River Thames Scheme

Protecting our communities
Securing our economy
Enhancing our Thames

Preliminary Environmental Information Report

Volume 2

Chapter 3: Consideration of Alternatives

3 Consideration of Alternatives

3.1 Introduction

3.1.1.1 Regulation 14(2)(d) of the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 specifies that an Environmental Statement (ES) should include '*a description of the reasonable alternatives studied by the applicant, which are relevant to the proposed development and its specific characteristics, and an indication of the main reasons for the option chosen, taking into account the effects of the development on the environment'.*

3.1.1.2 This chapter provides a summary of alternatives that were outlined within the River Thames Scheme (RTS) Environmental Impact Assessment (EIA) Scoping Report (Environment Agency and Surrey County Council, October 2022) ('the EIA Scoping Report'); summarises key alternatives and design development since the submission of the EIA Scoping Report and outlines how we will consider these further within the ES with respect to the requirements of the EIA Regulations outlined above.

3.2 Alternatives considered prior to EIA Scoping

3.2.1.1 The EIA Scoping Report summarised alternatives considered within the history of the project, including by the Lower Thames Flood Risk Management Strategy (LTFRMS) (Environment Agency, 2010). The LTFRMS identified broad approaches to flood risk management that were developed into a long list of over 50 options. Following detailed appraisal, it was concluded that the preferred approach to flood risk management is to improve conveyance and reduce flood risk through construction of a flood channel and capacity improvements in the River Thames downstream of the new flood channel.

3.2.1.2 Since its publication, we have demonstrated that the LTFRMS is still an up to date and appropriate assessment of alternative flood risk management strategies. This was evidenced as part of the Strategic Outline Case (approved in 2017) and Outline Business Case (approved in 2020). The Outline Business Case also included various sensitivity tests to ensure that the preferred option still has the best cost-benefit ratio.

3.2.1.3 The channel was originally proposed to be constructed of up to three sections; the Runnymede Channel, the Spelthorne Channel and a third channel in Berkshire. The channel in Berkshire is not being brought forward as part of the scope of the project, primarily as funding is not available at this time.

3.2.1.4 Planning and iterative design work on the project have been ongoing since 2015, including consultation with the public. During that time an initial design for the RTS has been developed from the recommendations set out in the LTFRMS, that considers economic, environmental, community, technical and landowner factors.

3.2.1.5 The process of iterative design has included considering the technical and economic feasibility, the potential environmental effects and the opinions of landowners and stakeholders. The process has also included ensuring statutory responsibilities are included, such as compliance with the Water Framework Directive (WFD) and Habitats Regulations.

3.2.1.6 Five specific areas of uncertainty were identified by the LTFRMS for further investigation including:

- The channel alignment at Thorpe Hay Meadow Site of Special Scientific Interest (SSSI);
- Assessing the need for a formalised flood control structure between Chertsey Bourne and St Ann's Lake;
- The downstream section of the Runnymede Channel;
- Whether the flood channel should have an augmented flow; and
- The outlet of the Spelthorne Channel.

3.2.1.7 As set out in the EIA Scoping Report, the following additional design developments were investigated as either option appraisals or as part of further investigation:

- Capacity improvements at Desborough Cut;
- Hybrid option to improve capacity at downstream weirs;
- Realignment avoiding Abbey 1 Lake on the Runnymede Channel;
- Spelthorne Channel alternative route (M3 Bridge);
- Abbey Meads Floodway on the Runnymede Channel;
- Littleton East Lake separation bund;
- Sunbury Weir capacity improvements;

- Molesey Weir capacity improvements; and
- Teddington Weir capacity improvements.

3.2.1.8 A summary of the reasonable alternative options that were considered, and reasons for selection of the preferred options, is provided within the EIA Scoping Report.

3.2.1.9 Further detail of these alternatives will be provided within the ES including a comparison of environmental effects.

3.3 Design Development since EIA Scoping

3.3.1 Introduction

3.3.1.1 The following sections provide a summary of the main areas of design development that have progressed since submission of the EIA Scoping Report in October 2022.

3.3.2 Spelthorne Channel Realignment

3.3.2.1 A section of the Spelthorne Channel (approximately 600 metres long) is proposed to be realigned at Sheepwalk, where the channel extends south of the M3. This is a change to the design presented within the EIA Scoping Report, but it is within the Project Boundary for the EIA Preliminary Environmental Information Report (PEIR).

3.3.2.2 Plate 3-1 below shows the approximate location of the Spelthorne Channel through Sheepwalk and Land South of Chertsey Road that was reported in the EIA Scoping Report. Plate 3-2 below shows the indicative alternative route of the channel and position of associated structures in this location that have been assessed for the purpose of our PEIR. The realignment will require relocation of a structure beneath the M3 and a change to the arrangement of the Chertsey Road/Renfree Way junction.

