

Environment Agency

NEC4 Professional Service Contract (PSC)

Scope

Project / contract information

Project name	Datchet to Hythe End Flood Improvement Measures Outline Business Case (OBC)
Project SOP code	ENV0004670C
Contract number	C17707
Date	31 August 2023

Assurance

Author	[REDACTED]	Date: 1 June 2023
Consulted	[REDACTED]	Date: 1 June 2023
Consulted	[REDACTED]	Date: 1 June 2023
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Checked prior to issue	[REDACTED]	Date: 12 July 2023

Revision History

Revision date	Summary of changes	Version number
	First issue	P01

This Scope should be read in conjunction with the version of the Minimum Technical Requirements and Exchange Information Requirements current at the Contract Date. In the event of conflict, this Scope shall prevail. The *service* is to be compliant with the following version of the Minimum Technical Requirements and Exchange Information Requirements:

Document	Document Title	Version No	Issue date
LIT 13258	Minimum Technical Requirements except for the referenced Environmental MTRs which are to be superseded with LIT 65160	12 MTR library	December 2021

LIT 65150	Environment and Sustainability MTR	1.0	24/01/2023
LIT 17641	Exchange Information Requirements	3.0	01/12/2022 EIR library

1 Overview

1.1 Scope of commission

- 1.1.1 The Environment Agency (EA / *Client*) has completed a Strategic Outline Case (SOC) Business Case that investigates the fluvial flood risk problems in the project area in parts of the wards of Datchet, Horton and Wraysbury and Old Windsor and potential options to reduce these. The approval of the SOC has released funding to enable the further appraisal required to investigate a short list of options and define a preferred option, in accordance with FCERM-Appraisal Guidance.
- 1.1.2 The Scope of this commission is to undertake a detailed appraisal of the project viability and other necessary activities for the production of the Outline Business Case (OBC) and further progression of the project. Some limitations within the SOC are acknowledged, mainly relating to the project area and baseline conditions to be adopted (dependent on the River Thames Scheme (RTS)) and this means that aspects of the problem definition will need to be re-examined. The existing preferred option (as identified at SOC) will require to be revisited against project objectives as part of the OBC.
- 1.1.3 The OBC stage will be split into 2 sections. Section 1 will comprise work up to identification of a preferred option. Section 2 will commence once a preferred option has been agreed as representing the best way forward to address project objectives across the whole project area.
- 1.1.4 This contract is to be let under the Collaborative Delivery Framework.
- 1.1.5 Where additions have been made to the standard work scope by the Consultant, this is shown by a prefix of AD at the beginning of each paragraph.

1.2 Technical background to project

- 1.2.1 The Datchet to Hythe End Flood Improvement Measures project has been established to investigate flood risk and where feasible implement a technically, and economically viable, affordable, and sustainable option to reduce fluvial flood risk for the project area, as shown in Figure 1 (defined at SOC stage).

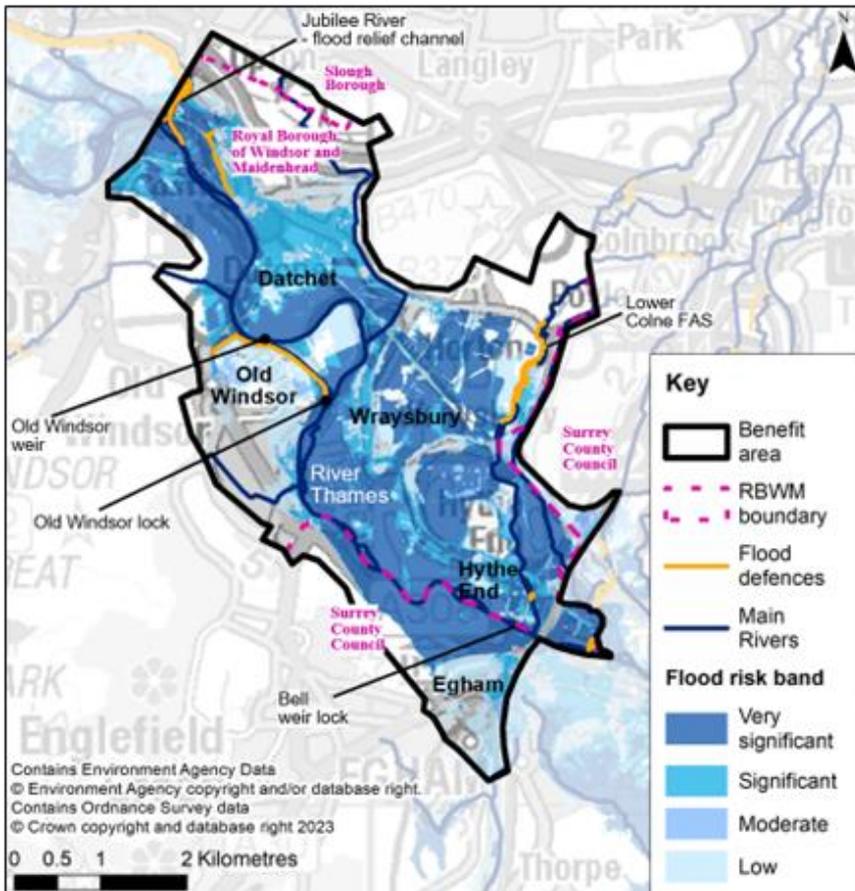


Figure 1: Project area

- 1.2.2 The River Thames flows through the project area and is the primary source of flooding. Part of the River Thames within the project area is navigable, including the Old Windsor Cut, a 0.9km engineered channel, and the Thames weirs and navigation lock structures at Old Windsor and Bell Weir near Runnymede. The Environment Agency has a legal duty to maintain navigation on the River Thames.
- 1.2.3 The following Main Rivers are within the Thames floodplain under study:
- Bourne Ditch (0.9km reach)
 - Battle Bourne (0.5km reach)
 - Slough Arm / Datchet Common Brook (4.5km reach)
 - Colne Brook (5.3km reach)
 - County Ditch (4.9km reach)
- 1.2.4 There are also several notable Ordinary Watercourses:
- Wraysbury Drain
 - Horton Drain
 - Datchet Common Brook
 - Burfield Road Ditch
- 1.2.5 The Lower Thames, including the project area, has been affected by several major floods, including in 1947 (estimated as a 2% Annual Exceedance Probability (AEP) event), 1968, 2003 (between 7% to 20% AEP event) and 2014 (about 15% AEP event). Flood durations are lengthy, with flood flows typically lasting for several days and flooding for weeks before levels fall.
- 1.2.6 Figure 1 also shows the flood mapping for present day fluvial conditions. Given that the River Thames has a vast floodplain, any flood improvement works within the project area have the

ability to impact on flood risk elsewhere. Therefore a key element of this project will be to ensure that no unacceptable increases in flood risk including upstream and downstream of the project area result from this project.

1.2.7 Surface water and groundwater flooding are also known to occur in the area, the former generally being high frequency but low consequence and the latter often occurring due to high river levels. These other sources of flooding and the interaction between fluvial and groundwater flooding need investigating at the OBC stage.

1.2.8 Reports of the 2014 flooding indicate that within the project area a total of 134 properties flooded internally (29 in Datchet, 1 in Horton, 78 in Wraysbury and 26 in Old Windsor). This was despite several interventions to better protect properties: flood warnings, operating the Thames weirs in fully open position, distribution of sandbags to residents and erecting a number of temporary defences (sandbag walls) in Datchet.

1.2.9 The fluvial flood risks to properties in the project area are given in Table 1 and illustrated in Figure 2 based on modelling for the RTS project (completed in 2022).

1.2.10 [REDACTED]

1.2.11 [REDACTED]

[REDACTED]

[REDACTED]

