("the knuckle") requiring piling;
- amendments to increase the height of the lock gates (Brunel Dam) at South Entrance Lock and raising the existing footbridge. Unlike other areas, amendments to Bathurst Dam is also only proposed to occur once rather than as an adaptive approach;
- flood defences along the south-west extent of Spike Island;
- earthwork flood defences at Bower Ashton;
- flood defences along Cumberland Road – these will include remedial works to areas identified by Bristol City Council;

[4] For further detail on the optioneering stage, refer to: Arup, 2020. Strategic Environmental Assessment Addendum, River Avon Flood Risk Management Strategy. Bristol City Council.

- proposed floodgate across the existing heritage railway and Chocolate Path adjacent to Cumberland Road. Works will also include remedial works to the structure of the railway and Chocolate Path;
- flood defences along Commercial Road;
- Amendment to increase the height of Bathurst Dam through mass concrete. Unlike other areas, amendments to Bathurst Dam is also only proposed to occur once rather than as an adaptive approach;
- flood defences along Clarence Road requiring contiguous piling;
- flood defences along Cattle Market Road;
- flood defences along the northern side of the River Avon at St Philips Marsh requiring contiguous piling;
- flood defences along the greenway on the southern side of the River Avon at St Philips Marsh to provide a continuous defence with no reliance on existing structures and path widening;
- flood defences through Netham requiring a new floodgate proposed across the Feeder Canal; and
- flood defences along Feeder Road, including a flood gate across the road.

The above construction works are separate from the proposed maintenance and management works, which are currently unknown at this design stage.

In addition to the construction of phased defences in the core areas, the scheme also includes measures to prevent detriment (an increase in flood risk) to other areas. These detriment mitigation measures include works:

- downstream of Bristol in Shirehampton, Pill and Sea Mills;
- on the banks of the Avon itself near the Malago and St Philip's Causeway;
- on the north and south banks at St Anne's;
- towards the downstream end of Brislington Brook; and
- on the Malago to allow Marksbury Open Space to flood.

It is important to note that proposals in these areas are at an early stage of development, and further investigations and design development on a local level will be required to confirm and refine proposals.

A number of areas have been identified further upstream than St Anne's that may require the implementation of detriment mitigation measures as a result of the amended Strategy. Due to the reduced modelling certainty and information available regarding these areas, they are included within the amended Strategy for pricing but are not included within the amended Environmental Report at this stage.

2.3 Distance from European Sites

The designated sites figure (Figure 2) shows the location of the proposed site in relation to the European Sites within 10km.

Bristol Channel Approaches SAC has been considered in this HRA as the proposed works are within the Celtic and Irish Sea Marine Mammal Management Unit. This management unit should consider all potential impacts on mobile qualifying features. As harbour porpoise (qualifying feature) could both be present within the River Avon and also form part of the Bristol Channel Approaches SAC, this SAC has been included within this assessment.

The European Sites identified within 10km of the proposed works are as follows (distances and direction are measured as a straight line from the proposed site to the European Site):

1) Avon Gorge Woodlands SAC, within site boundary;
2) Severn Estuary SPA, within site boundary;
3) Severn Estuary Ramsar, within site boundary;
4) Severn Estuary SAC, within site boundary;
5) Chew Valley Lake SPA; 9.2km south of site boundary;
6) Bristol Channel Approaches SAC, approximately 112km north-east of the site boundary.

3 Guidance and Methodology

This section sets out the guidance and evidence base used in assessing the potential effects of the amended Strategy.

3.1 Guidance and Policy

This information has been informed by the following guidance and policy documents:

- The Habitats Regulations Assessment Handbook, DTA Publications Ltd, 6th Issue, 2017[5]; and
- Tyldesley, D. and Chapman, C. 2018. People Over Wind – some Implications of the Judgment. The Habitat Regulations Journal, Issue 10, pp. 19 – 23[2].

This guidance is intended to improve understanding of how projects are regulated under the Habitats Directive. This guidance draws on experience throughout Britain and on case law in Britain and Europe.

3.2 Desk Study Information

In addition to the guidance noted above, the following websites were used to gather information on the European Protected Sites;

- NE website, including the Conservation Objectives and Site Improvement Plans;
- Magic (Multi-Agency Geographic Information for the Countryside) website; and
- Joint Nature Conservation Committee (JNCC).

Information on the interest features of European Sites has been obtained from the information provided on the JNCC website. The Core Management Plans for European Sites were obtained and have been used to inform this assessment.

These documents provide the main elements of NE's management plan for European Sites along with the Conservation Objectives for the features. The features will be considered to be in Favourable Conservation Status only when the conservation objectives are being met. These objectives therefore provide an indication of the type of effects which could affect the features of European Site. An effect which could affect the ability of a site or feature to meet its objective could be considered to be an adverse effect on the integrity of the European Site concerned.

[5] Tyldesley & Chapman. (2017). The Habitats Regulations Assessment Handbook, January 2017 Edition, UK: DTA Publications Limited.

3.3 Habitats Regulations Assessment Methodology

In order to understand the potential implications for European Sites from the amended Strategy it is necessary to identify those sites that are located close to the amended Strategy or are linked by pathways such as hydrological connections.

All European Sites within 10km of the project were identified using Geographic Information System data from datasets downloaded from the JNCC, Magic and NE (see Section 2.3).

3.3.1 Understanding qualifying interests and conservation objectives

For each of the sites identified the features were established and the conservation objectives for each feature were obtained. Information was also sought to understand the potential vulnerability of the features to any effects that might arise from the proposed project.

3.3.2 Identification of the potential effects of the project

Any potential pathways for effect on European Sites resulting from the proposed development were identified prior to consideration of best practice procedures (e.g. Guidelines for Pollution Prevention and CIRIA guidance) or the integration of any mitigation measures.

3.3.3 Identification of plans or projects considered for in-combination effects

An ‘in-combination’ assessment is required where the project may have an effect on a European Site, but on its own the effects would not be significant. The potential effects of the project should be considered in-combination with other plans or projects that similarly may have an effect, but where on their own those effects would not be significant. The combined effects may therefore become significant.

Details of other plans and projects which are currently proposed or consented within the vicinity of the European Sites identified were obtained from AECOM’s HRA[1] to inform the in-combination assessment of the proposed project.

3.3.4 Consideration of the significance of potential effects

The significance of potential effects was assessed in the absence of avoidance or other mitigation measures other than those which are standard construction practices such as pollution control or those incorporated into the scheme. The assessment has been made with awareness of the conservation objectives for the features of the European Sites, although as stated in the relevant guidance the assessment of the project against the conservation objectives is not required until the Appropriate Assessment stage of the HRA process.

In the assessment of the significance of effects, professional judgement was applied using the following criteria, as often insufficient information about the elements and interests is available:

- The vulnerability/sensitivity of the receiving environment/features of interest;
- When the risk of effects is likely to occur (e.g. construction and/or operation);
- The likely geographical extent of the effects; and
- Likelihood of significant effects (e.g. those above negligible in magnitude) occurring based on previous experience with similar elements, where available.

Professional judgement was used in the carrying out of this work where professional guidance was not available. Where there was not enough information about the risk of qualifying interest being present, or of the risk of effects, the assessment used the precautionary principle to inform the judgement. The precautionary principle has been applied to ensure that any assessment errs on the side of caution, without being overly cautious. This principle means that the conservation objectives should prevail where there is uncertainty or that harmful effects will be assumed in the absence of evidence to the contrary.

4 European Sites Potentially Affected by the Proposal

The features for which the identified European Sites have been designated are summarised in Tables 1 to 6. The distance of the European Site in relation to the project have also been noted within Section 2.3.

Table 1. Avon Gorge Woodlands SAC Qualifying Features.

Qualifying Features[6,7]	Importance	Conservation Objectives Summary	Vulnerability
Annex I habitats that are a primary reason for selection of this site: - Tilio-Acerion forests of slope, screes and ravines. **Annex I habitats** present as a qualifying feature, but not a primary reason for selection of this site: - Semi-natural dry grasslands and scrubland fascies on calcareous substrates (Festuco-Brometalia) (*important orchid sites)	Avon Gorge is representative of Tilio-Acerion forests in south-west England on the limestone cliffs and screes of a large river gorge. It is important because of the high concentration of small-leaved lime *Tilia cordata*, compared with other sites in the region, the presence of rare whitebeams *Sorbus* spp., including two unique to the Avon Gorge (*S. bristoliensis* and *S. wilmottiana*), and other uncommon plants, such as green hellebore *Helleborus viridis*. Other characteristic species include soft shield-fern *Polystichum setiferum* and hart's-tongue *Phyllitis scolopendrium*. Species-rich transitions to scrub and grasslands are associated with the woodland. Small groves of yew *Taxus baccata* also occur on some of the stonier situations.	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; • The extent and distribution of qualifying natural habitats; • The structure and function (including typical species) of qualifying natural habitats; and • The supporting processes on which qualifying natural habitats rely	• Invasive species • Undergrazing • Public access / disturbance • Disease • Changes in species distributions • Air pollution: impact of atmospheric nitrogen deposition

[6] https://sac.jncc.gov.uk/site/UK0012734 Accessed online 02/03/2020.
[7] http://publications.naturalengland.org.uk/publication/6740736611450880 Accessed online 02/03/2020.

Table 2. Severn Estuary SPA Qualifying Features.