Plate 3-1: Spelthorne Channel Alignment at Sheepwalk / Land south of Chertsey Road and location of associated structures that were reported within the EIA Scoping Report

Plate 3-2: Alternative Spelthorne Channel Alignment at Sheepwalk / Land south of Chertsey Road and location of associated structures

3.3.2.3 Three main reasons for considering a different alignment are as follows. The first is to maximise landscape and ecological opportunities. The realignment of the channel through Sheepwalk to follow the eastern boundary rather than following a central alignment allows additional space for landscape and green infrastructure opportunities, including recreation and habitat enhancements. Secondly, where the alignment has altered within the Land South of Chertsey Road, this allows for accommodation of a possible pathway upgrade along the existing roadside pathway in line with the Active Travel opportunities (see Section 2.1.8). Thirdly, replacing the existing staggered junction along Chertsey Road and Renfree Way with a single junction to serve both Sheepwalk and Chertsey Road will provide an improvement to the safety and use of the road network.

3.3.3 Landscape and Green Infrastructure Design Appraisal

3.3.3.1 The scope and content of the design for the RTS is defined by the RTS vision and goals and the opportunities arising from the DCO regime as a result of the Secretary of State's Section 35 Direction. The outline design has largely been completed for the remainder of the flood alleviation aspects of the project, however, the landscape, environment and green infrastructure design for the RTS is ongoing and is using an iterative and integrated optioneering process. To fully maximise the opportunity to create a connected, high-quality new major public green infrastructure asset, the project team began in early 2022 to develop the Landscape and Green Infrastructure (L&GI) design for the RTS.

3.3.3.2 The process of the design work for the proposed L&GI began with four conceptual landscape 'themes' which focussed on some of the key objectives of the project. These themes were called:

- Theme 1: Visually Connected Green Spaces – open spaces with significantly raised landforms to provide for new visual connections across the breadth of the RTS;
- Theme 2: Active Recreation, Green Spaces – open spaces for intensive active recreation and sports, seeking to attract visitors from a wide area;
- Theme 3: Active Travel, 'Snaking Rampart' - a commuter and recreation route for cyclists, pedestrians and other wheeled mobility users, linking communities and the new green open spaces; and

- Theme 4: Enhanced Ecological Value – maximised ecological benefits for wildlife and habitats, with relatively restricted access opportunities.

3.3.3.3 The themes were put through an options appraisal process which tested the themes against factors such as planning policies, flood risk, buildability, affordability, carbon generation/mitigation and biodiversity/ecology.

3.3.3.4 The process also involved engagement workshops with Local Planning Authorities and special interests groups. The feedback received, together with the result of the appraisal, led to the development of two preferred options and two sub-options. Both options included new green open spaces at Royal Hythe, Penton Park (including a new blue open space at Abbey 1 Lake), Sheepwalk and part of Land South of Chertsey Road. The options also included wide-ranging ecological enhancements. The options were:

- Option 1: A fully connected Active Travel Route, along the length of the scheme, with two new bridges over the river; and
- Option 2: Enhanced active travel provision but without a fully connected active travel route or connections across the river.

3.3.3.5 In addition, two sub-options were identified, which provided for, by example, (a) low-key, passive uses for the open spaces (such as walking, jogging and informal kickabout) or (b) more active, intensive recreational and sporting uses (such as skating/BMX, sport pitches and adventure play). These two sub-options could apply to either of the main options.

3.3.3.6 The options underwent a further stage of appraisal in which Option 1 was selected as the preferred L&GI option to secure connectivity across the River Thames and integration with local communities whilst also achieving better general policy and flood risk compliance.

3.3.3.7 It was decided that the core design under Option 1 sub-option (a) would be taken forward as the primary basis for the Design for Statutory Consultation, based on the stronger support for these types of recreational uses received from some stakeholders. However, it is important to note that the L&GI design at this stage is schematic and allows for further development and a range of uses. This includes

adopting a wide range of recreation opportunities, such as identified by sub-option (b).

3.3.3.8 As part of Statutory Consultation we are seeking views on the activities that could be facilitated by the new green and blue open spaces so that the design of them can be developed further to respond to this feedback. In particular, we are considering whether the focus should be on sub-option (a) or (b); or a combination of the two, and we are keen to understand what types/blend of uses stakeholders would like to see, including any preferences for the following types of uses and elements of the L&GI design that could be provided:

- The low-key recreation/leisure/play uses;
- The active recreation and sporting uses;
- The facilities in the supporting visitor buildings;
- Any education-based facilities or uses;
- Any opportunities to incorporate art into the green open spaces;
- Any entertainment-based facilities or uses; and
- The design of the active travel route, including surfaces, segregation of cycle and pedestrian users, the inclusion of bridges, and lighting.