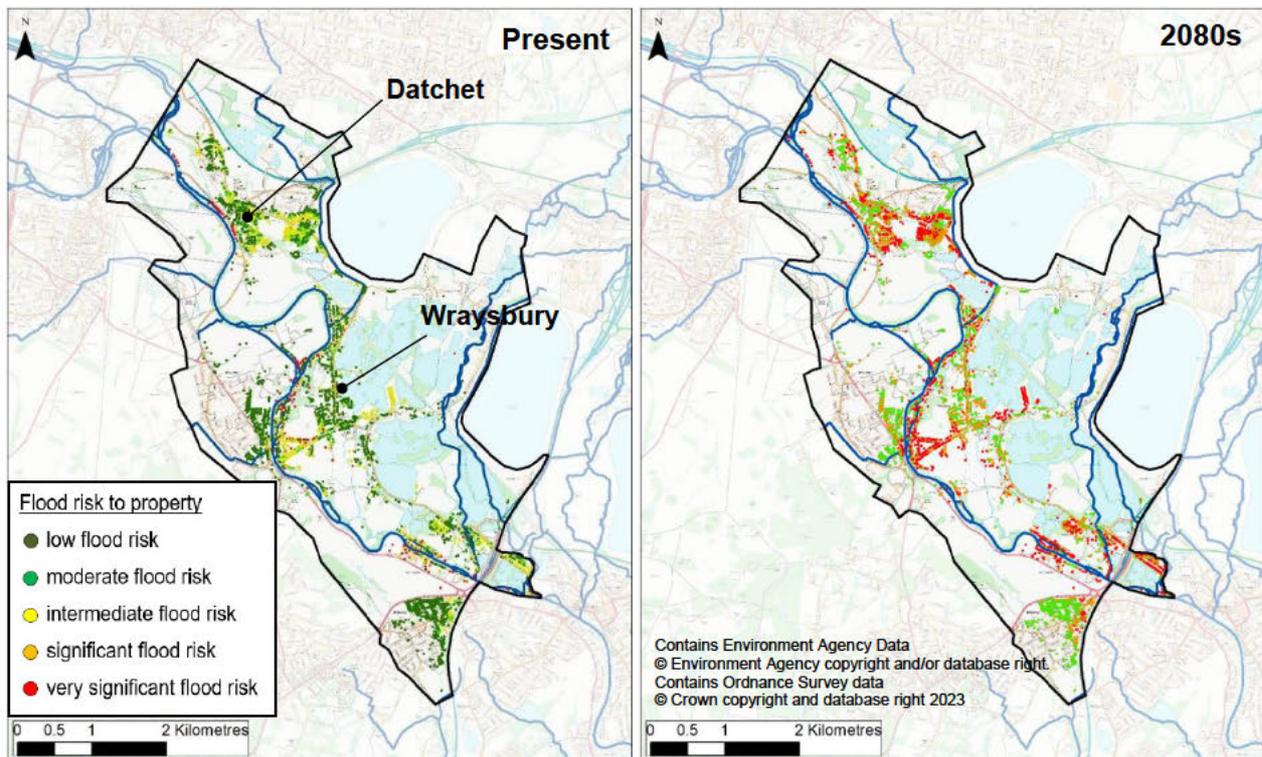


Figure 2: Flood risk in project area under no project scenario – Sustain option

1.3 Options to be considered

- 1.3.1 A SOC for the project was submitted to the EA's Large Projects Review Group (LPRG) in March 2023. This considered a long list of wide ranging measures to reduce flood risk that need to be further assessed at OBC stage for viability, feasibility, affordability and stakeholder acceptance. Several shortlisted options, based on packages of measures, were put forward representing different scales of potential investment. The initial economic appraisal demonstrated that a viable scheme is likely to be achievable but that the scale of works proposed will be dependent on funding availability.
- 1.3.2 The SOC identified up to 1,200 properties that would benefit from a flood improvement measures project and a Do-nothing present value of damages (PVd) of £730 million. The initial long-list of options presented in the SOC included combinations of flood defences, improved flood conveyance, temporary defences and property flood resilience measures. [REDACTED]
- 1.3.3 Given that the preferred option from the SOC does not fully address the objective to address the fluvial flood risk problems in the whole of the project area, it is required to undertake an initial assessment to identify the preferred option to take forward for the OBC. The exact nature of the likely preferred option is subject to considerable uncertainty based on the SOC stage work and needs to be confirmed early in the OBC stage. The standard of evidence required to eliminate an option is that required to withstand a legal challenge (judicial review), which needs addressing at OBC stage. The SOC report recommendation (Section 7.1) states '...Where options are not investigated further, robust evidence will have been compiled. This is to help withstand a potential legal challenge (judicial review) and aid community engagement...'
- 1.3.4 There is potential for phased investment which allows practical short and medium-term actions (such as Option 4 referenced in the SOC) to manage flooding, whilst keeping options to adapt to a range of future climate change scenarios in the longer term. Short and medium-term actions

are likely to be a package of measures, including flood defences (limited in scale) and increased flood conveyance, where this can be economically justified, and property flood resilience. Prior to commencing any OBC assessment, a review should be undertaken to include revisiting option 6 considering different standards of protection to assess viability.

1.3.5 The Scope of this commission is based on the limited investment option (Option 4 as referenced in the SOC) being taken forward as the preferred option for outline design and environmental assessment. High investment options are considered viable only for future delivery. Phased high investment options (such as Option 8 referenced in the SOC) need to be considered in the short-list to support economic appraisal but not in detail as the preferred option. If the analysis shows a high investment option to be the preferred option requiring detailed appraisal, then a Compensation Event will be agreed for extra work (see 1.3.6).

1.3.6 The Scope of this commission for the preferred option for outline design and environmental assessment is based on the limited investment option (Option 4) defined in the SOC which includes the measures listed below. The approximate locations of the measures are included in figures within the SOC Options Appraisal report.

- [REDACTED]

1.3.7 If the initial appraisal at OBC stage determines that high investment options are viable and affordable for delivery in the short term then the Scope of this commission will need reconsidering to enable an additional appropriate level of option development.

1.3.8 There is a risk that no technically and economically viable, affordable, and sustainable preferred option can be identified to take forward. For this reason it is important to focus the initial OBC appraisal on early confirmation that options can be progressed to more detailed appraisal and outline design, with staged decision points included in the OBC programme to support this approach. This is presented as Section 1 in the Contract, with the output being identification of the proposed preferred option, to allow a decision on whether this should be taken forward. If necessary, the project will be scaled back if only minor scale works can be justified.

1.4 Project area versus study area

1.4.1 The project area, as shown in Figure 1, extends from the confluence of the Jubilee River with the River Thames (upstream) to a small residential area downstream of the M25 motorway known as Gloucester Drive.

1.4.2 [REDACTED]

- 1.4.3 The project area has been refined using the Flood Map for Planning, other flood risk mapping, proposed development sites put forward in the Borough Housing and Economic Land Availability Assessment (HELAA) and the ward boundaries. A section of the M25 motorway has been used as a downstream boundary, this has resulted in parts of Surrey (Runnymede and Spelthorne districts) being included in the project area.
- 1.4.4 The study area for the OBC stage is defined below, both in terms of the flood risk locations and the wider area within which flood resilience measure (FRM) options should be considered. The locations of interest in terms of reducing flood risk are defined in Section 1.2. The areas where FRM options may exist that could benefit these locations at flood risk are:
- Within the limits of the project area.
 - Upstream of the project area, in the River Thames Valley and on the tributary rivers which intersect the project area. In these areas consideration will be given to nature based solutions, such as Natural Flood Management and formal flood storage areas. Capturing peak flood flows may be one feasible option to reduce flood risk.
 - Downstream of the project area, within the River Thames corridor. Improved flood conveyance may be one feasible option to reduce flood risk, particularly for the downstream part of the project area.
- 1.4.5 For the study area upstream of the project area, the findings of the ongoing Thames Valley Flood Scheme project, at OBC stage, will inform the options to be considered and benefits to be claimed (avoiding double counting). This is a separate study outside of the project area and is not part of this Scope.
- 1.4.6 For the study area downstream of the project area, the findings of the ongoing River Thames Scheme project, at OBC stage, will inform the options to be considered and benefits to be claimed (avoiding double counting as there will be an overlap in benefits area). This is a separate study with measures proposed outside the project area and is not part of this Scope.
- 1.4.7 In addition to the two schemes described above, within the project area there is overlap with other ongoing projects, and their benefit areas, including the Lower Colne Improvement Scheme and the Thames Weirs Refurbishment Programme. The *Consultant* shall consider how these projects could impact the options considered and benefits to be claimed (avoiding double counting), drawing on the reported findings of the Lower Colne Improvement Scheme, Thames Valley Scheme and River Thames Scheme.
- 1.4.8 The Consultant is to undertake a review of the project area at the outset of the OBC in collaboration with the Client, building on the outputs of the OBC workshop (held on 16/5/23).

Project Area Deliverables

- 1.4.9 The Consultant is to produce a definitive project area plan (both GIS and pdf format) for the Client's acceptance.

1.5 Previous Studies

- 1.5.1 In undertaking the *service*, the *Consultant* shall take account of the previous studies detailed in the table below and produce a short technical summary explaining how best use will be made of historical data.
- 1.5.2 AD: From previous studies there are also key documents from which information relevant to the project can be extracted. These include two business case reports: (a) RTS OBC including channel 1 and (b) Lower Thames Strategy, as well as technical reports, e.g. RTS geotechnical reports by Binnies and the Temporary Defence Deployment Plans for the area

Report	Date	Format	Outcomes of study
Strategic Outline Case and appendices	Mar 23	Digital	Initial long-list of measures / options and supporting economic case.
Modelling Reports by Binnies	2022	Digital	Baseline flood risk for Do-nothing, Sustain and 2-channel and 3-channel flood relief options

Extensive historical information is also available relating to neighbouring schemes and previous assessment work and will be provided throughout the project, as recorded in a document register. Reference to these known information sources should be included in the short technical summary referenced in 1.5.1.

- 1.5.3 ~~The previous studies have been undertaken by or for the Client using reasonable skill and care and have been accepted. The Consultant shall review the information provided and notify the Client of any deficiencies in its adequacy. Following this review, and completion of any work required to rectify the deficiencies identified, the Consultant shall take the risk of any deficiencies in existing data quality and quantity which have not been notified to the Client.~~
- 1.5.4 AD: The previous studies have been undertaken by or for the *Client* using reasonable skill and care and have been accepted. The *Consultant* shall review the information provided and notify the *Client* of any deficiencies in its adequacy in relation to its intended purpose or use with the project at the time of the deficiency review. Following this review, and completion of any work required to rectify the deficiencies identified (that work being the subject of a Compensation Event), the *Consultant* shall take the risk of any deficiencies in existing data quality and quantity that were reasonably identifiable at the time of the deficiency review which have not been notified to the *Client*. For the avoidance of doubt, the *Consultant* shall not carry the risk of any deficiencies not identified at the time of the deficiency review in the event that a subsequent change in Scope or focus of the project changed the intended purpose or use of the previous studies.

1.6 Project objectives

- 1.6.1 The project is currently being led by the Environment Agency but it is expected that any scheme would be delivered in partnership with the Royal Borough of Windsor and Maidenhead (RBWM). The primary objective for the current stage of the project, set by the Environment Agency, is:

‘...Develop the Outline Business Case by assessing and making recommendations to plan and deliver technically and economically viable, affordable, and sustainable options in partnership with RBWM, to reduce flood risk in the wards of ‘Datchet, Horton and Wraysbury’ and ‘Old Windsor’ whilst mitigating environmental risk and creating a better environment...’

- 1.6.2 The wider project objectives that each of the options has been initially tested against at SOC stage are listed below. They will be refined during the OBC stage.
- Support the natural environment: Protect, enhance, and create the natural environment and landscape.
 - Take climate action: Minimise whole life carbon impacts and reduce carbon throughout the project lifecycle.
 - Take climate action: Better protect properties and communities through resilience to climate change.
 - Communities and place: Better protect properties and communities from flooding.
 - Communities and place: Increase flood resilience and conditions that stimulate economic growth.

- Communities and place: Enhance and create recreational opportunities.
 - Communities and place: Work in partnership to create a great place for living.
- 1.6.3 The Consultant shall review these objectives at the outset of the OBC stage in collaboration with the Client, building on the outputs of the OBC workshop (held 16/05/23) and produce an updated list of project objectives for the Client's acceptance.
- 1.6.4 The above are overarching project objectives and are therefore applicable to the whole Scope. In undertaking this commission for the OBC stage, the primary objectives for the *Consultant* are:
- To review and address the identified limitations within the SOC, including the problem definition, baseline economics and options long list to short list work.
 - To undertake the detailed appraisal stage (OBC) of the project, including further modelling, assessment of damages and costs for the shortlisted options, identifying a viable preferred option and providing enhanced detail regarding the preferred option.
 - To support the production of the Outline Business Case and provide the associated appendices, with input from the Client.
 - To identify and develop environmental enhancements and OM4 habitat proposals.
 - To address safety, environmental opportunities, sustainability and carbon throughout.