Qualifying Features[8]	Importance	Conservation Objectives Summary	Vulnerability[9]
Annex I species qualifying under Article 4.1 of Birds Directive: - Bewick's swan *Cygnus columbianus bewickii* (the 5-year peak mean population size for the Bewick's swan population is no less than 289 individuals (i.e. the 5-year peak mean between 1988/9 - 1992/3)) - Dunlin *Calidris alpina* (the 5-year peak mean population size for the wintering dunlin population is no less than 41,683 individuals (i.e. the 5-year peak mean between 1988/9 - 1992/3)) - Gadwall *Mareca strepera* (the 5-year peak mean population size for the wintering gadwall population is no less than 330 (i.e. the 5-year peak mean between 1988/9 - 1992/3)) - Common redshank *Tringa totanus* (the 5-year peak mean population size for the wintering redshank population is no less than 2,013 individuals (i.e. the 5-year peak mean between 1988/9 - 1992/3)) - Common shelduck *Tadorna tadorna* (the 5-year peak mean population size for the wintering shelduck population is no less than 2,892 individuals (i.e. the 5-year peak mean between 1988/9 - 1992/3)) - Greater white-fronted goose *Anser albifrons albifrons* (the 5-year peak mean population size for the wintering European white fronted goose population is		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; • The extent and distribution of the habitats of the qualifying features; • The structure and function of the habitats of the qualifying features; • The supporting processes on which the habitats of the qualifying features rely; • The population of each of the qualifying features; and • The distribution of the qualifying features within the site. Further detail on conservation objectives specific to each species are detailed in the Severn Estuary European Marine Site[10]	• Public access / disturbance • Physical modification • Impacts of development • Coastal squeeze (with the aim to limit coastal squeeze, provide sustainable coastal defences, improve existing structures, deliver compensatory habitat) • Change in land management • Changes in species distributions • Water pollution • Air pollution: impact of atmospheric nitrogen deposition • Marine consents and permits: minerals and waste

[8] http://publications.naturalengland.org.uk/publication/5601088380076032 Accessed online 02/03/2020.
[9] http://publications.naturalengland.org.uk/publication/4590676519944192 Accessed online 02/03/2020.
[10] http://publications.naturalengland.org.uk/publication/3184206 Accessed online 02/03/2020.

Qualifying Features[8]	Importance	Conservation Objectives Summary	Vulnerability[9]
no less than 3,002 individuals (i.e. the 5-year peak mean between 1988/9-1992/3)) **Under Article 4.2, the site supports in winter over 20,000 waterfowl:** - Waterfowl assemblage (the 5-year peak mean population size for the waterfowl assemblage is no less than 68,026 individuals (i.e. the 5-year peak mean between 1988/9 - 1992/3))			• Fisheries: recreational marine and estuarine • Fisheries: commercial marine and estuarine • Invasive species • Marine litter • Marine pollution incidents

Table 3. Severn Estuary SAC Qualifying Features.

Qualifying Features[11]	Importance	Conservation Objectives Summary	Vulnerability
Annex I habitats that are a primary reason for selection of this site: - Estuaries - Mudflats and sandflats not covered by seawater at low tide - Atlantic salt meadows (Glauco-Puccinellietalia martimae). **Annex I habitats** present as a qualifying feature, but not a primary reason for selection of this site:	The Severn Estuary lies on the south west coast of Britain at the mouth of four major rivers (the Severn, Wye, Usk, and Avon). The immense tidal range (the second highest in the world) and classic funnel shape make the Severn Estuary unique in Britain and very rare worldwide. This tidal range creates strong tidal streams and high turbidity, producing communities characteristic of the extreme physical conditions of liquid mud and tide-swept sand and rocks. The Estuary includes a wide diversity of habitats including Sandbanks which are slightly covered by sea water all the time, Mudflats and sandflats not covered by sea water at low tide, Atlantic salt meadows, and Reefs, which are identified as Annex I habitat types in their own right. The intertidal zone of mudflats, sand banks, rocky platforms and saltmarsh is one of the largest and most important in Britain. The estuary has a diverse geological setting and a wide range of geo-morphological features, especially sediment deposits. It is important for the interpretation of coastline dynamics and land-forms, and also past changes, in sea level, sediment supply, climate and river flow. The estuary's overall interest depends on its large size, and on the processes and interrelationships between the intertidal and marine habitats and its fauna. The fluctuating salinity and highly mobile sediments with consequent high turbidity limits the benthic invertebrates of the mud and sandflats to relatively	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; • The extent and distribution of qualifying natural habitats and habitats of qualifying species; • The structure and function (including typical species) of qualifying natural habitats; • The structure and function of the habitats of qualifying species; • The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely;	• Modification of cultivation practices • Grazing • Improved access to site • Other urbanisation, industrial and similar activities • Outdoor sports and leisure activities, recreational activities • Interpretative centres • Human-induced changes in hydraulic conditions • Changes in abiotic conditions

[11] https://sac.jncc.gov.uk/site/UK0013030 Accessed online 02/03/2020.

Qualifying Features[11]	Importance	Conservation Objectives Summary	Vulnerability
- Sandbanks which are slightly covered by sea water all the time - Reefs **Annex II species** that are a primary reason for selection of this site - Sea lamprey *Petromyzon marinus* - River lamprey *Lampetra fluviatilis* - Twaite shad *Alosa fallax*	few species. Those which are tolerant of such conditions occur in very high densities on the more stable mudflats. Beds of eel-grass *Zostera* spp. also occur on some mudflats. A greater variety of invertebrates occurs on the intertidal rock platforms, a more stable habitat with rock pools and a relatively high cover of seaweeds. The estuary fringes have large areas of saltmarsh. These are often grazed by sheep and/or cattle, a significant factor determining the plant communities. A range of saltmarsh types is present, with both gradual and stepped transitions between bare mudflat and upper marsh. The estuarine fauna includes: invertebrate populations of importance (especially as a food resource for a wide range of bird and fish species), internationally important populations of waterfowl; and large populations of migratory fish, including Sea lamprey *Petromyzon marinus*, River lamprey *Lampetra fluviatilis* (both of which spawn in freshwater but complete part of their life cycle in the sea), Twaite shad *Alosa fallax* and the nationally rare and endangered Allis Shad *Alosa alosa*. Migratory fish (salmon, eel, sea trout and allis shad) are listed as a notable species sub feature of the 'estuaries' feature.	• The populations of qualifying species; and • The distribution of qualifying species within the site.	

Table 4. Severn Estuary Ramsar Qualifying Features.

Ramsar Criteria[12]	Importance	Conservation Objectives Summary	Vulnerability
Ramsar criterion 1: Due to immense tidal range (second-largest in world), this affects both the physical environment and biological communities. Habitats Directive Annex I features present on the pSAC include: - H1110 Sandbanks which are slightly covered by sea water all the time; - H1130 Estuaries; - H1140 Mudflats and sandflats not covered by seawater at low tide; and - H1330 Atlantic salt meadows (Glauco-Puccinellietalia maritimae). **Ramsar criterion 3:** Due to unusual estuarine communities, reduced diversity and high productivity. **Ramsar criterion 4:** This site is important for the run of migratory fish between sea and river via estuary. Species include Salmon *Salmo salar*, sea trout *S. trutta*, sea lamprey *Petromyzon marinus*, river lamprey *Lampetra fluviatilis*, allis shad *Alosa alosa*, twaite shad *A. fallax*, and eel *Anguilla anguilla*. It is also of importance for migratory birds during spring and autumn. **Ramsar criterion 8:** The fish of the whole estuarine and river system is one of the most diverse in Britain, with over 110 species recorded. Salmon, sea trout, sea lamprey, river lamprey, allis shad, twaite shad, and eel use the Severn Estuary as a key migration route to their spawning grounds in the many tributaries that flow into the estuary. The site is important as a feeding and nursery ground for many fish species particularly allis shad and twaite shad which feed on mysid shrimps in the salt wedge.		The conservation objective for the "estuaries" feature of the Severn Estuary Ramsar Site is to maintain the feature in favourable condition, as defined by the conservation objective for the SAC "estuaries" feature", in so far as these objectives are applicable to the area designated as Ramsar Site[13]. The conservation objective for the "assemblage of migratory fish species" feature of the Severn Estuary Ramsar Site is to maintain the feature in favourable condition, as defined below: - The feature will be considered to be in favourable condition when, subject to natural processes, each of the following conditions are met: i. the migratory passage of both adults and juveniles of the	• Dredging • Erosion • Recreational tourism / disturbance

[12] http://archive.jncc.gov.uk/pdf/RIS/UK11081.pdf Accessed online 02/03/2020.
[13] https://naturalresources.wales/media/673887/severn-estuary-sac-spa-and-ramsar-reg-33-advice-from-ne-and-ccw-june-09.pdf Accessed online 02/03/2020.

Ramsar Criteria[12]	Importance	Conservation Objectives Summary	Vulnerability
Ramsar criterion 5: Assemblages of international importance: Species with peak counts in winter: 70919 waterfowl (5-year peak mean 1998/99-2002/2003) **Ramsar criterion 6**: species/populations occurring at levels of international importance. Qualifying Species/populations (as identified at designation): **Species with peak counts in winter:** Tundra swan, *Cygnus columbianus bewickii*, NW Europe 229 individuals, representing an average of 2.8% of the GB population (5-year peak mean 1998/9- 2002/3) Greater white-fronted goose, *Anser albifrons albifrons*, NW Europe 2076 individuals, representing an average of 35.8% of the GB population (5-year peak mean for 1996/7-2000/01) Common shelduck, *Tadorna tadorna*, NW Europe 3223 individuals, representing an average of 1% of the population (5-year peak mean 1998/9- 2002/3) Gadwall, *Mareca strepera strepera*, NW Europe 241 individuals, representing an average of 1.4% of the GB population (5-year peak mean 1998/9- 2002/3) Dunlin, *Calidris alpina alpina*, W Siberia/W Europe 25082 individuals, representing an average of 1.8% of the population (5-year peak mean 1998/9-2002/3) Common redshank, *Tringa totanus totanus*, 2616 individuals, representing an average of 1% of the population (5-year peak mean 1998/9- 2002/3) **Species/populations identified subsequent to designation for possible future consideration under criterion 6.** **Species regularly supported during the breeding season:**		assemblage of migratory fish species through the Severn Estuary between the Bristol Channel and any of their spawning rivers is not obstructed or impeded by physical barriers, changes in flows, or poor water quality; ii the size of the populations of the assemblage species in the Severn Estuary and the rivers which drain into it, is at least maintained and is at a level that is sustainable in the long term; iii. the abundance of prey species forming the principle food resources for the assemblage species within the estuary, is maintained. iv. Toxic contaminants in the water column4 and sediment are below levels which would pose a risk to the ecological objectives described above. The conservation objectives for the bird species features (including internationally important assemblage of waterfowl) of the Severn Estuary	

Ramsar Criteria[12]	Importance	Conservation Objectives Summary	Vulnerability
Lesser black-backed gull, *Larus fuscus graellsii*, W Europe/Mediterranean/W Africa 4167 apparently occupied nests, representing an average of 2.8% of the breeding population (Seabird 2000 Census) **Species with peak counts in spring/autumn:** Ringed plover, *Charadrius hiaticula*, Europe/Northwest Africa 740 individuals, representing an average of 1% of the population (5-year peak mean 1998/9- 2002/3) **Species with peak counts in winter:** Eurasian teal *Anas crecca*, NW Europe 4456 individuals, representing an average of 1.1% of the population (5-year peak mean 1998/9-2002/3) Northern pintail, *Anas acuta*, NW Europe 756 individuals, representing an average of 1.2% of the population (5-year peak mean 1998/9- 2002/3)		Ramsar site are to maintain them in favourable condition, as defined by the conservation objectives of the SPA.	