3.3.3.9 As noted in Section 2.1.2 (see Chapter 2: Project Description) and Appendix 2.1, whilst the design has evolved since the design parameters were set for this EIA PEIR, following the steps set out above, the maximum parameters have varied little and whilst there have been reductions in the number of potential new green and blue open spaces proposed within those parameters, the preliminary assessments identified in this PEIR are still considered valid.

3.3.3.10 As noted above, the landscape and green infrastructure design appraisal development process has included consideration of biodiversity improvements. We are committed to delivering BNG as well as the provision of high-quality habitats. In order to achieve this, we are undertaking a comprehensive options appraisal process to understand which sites to include within the project. So far, this has refined an initial list of over 50 identified locations, down to the priority areas for habitat creation, enhancement or mitigation explained within Section 2.1.9 (see Chapter 2: Project Description) and shown on Figure 2.1. The initial sites were originally identified based on a combination of known areas of

potentially suitable land in geographic proximity to the flood channels, existing baseline information collected for the project, publicly available documents, aerial photography and mapping. They were refined using a multi-criteria analysis which rated against a series of categories including location, size, ground conditions, flood risk, habitat connectivity, BNG potential, cultural heritage, environmental designations, local significance, existing land use and technical feasibility. This process will continue as the project design and habitat requirements continue to develop.

3.3.3.11 The project approach to habitat design continues to develop, seeking to balance the delivery of multiple project goals. This includes consideration of high-quality habitat provision, BNG, carbon sequestration and ecosystem services in order to inform a strategic approach to the placement of habitat creation, enhancement or mitigation.

3.3.3.12 Since EIA Scoping, there have been some changes to the project boundary as a result of ecological and BNG considerations. Key areas are:

- An area to the north of Norlands Lane / west of Royal Hythe was identified as not being required to deliver the project goals or for associated construction activities. This area contained several ecological constraints including the presence of both protected species and invasive non-native species (INNS);
- The statutory designation of Thorpe Hay Meadow as a SSSI means it cannot be considered in the calculation of BNG. This area was therefore removed from the project boundary for EIA PEIR;
- The embankment surrounding Wraysbury Reservoir had been previously identified as having the potential to generate BNG, however, this has since been considered against the requirements of the reservoir. It is understood that the strict maintenance regime on reservoirs requires a grass sward of between five and 15 centimetres to be maintained at all times to enable visual inspections and to provide a mat coverage that binds the banks together. In contrast, grassland that provides higher BNG would require less frequent grazing. This section of the site is therefore not being progressed further however, the flat area of land to the south of Wraysbury Reservoir remains. The project boundary for EIA PEIR has been updated to reflect this change; and

- During recent UKHab surveys an area of land approximately 3.5 hectares in size to the east of Laleham Reach was identified as containing a mixture of modified grassland, woodland and blackthorn scrub of moderate condition. This area provides the potential to achieve BNG and ecological connectivity to RTS and therefore it has been added to the project boundary for the EIA PEIR.

3.3.4 Off-site car parking for construction workers

3.3.4.1 To mitigate for construction disturbance to traffic on roads local to the project boundary for the EIA PEIR, a study is being undertaken to consider off-site car parks for construction workers. This study has been undertaken on the basis of early contractor involvement, but does not account for likely travel plan mitigation measures that we will develop for the DCO Application, which will likely reduce the amount of car parking spaces needed.

3.3.4.2 A long-list of 22 potential car park locations was identified through a desk study. A high-level multi-criteria assessment (MCA) was then undertaken to identify any sites deemed unsuitable for use. The MCA considered factors including current conditions on site (existing surface/hardstanding), the suitability of the existing road network, public transport connections, ecology, cultural heritage/archaeology, ground conditions, flood risk and impact to local community.

3.3.4.3 This has resulted in the refinement to a short-list of six potential off-site car park locations for construction workers. These are not located within the project boundary for the EIA PEIR but are included within the Design for Statutory Consultation. The locations of the potential car park sites are shown in Figure 2.2. As noted in Section 4.2.3 (see Chapter 4: Approach to the Environmental Assessment) effects associated with these car parks are scoped into the assessment as a precautionary measure and will be subject to further detailed study alongside the development of the travel plan mitigation measures which will seek to reduce parking demand.

3.3.5 Augmented flow

3.3.5.1 Following a conceptual water quality modelling exercise at the end of 2022, it was agreed the upper limit of the augmented flow will be modified from 1.5 m^3 /s (as considered in the Scoping Report) to 1m^3 /s (as

described in Chapter 2 Project Description). This reduction in augmented flow is proposed in order to reduce potential effects on the water environment on the section of the River Thames that is bypassed by the flood channel.

3.3.6 Spelthorne Channel at Ferry Lane Lake

3.3.6.1 Our PEIR assumes that the Spelthorne Channel passes through Ferry Lane Lake (also known as Ferris Meadow Lake) as reported in Chapter 2: Project Description. However, during the course of project development the lake has become used for open water swimming. In light of this and associated feedback from stakeholders, we are currently undertaking a water quality assessment of the effects of our current alignment on Ferry Lane Lake and an options study to understand the feasibility of alternative alignment options for the Spelthorne Channel at this location. This assessment and the options study are considering flows within the flood channel when it is being used for flood relief as well as the flow in normal day-to-day conditions (known as the augmented flow).