2 The service

2.1 Outcome specification

- 2.1.1 The *Consultant* shall deliver the service such that it meets the outcomes listed in this section.
- 2.1.2 The *Consultant* shall demonstrate sustainability leadership through fully considering and contributing to achieving the *Client's* environment and sustainability ambitions and targets. These are set out in the EA2025 Action Plan, e:Mission 2030 Strategy, the Defra 25 Year Environment Plan and are in line with the principles of sustainability as described by the United Nation's Sustainable Development Goals.
- 2.1.3 The *Consultant* shall design the scheme taking into account the environmental sensitivities and opportunities of the sites and involving key environmental specialists as appropriate within the *Consultant's* and the *Client's* organisation.
- 2.1.4 The *Consultant* shall ensure the optioneering process fully considers and addresses sustainability including carbon reduction as strategic outcomes. The EA business case template further requires separate option appraisals of sustainability benefits and whole-life carbon to compare with the economic appraisal and promotes a preference for the most sustainable option.
- 2.1.5 The *Consultant* shall ensure the optioneering process fully considers environmental mitigation and opportunities to further conserve and enhance as per our legal and policy obligations but to also contribute to the Environment Agency's ambitions. This includes delivery against OM4, to achieve biodiversity net gain but must also consider wider sustainability opportunities. The *Consultant* shall ensure the optioneering process avoids where possible [AD: feasible], minimises and compensates or offsets any adverse environmental effects.
- 2.1.6 The *Consultant* shall produce an outline design which seeks to provide the optimum economic, technical, social and environmental/sustainability/carbon outcomes, supported by evidence that will enable the *Client* to produce an Outline Business Case.
- 2.1.7 The *Consultant* shall produce an appraisal report and outline design that enables the *Client* to achieve efficiency targets set for this commission and future stages of the project using the Combined Efficiency Reporting Tool (CERT).
- 2.1.8 The *Consultant* shall ensure that the options and final solution take into consideration all relevant guidance and legislation and seek to minimise long-term asset/land management and maintenance costs and carbon.
- 2.1.9 The options will also demonstrate that the *Consultant* has learnt from best practice and demonstrate how optimum flood risk reduction, natural processes, carbon reduction, recreation, good ecological water quality and visual amenity can be combined.
- 2.1.10 This commission must consider planning permission and all other necessary permissions/licences being obtained at detailed design stage. The outline design shall feasibly be able to obtain planning permission.
- 2.1.11 The *Consultant* shall demonstrate that consideration has been given to a long list of potential options, which has led to identification of an appropriate shortlist, which have been appraised to identify a preferred option and developed this option, its impacts, planning and Environmental Impact Assessment (EIA) requirements scoped to a level that it can be priced. The *Consultant* shall develop a series of options to meet the above objectives.
- 2.1.12 The *Consultant* shall assume that the options shortlisted in the SOC provide only a high-level starting point for the OBC and require to be revisited and reassessed against the specified objectives. The *Consultant* shall not assume that the preferred option will necessarily be the same as that identified at the SOC stage.
- 2.1.13 The *Consultant* shall compile the supporting technical documentation required for the *Client* to obtain a screening opinion from the local planning authority

2.1.14 AD: For the avoidance of doubt and notwithstanding any other terms of this Scope the *Consultant's* obligation is to use the skill and care referred to in 20.2 of the NEC4 PSC to Provide the Service in accordance with the Scope. Should any interpretation of this clause present a contradiction and/or ambiguity then NEC4 PSC Clause 20.2 takes precedence.

2.2 Constraints

2.2.1 AD: There are a number of third party assets in the study area (including, but not limited to, highways, rail and reservoir assets) and interaction with these is likely to require specific approvals. No additional studies, assessments or calculations in support of these approvals are included within the OBC scope. The Consultant shall advise the Client if they become aware that the shortlisted options or preferred option are likely to require such approvals as early as possible so that the Client can decide whether inclusion of supporting studies would be prudent to reduce risk later in the design process. If additional studies, assessments or calculations are required, the *Service Manager* shall instruct a change to the Scope and notify a Compensation Event.

2.2.2 AD: The SOC report highlights the following project constraints:

- Land availability: Crown Estate owned land is within the project area and cannot be compulsorily purchased.
- Funding: RBWM have committed to contribute approximately £10 million to flood alleviation works. However, additional funding is likely to be needed to implement the project and this will need to be identified.
- Downstream conveyance: There are constraints associated with the provision of additional downstream weir capacity to allow for potential future flow increases resulting from DHEFIM options.
- Underlying ground conditions: The underlying ground conditions are typically alluvial deposits resulting in the project area being vulnerable to groundwater flooding during periods of elevated river levels, therefore any potential solution to fluvial flooding will also have to consider groundwater flooding.

2.2.3 AD: The SOC report also highlights the following constraints and opportunities with respect to environmental considerations:

- The River Thames Corridor is a very special natural resource that provides an environmentally valuable landscape that is rich in flora, fauna, recreational opportunities and historically important areas.
- Within the project area there are numerous historic and environmentally sensitive sites including Windsor Castle, the Royal Estate of Windsor Great Park and Windsor Forest.
- In the area around Wraysbury there are internationally important Special Protection Area and Ramsar sites (Southwest London Waterbodies). There are also nationally important Sites of Special Scientific Interest (Wraysbury Gravel Pits).
- The project area also encompasses other sensitive areas including many Local Wildlife Sites, Ancient Woodlands, a number of other SSSIs, listed buildings, Registered Parks and Gardens as well as Local Nature Reserves.
- It is likely that a full planning application and statutory Environmental Impact Assessment will be required, depending on the option taken forward.
- Other consents and assessments (e.g. Habitat Regulations Assessment) are likely to be required as any works are likely to impact on nationally and internationally designated sites
- Protected species surveys are likely to be required, including an extended Phase 1 Habitat survey to confirm the surveys' scope and inform a Preliminary Ecological Appraisal.

2.2.4 Biodiversity Net Gain (BNG) requirements will need to be met. Under the Environment Act 2021, the mandatory requirement for all development seeking planning permission will be 10% BNG. This is expected to be applicable from November 2023. For this project, the Consultant should align with the Environment Agency's current target for BNG of 20%.

2.3 *Consultant* project management

2.3.1 In managing the *service* the *Consultant* shall follow all the requirements as set out in the Collaborative Delivery Framework schedules and the relevant content of the Minimum Technical Requirements.

2.3.2 In managing the *service* the *Consultant* shall:

- Contribute monthly to the updates to the project risk register.
- AD: Provide monthly programme updates.
- Provide input to project efficiency CERT Form.
- Attend progress meetings and prepare record minutes within a week for the *Client* to issue.
- Deliver a monthly progress report in the *Client's* standard template (details to be agreed) giving progress against programme, deliverables received and expected through IDP and MIDP, financial summary against programme and forecast project carbon.
- Provide a backup to application for payment in accordance with the *Client's* standard template (Worksheet for actual Cost and Carbon CDF Lot 1).

2.3.3 Submission of an application for payment without this format of backup sheet will not be recognised or treated as a compliant submission.

- Commission capital forecast to be entered on FastDraft monthly & Project forecast carbon outturn to be entered onto FastDraft monthly. The *Consultant* is required to provide a monthly forecast on FastDraft for both carbon and cost in accordance with the following Framework Heads Ups:
 - Framework Heads Up 244 Commercial Clarification 54
 - Framework Heads Up 256 Commercial Clarification 57
- Attend project board meetings as required (AD: assume on a quarterly basis, 8no.).
- Ensure quarterly input into framework performance assessment/environmental performance measures.
- Ensure the *Consultant's* environmental lead provides monthly progress and risk reviews to the *Client* and attends progress meetings, as invited.
- Maintain and show how accurate and up to date information on the whole-life cost and carbon is driving optimum solutions at all stages of design development.
- Capture lessons learnt relevant to scheme delivery for the EA project manager to include in the scheme lessons learnt log to be appended to the OBC.

2.3.4 The contract will be administered using FastDraft.

2.3.5 Procurement of subcontractors: Subcontractors need to be selected using best value processes. This requires the *Consultant* to demonstrate that they have made reasonable attempts to obtain three competitive tenders for all work in excess of £25,000. The only exception to this is work which has been accepted (in writing) by the hub Commercial Services Manager for strategic suppliers or for emergency work.

2.4 Outputs and deliverables

2.4.1 The Consultant shall provide input to product descriptions for key outputs and deliverables that the Consultant shall produce during the appraisal stage. The Consultant shall agree the list of products with the Client and submit the product description for the Client's acceptance before commencing work on the product. The *Consultant* shall produce the following key documents for this commission:

- Project deliverable descriptions
- Project area and objectives review (see 1.4 and 1.6):
- AD: Revised project area
- AD: Revised Project Objectives

Previous studies and historical datasets (see 1.5):

Site investigations, topographic survey (see 3.1.6):

Site investigations, ground investigation (see 3.2.14, 3.2.18 & 3.3.7):

Flood risk and modelling (see 4.1.29):

Economics Appraisal (see 5.1.18):

Environmental assessment (see 6.1.32):

Option development (see 7.1.27):

Stakeholder engagement (see 8.1.10):

Business case submission (see 10.1.1-10.1.8):

Carbon appraisal (see 11.10):

Requirements for the programme (see 14.1.1-14.1.4):

2.4.2 The Consultant shall attend (virtually unless stated otherwise in this scope) the following workshops for this commission

- Risk and optimism bias workshop
- AD: BREEAM Infrastructure scoping meeting
- AD: BREEAM Infrastructure pre-assessment review workshop
- AD: Sustainability challenge workshop
- AD: Initial options workshop
- AD: Shortlisting workshop
- AD: 3no. Design workshops
- Risk workshop (for risk register)
- AD: 4no. Stakeholder workshops

2.4.3 AD: The project notes listed above are required to provide interim information to the *Client* on various tasks as they progress. These do not need to be produced to full report standard but should contain sufficient information, based on data available at the time, to allow the *Client* to make a decision, where needed, on whether any further work should be added to the Scope.

2.4.4 The Consultant shall in accordance with the latest Exchange Information Requirements ensure that a 3D modelling approach is undertaken. The approach should plan to generate object-based native Autodesk format discipline 3D models and to federate these for coordination, alignment and review by the Client purposes. The federated output model should be produced in NavisWorks NWD format and open ifc format.

3 Site investigation

3.1 Topographic survey

- 3.1.1 The *Consultant* will review previous topographic surveys to identify gaps in existing data. The *Consultant* will use this to inform the scope of supplementary topographic survey required. Based on previous reports, it is clear that some parts of the study area do have deficiencies in topographic survey data and that supplementary surveys will be required.
- 3.1.2 AD: The *Consultant* shall produce a short technical note summarising the extent, resolution and type of topographic survey available for the study area, including gaps and data deficiencies.
- 3.1.3 The *Consultant* shall work with EA NEAS to ensure that environmental and sustainability constraints within the likely scheme footprint are identified and included in the survey and to determine if efficiencies can be made by joint working.
- 3.1.4 The *Consultant* shall use the outputs from the existing topographic survey in their modelling and option appraisal where appropriate. The *Consultant* shall liaise with EA's topographic survey lead to ensure that information requirements are covered.
- 3.1.5 AD: The scoping, procurement and delivery of additional topographic survey is not included in the Scope as current significant uncertainty on the likely preferred option means that the level of effort for this task is unknown. The *Service Manager* will instruct a change to the scope for the scoping, procurement and delivery of additional survey where required. It is expected that any additional survey required will be undertaken at two stages:
- After review of all available hydraulic modelling evidence so it can be incorporated into any model updates.
 - After identifying the preferred option so it can be used to inform the outline design.