Table 5. Chew Valley Lake SPA Qualifying Features.

Qualifying Features[14]	Importance	Conservation Objectives Summary[15]	Vulnerability
During the non-breeding season the SPA regularly support: - Shoveler *Anas clyptea*	503 individuals representing 1.3% of the wintering Northwestern/Central Europe population (5 year peak mean 1991/2 - 1995/6) reliant upon undisturbed open waters with sufficient submerged and emergent vegetation to support prey species found on or just below the surface. Arguably the population at Chew Valley Lake could be viewed in combination with that of nearby Blagdon Lake SSSI as its proximity is nearer at its closest point than Chew Valley Lake is long (at its widest point).	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; • The extent and distribution of the habitats of the qualifying features; • The structure and function of the habitats of the qualifying features; • The supporting processes on which the habitats of the qualifying features rely; • The population of each of the qualifying features; and • The distribution of the qualifying features within the site.	• Loss of habitat over winter/non-breeding stages • Air pollution • Connectivity with other supporting habitats • Mismanagement • Inappropriate water depth • Disturbance

[14] https://sac.jncc.gov.uk/site/UK0030396
[15] http://archive.jncc.gov.uk/pdf/BristolChApproaches_ConsAdvice.pdf

Table 6. Bristol Channel Approaches SAC Qualifying Features.

Qualifying Features[16]	Importance	Conservation Objectives Summary[17]	Vulnerability
Annex II species that are a primary reason for selection of this site - Harbour porpoise *Phocoena phocoena*	Bristol Channel Approaches / Dynesfeydd Môr Hafren SAC has been designated because of its importance to harbour porpoise in the winter months (October to March). This SAC has been selected primarily based on the long-term, relatively higher densities of porpoise in contrast to other areas of the Management Unit (MU). The implication is that the SAC provides relatively good foraging habitat and may also be used for breeding and calving. However, because the number of harbour porpoise using the site naturally varies (e.g. between seasons), there is no exact number of animals within the site.	To ensure that the integrity of the site is maintained and that it makes the best possible contribution to maintaining Favourable Conservation Status (FCS) for Harbour Porpoise in UK waters. In the context of natural change, this will be achieved by ensuring that: • Harbour porpoise is a viable component of the site; • There is no significant disturbance of the species; and • The condition of supporting habitats and processes, and the availability of prey is maintained.	• Presence of non-target species • Contaminants • Anthropogenic underwater sound • Death or injury by collision • Removal of target species • Agriculture, aquaculture, sewage: nutrient and organic enrichment • Waste disposal • Sewage: microbial pathogens

[16] https://sac.jncc.gov.uk/site/UK0030396
[17] http://archive.jncc.gov.uk/pdf/BristolChApproaches_ConsAdvice.pdf

4.1 Identification of Other Plans and Projects

A detailed identification of other plans and projects should be undertaken at EIA stage to support the HRA of the planning application.

As in AECOM's HRA[1], the Shoreline Management Plan (SMP2) for the Severn Estuary is also considered[18].

At EIA stage, the planning application HRA must consider the SMP2, as well as other local plans and strategies, as identified in AECOM's HRA[1]: Severn Estuary Strategy, Bristol City Council Local Plan, Bristol Central Area Plan, and Bristol One City Climate Strategy[19].

[18] https://www.severnestuarycoastalgroup.org.uk/shoreline-management-plan/ Accessed online 15/04/2020

[19] Bristol's One City Environmental Sustainability Board (2020). Bristol One City Climate Strategy; A strategy for a carbon neutral, climate resilient Bristol by 2030. February 2020.

5 Screening Assessment

At this design stage, post-construction impacts are more uncertain. Post-construction impacts are split into two distinctions: operational, and management/maintenance impacts. The latter point on management/maintenance is excluded from this assessment and should be included in a later design stage SIAA.

5.1 Screening Out of European Sites

The following European Sites have been screened out of the following assessment for construction and operation:

- Chew Valley Lake SPA; and
- Bristol Channel Approaches SAC.

5.1.1 Justification for Screening Out European Sites

5.1.1.1 Chew Valley Lake SPA

The single feature of this SPA is non-breeding shoveler. There is little suitable habitat on site for shoveler, and with the distances involved from the proposed works to Chew Valley (9.3km), it is reasonable to conclude that there would be **no likely significant effect** on the Chew Valley Lake SPA, during construction and operation.

5.1.1.2 Bristol Channel Approaches SAC

Although harbour porpoise visit shallow bays, estuaries, and tidal channels less than 200m in depth, and have been known to swim up rivers (including some anecdotal evidence for their occasional presence in the River Avon) the proposed works are over 100km from the SAC. Guidance from the Joint Nature Conservation Committee (JNCC) is that a likely significant effect on an SAC designated for marine mammals is unlikely to arise from works that are located more than 50km from the SAC (refer to correspondence between JNCC and AECOM dated 27/09/2016[1]).

As such, it is reasonable to conclude that there would be **no likely significant effect** on the Bristol Channel Approaches SAC, during construction and operation.

5.2 Screening In of European Sites

The following European Sites have been screened in for consideration at appropriate assessment:

- Avon Gorge Woodlands SAC;
- Severn Estuary SPA;

- Severn Estuary Ramsar; and
- Severn Estuary SAC.

5.2.1 Potential Effects of the Proposed Works

5.2.2 Construction and Operation

During construction, there is predicted to be a potential pathway for effect on the features of the Avon Gorge Woodlands SAC, Severn Estuary SPA, Severn Estuary Ramsar and Severn Estuary SAC. The potential pathway for effects are in the form of:

- Habitat loss and degradation, e.g. from direct habitat loss during construction, and from construction activities giving rise to potential pollution events, in part transported by air and water;
- Disturbance, e.g. potential visual, noise, vibration and lighting impacts during construction; and,
- Species mortality / Injury, e.g. through potential pollution events and/or percussive activities, e.g. piling.

There are no anticipated operational impacts on qualifying features of the SAC.

5.2.2.1 Avon Gorge Woodlands SAC

Annex I Habitats

Habitats of the SAC (Tilio-Acerion forests of slope, screes and ravines, and semi-natural dry grasslands and scrubland fascies on calcareous substrates) are screened in for appropriate assessment as there is a pathway for effect through potential habitat loss and degradation of Annex I habitat.

As such, it is reasonable to conclude that there are **likely significant effects** on the Avon Gorge Woodlands SAC habitats.

5.2.2.2 Severn Estuary SPA

Annex II Species (Birds)

Qualifying bird species, as features of the SPA, are screened in due to the potential pathway for effect through disturbance, and species mortality and/or injury, arising in part from loss and/or degradation of supporting habitat (specifically around Shirehampton and Pill).

As such, it is reasonable to conclude that there are **likely significant effects** on the Severn Estuary SPA qualifying features.

5.2.2.3 Severn Estuary Ramsar

Criteria 1, 3 (Habitats)

Habitats of the Ramsar, notably estuaries (H1130) and potentially salt meadows (H1330), are screened in due to the potential pathway for effect through habitat loss and/or degradation directly within the Ramsar and of supporting habitat outside the Ramsar.

As such, it is reasonable to conclude that there are **likely significant effects** on the Severn Estuary habitats.

Criteria 5, 6 (Birds)

As outlined for the Severn Estuary SPA, birds, as features of the Ramsar, are screened in due to the proposed works being within the Ramsar site boundary and the potential pathway for effect through loss and/or degradation of supporting habitat (specifically around Shirehampton and Pill). Further potential pathways for effect exist through disturbance, and species mortality and/or injury of qualifying bird species.

As such, it is reasonable to conclude that there are **likely significant effects** on the Severn Estuary Ramsar birds.

Criteria 4, 8 (Migratory Fish)

Migratory fish are screened in for appropriate assessment as there is pathway for effect through habitat loss / degradation, disturbance, and species mortality / injury.

As such, it is reasonable to conclude that there are **likely significant effects** on the Severn Estuary Ramsar migratory fish.

There are no anticipated operational impacts on features of the Ramsar site.

5.2.2.4 Severn Estuary SAC

Annex I Habitats

SAC habitats are screened in due to the proposed works being within the SAC boundary and the potential pathway for effect through habitat loss and/or degradation directly within the SAC and of supporting habitat outside the SAC.

As such, it is reasonable to conclude that there are **likely significant effects** on the Severn Estuary SAC Annex I habitats.

Annex II Species (Migratory Fish)

Migratory fish are screened in for appropriate assessment as there is pathway for effect through habitat loss and degradation, disturbance, and species mortality / injury from the proposed works.

As such, it is reasonable to conclude that there are **likely significant effects** on the Severn Estuary SAC migratory fish.

There are no anticipated operational impacts on qualifying features of the SAC.

5.2.3 Summary of Effects

Table 6 summarises the effects from the proposed works on the qualifying features of the designated sites during construction.

Table 7. Summary of effects from proposed works during construction and operation.