3.3.6.2 The options study is considering the following options:

1. Spelthorne channel passes through Ferry Lane Lake;
2. Direct the flood channel north of Ferry Lane Lake into the River Thames via the Chap along a newly constructed route;
3. Divert the Spelthorne channel down the west side of Ferry Lane Lake into the River Thames along a newly constructed route;
4. Divide the Spelthorne channel into two sections with half diverted to the north via the Chap and half down the west side of Ferry Lane Lake along a newly constructed route;
5. A tunnel under Ferry Lane Lake for flood flows; and
6. Retain the flood relief channel alignment through Ferry Lane Lake but with the augmented flow diverted into the Chap via a newly constructed route, with sub-options to consider both with (6b) and without (6a) a new flow control structure

3.3.6.3 The study is considering flood capacity, engineering, costs, policy and environmental factors alongside their fit with the RTS Environmental Design Principles (available for review as part of our statutory consultation material), which stem from the project goals.

3.3.6.4 The outcomes of this study will be used, alongside the comments received in this consultation and previous consultations, as part of determining which option will be taken forward. Following this consultation and the completion of the options study, we will engage further with the public.

3.3.6.5 Further detail of the alternatives considered at this location and the reason for selection of the preferred option will be presented in more detail within the ES which will be submitted as part of the DCO application.

3.3.6.6 Our current high-level understanding of the key constraints for the options is provided below. We are considering these and identifying if there are others, as our assessment work is ongoing.

Option 1 – Our current proposal, Spelthorne channel passes through Ferry Lane Lake

3.3.6.7 Under this option both the augmented flow and the flood flow pass through Ferry Lane Lake.

3.3.6.8 We are further developing our understanding of water quality effects including habitats within the lake and impacts on recreational activities, such as swimming.

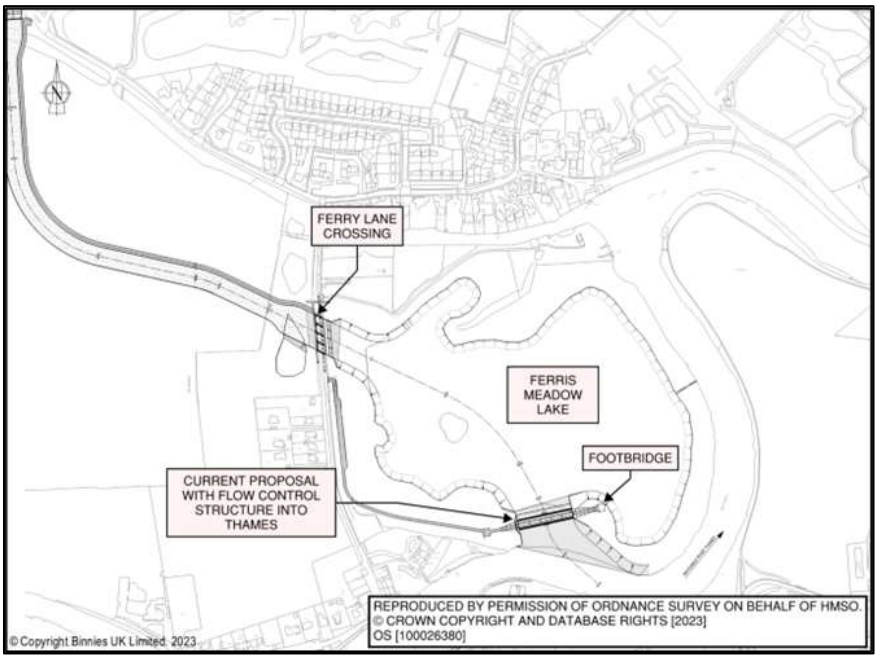


Plate 3-3: Option 1 (our current proposal)

Option 2 - Direct the flood channel north of Ferry Lane Lake into the River Thames via the Chap along a newly constructed new route

3.3.6.9 Under this option:

- The augmented flow and the flood flow pass down the Chap along a newly constructed route;
- Extensive excavation in an area of known landfill would be required to the west of Ferry Lane Lake;
- The sailing club would need to be moved to a new location.
- Extra utility service diversions would be needed;
- The Chap does not currently have sufficient capacity so it would have to be made wider and deeper to pass flood flows; and
- Erosion protection works are likely to be required.