Topographic survey deliverables

- 3.1.6 AD: The *Consultant* shall prepare the following key deliverables:
- Technical note summarising existing available topographic survey
 - Recommendations on where additional topographic survey will be required and what survey data will be used for

3.2 Ground investigation

- 3.2.1 ~~The *Consultant* shall scope the Ground Investigation required to be able to undertake an options appraisal and detailed design and agree the scope with the *Client*.~~
- 3.2.2 ~~The *Consultant* shall ensure that the environmental risks and opportunities associated with the Ground Investigation, including the collection of environmental evidence to support Appraisal and Assessment, are identified and addressed.~~
- 3.2.3 ~~In scoping the Ground Investigation works the *Consultant* shall include the necessary works to facilitate efficient and sustainable materials management planning and re-use within the project.~~
- 3.2.4 ~~The *Consultant* shall identify any contaminated land within the area of the project and specify testing within the Ground Investigation scope such that it can be classified properly for disposal.~~
- 3.2.5 ~~The *Consultant* shall clearly communicate the scope of the Ground Investigation to the Lot 2 contractor for the Lot 2 contractor to undertake.~~
- 3.2.6 ~~The *Consultant* shall supervise the Ground Investigation undertaken by the Lot 2 contractor.~~

~~The supervision will be subject to a Compensation Event.~~

- 3.2.7 ~~The *Consultant* shall produce a summary of key interpretative decisions for the Ground Investigation undertaken by the Lot 2 contractor.~~

Geotechnical desk study (review of existing data)

- 3.2.8 AD: The aim of the geotechnical desk study is to identify existing data and whether any additional work will be required during the appraisal stage to inform the appraisal of all shortlisted options and the preferred option design development. The locations of the desk study will be informed by current thinking on options footprint, informed by the shortlisted options at SOC stage.
- 3.2.9 AD: The *Consultant* shall commence this task early to facilitate delivery of the expected ground investigation as early as possible in the design development. ~~in time to inform preferred option development. The task should commence once better insight is gained regarding surface water and groundwater flood risk (see Section 4). The task shall include geo-environmental aspects relevant to the options considered.~~
- 3.2.10 AD: The *Client* shall provide to the *Consultant* for review all available ground investigation information relevant to the area of study (British Geological Survey (BGS), data from RTS and any other *Client* projects or provided by partners). The *Consultant* shall assume that any third-party data costs will be paid for as a Compensation Event.
- 3.2.11 AD: The *Client* is aware of comprehensive ground investigation data and reporting held for the RTS project which covers at least part of the project area and shall provide this to the *Consultant* for review. It is assumed that the data will be provided in AGS file format. The *Consultant* shall review this information as part of the geotechnical desk study.

Preliminary geotechnical desktop assessment

- 3.2.12 AD: If sufficient existing information exists, the *Consultant* shall produce preliminary ground models for the project area, possibly subdivided into quadrants (but no more detailed than this) based on the existing information with the expectation that this will be used to inform the development of the options short list, their appraisal, and also the preferred option (should further GI not be delivered in time to avoid programme delay).
- 3.2.13 Consultant shall undertake a preliminary geotechnical desktop assessment to inform the options shortlist, appraisal and development of the preferred option. This will include:
- Assessment of the ground model for the area, based on the readily available information summarised in the geotechnical desk study (review of existing data) described above.
 - Preliminary geotechnical engineering assessment for the main types of measure under consideration.
 - Geotechnical risk register
 - Conclusions and recommendations.
- 3.2.14 AD: The *Consultant* shall prepare a preliminary geotechnical desktop assessment report on the findings.

Ground investigation

- 3.2.15 AD: The scoping, procurement and delivery of ground investigation is not included in the Scope as current significant uncertainty on the likely preferred option means that the level of effort for this task is unknown. The Service Manager will instruct a change to the scope for the scoping, procurement and delivery of additional investigation where required. It is expected that this will be undertaken once the preferred option has been confirmed, to inform the outline design.

Geo-environmental desk study

- 3.2.16 AD: The *Consultant* shall undertake a high-level geo-environmental desk study using existing data provided by the *Client* or that is readily available online. The *Consultant* shall assume that any third-party data costs will be paid for as a Compensation Event.
- 3.2.17 AD: The locations of the desk study will be informed by current thinking on options footprint, informed by the shortlisted options at SOC stage.
- 3.2.18 AD: The *Consultant* shall prepare a geo-environmental desk study report on the findings.

Geotechnical, geo-environmental and groundwater inputs to support optioneering/design

- 3.2.19 AD: The *Consultant* shall allow for limited preliminary ad-hoc advice from geotechnical, geo-environmental and groundwater specialists in support of the optioneering and preferred option design phases. This shall be used to advise on whether additional studies or design calculations may be needed in support of the design process. Scoping and undertaking of these studies is not included in this Scope and would be subject to a Compensation Event if required.

Geotechnical deliverables

- 3.2.20 AD: The *Consultant* shall prepare the following key deliverables:
- Geotechnical desk study report
 - Geo-environmental desk study

3.3 Services search

- 3.3.1 ~~The *Consultant* shall obtain services data from utility companies and shall ensure services data is requested from relevant landowners. This shall include direct costs of obtaining data. This shall be incorporated into the appraisal, including preparation of plans.~~
- 3.3.2 ~~The *Client* will arrange for a non-intrusive survey to detect key utilities (e.g. GPR etc.) to inform SI and or options appraisal. The *Consultant* shall determine the extent of the survey and produce a specification for the survey in accordance with EA Guidance and Principal Designer discussion; defining type and purpose of survey including extents and available information.~~
- 3.3.3 ~~The *Consultant* shall also provide a site supervisor to manage the survey supplier.~~
- 3.3.4 ~~The outputs from this survey shall be included in the appraisal, including revising the plans.~~
- 3.3.5 AD: The *Client* is aware of comprehensive service search information held for the RTS project which covers at least part of the project area and shall provide this to the *Consultant* for review. The *Consultant* shall prepare an initial services search review project note using the information to determine if it provides coverage for the areas of interest for the options considered and any major constraints that need investigating further. The areas where further services search information is required shall also be identified.
- 3.3.6 AD: The scoping, procurement and delivery of services searches is not included in the Scope as current significant uncertainty on the likely preferred option means that the level of effort for this task is unknown. The Service Manager will instruct a change to the scope for the scoping, procurement and delivery of additional service searches where required. It is expected that this will be undertaken once the preferred option has been confirmed, to inform the outline design.

Services search deliverables

- 3.3.7 AD: The *Consultant* shall prepare the following key deliverables:
- Project note: initial services search review.

4 Flood risk and modelling

~~Hydrology and hydraulics~~

4.1 General

- 4.1.1. AD: The *Consultant* shall use the findings of previous studies on flood risk and modelling to develop the problem definition for the fluvial flood risk and the other sources of flood risk, surface water / pluvial and groundwater.
- 4.1.2. AD: The hydraulic model used to determine the fluvial flood risk at SOC stage will provide the initial baseline model to be updated for baseline and options modelling. No appraisal of the other sources of flood risk was completed at SOC stage, and the OBC requires baseline desk studies as a starting point to define the requirements of further investigations.
- 4.1.3. AD: The *Consultant* shall reference the relevant studies completed for the RTS project and hold up to 2no. virtual meetings with the RTS project team and specialists to discuss the flood risk problems and issues, available datasets and models and determine the most efficient and proportionate approach to further investigate the baseline flood risks and options.

Hydrology and hydraulic model verification

- 4.1.4. The extents of the modelling and assumptions made are within the model report prepared at SOC stage.
- 4.1.5. The *Consultant* shall verify the modelling evidence with quality and extent checks and include this as part of a Design Note.
- 4.1.6. AD: The *Consultant* shall verify the hydrological inputs to the existing model are accurate and calibrated using historical data.
- 4.1.7. The *Consultant* shall provide the *service* in accordance with the Modelling Technical Scope, included in Appendix 2.
- 4.1.8. ~~Additional runs shall be allowed for the final design case to give a sensitivity analysis on key parameters.~~
- 4.1.9. ~~The output shall be designed to interface with the economic analysis to allow for depths and durations of flooding to be determined.~~
- 4.1.10. AD: When completing the hydrology and hydraulic model verification, the *Consultant* shall identify modifications which are required to improve the model quality or suitability for its intended purpose, for review by the *Client*. The *Service Manager* will notify any consequential change to the Scope.
- 4.1.11. AD: The *Consultant* shall report on the measures they have taken to reduce the carbon emissions from modelling activities. This shall include an estimate of carbon savings compared to business as usual.

Baseline hydraulic modelling

- 4.1.12. AD: The *Consultant* shall identify opportunities to reduce model run time to facilitate optioneering, for agreement with the *Client*. This may include, but is not limited to, reduction in model extent, reduction in model resolution, changes in model parameters. The *Consultant* shall document any changes made to the model in the modelling report. The *Consultant* shall demonstrate that the updated model is representative of the flood risk shown by the original model in the area of interest. The reduced model extents shall remain sufficient to determine whether options tested result in an increase in flood risk elsewhere.
- 4.1.13. AD: The *Consultant* shall undertake hydraulic modelling of the baseline scenarios (Do Nothing and Do Minimum) and of the existing scenario (Sustain option). The *Consultant* shall agree the

assumptions made for the Do Nothing, Do Minimum and Sustain scenarios with the *Client*. The *Client* will advise whether this scenario should include or exclude the expected impacts of the River Thames Scheme.

- 4.1.14. AD: The *Consultant* shall complete model runs for the following, which totals 40no. runs for each of the three scenarios, therefore a total of up to 120no. runs:
- flood events: 50% AEP, 20% AEP, 10% AEP, 5% AEP, 3.3% AEP, 2% AEP, 1.3% AEP, 1% AEP, 0.5% AEP, 0.1% AEP.
 - climate change epochs: present day (no uplift), 2020s, 2050s, 2080s as defined in Flood and coastal risk projects, schemes and strategies: climate change allowances (Environment Agency, updated May 2022).
- 4.1.15. AD: For the scenarios described in 4.1.13, the *Consultant* shall produce 2D model outputs in ASCII grid format for velocity, depth, level, hazard and time of onset.
- 4.1.16. AD: The *Consultant* shall undertake sensitivity testing on the existing scenario (Sustain option) for the 1% AEP present day event. Tests are required on hydraulic roughness, upstream boundary conditions (model inflow), downstream boundary conditions, and 1D-2D (bank) spill coefficients. Sensitivity testing is also required on the presence/absence of the River Thames Scheme. Any further sensitivity testing identified as beneficial during project delivery will be instructed by the Service Manager as a change in scope and notified as a Compensation Event.
- 4.1.17. AD: The *Consultant* shall use the results of the sensitivity testing to determine an initial estimate for a residual uncertainty allowance. The *Consultant* shall document this assessment in a project note.
- 4.1.18. AD: The *Consultant* shall document the baseline modelling in a baseline modelling report. This shall include a clear technical description of any changes made to the original model supplied (as listed in 1.5), a summary of model results including mapping of flood extents, a summary of model performance, and details of the sensitivity testing.