Pathway for Effect	Features of SAC				Features of SPA		Features of Ramsar		
	Avon Gorge Woodlands	Severn Estuary		Bristol Channel Approaches	Severn Estuary	ChewValley Lake	Severn Estuary		
	Annex I habitats	Annex I habitats	Annex II species	Annex II species	Annex I bird species, including assemblage	Annex I bird species	Criteria 1, 3 (Habitats)	Criteria 4, 8 (Migratory fish)	Criteria 5, 6 (Birds)
Construction									
Habitat Loss	Pathway for effects	Pathway for effects	Pathway for effects	No pathway for effects	Pathway for effects	No pathway for effects	Pathway for effects	Pathway for effects	Pathway for effects
Habitat Degradation	Pathway for effects	Pathway for effects	Pathway for effects	No pathway for effects	Pathway for effects	No pathway for effects	Pathway for effects	Pathway for effects	Pathway for effects
Habitat Severance	No pathway for effects	No effects	Pathway for effects	No pathway for effects	No effects	No pathway for effects	No effects	Pathway for effects	No effects
Disturbance	No pathway for effects	No effects	Pathway for effects	No pathway for effects	Pathway for effects	No pathway for effects	No effects	Pathway for effects	Pathway for effects
Species Mortality / Injury	No pathway for effects	No effects	Pathway for effects	No pathway for effects	Pathway for effects	No pathway for effects	No effects	Pathway for effects	Pathway for effects

5.3 Consideration of Effects and Significance

The Bristol Channel Approaches SAC and Chew Valley Lake SPA have been screened out of this assessment during the construction and operational stage of the amended Strategy.

For the purposes of this assessment, it is concluded that in the absence of mitigation (as confirmed by Coillte vs People against Wind judgement[2]) where pathways for effects are present, these are considered to have the potential to cause significant effects and therefore an appropriate assessment is required for these sites.

The Avon Gorge Woodlands SAC, Severn Estuary SPA, Severn Estuary SAC and Severn Estuary Ramsar have been screened into further appropriate assessment during the construction phase of the amended Strategy. The Severn Estuary SAC and Ramsar have been further screened into appropriate assessment during operation of the amended Strategy.

These European Sites have been screened in due to the potential presence of habitats and mobile qualifying features being impacted by the proposed works.

6 Appropriate Assessment

6.1 Avon Gorge Woodlands SAC

6.1.1 Habitats

6.1.1.1 Conservation Objectives

The conservation objectives for the Annex I features of the Avon Gorge Woodlands SAC are to 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;

- The extent and distribution of qualifying natural habitats;
- The structure and function (including typical species) of qualifying natural habitats; and
- The supporting processes on which qualifying natural habitats rely.

6.1.1.2 Habitat Loss

Without baseline data on the habitats present, an assessment of impact is limited. Using the Site of Special Scientific Interest (SSSI) unit conditions for the Avon Gorge Woodlands SSSI[20], the proposed works area within the SAC is comprised of the main habitat of inland rock. This habitat is however noted to include species-rich lowland calcareous grassland, which may form Annex I habitat. From aerial photography, the proposed works area appears to also comprise woodland habitat; under the precautionary principle and without survey data, it cannot be assumed this habitat is not Annex I forest habitat either.

The proposed works within the SAC involve clearance of habitat to form an embankment with a works footprint up to 11m in width (approximately 80m in length, totalling an area of approximately 0.1ha). The loss of this habitat is relatively small in relation to the total area of the SAC (151.1 ha), equating to 0.07% of the SAC area.

Without a botanical survey to confirm whether Annex I habitats are present and detailed construction information to relate against conservation objectives, and without avoidance or mitigation measures, there is the potential for the proposed works to give rise to an **adverse effect** on the integrity of the SAC.

20 https://designatedsites.naturalengland.org.uk/UnitDetail.aspx?UnitId=1002306&SiteCode=S1003073&SiteName=avon&countyCode=&responsiblePerson= Accessed online 14/04/2020.

6.1.1.3 Habitat Degradation

Water Quality Effects

During construction, sediment will be generated from a number of activities which may include excavation, vehicle movements, material and earth stock piling, and through vegetation clearance, such as felling of trees. Pollutants could also arise from machinery and/or plant movement.

If a pollution incident were to occur on site, any pollution could be transported off the work site into adjacent habitat, which may comprise Annex I habitat.

The works footprint in the SAC is relatively small in relation to the total area of the SAC. Furthermore, the works are largely downhill of the SAC habitat, and any pollutant is likely to run in to the River Avon and largely avoid any potential Annex I habitat. Consequently, given the relatively small area to be potentially impacted by sediments and/or pollutants, the proposed works are considered **unlikely to give rise to an adverse effect** on the integrity of the SAC, from water quality effects.

As standard practice, all proposed works will be however carried out in accordance with relevant legislation and undertaken in compliance with the relevant Guidance for Pollution Prevention (GPPs) and industry best practice (e.g. GPP5: works and maintenance in or near water, PPG 21, CIRIA best practice). Such measures will be integrated into the Outline Construction Environmental Management Plan (CEMP) as a standard best practice requirement.

For example, all plant will be sourced from a trusted reputable company and will come with spill kits which site personnel will be trained to use. No containers or fuel will be stored within the SAC. All storage containers will remain within an appropriately located site compound away from the SAC and be suitably bunded to prevent any spillages or leaks.

Air Quality Effects

Given the SAC is vulnerable to the impact of atmospheric nitrogen deposition, the proposed works may cause an impact to Annex I habitat within the vicinity of the proposed works.

The works footprint in the SAC is relatively small in relation to the total area of the SAC. However, as atmospheric deposition can occur at distance from source, any potential Annex I habitat at distance from the proposed works could be impacted. Without knowing the habitats present on or near the proposed works, nor the construction methodology, it is considered possible that, without mitigation and/or avoidance measures, there could be an **adverse effect** on the integrity of the SAC, via degradation of Annex I habitats from air quality effects.

6.2 Severn Estuary SPA

6.2.1 Species

6.2.1.1 Conservation Objectives

The conservation objectives for this SPA are to 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;

- The extent and distribution of the habitats of the qualifying features;
- The structure and function of the habitats of the qualifying features;
- The supporting processes on which the habitats of the qualifying features rely;
- The population of each of the qualifying features; and
- The distribution of the qualifying features within the site.

6.2.1.2 Disturbance, Species Mortality/Injury, and Habitat Loss/Degradation

In line with AECOM's HRA, it is considered that the works from and upstream of Avon gorge, are unlikely to result in significant disturbance and species mortality/injury given the lack of opportunities for roosting and foraging, and also as the proposed works at these locations are at distance from the SPA.

The proposed works around Shirehampton and Pill, if occurring over winter, could however support larger numbers of qualifying bird species given suitable coastal habitat for both foraging and roosting.

If works occur over winter, there is the potential for construction activities to disturb birds, through visual (including lighting), noise and vibration disturbance, and consequently reduce their opportunities to both forage and roost. A reduction in foraging and roosting opportunities could lead to further indirect increased energetic expenditure in flying, foraging in alternative areas, and potentially increased competition for food resources and/or roosting locations.

As no night time works are proposed, illumination of the River Avon, and any potential negative effect, is avoided. Security lighting or lighting around dawn/dusk may be required, and in the absence of mitigation, this illumination may negatively impact qualifying bird species by excluding sensitive bird species from foraging and/or roosting opportunities, through any potential aversion to lighting.

There is also the potential for species mortality / injury to arise through: direct mortality (although unlikely given the bird's mobility) and injury through air and water quality effects. Mortality/injury could also arise indirectly through loss and degradation of supporting habitat, both within and outside the SPA boundary, which could result in increased energetic expenditure in flying, foraging and through competition for food resources and/or roosting locations.

Consequently, without avoidance and/or mitigation measures, the proposed works could give rise to an **adverse effect** on the integrity of the Severn Estuary SPA, through construction disturbance and/or species mortality/injury.

6.3 Severn Estuary Ramsar

6.3.1 Habitats

6.3.1.1 Conservation Objectives

The conservation objective for the "estuaries" feature of the Severn Estuary Ramsar Site is to maintain the feature in favourable condition, as defined by the conservation objective for the SAC "estuaries" feature", in so far as these objectives are applicable to the area designated as Ramsar Site[13].

6.3.1.2 Habitat Loss and Degradation

Habitat Loss

The proposed works may install coastal defence improvements in front of their current placing, resulting in land take of potential estuarine habitat, including potentially saltmarsh and mudflats. Without detailed design, the area of land take and the habitats impacted are unknown precisely. For purposes of assessment, a worse-case scenario of 0.47ha of coastal habitat is to be lost on a precautionary basis (2024 works, with additional 0.15ha in 2065 works). This figure may however also include terrestrial habitats next to the river channel, but not exposed to tidal waters.

The majority of the proposed works are outside of the Ramsar habitats. However, the works around Shirehampton are partly within the Ramsar site boundary. Without baseline data and on a precautionary basis, the coastal habitats could be viewed as estuarine habitat, a qualifying habitat under Ramsar Criterion 1.

Without a botanical survey to confirm whether Ramsar habitats are present and detailed construction information to relate against conservation objectives, and without avoidance or mitigation measures, there is the potential for the proposed works to give rise to an **adverse effect** on the integrity of the Ramsar.

Habitat Degradation - Water and Air Quality Effects

The proposed works, both in the Ramsar site and adjacent to the River Avon, could result in water and air quality effects if any pollution incident or dust were to occur or sediment run-off/disturbance was considered to adversely affect water quality.

As standard practice, all proposed works will be carried out in accordance with relevant legislation and undertaken in compliance with the relevant Guidance for Pollution Prevention (GPPs) and industry best practice (e.g. GPP5: works and maintenance in or near water, PPG 21, CIRIA best practice). Such measures will be integrated into the Outline CEMP as a standard best practice requirement.

Even with incorporation of standard practice measures, there may still be a requirement to avoid and/or mitigate any water and air quality effects. Without detailed information on construction methodology, sensitivity of receptors, and further information on baseline habitats, the proposed works could give rise to an **adverse effect** on the integrity of the Ramsar.