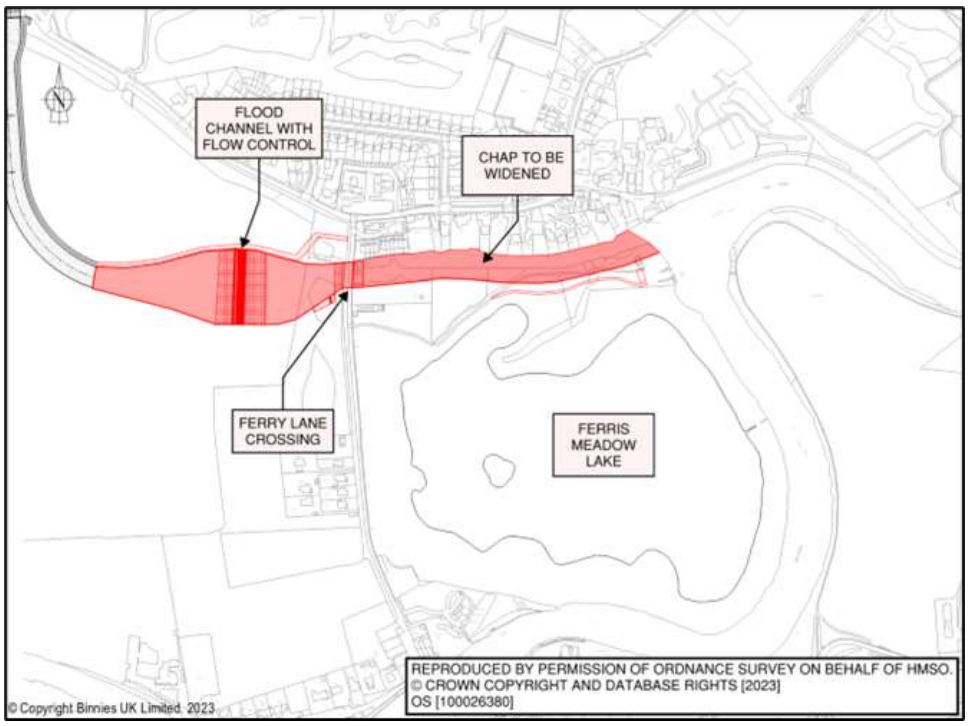


Plate 3-4: Ferry Lane Lake Option 2

Option 3 - Divert the Spelthorne channel down the west side of Ferry Lane Lake into the River Thames along a newly constructed route

3.3.6.10 Under this option:

- Both augmented flows and flood flows pass along a newly constructed route;
- There is very limited space to fit the size of channel required so it would need hard engineered sides such as sheet piles resulting in little potential for habitat improvements within the channel;
- Considerable replacement of lost habitat would be required including grassland and woodland;
- Extensive excavation in an area of known landfill would be required to the west of Ferry Lane Lake; and
- Extra utility service diversions would be needed.

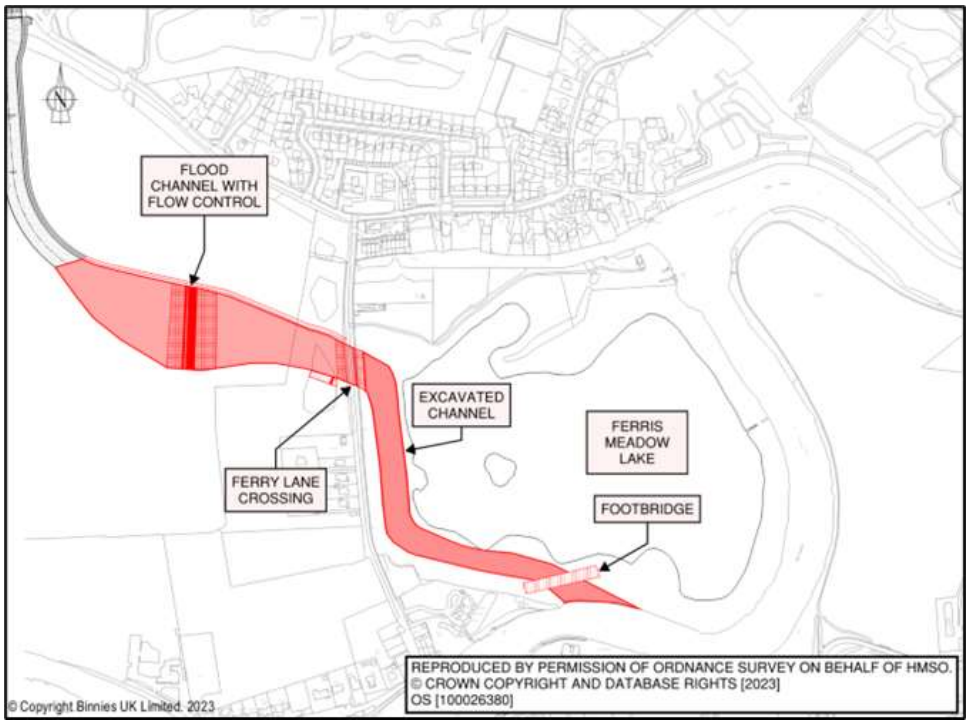


Plate 3-5: Ferry Lane Lake Option 3

Option 4 – Divide the Spelthorne channel into two sections with half diverted to the north via the Chap and half down the west side of Ferry Lane Lake along a newly constructed route.