Hydraulic modelling – initial optioneering

- 4.1.19. AD: The *Consultant* shall undertake hydraulic modelling of the scenarios described in 7.1.2 and in 7.1.3. These model runs shall be undertaken for the present day 3.3%, 1.3% and 1% present day events and for the 1% AEP event for the 2020s, 2050s and 2080s epochs (6no. runs per scenario). The *Consultant* shall produce 2D model outputs in ASCII grid format for velocity, depth, level, hazard and time of onset. The *Consultant* shall also produce grids comparing the peak level with the equivalent existing conditions (Sustain option) scenario.

Hydraulic modelling – short-list / preferred options

- 4.1.20. AD: The *Consultant* shall undertake hydraulic modelling of the short listed options to support the economic and technical assessment described in 7.1.4. The *Consultant* shall complete model runs for the following, which totals up to 40no. runs for each option, therefore a total of up to 200no. runs based on 5no. different options considered in the short list.
- flood events: 50% AEP, 20% AEP, 10% AEP, 5% AEP, 3.3% AEP, 2% AEP, 1.3% AEP, 1% AEP, 0.5% AEP, 0.1% AEP.
 - climate change epochs: present day (no uplift), 2020s, 2050s, 2080s as defined in *Flood and coastal risk projects, schemes and strategies: climate change allowances* (Environment Agency, updated May 2022).
- 4.1.21. AD: The *Service Manager* shall instruct a change to the Scope and notify a Compensation Event if additional options require testing in the hydraulic model.
- 4.1.22. AD: The *Consultant* shall produce 2D model outputs in ASCII grid format for velocity, depth, level, hazard and time of onset. The *Consultant* shall also produce grids comparing the peak level with the equivalent existing conditions (Sustain option) scenario.

- 4.1.23. AD: The *Consultant* shall produce an options modelling report documenting how each option has been represented in the model, a summary of model results including mapping of flood extents, and a summary of model performance.
- 4.1.24. AD: No hydraulic modelling of low flows is included in the Scope. If this is found to be required, the *Service Manager* shall instruct a change to the Scope and notify a Compensation Event.
- 4.1.25. AD: No modelling of flood risk from other (non-fluvial) sources is included in the Scope. If this is found to be required, the *Service Manager* shall instruct a change to the Scope and notify a Compensation Event.

Sources of flood risk appraisal (review of flood history and other evidence)

- 4.1.26. AD: The *Consultant* shall undertake a desk study appraisal of fluvial flood risk based on existing data and previous modelling (by others). It is expected that this study will reach a conclusion on locations where this flood risk is a significant issue. If the recommendations identify that further work is required, this shall be agreed with the *Service Manager* shall instruct a change to the Scope and notify a Compensation Event.
- 4.1.27. AD: The *Consultant* shall undertake a desk study appraisal of surface water / pluvial flood risk based on existing data and previous modelling (by others). It is expected that this study will reach a conclusion on locations where this flood risk is a significant issue. It should also determine whether existing models are available and provide recommendations for any baseline modelling and options modelling, and the need for data collection and model updates. If the recommendations identify further work that is required, this shall be agreed with the *Client* and RBWM and the *Service Manager* shall instruct a change to the Scope and notify a Compensation Event.
- 4.1.28. AD: The *Consultant* shall undertake a desk study appraisal of groundwater flood risk throughout the areas considered of interest (those at flood risk from other sources and potentially impacted by the project). It is expected that this study will provide recommendations on whether groundwater is a significant issue and whether further data collection and quantification of this source of risk is warranted. If the recommendations identify further work that is required, this shall be agreed with the *Client*, who will instruct a Compensation Event.

Flood risk and modelling deliverables

- 4.1.29. AD: The *Consultant* shall prepare the following key deliverables which will include advance issue of a series of project notes to allow feedback prior to the final report being developed:
- Fluvial flood risk baseline hydraulic modelling report:
 - Project note: existing hydraulic modelling and hydrology review
 - Project note: method statement on proposed approach to hydraulic modelling
 - Project note: residual uncertainty allowance
 - Fluvial flood risk options hydraulic modelling report:
 - Project note: initial options hydraulic modelling
 - Project note: shortlist options hydraulic modelling
 - Other sources of flooding:
 - Project note: fluvial, surface water/pluvial and groundwater flood risk
 - Carbon
 - Project note: measures to reduce carbon emissions from modelling activities

5 Economics appraisal

- 5.1.1 The *Consultant* shall undertake an economic appraisal in line with FCERM – Appraisal Guidance (FCERM-AG), Supplementary guidance on the mental health costs of flooding and the HM Treasury ‘Green Book’. This will include a valuation of all the key benefits, both economic and environmental, carbon assessment and whole life costs in order to produce a cost benefit analysis that will be used to determine the selection of a preferred option.
- 5.1.2 Costs will be the whole life expenditure including, design, investigation, construction, operation and maintenance. Costs can be devised in the most efficient but accurate manner and Early Supplier Engagement (ESE) input is required. The *Client* will provide support using the Project Cost Tool and based on experience of the *Client*’s PCM team to complete this estimate.
- 5.1.3 Carbon will be whole-life emissions of an asset including embodied (construction), operation, maintenance and end of life emissions. The values will be calculated from the carbon tool (OI 120_16) to help optimise all options through all stages of design and business case development.
- 5.1.4 AD: The costing task is a collaborative exercise involving the *Client* and *Consultant* and will start once the options short list development is completed. The option drawings will provide the basis for the work.
- 5.1.5 AD: The capital costs for the preferred option will be estimated by the ESE contractor. This work will be instructed by the *Client* but the *Consultant* shall review the output and provide comment to the *Client*. The *Consultant* should expect 4 weeks for this process to be completed.
- 5.1.6 AD: The *Consultant* shall compile an estimate of future costs (Operations & Maintenance and asset renewal if relevant) in consultation with the *Client*’s Asset Performance team and considering other data sources (e.g. existing local data and the Long Term Costing Tool). This should include costings to cover 30 years’ maintenance of the habitats delivered for Biodiversity Net Gain.
- 5.1.7 AD: The *Consultant* shall convene a workshop to agree risk and optimism bias applicable to the options. The *Client* may invite its ESE contractor to this workshop. The *Consultant* shall capture the conclusions of this in the output associated with this overall task.
- 5.1.8 Risk and Optimism Bias allowances shall be calculated in accordance with Risk Guidance for Capital Flood Risk Management Projects. The *Consultant* shall attend 2 no. risk workshops facilitated by others / the *Consultant* to deliver the Scope.
- 5.1.9 Selection of the preferred option shall be undertaken in accordance with the FCERM-AG decision rules including consideration of the most sustainable and lowest carbon options following the EA business case template and guidance.
- 5.1.10 The assessment shall include for sensitivity tests to look at the effects of any changes to key parameters / beneficiaries and to demonstrate the robustness of any key assumptions made.
- 5.1.11 The *Consultant* shall produce, and maintain through the project, the FCRM Partnership Funding Calculator for Flood and Coastal Erosion Risk Management Grant in Aid (The PF calculator). The PF calculator shall be updated at the request of the *Client* or when evidence obtained during the project suggests a significant change is likely. The *Consultant* shall inform the *Client* of any expected significant change in scheme choice or affordability at the earliest opportunity as the project develops.
- 5.1.12 The *Consultant* shall use this data to assist the *Client* in identifying suitable sources of external funding.
- 5.1.13 AD: The *Consultant* shall allow for 100 hours’ input to support the *Client* in identifying potential sources of partnership funding and additional benefits.
- 5.1.14 AD: The *Consultant* shall consider adaptive approaches based on staged delivery of options

over the economic appraisal period of 100 years to determine if this could provide a more efficient and viable solution for adapting to climate change, and other catchment changes, than based only on initial investment. For the economic appraisal, the modelling results from the above will be adjusted to reflect delivery in different climate change epochs, rather than attempting to model every scenario. This is considered a proportionate approach.

5.1.15 The *Consultant* shall provide the results of this section of the study in an economics report which shall feed into the economics appendix of the OBC. This will provide a clear view of the process in order that the economic lead for the review team can review the process. As a minimum this will include, but not be limited to:

- Overview of methodology adopted.
- Parameters quantified and standards used (e.g. Multi-Coloured Manual).
- Parameters considered and not used together with reasons.
- Key receptors/ major beneficiaries.
- Wider benefits.
- Assumptions made.
- How the decision rules have been applied.
- What sensitivity tests have been applied and why.
- Treatment of climate change, carbon reduction and sustainability benefits.
- FCERM-AG spreadsheets and PF calculator.

Economic appraisal deliverables

5.1.16 AD: The *Consultant* shall prepare the following key deliverables:

- Project note: whole life costing (including risk and optimism bias)
- Project note: adaptive pathways
- Partnership funding calculator for preferred option
- Economics report
- Carbon Impact Tool

6 Environmental assessment

6.1.1 The *Consultant* shall confirm in the activity schedule the expected environmental outputs agreed through engagement with NEAS. The activities identified shall take into account proportionality whilst supporting the achievement of the *Client's* wider aspirations.

6.1.2 AD: The *Consultant* shall produce Product Descriptions for all the environmental deliverables listed in this section. Each Product Description shall be submitted to the *Client* for acceptance prior to commencing work on each deliverable.

6.1.3 The *Consultant* shall give due consideration of the environment and sustainability risks and opportunities throughout the design evolution of the project to maximise the delivery of *Client* and project objectives.

6.1.4 The *Consultant* shall ensure that the project level assessment sits within the context of any previous strategic environmental assessment and supporting information for the area and brings forward all relevant information and conclusions.

6.1.5 The *Consultant* shall establish and understand the baseline and the legal and policy context to identify the key environmental/sustainability risks and opportunities. This shall support the

options appraisal and justify the need for any future environmental assessment activity.

- 6.1.6 The *Consultant* shall report the findings of the scoping exercise as required which will form an Appendix to the OBC with relevant summary details incorporated into the relevant section(s) of the OBC main text.