6.3.2 Species

6.3.2.1 Conservation Objectives

The conservation objective for the "assemblage of migratory fish species" feature of the Severn Estuary Ramsar Site is to maintain the feature in favourable condition, as defined below:

The feature will be considered to be in favourable condition when, subject to natural processes, each of the following conditions are met:

- The migratory passage of both adults and juveniles of the assemblage of migratory fish species through the Severn Estuary between the Bristol Channel and any of their spawning rivers is not obstructed or impeded by physical barriers, changes in flows, or poor water quality;
- The size of the populations of the assemblage species in the Severn Estuary and the rivers which drain into it, is at least maintained and is at a level that is sustainable in the long term;
- The abundance of prey species forming the principle food resources for the assemblage species within the estuary, is maintained; and
- Toxic contaminants in the water column and sediment are below levels which would pose a risk to the ecological objectives described above.

The conservation objectives for the bird species features (including internationally important assemblage of waterfowl) of the Severn Estuary Ramsar site are to maintain them in favourable condition, as defined by the conservation objectives of the SPA (Section 6.2.1.1).

6.3.2.2 Habitat Loss and Degradation

Habitat Loss

Habitat loss and its impact is defined within Section 6.3.1.2

As outlined in AECOM's HRA[1], it is acknowledged that the intertidal mud associated with the works for the River Avon are outside the Severn Estuary Ramsar. However, the report concluded that intertidal mud could be used by larval lamprey (ammocoetes)[21], which are associated with the Severn Estuary Ramsar.

[21] Maitland PS (2003). Ecology of the River, Brook and Sea Lamprey. Conserving Natura 2000 Rivers Ecology Series No. 5. English Nature, Peterborough.

Other fish species of the Ramsar are not anticipated to be subject to habitat loss given their breeding habitat being different from that on site[22,23,24,25].

The only habitat potentially to be lost which could support ammocoetes is intertidal mudflat. Whilst ammocoete (larval) stages of lamprey species use silt, they are typically found in freshwater and not below the tidal limit. They require stable sediment that is not exposed to disturbance from high velocity river flow[26]. Based on the intertidal nature of the river, which results in the exposure of sediments at low tide and high flow velocities, the intertidal mudflat is considered highly sub-optimal for ammocoetes. However, the potential for ammocoetes to be present in mid-upper intertidal mudflats, that are not exposed cannot be entirely excluded and their presence is assumed from a precautionary perspective.

Even with their assumed presence in this sub-optimal habitat of the upper intertidal mudflat (where habitat loss will occur), the habitat to be lost is not considered to support a significant population of ammocoetes due to its sub-optimal quality and small area relative to the total area of mudflats within the River Avon. Consequently, the worst-case predictions for the area of habitat loss through flood defence construction is assumed **unlikely to give rise to an adverse effect** on the integrity of the Severn Estuary Ramsar site.

In relation to qualifying bird species, and as discussed in Section 6.2.1.2, the proposed works around Shirehampton and Pill, if occurring over winter, could support significant numbers of qualifying bird species, given suitable coastal habitat. Without baseline ornithological data on use of the habitat proposed to be lost, there is the potential for an **adverse effect** on the integrity of the Severn Estuary Ramsar site

Habitat Degradation - Water and Air Quality Effects

The impact of the proposed works in relation to habitat degradation, and the use of standard practice measures, are detailed in Section 6.3.1.2.

As detailed design progresses this SIAA will be re-assessed to determine if mitigation for water and air quality effects are required to ensure and maintain that the prosed works are **unlikely to give rise to an adverse effect** on the integrity of the Severn Estuary Ramsar fish and bird species.

Habitat Degradation – In-River Works

Whilst construction detail is to be confirmed, it is likely that there will be a requirement for in-river works. The scope of these works may involve floating platforms, which will be raised on stilts (jack-up barges). These stilts will cause

[22] Maitland PS & Hatton-Ellis TW (2003). Ecology of the Allis and Twaite Shad. Conserving Natura 2000 Rivers Ecology Series No. 3. English Nature, Peterborough.
[23] Gibson, R.J., (1993). The Atlantic salmon in freshwater: spawning, rearing and production. *Reviews in Fish Biology and Fisheries*, **3**, 39-73.
[24] Aarestrup, K., et al. (2009). Oceanic Spawning Migration of the European Eel. *Science*, 325, 5948.
[25] Harris, G. and Milner, N., 2004. Sea trout: Biology, Conservation, and Management. Proceedings of the First International Sea Trout Symposium, Cardiff, July 2004.
[26] Maitland PS (2003). Ecology of the River, Brook and Sea Lamprey. Conserving Natura 2000 Rivers Ecology Series No. 5. English Nature, Peterborough.

degradation of intertidal mudflats locally by the compression of sediment and the change to local hydrology, which in turn may impact the sediments. These changes to sediment structure may cause degradation of supporting habitat (sub-optimal) for ammocoetes, if they are present in the mudflats.

It is considered however that the scale of the works will be minor, in relation to the total area of mudflats within the River Avon, and the dynamic nature of the river is likely to revert the mudflats to their former condition once the platforms are removed.

Impacts on other fish species of the Ramsar are not considered to be negatively impacted by the presence of raised platforms in the river.

Consequently, it is considered that in-river works are **unlikely to give rise to an adverse effect** on the integrity of the Ramsar site, through habitat degradation and its potential impact on lamprey ammocoetes, and other qualifying fish species.

Degradation of habitat is **unlikely to give rise to an adverse effect** on the integrity of the Ramsar birds, with the adoption of the standard practice, as outlined in Section 6.3.1.2.

6.3.2.3 Habitat Disturbance and Severance

Noise and Vibration

Whilst the proposed works have not been finalised and are subject to detailed design, it can be assumed that the proposals may give rise to noise and vibration disturbance on migratory fish in the River Avon through piling. As outlined in AECOM's HRA[1], migratory fish, i.e. sea trout, sea lamprey, river lamprey, allis shad, twaite shad and eel, can be sensitive to underwater noise. The proposals, including to install sheet piling alongside the existing defences and in-river works from raised platforms, could give rise to noise disturbance on any fish within a distance of the works to which significant noise propagates. Whilst there are significant evidence gaps in relation to how sound generated from pile driving travels, the hearing ability of different fish species and what affect a sound will have on different fish species, it is clear that underwater sound has the potential to harm, and potentially kill, fish and therefore attempts should be made to avoid / minimise the likelihood of this occurring. Noise disturbance can generate adverse behavioural responses in fish and if the noise is of sufficient duration this may prohibit fish moving up or downstream, effectively severing habitat.

As outlined in AECOM's HRA[1] salmon, sea trout and eel have all been recorded upstream of the River Avon. These fish species may therefore be using the stretch of the River Avon, where the proposed works are, for migration. Sea and river lamprey are considered likely to be present and/or migrating through the amended Strategy area. Twaite and allis shad may also be present in low numbers. Spawning populations of twaite shad are still found in the rivers Severn, Wye, Usk and Tywi, but not the Avon. There are currently no known spawning sites for allis shad in Britain, although they were previously believed to spawn in the

Rivers Severn and Wye and sexually mature adults are still regularly recorded around the British coast[27].

Lamprey species are however not considered further within this section, as their ability to respond to noise is both uncertain and considered limited[1,28].

Fish population estimates using the River Avon (at the area of the proposed works and/or upstream or downstream) of the Ramsar site are unknown. Under the precautionary principle, without avoidance or mitigation measures, it is considered that noise and vibration disturbance, could give rise to an **adverse effect** on the integrity of the Severn Estuary Ramsar site, through habitat disturbance and severance to key freshwater and/or marine habitats required for the qualifying fish species to complete their life cycle.

Noise and vibration disturbance from construction methodology could also impact upon Ramsar bird species, most notably around Shirehampton and Pill, as outlined in Section 6.2.1.2. Consequently, without avoidance and/or mitigation measures, the proposed works could give rise to an **adverse effect** on the integrity of the Severn Estuary Ramsar, through construction disturbance.

Light

As no night time works are proposed, illumination of the River Avon, and any potential negative effect, is avoided. Security lighting or lighting around dawn/dusk may be required, and in the absence of mitigation, this illumination may negatively impact migratory fish by disturbing habitat and/or potentially severing habitat through the fish's aversion to light.

As above, fish population estimates using the River Avon (at the area of the proposed works and/or upstream) of the Ramsar site are unknown. Under the precautionary principle, without avoidance or mitigation measures, it is considered that lighting, could give rise to an **adverse effect** on the integrity of the Severn Estuary Ramsar site.

6.3.2.4 Species Mortality / Injury

Direct Mortality / Injury

The proposed works in the intertidal area, involving both hard defence construction on intertidal mudflats and installation of raised platforms (for in-river works), may cause direct mortality or injury to qualifying features of the Ramsar site. Mortality or injury may arise through the physical placement of structures into supporting habitat of ammocoetes or through piling which in extreme cases

[27] Maitland PS & Hatton-Ellis TW (2003). Ecology of the Allis and Twaite Shad. Conserving Natura 2000 Rivers Ecology Series No. 3. English Nature, Peterborough.
[28] Lamprey are regarded as "non-specialists" with respect to hearing ability, since they do not possess a swim bladder and are therefore not considered to be sensitive to acoustic effects (Popper, A. 2005. Environmental Bioacoustics. A Review of Hearing by Sturgeon and Lamprey). Lamprey have statolith organs, with which they may respond to low frequency sound or particle velocity rather than sound pressure (Lenhardt M L, Sismour E (1995) Hearing in the sea lamprey (*Petromyzon marinus*) and the long nose gar (*Lepisosteus spatula*). The Association for Research in Otolaryngology, Abstract: 259).

can injure and kill fish. However, mobile fish species are considered likely to disperse once the works begin – thus resulting in avoidance of direct mortality or injury from the proposed works.