3.3.6.11 Under this option:

- Both augmented flows and flood flows pass along both the Chap and a newly constructed route;
- Extensive excavation in an area of known landfill would be required to the west of Ferry Lane Lake;
- Extra utility service diversions would be needed;
- Considerable replacement of lost habitat would be required including grassland and woodland;
- The Chap may prove to be wide enough for this option but excavation to provide sufficient depth would be needed. Erosion protection works are likely to be required; and
- Similar to Option 3, for the channel route to the west of the lake there is still limited space for the channel size required (although not such a constraint as Option 3) so sheet piled sides are likely to be needed resulting in little potential for habitat improvements within the channel.

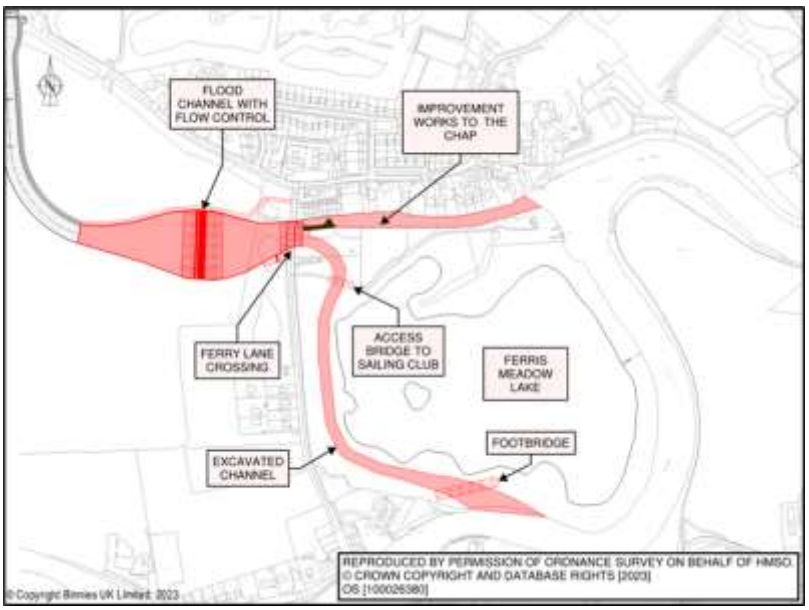


Plate 3-6: Ferry Lane Lake Option 4

Option 5 – A tunnel under Ferry Lane Lake for flood flows with augmented flow diverted into the Chap via a newly constructed route

3.3.6.12 Under this option:

- The augmented flow passes along the Chap via a newly constructed route and the flood flows pass through a newly constructed tunnel;
- This option would be complex to build as a large diameter tunnel would be required to carry flood flow and is likely to be prohibitively expensive;
- Deep tunnel shafts would be needed through poor ground conditions; and
- A separate small channel for augmented flow directed into the Chap would be required.