Sustainability performance

- 6.1.7 AD: The *Consultant* shall provide a qualified BREEAM Infrastructure assessor and undertake a scoping workshop with the project team to identify the BREEAM Infrastructure assessment issues to be scoped into the assessment. The number of BREEAM Infrastructure assessment issues applicable to the project will be proportionally scoped based on the sustainability impacts of the project. All BRE Global Ltd registration fees shall be paid by the Client.
- 6.1.8 AD: The *Consultant* shall set up and undertake the BREEAM Infrastructure assessment and evidence-gathering throughout the services. The assessment shall be based on the version of the BREEAM Infrastructure Technical Manual current at the time of signing the appraisal contract. The *Consultant* shall use the *Client's* specified BRE online tool (BREEAM Projects) and any accompanying BREEAM Infrastructure guidance.
- 6.1.9 AD: The BREEAM Infrastructure assessor will lead a BREEAM Infrastructure workshop as early as possible in scheme development to build understanding of BREEAM Infrastructure requirements, identify the evidence to be produced, who will be responsible for providing this evidence and when it might reasonably be expected.
- 6.1.10 AD: The *Consultant* shall collate, review and upload evidence to BREEAM Projects relevant to the stage being assessed. This shall be an ongoing process throughout the project. The *Consultant* shall update the project team on progress, highlight where evidence is incomplete and indicate evidence expected before the next milestone.
- 6.1.11 AD: On completion of the BREEAM Infrastructure Strategy Stage Assessment the *Consultant* shall ensure commentary, credits and evidence are entered on BREEAM Projects for all relevant criteria.
- 6.1.12 AD: The *Consultant* shall support the verification process by attending meetings and responding to queries, as required.
- 6.1.13 AD: At least one Sustainability Challenge workshop will be run for the project. The purpose of the workshop is to build an understanding of the requirements and opportunities to deliver sustainable outcomes for the project including, but not limited to, the four themes of the Environment Agency's sustainability plan, eMission2030: responding to the climate emergency, optimising our use of resources, benefitting people and communities and delivering environmental net gain.
- 6.1.14 AD: The *Consultant* shall provide a suitably experienced sustainability lead, preferably independent of the project, to set up, run and report on a project Sustainability Challenge workshop early in the project's development. This does not preclude workshops being held later in the project's life cycle.
- 6.1.15 AD: The sustainability lead shall organise the Sustainability Challenge workshop, in partnership with the *Client's* Project Manager and subject matter experts, as required.
- 6.1.16 AD: Further Sustainability Challenge workshops may be run through the project lifecycle, at the *Client's* discretion, as necessary, and for groups of projects in a sub-programme when appropriate. Where these are required, the *Service Manager* shall instruct a change to the Scope and notify a Compensation Event.

6.1.17 AD: Any opportunities identified in the Sustainability Challenge workshop shall be documented in a Sustainability Opportunities Register and reviewed regularly by the combined project team to allow them to be implemented.

Optioneering stage

6.1.18 AD: The *Consultant* shall produce up to 5no. Environmental Design Concept drawings to support the long list to short list stage of optioneering.

6.1.19 AD: The following environmental activities/deliverables are required to support environmental assessment of the short-listed options:

- The *Consultant* shall organise and attend a site visit with the *Client*. The *Consultant* shall ensure attendance of their environmental lead for the project, plus up to 3no. specialists as required. It is assumed that the site visit can be completed in one standard working day (8 hours).
- The *Consultant* shall provide a note within two weeks of the site visit summarising the visit and its findings.
- The *Consultant* shall produce a Preliminary Ecological Appraisal Report. This shall include relevant desk-based data for the entire project area (as defined in Figure 1) and site walkover results only for areas accessed on the site visit. The *Consultant* shall inform the *Client* whether the study would benefit from any additional site-based information. If further site-based information is required, the *Service Manager* shall instruct a change to the Scope and notify a Compensation Event.
- The *Consultant* shall produce a Preliminary Historical Environment Appraisal Report. This shall include relevant desk-based data for the entire project area (as defined in Figure 1) and site walkover results only for areas accessed on the site visit. The *Consultant* shall inform the *Client* whether the study would benefit from any additional site-based information. If further site-based information is required, the *Service Manager* shall instruct a change to the Scope and notify a Compensation Event.
- The *Consultant* shall produce a Preliminary Landscape and Visual Appraisal Report. This shall include relevant desk-based data for the entire project area (as defined in Figure 1) and site walkover results only for areas accessed on the site visit. The *Consultant* shall inform the *Client* whether the study would benefit from any additional site-based information. If further site-based information is required the *Service Manager* shall instruct a change to the Scope and notify a Compensation Event.
- The *Consultant* shall produce up to 5no. Environmental Site Appraisal Plan drawings at 1:1,250 @ A1 scale. If additional drawings are required, due to the scale/complexity of the preferred option the *Service Manager* shall instruct a change to the Scope and notify a Compensation Event.

6.1.20 AD: Once a short list of options has been established (see 7.1.4), the *Consultant* shall review the activities listed in 6.1.189 and identify any changes required to the Scope (including any changes in the assumptions/coverage of the studies). The scope of activities identified shall take into account proportionality whilst supporting the achievement of the *Client's* wider aspirations. If changes are identified, these shall be agreed with the project NEAS officer and the *Service Manager* shall instruct a change to the Scope and notify a Compensation Event.. Following agreement, the *Consultant* shall undertake the activities listed in 6.1.189 in accordance with the Minimum Technical Requirements.

6.1.21 AD: The *Consultant* shall produce 5no. Landscape Options Plans for the shortlisted options at 1:1,250 @ A1 scale. If additional drawings are required, due to the scale/complexity of the options the *Service Manager* shall instruct a change to the Scope and notify a Compensation Event.

6.1.22 AD: The *Consultant* shall use the Landscape Options Plans to scope the requirements for biodiversity net gain surveys and assessment for the shortlisted options. The scope shall be agreed with the *Client* and if additional surveys and assessment are required, the *Service*

Manager shall instruct a change to the Scope and notify a Compensation Event. To support in the scoping, the Consultant shall undertake a site walkover. It is assumed that this will be completed within a working day (8 hours) and will be attended by the Consultant's river condition assessment and terrestrial ecology assessment leads.

Preferred option development

- 6.1.23 AD: The *Consultant* shall undertake a Habitat Regulations Likely Significant Effect Assessment to identify if the preferred option will have a significant effect on any internationally designated site covered by the Habitat Regulations.
- 6.1.24 AD: The *Consultant* shall undertake a Water Environment (WFD) Regulations (WER) Assessment Screening and Preliminary Assessment to determine whether the preferred option could have an adverse or beneficial impact on WER waterbodies and whether any further assessment is required. The *Client* will review the findings and, if required, the *Service Manager* shall instruct a change to the Scope and notify a Compensation Event.
- 6.1.25 AD: The *Consultant* shall scope the required biodiversity net gain assessment for the preferred option and provide this scope to the *Client* for agreement. Once agreed, the *Service Manager* shall instruct a change to the Scope and notify a Compensation Event.
- 6.1.26 AD: The *Consultant* shall consider the application of any relevant current EIA Regulations and assess the requirement for a statutory EIA including, but not limited to, Town and Country Planning and Land Drainage Improvement Works. Where a project will or could be subject to a statutory EIA the *Consultant* shall obtain a screening opinion from the relevant Competent Authority/Authorities. The *Consultant* shall provide the screening documentation to the *Client's* NEAS officer for acceptance prior to submitting it for a screening opinion, including any mitigation assumed.
- 6.1.27 AD: Where a statutory EIA is required for the preferred option, the *Consultant* shall compile an Environmental Impact Assessment (EIA) Scoping Report in accordance with the EIA Regulations and obtain an EIA Scoping Opinion from the relevant Competent Authority/Authorities. The *Consultant* shall submit the scoping documentation to the *Client's* NEAS officer for acceptance prior to submitting it to the Project Team for a scoping opinion.
- 6.1.28 AD: The *Client* shall obtain a letter of support from Natural England, where this is required, to accompany the Outline Business Case. The *Consultant* shall provide the *Client* with support to facilitate this process.
- 6.1.29 AD: The *Consultant* shall produce a Historic Environment Management Plan for the preferred option.
- 6.1.30 The *Consultant* shall produce a scope for a Tree Survey and Arboricultural Impact Assessment for trees within the scheme footprint to BS 3587. Once agreed, the *Service Manager* shall instruct a change to the Scope and notify a Compensation Event.. for undertaking the survey and Arboricultural Impact Assessment.
- 6.1.31 AD: The *Consultant* shall produce up to 5no. Indicative Landscape Plan drawings at 1:1,000 @ A1 scale for the preferred option. If additional drawings are required, due to the scale/complexity of the preferred option, these shall be agreed with the *Client*, and, if required, the *Service Manager* shall instruct a change to the Scope and notify a Compensation Event. The *Consultant* shall provide sufficient detail to inform production of the Landscape Cost Estimate by the *Client's* cost consultant.

Environmental assessment deliverables

- 6.1.32 AD: The *Consultant* shall prepare the following key deliverables which will include advance issue of a series of product description documents to allow feedback prior to the final report being developed:

- BREEAM Infrastructure scoping note
- BREEAM Infrastructure pre-assessment tracker
- BREEAM Infrastructure strategy stage assessment
- Sustainability opportunities register
- 5no. Environmental Design Concept drawings
- Summary note for environmental site visit
- Preliminary Ecological Appraisal Report
- Preliminary Historical Environment Appraisal Report
- Preliminary Landscape and Visual Appraisal Report:
- 5no. Environmental Site Appraisal Plans (ESAPs)
- Technical note on ability of shortlisted options to meet Biodiversity Net Gain Requirements (product description: Biodiversity Net Gain technical note for shortlisted options (assessment methodology))
- 5no. Landscape Options Plans
- Habitat Regulations Likely Significant Effect Assessment
- WER Assessment Screening and Preliminary Assessment
- Scope of Biodiversity Net Gain assessment
- EIA screening documentation
- EIA scoping report and scoping determination documentation
- Historic Environment Management Plan
- Scope for Tree Survey and Arboricultural Impact Assessment
- 5no. Indicative Landscape Plans

7 Option development

7.1.1 ~~The *Consultant* shall undertake an options appraisal, which will include a review of the previous work, to prepare a long list of options. The long list shall not be constrained by previous work and will be agreed with the *Client* at an options meeting, where the *Client* will invite representation from (add or delete as necessary) area FCRM, the ESE contractor's representative, NEAS, MEICA, Field Services and the Principal Designer. The *Consultant* shall screen and assess this long list of options for technical, environmental, sustainability, carbon and economic suitability, as considered appropriate.~~

Initial optioneering

7.1.2 AD: The *Consultant* shall review the long list of measures identified in the SOC report to prepare an initial long list of options. The *Consultant* shall identify and screen an initial long list of options to determine their effectiveness in reducing flood risk as follows:

- Options between Sustain and Do Minimum: The *Consultant* shall agree with the *Client* an initial list of 2no. options for testing in the hydraulic model.
- Raised flood defences: The *Consultant* shall agree with the *Client* an initial list of 5no. different flood defence alignments for testing in the hydraulic model. The *Consultant* shall agree with the *Client* whether the scenarios are to include "glass-walling" of the defences.
- Floodplain conveyance: The *Consultant* shall agree with the *Client* an initial list of 3no. different floodplain conveyance options for testing in the hydraulic model.
- River corridor conveyance: The *Consultant* shall agree with the *Client* an initial list of 3no. different river corridor conveyance options for testing in the hydraulic model.
- Structure modifications: The *Consultant* shall agree with the *Client* an initial list of 3no. different structure modification options for testing in the hydraulic model.
- Reduce downstream levels: The *Consultant* shall agree with the *Client* and test in the hydraulic model 2no. different scenarios for downstream level reduction.
- Flow diversion/modified abstractions: The *Consultant* shall agree with the *Client* and test in the hydraulic model 2no. different scenarios for diversion of flood flows or different abstraction regimes (to be tested for flood conditions only)
- Increased channel maintenance: The *Consultant* shall agree with the *Client* and test in the hydraulic model 1no. channel maintenance regime.
- Flood storage: The *Consultant* shall agree with the *Client* an initial list of 3no. different flood storage options for testing in the hydraulic model. This should consider work already undertaken for the Thames Valley Flood Scheme (TVFS), where appropriate. The *Client* shall provide the relevant information from TVFS.
- Aquifer recharge: The *Consultant* shall undertake a simple desk-based assessment based on available flood history information, and other readily available relevant information, to determine whether aquifer recharge is likely to be feasible given the expected interdependency between river and groundwater levels.
- Temporary defences: The *Consultant* shall agree with the *Client* an initial list of 3no. different temporary defence alignments for testing in the hydraulic model.
- Land management: The *Consultant* shall agree with the *Client* 2no. different upstream inflow scenarios for testing in the model that are considered representative of the type of impacts that land management changes may have on catchment flows. This should draw on the results of the land management (natural flood management) optioneering already completed for the Thames Valley Flood Scheme (TVFS). The *Client* shall provide the relevant information from TVFS.
- Flood-proofing: The *Consultant* shall undertake 3no. Flood Modeller Damage Calculator runs to determine the potential impacts of flood proofing on properties.

- Land-use planning: The *Consultant* shall undertake a high-level review of land-use planning measures that would be consistent with existing strategies.

7.1.3 AD: The *Consultant* shall present the findings of the screening described in 7.1.2 to the *Client* in an initial options workshop. At this workshop the *Consultant* and *Client* shall agree additional options (up to 3no.), including combinations, to be screened. These may be refinements to the previously tested options or new options. The *Service Manager* will instruct a change to the scope and notify a Compensation Event for any additional options to be tested over those described.

Short list option development

7.1.4 Following this screening, the *Consultant* shall prepare a short list for option development for the *Client's* approval, giving reasons for including or excluding each of the options. The most sustainable option shall be included in the short list. On the agreement of the *Client*, the *Consultant* shall assess in more detail these options for technical, environmental and economic suitability, as discussed in the relevant sections of this brief, utilising the evidence and data collated as part of this commission.

7.1.5 AD: The *Consultant* shall lead a workshop to review the findings of the initial options screening exercise and the Environmental Design Concept drawings to determine the short list of options to be considered.

7.1.6 AD: It is assumed that 5no. options (packages of measures) will be included in the short list. If additional options require inclusion, the *Service Manager* shall instruct a change to the Scope and notify a Compensation Event

7.1.7 AD: The *Consultant* shall arrange a site visit by the core team to support the shortlist option development.

7.1.8 AD: The *Consultant* shall develop the outline design of the shortlisted options to a point where sufficient confidence is gained to allow their appraisal (options modelling, environmental assessment, carbon assessment, informed public consultation, option costing to circa +/-45% confidence by the ESE Contractor). The *Consultant* shall produce Appraisal Summary Tables comparing the options.

7.1.9 AD: A key component of this task will be the production of drawings for each option. These drawings should adopt the *Client's* CAD requirements – (3D drawings of all short list options and use of the *Client's* object standards. It is assumed that 2no. drawings will be produced for each of the 5no. shortlisted options (a general arrangement plan and a details/sections drawing for each). If additional drawings are required, the *Service Manager* shall instruct a change to the Scope and notify a Compensation Event.

7.1.10 Options appraisal shall include engagement with the ESE contractor on pricing, buildability and maintainability and the *Client* including Field Services and Area FCRM.

7.1.11 The *Consultant* shall analyse/appraise the carbon footprint of options as outlined in Section 11.

7.1.12 The *Consultant* shall seek options that support the e:Mission2030 sustainability targets.

7.1.13 The *Consultant* shall use these outputs to select a preferred option. The *Consultant* shall facilitate design workshops (AD: assume 3no.), attend/ facilitate risk workshops (AD: assume 1no.) to produce a risk register with analysis in accordance with LIT 14847 Risk Guidance for Capital Flood Risk Management Projects.

7.1.14 AD: The *Consultant* shall use these outputs to select the preferred option, for agreement with the *Client*.

7.1.15 AD: The *Consultant* shall document the long listing and short listing process and selection of

the preferred option in an options appraisal report. This should include proportionate and adequate evidence in support of decision making in line with FCERM appraisal guidance. This may need to be used as evidence subject to future scrutiny (including judicial review). It can be expected that further work would be necessary if there is a legal challenge to the project proposals (including judicial review) and this work is not included in this Scope. The Consultant shall not provide legal support, which would need to be provided by others.

- 7.1.16 ~~The Consultant shall develop the business case for the preferred option and the outline design including provision of specification, drawings and documentation required for Early Supplier Engagement.~~

Preferred option development

- 7.1.17 AD: The *Consultant* should assume for pricing the design of the preferred option that the preferred option will be similar in scale, option type and location to the preferred option identified at SOC stage (as identified in section 1.3 of this Scope). Any difference in level of effort required to complete the outline design should be identified by the *Consultant* as early as possible and additional work agreed with the *Client* as a change in scope, notified by the Service Manager as a Compensation Event.
- 7.1.18 AD: The *Consultant* shall develop the outline design for the preferred option in sufficient detail to allow the completion of the environmental assessment and a higher degree of cost confidence than achieved at short list stage (circa +/- 30% total risk and optimism bias). The *Consultant* shall engage the ESE contractor throughout. The *Consultant* shall allow for cross-disciplinary input into development of the design.
- 7.1.19 AD: The *Consultant* shall produce up to 10no. drawings with sufficient detail to inform costing by the Early Supplier Engagement (ESE) contractor and to input into the carbon calculator (see Section 11). The *Consultant* shall produce a design report detailing key design principles, technical considerations, design decisions and limitations.
- 7.1.20 AD: The *Consultant* shall liaise with relevant officers from RBWM and key stakeholders during the preferred option development to ensure information, advice and any views from these organisations on the proposals are considered. The *Client* should be made aware of any planned engagement with external parties and be issued notes documenting any engagement.
- 7.1.21 AD: The *Consultant* shall develop the outline design in accordance with the requirements of the Environment Agency's Safety, Health, Environment and Wellbeing Code of Practice.
- 7.1.22 AD: The *Consultant* shall arrange a site visit by the core team to support the preferred option development. It is assumed that this can be completed within 8 hours. This shall be attended by the *Consultant's* technical lead, environmental lead, landscape lead and engineering lead.
- 7.1.23 AD: The *Consultant* shall produce a basic buildability statement for the preferred option. The *Consultant* shall ensure that the buildability statement includes an assessment of how the works could be safely and effectively constructed, consideration of construction access, working area, traffic movements, material handling and identify any residual hazards. This will be presented in a project note.
- 7.1.24 AD: The *Consultant* shall update the Design Hazard Elimination and Risk Register and prepare a draft RaG list for the preferred option.
- 7.1.25 AD: The *Consultant* shall develop a 3D model of the preferred option, as required by the Environment Agency Employer's Information Requirements.
- 7.1.26 The *Client* shall draft the scope for the next stage of the project (OBC-FBC) and the *Consultant* shall support the *Client* to produce the scope.

Option development deliverables

7.1.27 AD: The *Consultant* shall prepare the following key deliverables which will include advance issue of a series of project notes to allow feedback prior to the final report being developed:

- Options appraisal report:
 - Project note: initial long list options for testing
 - Project note: additional long list options
 - Project note: aquifer recharge feasibility desk-based assessment
 - Project note: flood proofing damage calculator assessment
 - Project note: high-level review of land-use planning measures
 - Project note: shortlisted options
- Presentation materials for initial options workshop
- 3D model of each short-listed option
- 2no. (up to) drawings for each shortlisted option
- Design report
- 10no. (up to) outline design drawings for preferred option
- Buildability assessment
- Design Hazard Elimination and Risk Register (HERR)
- Draft RaG list
- 3D model of the preferred option

8 Stakeholder engagement

- 8.1.1 ~~The *Consultant* shall prepare / review and update and maintain a stakeholder engagement plan in accordance with the EA guidance “Working with Others” including agreement of key stakeholders with discussion with the *Client*. The *Consultant* shall ensure that the results from the stakeholder engagement informs the appraisal.~~
- 8.1.2 ~~Monthly/Quarterly circulation of updated communications record at progress meetings.~~
- 8.1.3 ~~The *Consultant* shall provide technical support, prepare information for and attend a key stakeholder meeting as well as preparing information and reviewing external communications prepared by Others (e.g. quarterly newsletters).~~
- 8.1.4 ~~The *Client* will arrange and advertise 2no. public exhibitions. The *Consultant* shall provide technical support, prepare information for input into the consultation documents and prepare site plans and typical ~~outline design~~ [AD: landscape] drawings for public display. AD: No allowance has been made for potential expenses; these will be the subject of a Compensation Event as required. Attendance at these meetings shall include the *Consultant* project manager, environmental lead and other roles as necessary.~~
- 8.1.5 The *Consultant* shall provide technical support and attend 4no. meetings with key external organisations/individuals impacting upon option selection process. AD: No allowance has been made for potential expenses; these will be the subject of a Compensation Event as required. ~~The current known stakeholders are identified in Appendix XX.~~
- 8.1.6 AD: The *Consultant* ~~is not expected to~~ shall attend the exhibitions described in 8.1.4. Attendance at the meetings/workshops described in 8.1.4 and 8.1.5 will be in-person unless otherwise agreed. Attendance at these meetings should include the *Consultant* technical lead, environmental lead and stakeholder engagement lead (see **Error! Reference source not found.**).
- 8.1.7 The *Consultant* shall consider the following and document how they are addressed on this contract:
- Public diversity in engagement and perception of the project team.
 - Accessibility.
 - How inclusive environments are created for the project team.
- 8.1.8 AD: Activities undertaken by the *Consultant*'s stakeholder engagement personnel to support the *Client* will be covered as an extension of scope, covered by a compensation event. Activities may include, but not be limited to:
- Preparation of, and updates to, the Stakeholder Engagement Plan and other communications and engagement documents
 - Preparing and/or reviewing external communications (e.g. quarterly newsletters, digital newsletters etc.).