As considered in Section 6.3.2.2, if ammocoetes are present in sub-optimal mudflat habitat within the proposed works area, it is unlikely the relatively small area of habitat to be impacted (in relation to the total area of mudflat in the River Avon) will be also of high enough quality to support a significant population of ammocoetes.

Consequently, the construction of flood defences in-river and the use of floating platforms, are assumed **unlikely to give rise to an adverse effect** on the integrity of the Severn Estuary Ramsar site, through mortality or injury of ammocoetes or other qualifying fish species.

As birds are considered mobile species, direct mortality / injury is unlikely to occur and it is considered that the proposed works are **unlikely to give rise to an adverse effect** on the integrity of the Severn Estuary Ramsar.

Air and Water Quality Effects

The proposed works adjacent to the River Avon could result in water and air quality effects if any pollution incident or dust were to occur or sediment was considered to adversely affect water quality. If water and air quality effects were significantly negative migratory fish and birds could be impacted by mortality, injury or disturbance.

As standard practice, all proposed works will be carried out in accordance with relevant legislation and undertaken in compliance with the relevant Guidance for Pollution Prevention (GPPs) and industry best practice (e.g. GPP5: works and maintenance in or near water, PPG 21, CIRIA best practice). Such measures will be integrated into the Outline CEMP as a standard best practice requirement.

As detailed design progresses this SIAA will be re-assessed to determine if mitigation for water and air quality effects are required to ensure that the proposed works are **unlikely to give rise to an adverse effect** on the integrity of the Severn Estuary Ramsar.

Noise and Vibration

The proposed works and their resultant sound pressure if significantly negative could cause injury or death to fish nearby. Impacts to birds will likely result in dispersal away from the site limiting opportunities for roosting and/or foraging.

Without avoidance or mitigation measures, it is considered that noise and vibration, could give rise to an **adverse effect** on the integrity of the Severn Estuary Ramsar site through injury or mortality of fish species.

As outlined in Section 6.2.1.2, without avoidance and/or mitigation measures, the proposed works could give rise to an **adverse effect** on the integrity of the Severn Estuary Ramsar, through construction disturbance and/or indirect species mortality/injury to birds due to reduced foraging resource and increased of flight energy to find alternative foraging areas (as discussed in Section 6.2.1.2).

6.4 Severn Estuary SAC

6.4.1 Conservation Objectives

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;

- The extent and distribution of qualifying natural habitats and habitats of qualifying species;
- The structure and function (including typical species) of qualifying natural habitats;
- The structure and function of the habitats of qualifying species;
- The supporting processes on which qualifying natural habitats and the habitats of qualifying species rely;
- The populations of qualifying species; and
- The distribution of qualifying species within the site.

6.4.2 Habitats

6.4.2.1 Habitat Loss and Degradation

Habitat Loss

As outlined in Section 6.3.1.2, without a habitat survey to confirm whether SAC Annex I habitats are present and detailed construction information to relate against conservation objectives, and without avoidance or mitigation measures, there is the potential for the proposed works to give rise to an **adverse effect** on the integrity of the SAC.

Habitat Degradation - Water and Air Quality Effects

As outlined in Section 6.3.1.2, the proposed works, both in the SAC and adjacent to the River Avon, could result in water and air quality effects if any pollution incident or dust were to occur or sediment run-off/disturbance was considered to adversely affect water quality.

As detailed design progresses this SIAA will be re-assessed to determine if mitigation for water and air quality effects are required to ensure and maintain **no adverse effects** on the integrity of the Severn Estuary SAC.

6.4.3 Species

Habitat Loss

Habitat loss and its impact is defined within Section 6.3.1.2 and Section 6.3.2.2.

In relation to fish and habitat loss, the area of habitat loss through flood defence construction is assumed **unlikely to give rise to an adverse effect** on the integrity of the Severn Estuary SAC.

Without baseline habitat data and information on any habitat proposed to be lost, there is the potential for an **adverse effect** on the integrity of the Severn Estuary SAC.

Habitat Degradation - Water and Air Quality Effects

The impact of the proposed works in relation to habitat degradation, and the use of standard practice measures, are detailed in Section 6.3.1.2.

As detailed design progresses this SIAA will be re-assessed to determine if mitigation for water and air quality effects are required to ensure that the proposed works are **unlikely to give rise to an adverse effect** on the integrity of the Severn Estuary SAC fish and bird species.

Habitat Degradation – In-River Works

As outlined in Section 6.3.2.2., it is considered that in-river works are **unlikely to give rise to an adverse effect** on the integrity of the Ramsar site, through habitat degradation and its potential impact on lamprey ammocoetes, and other qualifying fish species.

Degradation of habitat from in-river works is **unlikely to give rise to an adverse effect** on the integrity of the SAC fish, with the adoption of the standard practice, as outlined in Section 6.3.1.2.

6.4.3.1 Habitat Disturbance and Severance

Noise and Vibration

As outlined in Section 6.3.2.3, whilst the proposed works have not been finalised and are subject to detailed design, it can be assumed that the proposals may give rise to noise and vibration disturbance on migratory fish in the River Avon through piling.

Under the precautionary principle, without avoidance or mitigation measures, it is considered that noise and vibration disturbance, could give rise to an **adverse effect** on the integrity of the Severn Estuary SAC site, through habitat disturbance and severance to key freshwater and/or marine habitats required for the qualifying fish species to complete their life cycle.

Light

As no night time works are proposed, illumination of the River Avon, and any potential negative effect, is avoided. Security lighting or lighting around dawn/dusk may be required, and in the absence of mitigation, this illumination may negatively impact migratory fish by disturbing habitat and/or potentially severing habitat through the fish's aversion to light.

As above, fish population estimates using the River Avon (at the area of the proposed works and/or upstream) of the SAC site are unknown. Under the precautionary principle, without avoidance or mitigation measures, it is considered that lighting, could give rise to an **adverse effect** on the integrity of the Severn Estuary SAC site.

6.4.3.2 Species Mortality / Injury

Direct Mortality / Injury

As outlined in Section 6.3.2.4, the construction of flood defences in-river and the use of floating platforms, are assumed **unlikely to give rise to an adverse effect** on the integrity of the Severn Estuary SAC, through mortality or injury of ammocoetes or other qualifying fish species.

As fish are considered mobile species, direct mortality / injury is unlikely to occur and **no adverse effect** on the integrity of the Severn Estuary SAC is anticipated.

Air and Water Quality Effects

As outlined in Section 6.3.2.4, the proposed works could result in water and air quality effects if any pollution incident or dust were to occur or sediment was considered to adversely affect water quality. If water and air quality effects were significantly negative migratory fish could be impacted by mortality, injury or disturbance.

As detailed design progresses this SIAA will be re-assessed to determine if mitigation for water and air quality effects are required to ensure that the proposed works are **unlikely to give rise to an adverse effect** on the integrity of the Severn Estuary SAC.

Noise and Vibration

As outlined in Section 6.3.2.4, without avoidance or mitigation measures, it is considered that noise and vibration, could give rise to an **adverse effect** on the integrity of the Severn Estuary SAC site through injury or mortality of fish species.

As outlined in Section 6.2.1.2, without avoidance and/or mitigation measures, the proposed works could give rise to an **adverse effect** on the integrity of the Severn Estuary SAC, through construction disturbance and/or species mortality/injury to fish.

6.5 Mitigation Measures

6.5.1 Habitats

The proposed mitigation measures will be confirmed in subsequent design stages. As detailed design progresses, the mitigation hierarchy[29] should be followed for all design proposals where ecological receptors are impacted. Loss of Annex I and Ramsar criteria habitat should be avoided in the first instance and baseline survey can identify whether the habitat loss areas represent qualifying habitat. Consultation with NE, Environment Agency (EA) and BCC (as the competent

[29] Ministry of Housing, Communities, & Local Government, 2019. National Planning Policy Framework: Section 175(a): if significant harm to biodiversity resulting from a development cannot be avoided (through locating on an alternative site with less harmful impacts), adequately mitigated, or, as a last resort, compensated for, then planning permission should be refused.

authority) is recommended early in the design process to ensure agreement with the conclusions of this SIAA and any proposed baseline survey effort.

It is important to note that if habitat loss is unavoidable, and mitigation is not appropriate, an adverse effect of in the integrity of the European Site may be concluded, and this amended Strategy's HRA may progress to Stages 3 and 4 (Section 1.4). Stages 3 and 4 would then consider there alternatives to the amended Strategy, and then subsequently if there are any IROPI, and only at this stage can Compensatory Measures be considered.

Habitat loss currently potentially occurs within the Avon Gorge Woodlands SAC, Severn Estuary SAC, SPA and Ramsar. If habitat loss is unavoidable, mitigation may be required to reinstate and/or create habitats post-construction within the European Site, and provide monitoring and management, with ecological supervision, where appropriate. The proposed works should additionally provide biodiversity net gain. A targeted Phase 1 habitat survey should be completed early in the design phase to both quantify scale of impacts and identify opportunities for offsite mitigation if necessary. A geomorphological appraisal would be necessary to confirm whether the estuary's form would permit expansion of intertidal habitats[1].

The potential air quality impacts, arising from construction activities including earthworks, and potentially leading to habitat degradation, may require a construction dust assessment at detailed design stage. Furthermore, once construction methodologies are defined it would be important to, through consultation, understand the requirement for an air quality assessment.

Baseline survey (for both habitats and species) and detailed design information can also be incorporated to ensure habitat degradation is minimised through sensitive use of construction methodology and avoidance of sensitive receptors. For example, limiting construction duration, temporally phasing works, using silt fencing (or other sediment capture measures), bog mats to avoid compression of semi-natural habitats, and using machinery with low emissions to reduce air quality impacts.

The construction of detriment mitigation should furthermore consider opportunities to reduce the impact of coastal squeeze[30], allowing for future expansion of intertidal habitats into landward semi-natural terrestrial habitats and opportunities for habitat use by qualifying species and habitats of European Sites.

All mitigation measures and standard practice measures should be integrated into the Outline CEMP, where appropriate.