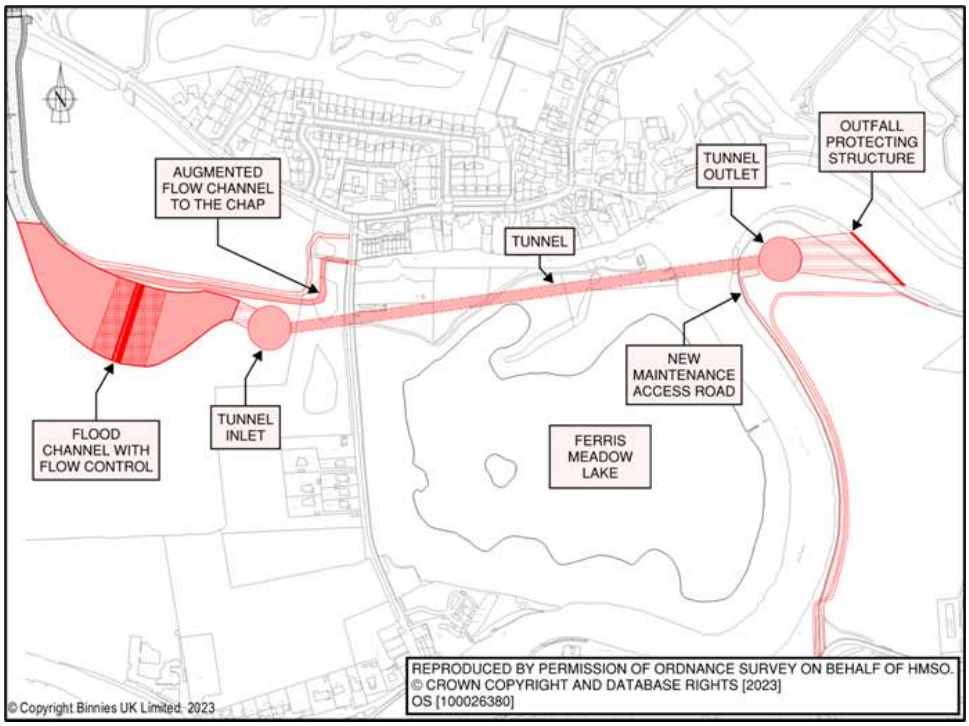


Plate 3-7: Ferry Lane Lake Option 5

Option 6a - Retain the flood relief channel alignment through Ferry Lane Lake with the augmented flow diverted into the Chap via a newly constructed route

3.3.6.13 Under this option:

- Augmented flow passes along the Chap via a newly constructed route and flood flows pass through Ferry Lane Lake. No control structure is provided at the junction;
- A small channel between the Spelthorne channel and the Chap would be needed to carry the augmented flow. This area may be landfill; and
- We are further developing our understanding about how successful this option would be in preventing augmented flow from reaching the lake without having a flow control structure.

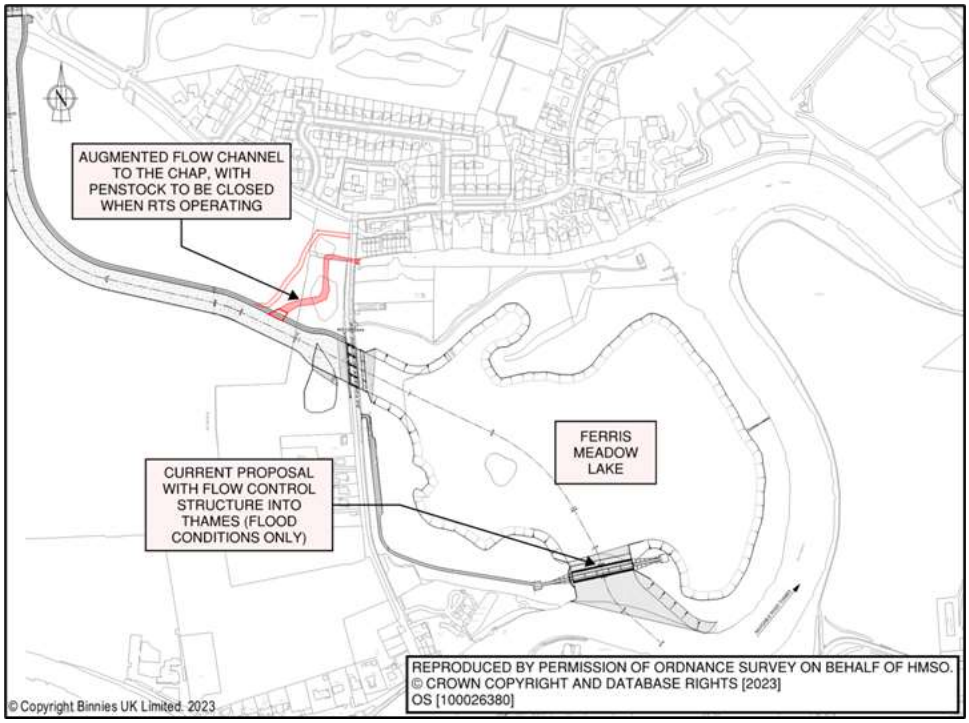


Plate 3-8: Ferry Lane Lake Option 6a

Option 6b - Retain the flood relief channel alignment through Ferry Lane Lake with the augmented flow diverted into the Chap via a newly constructed route with a new flow control structure

3.3.6.14 Under this option:

- Augmented flow passes along the Chap via a newly constructed route and flood flows pass through Ferry Lane Lake. A control structure is provided at the junction to prevent augmented flow from reaching the lake; and
- A small channel between the Spelthorne channel and the Chap would be needed to carry the augmented flow. This area may be landfill.

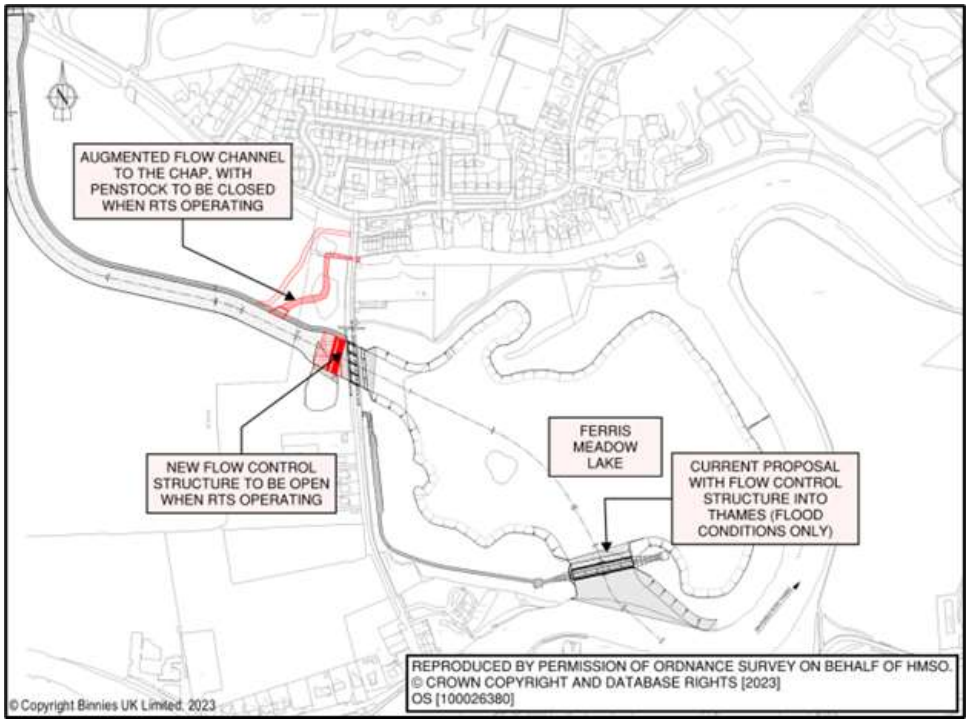


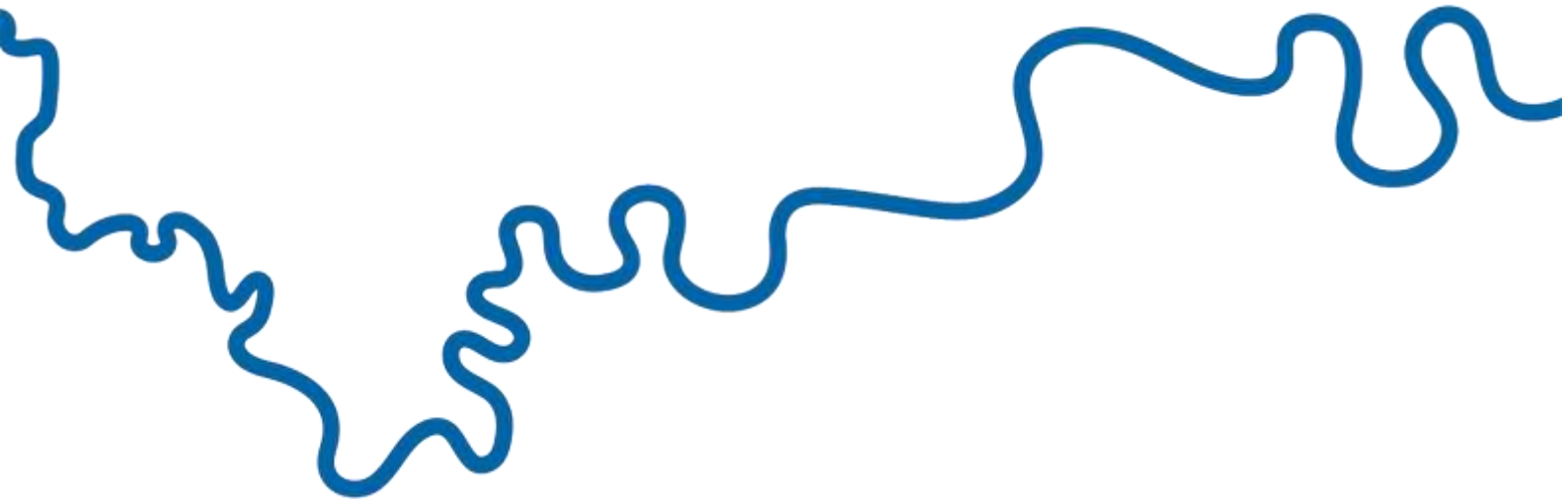
Plate 3-9: Ferry Lane Lake Option 6b

3.4 Assessment of alternatives within the ES

3.4.1.1 Our PEIR chapter presents a summary of the reasonable alternatives that have been considered and taken forward as part of the project as described in Chapter 2: Project Description. In line with the EIA Regulations, the ES will include further detail of the reasonable

alternatives and an indication of the main reasons for selecting the chosen option, including a comparison of the environmental effects.

3.4.1.2 The design to be reported and assessed within the ES will take in to account the outcomes of statutory consultation as well as ongoing environmental assessment, design development and engagement. We will describe any further changes to the design subsequent to the PEIR and the reasons for these within the ES.



SURREY COUNTY COUNCIL

Environment Agency

The River Thames Scheme represents a new landscape-based approach to creating healthier, more resilient and more sustainable communities by reducing the risk of flooding and creating high quality natural environments.

River Thames
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