[30] Coastal squeeze can be defined by the future loss of habitat from sea level rise and the inability for coastal habitats to migrate inland due to the presence of hard sea defences. (Pontee, N., 2013. Defining coastal squeeze: A discussion. Ocean & Coastal Management, **84**, 204-207.
[30] Bristol City Council, 2011. Bristol Development Framework; Core Strategy. Adopted June, 2011.)

6.5.2 Species

Where works occur close to existing flood defences there is the potential for associated noise and vibration to affect fish behaviour and migration. The proposed mitigation measures will be confirmed in subsequent design stages. Following the mitigation hierarchy, the first objective should be to avoid works at key times pertaining to fish migration. Key/predominant migration periods are as follows:

- Atlantic salmon / sea trout (adult upstream migration: Nov-Dec[31], juvenile smolt migration: late-Mar-April, typically nocturnal[32]);
- River lamprey (Oct-Dec) and sea lamprey (May-June)[33];
- Shad (Apr-Jun)[34]; and
- European eel (adult downstream migration: Sep-Nov, juvenile upstream migration: April/May)

Without detailed construction information, it is advised that the proposed works initially avoid the use of percussive methods, including piling. If this is not possible, it is recommended to use low noise and vibration piling techniques, such as pressing/screwing and/or vibro-piling rather than impact/percussive piling[1].

In repeating AECOM's advice[1], where impact piling is required (and/or other significant noise and vibration construction methods), additional mitigation measures should be adopted, during the key fish migration periods (April-June and September–December), if this overlaps with the construction period, to minimise impacts on migratory fish:

- The lowest power levels of impact piling equipment that can undertake the task will be selected;
- Soft start piling will be employed to allow fish to disperse prior to piling at full noise level;
- No percussive piling should be permitted at dusk and dawn or overnight;
- The piling programme should be carefully scheduled to minimise impact piling during the most sensitive time periods;
- Piling should only be permitted on the ebb tide only during migration upstream and during the flood tide only for migration downstream;

[31] Hendry K &Cragg-Hine D (2003). Ecology of the Atlantic Salmon. Conserving Natura 2000 Rivers Ecology Series No.7.English Nature, Peterborough.
[32] https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/770799/Appendix_3e_Review_of_available_literature_-_salmon_smolts.pdf
[33] Maitland PS (2003). Ecology of the River, Brook and Sea Lamprey. Conserving Natura 2000 Rivers Ecology Series No. 5. English Nature, Peterborough.
[34] Maitland PS & Hatton-Ellis TW (2003). Ecology of the Allis and Twaite Shad. Conserving Natura 2000 Rivers Ecology Series No. 3. English Nature, Peterborough.

- Piling operations should be designed to maintain half the river width with sonification below the limit for a behavioural response from key species;
- Scheduling impact piling to restrict percussive piling to a maximum of *N* hours per day/ per week during the sensitive season (*N* to be determined based on local site conditions, particularly water depth at piling position and confirmed details of the piling equipment to be used); and
- Where necessary, low tide working (where percussive piling is only permitted at low tide ± *X* hours (*X* to be determined based on tidal cycles and local site conditions) can also be adopted during the migration season (though this can be very time restrictive in the winter months).

Whilst operational impacts are not anticipated on migratory fish, it is advised that consultation is undertaken with the EA to ascertain whether amendments to the lock gates will result in consideration of the Eel Regulations (2009) and the Salmon and Freshwater Fisheries Act (1975). Under these pieces of legislation there may be a requirement to fit fish and eel passes.

As a general precaution, the presence of any dolphin or harbour porpoise whilst percussive in-river works occurred, should cease for that day and a suitably qualified ecologist should be consulted.

The use of in-river platforms should only be installed and used during the day. Once they are installed, it is assumed that there will be no noise, vibration or lighting at night.

No night-time working should be proposed, however if security lighting or lighting around dawn/dusk is required, then any potential light spill on the River Avon or semi-natural terrestrial habitats (in relation to qualifying birds) will be avoided by directional lighting.

If works occur over summer and outside of periods in use by migratory fish, impacts to qualifying species are largely avoided. If the works cannot be temporally separated, then measures must be adopted to reduce construction noise and vibration when in the vicinity of habitats used by qualifying birds (as identified from proposed baseline surveys). Measures could include sound barriers, low noise machinery/plant, temporary works restrictions in relation to tidal state and ecological supervision to, in part, assess if significant numbers of qualifying bird species are present. Significance to be determined in discussion with NE.

As planning application(s) are developed, the typical mitigation measures listed above will need to be developed further and confirmed at subsequent design stages, with regard to the noise generated by the actual construction methods. Furthermore, mitigation measures could include measures to limit the vulnerabilities stated for each European Site, as either a mitigation or enhancement measure (Tables 1 to 6). These further developed measures will need to be included in an HRA to accompany the planning application. They will then need to be conditioned as part of any planning permission.

6.6 Residual Effects

As detailed design progresses, and consultation with statutory bodies continues, it is anticipated that with the inclusion of avoidance measures, and appropriate and agreeable mitigation, the proposed works could conclude no adverse effect on the integrity of the European sites.

6.7 In-Combination Assessment

Any in-combination assessment, as a requirement of the Conservation of Habitats and Species Regulations 2017 (as amended), must consider the proposed works, not in isolation, but in relation to other projects and plans in-combination.

At EIA stage, the planning application HRA must consider the SMP2, as well as other local plans and strategies, as identified in AECOM's HRA[1]: Severn Estuary Strategy, Bristol City Council Local Plan, Bristol Central Area Plan, and Bristol One City Climate Strategy[19].

As in Section 4.1 , a detailed identification of other plans and projects should be undertaken at EIA stage to support the HRA of the planning application. It is assumed, though analysis is required once information on future plans/projects is known, that if the proposed works are considerate of timing, spatial separation, and are mitigated with regards to noise/vibration production, then an in-combination effect is unlikely.

7 Conclusion

This SIAA considers the impact of the proposed flood design works along the River Avon and its tributaries on European Sites. A number of European Sites have been screened in at Appropriate Assessment, including: Avon Gorge Woodlands SAC, Severn Estuary SPA, Severn Estuary Ramsar, and Severn Estuary SAC.

Potential pathway for effects at construction include habitat loss and degradation, disturbance, and species mortality / injury.

As detailed design progresses, and consultation with statutory bodies continues, it is anticipated that baseline survey and supporting information will provide further assessment on the potential for adverse effects to arise. Without further baseline and supporting survey information at this stage, and without avoidance and/or mitigation measures, it is reasonable to conclude there could be adverse effects on the integrity of the European Sites.

Appropriate Assessment at detailed design should consider the impact of the works in relation to the Conservation Objectives of the European sites, and also in-combination with other plans and projects.

Figures

Figure 1. Site Boundary and Proposed Works.

A3

357000 358000 359000 360000 361000 362000 363000 364000

173000 172000 171000 170000

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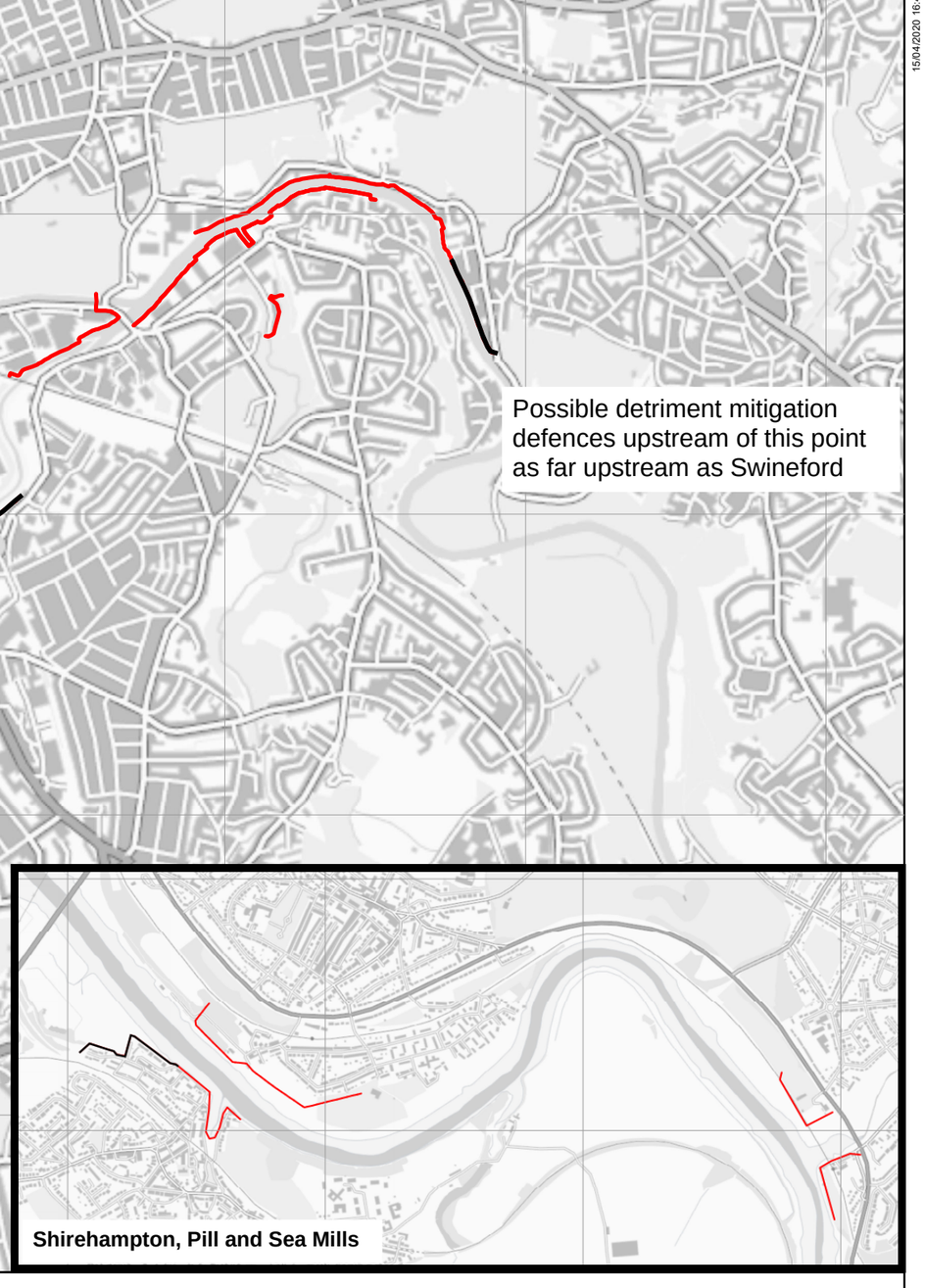
Possible detriment mitigation defences upstream of this point as far upstream as Swineford

Potential flood storage area



Key

River Avon raised flood defences proposed in 2020s. Most to be raised in 2060s

Defences built in 2060s

Note:
- All designs subject to development
- Some defences involve raising of existing structures rather than construction of new

Issue	Date	By	Chkd	Appd
P0	2020-03-10	CW		

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Client
BRISTOL CITY COUNCIL

Job Title
BRISTOL FLOOD STRATEGY

Full Extent
2065 Defences

Scale at A3
1:20,000

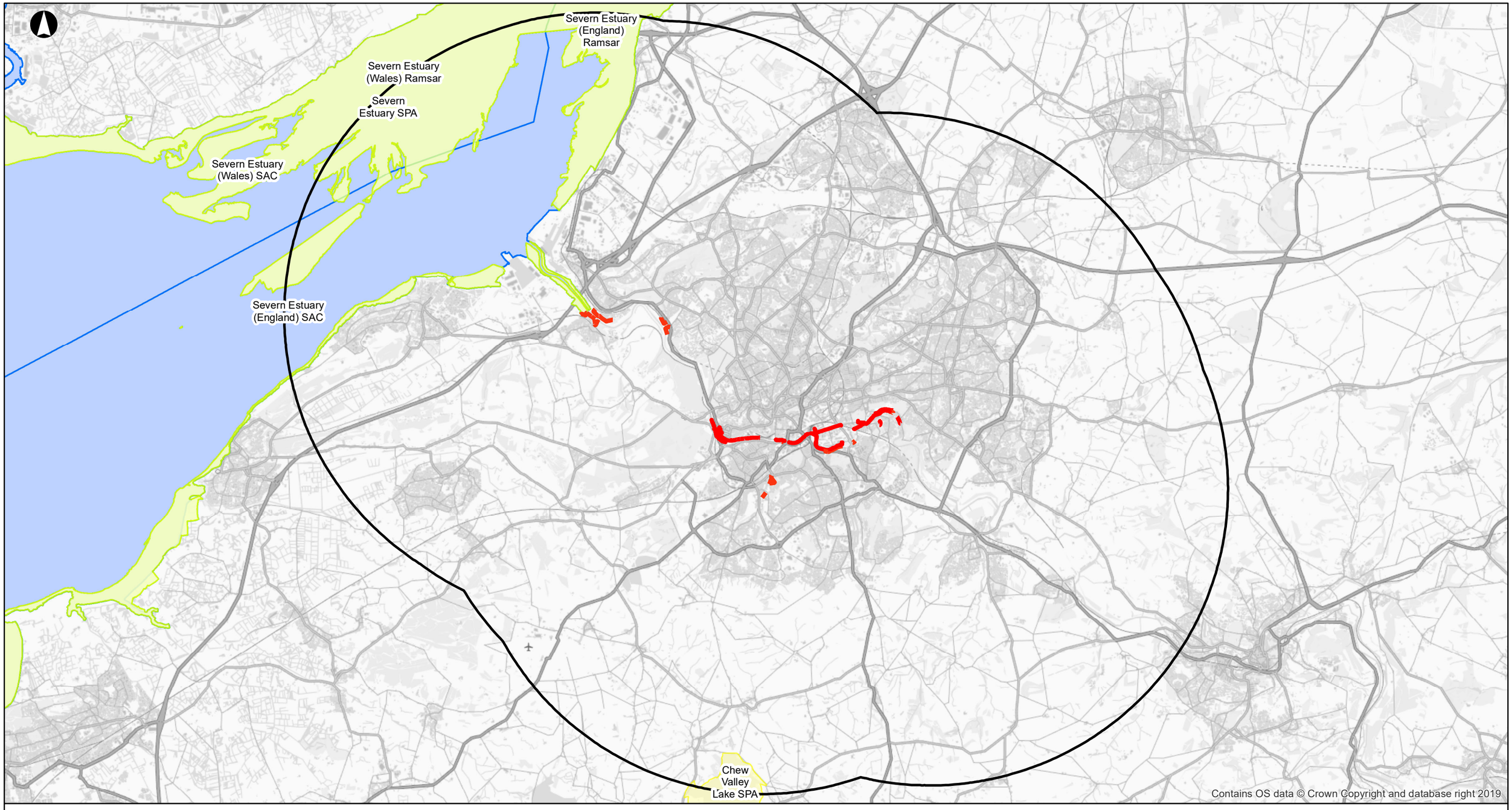
Job No	Drawing Status
260498	**Preliminary**

Drawing No	Issue
002	**P0**

C:\Users\Cat.Wallace\Desktop\BFS\Defence height comparison_7_10.6.mxd

Figure 2. European Sites within 10km of the proposed site.

A3



23/06/2020 08:44:59

Legend

- 10km buffer boundary
- SPA
- Ramsar
- SAC
- Proposed defences

Issue	Date	By	Chkd	Appd
P1	2020-06-23	EB		

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0 1,600 3,200 6,400

Client
BRISTOL CITY COUNCIL

Job Title
BRISTOL FLOOD STRATEGY

European Sites within 10km of Proposed Works

Scale at A3
1:125,000

Job No	Drawing Status
260498	**Preliminary**

Drawing No	Issue
047	**P1**

Appendix A

Habitats Regulations Assessment Procedure

A1 Habitats Regulations Assessment Procedure

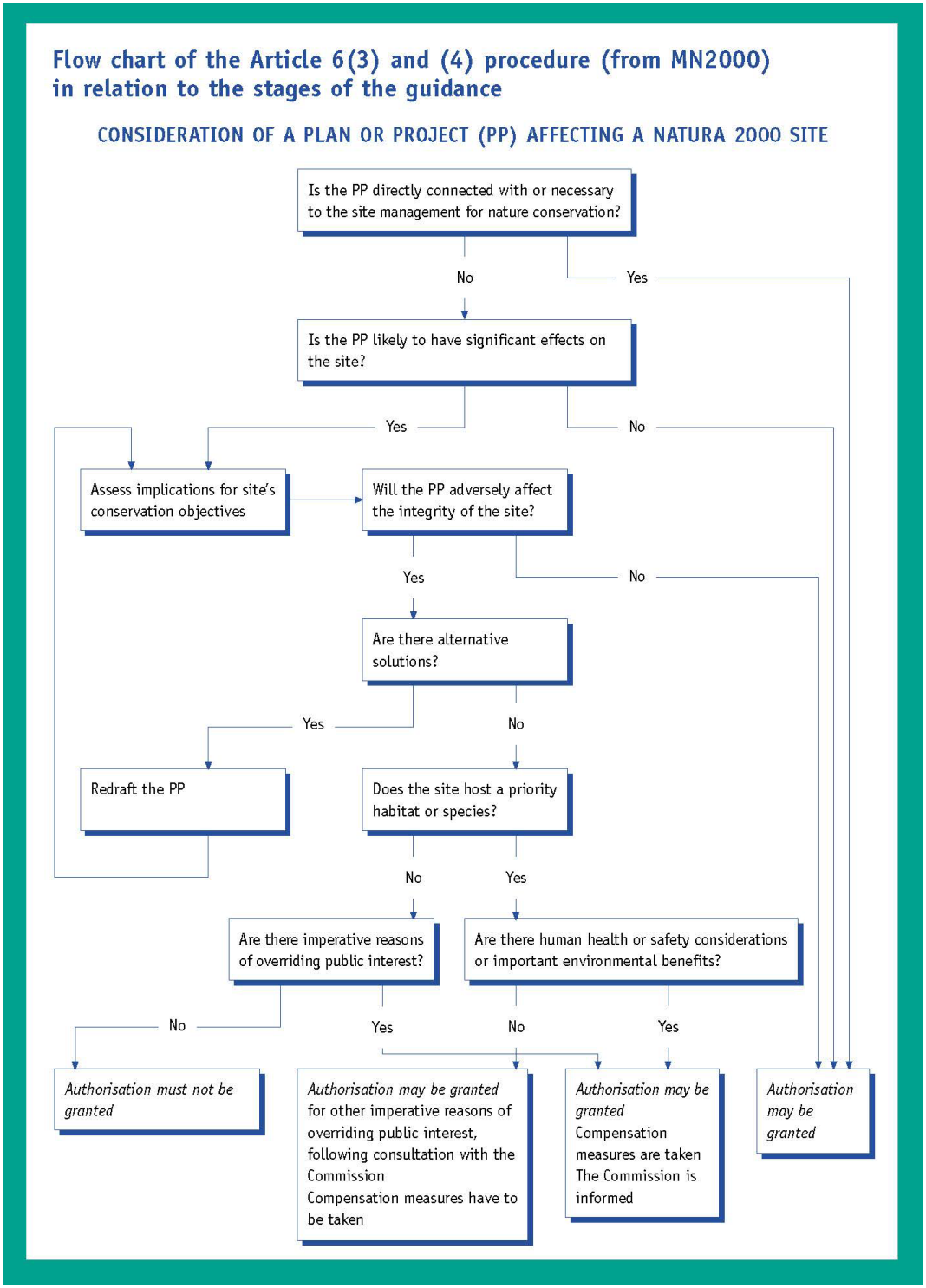

Figure extracted from: 'Assessment of plans and projects significantly affecting Natura 2000 sites: Methodological guidance on the provisions of Article 6(3) and (4) of the Habitats Directive 92/43/EEC' European Commission 2001.