Stakeholder engagement deliverables

- 8.1.9 AD: The *Consultant* shall prepare the following key deliverables:
- Materials for 2no. public exhibitions
 - Materials for 4no. stakeholder meetings

9 Health and safety

- 9.1.1 Health, Safety and Wellbeing (HSW) is the number one priority of the *Client*. The *Consultant* shall promote and adopt safe working methods and shall strive to deliver design solutions that provide optimum HSW to all.
- 9.1.2 The *Consultant* shall follow and comply with the requirements outlined in the Safety, health environment and wellbeing (SHEW) Code of Practice ([LIT 16559](#)).
- 9.1.3 The *Consultant* shall supply designer risk assessments, drawings and any other data required to fulfil their duties under CDM.
- 9.1.4 AD: Undertaking of duties related to the Principal Designer role is not currently included in this Scope. As set out in the Procurement Strategy, it is intended that the Consultant will undertake the Principal Designer role. As this is not a critical path activity, this will therefore be notified by the Service Manager as a change of scope and instructed as a Compensation Event.
- ~~9.1.5 The works on site included in the geotechnical section will be subject to notification to the HSE. Appraisal work to outline design shall be treated as if it was notifiable.~~

10 Business case submission

- 10.1.1 The *Consultant* shall aggregate all of the work undertaken from this commission into a business case document – the Outline Business Case. The format of this document and guidance on the contents is detailed in Write a Business Case LIT 55124 and the Business Case templates.
- 10.1.2 AD: The *Consultant* shall work collaboratively with the *Client* in drafting the OBC report as there is considerable overlap between the five cases to be reported and in the executive summary. The *Client* will provide the current OBC template to be used. The Consultant will lead on the strategic, commercial, economic, financial and management cases. The Client shall review and provide comment on these sections including, but not limited to, inputs to the commercial and management cases as required. Regarding the Management Case, the *Consultant* shall work collaboratively with the *Client* to develop an outline programme to FBC submission.
- 10.1.3 AD: The *Consultant* shall also draft and compile all appendices relevant to its work under this Scope. For example, the *Consultant* shall ensure that the options development and appraisal process is suitably reported and available to append to the OBC.
- 10.1.4 AD: The Consultant is responsible for compiling any versions of the OBC submitted for assurance. The Client is responsible for submission of the OBC to, and liaison with, the relevant assurance Board.
- ~~10.1.5 The *Consultant* shall be responsible for dealing with responses to queries during the approval process and any resubmission required.~~
- 10.1.6 AD The Consultant shall be responsible for dealing with responses to queries during the approval process which relate to Consultant-produced text or supporting documents. The Client will coordinate and collate all responses and shall be responsible for dealing with responses to queries on any Client-produced text or supporting documents.
- 10.1.7 The OBC Delivery is to be in accordance with the *Client's* submission programme for either the National Project Assurance Service (NPAS) or the Large Projects Review Group (LPRG) for projects costing over £10m. The *Client* shall be kept up to date of progress and submission dates in order that the delivery of this to the review team can be programmed and a place booked at the appropriate review meeting.
- 10.1.8 This section of the study shall conclude with the final approval of OBC using latest EA Guidance including all appendices and FSoD approval following submission to NPAS or LPRG.

11 Carbon appraisal

- 11.1. An OBC must aim to minimise carbon emissions by:
- Stating 'minimised carbon' as a strategic objective.
 - Appraising and ranking options by their net whole-life carbon impact value (cost-benefit) in tCO₂e and monetised as carbon £ NPV.
 - Selecting a most likely/preferred option that best delivers the outcome measures and strategic objectives whilst minimising carbon based on the ranked carbon impact measures.
 - Optimising for lowest carbon in the design of the proposed option and evidencing this through an assessment of carbon forecast against a carbon budget
- 11.2. An OBC must have a supporting carbon appendix that reports the results of appraising carbon impacts and the carbon assessment. A carbon impact tool and guidance is available as part of the FCRM Appraisal Guidance. The EA carbon assessment tool is ERIC for calculating carbon forecasts (ERIC CMT or CC tool) and a carbon budget (ERIC CBUD sheet). The carbon appendix is a further EA spreadsheet tool available to projects and must have been verified by EA appointed Carbon Specialist before submission of the OBC.
- 11.3. The project team should be looking at how to minimise carbon throughout the OBC stage. The project team will produce 'draft' versions of carbon assessments (as forecasts) as well as carbon budgets to reflect their consideration of opportunities and constraints in reducing carbon as they progress their appraisal of options and optimisation of a proposed option and design. A monthly report of the 'draft' forecast and budget of a most likely/proposed option must be provided by the Consultant via FastDraft (using the carbon form) to inform the *Client* of progress.
- 11.4. The Consultant will submit the carbon appendix and supporting carbon assessment and carbon budget (i.e. ERIC) for verification by an EA appointed Carbon Specialist via Asite. The verification process requires project team engagement with the verifier and may result in actions for the Consultant to:
- a) update the carbon appendix and supporting carbon assessment and budget (i.e. ERIC).
 - b) set out most likely opportunities for further reductions by project completion.
- 11.5. The verified forecasts and budgets from this process will be required in the OBC and for the performance measure set out in this contract.
- 11.6. The verification information in the carbon appendix will be required for an EA process of carbon budget authorisation managed by EA Project Sponsor.
- 11.7. AD: The *Consultant* shall consider ways to reduce carbon impacts throughout and record decisions resulting in carbon savings, making reference to the existing carbon strategy for the project. Potential for local offsetting opportunities should also be identified.
- 11.8. AD: The *Consultant* shall produce a technical note summarising the assumptions made in the carbon assessment and decisions that have been made resulting in carbon savings.

Carbon deliverables

- 11.9. AD: The *Consultant* shall prepare the following key deliverables:
- Carbon modelling tool for 5no. shortlisted options
 - Carbon calculator for preferred option
 - Verified carbon appendix
 - Project note: carbon assessment assumptions and carbon savings

12 General

12.1 Approach to meetings and workshops

- 12.1.1 AD: Various tasks required by the Scope include the need for meetings and workshops. Unless specified otherwise, any meetings or workshops are to be “virtual” using suitable software (e.g. Teams or Webex). The reasons for this are to maximise team efficiency (avoid unnecessary travel time), minimise carbon impacts and eliminate health and safety risks associated with travel. The *Consultant* shall allow for attendance at up to 4no. face-to-face meetings with the *Client*. It should be assumed that these meetings will take place at either the *Client’s* offices in Reading or the *Consultant’s* offices in Winnersh and that they will be attended by the *Consultant’s* technical lead and environmental lead.

13 Relevant guidance

The *Consultant* shall deliver the *service* using the following guidance:

Ref	Report Name	Where used
LIT 16559	Safety, health environment and wellbeing (SHEW) Code of Practice	Throughout
183_05	Data management for FCRM projects	Mapping and modelling
379_05	Computational Modelling to assess flood and coastal risk	Modelling
LIT 14847	Risk Guidance for Capital Flood Risk Management Projects	Option development
OI 120_16	Whole-life Carbon Planning Tool	Option development
LIT 14284	Whole Life (Construction) Carbon Planning Tool User Guide	Option development
	Access for All Design Guide	Option development
	Project Cost Tool	Costs
LIT 12982	Working with Others: A guide for staff	Consultation & Engagement
Gov.uk	Appraisal Guidance Manual	OBC
672_15_SD03	Business case template – 5 case Model	OBC
672_15_SD02	Short Form Business case template	OBC
LIT 4909	Flood and Coastal Erosion Risk Management appraisal guidance (FCERM-AG)	OBC
	Flood and Coastal Erosion Risk Management: A Manual for Economic Appraisal (the 'Multi Coloured Manual')	OBC
	FCERM Carbon impacts tool	OBC
OI 1334_16	Benefits management Framework	OBC
Gov.uk	Partnership Funding Calculator Guidance	OBC
LIT 15030	The Investment Journey	OBC
LIT 55124	Write a Business Case	OBC
LIT 14953	FCRM Efficiency Reporting – capital and Revenue	OBC
LIT 12280	Lessons Log template	OBC
LIT 55096	Integrated Assurance & Approval Strategy	Approvals

14 Requirements of the programme

- 14.1.1 The *Consultant* shall provide a detailed programme in Microsoft Project format ~~version X~~ meeting all requirements of Cl.31 of the Conditions of Contract.
- 14.1.2 The *Consultant* shall provide a baseline programme for the project start up meeting and shall update the programme monthly for progress meetings with actual and forecast progress against the baseline. The programme shall also include alignment and submission of the BIM Execution Plan (BEP) and Master Information Delivery Plan (MIDP).
- 14.1.3 The programme shall cover all the activities and deliverables in the project and include all major project milestones from commencement to the end of the reporting, consultation and approvals stage.
- 14.1.4 The programme shall include review and consultation periods for drafts, scoping letters, statutory consultation etc.
- 14.1.5 The programme shall identify time risk allowance on the activities and float.
- 14.1.6 The ~~*Consultant* shall produce a Programme such that the following milestone dates are achieved (examples below, delete if not required):~~

Date	Event
XX/XX/XXXX	Completion of stakeholder engagement plan
	Consultation meeting Any Village Parish Council
XX/XX/XXXX	Submission of OBC to NPAS

- 14.1.7 The following are absolute requirements for Completion to be certified:

- Population of the *Client's* latest version of the Project Cost and Carbon Tool, or its successor
- Transfer to the *Client* of BIM data
- Clause 11.2(2) work to be done by the Completion Date

15 Services and other things provided by the *Client*

15.1.1 Access to Environment Agency systems and resources including:

- Asite.
- FastDraft.
- Collaborative Delivery Community SharePoint access.

15.1.2 Letter of Appointment of Principal Designer.

15.1.3 Site access authorisation letter(s).

15.1.4 Previous studies listed in Section 1.2.1. The *Client* will provide the previous studies within two weeks of contract award.

16 Data

16.1.1 The *Consultant* shall handle, manage data in accordance with the framework schedules and Exchange Information Requirements (EIR).

17 *Client's* advisors

17.1.1 The *Client* for the Contract is represented by the Programme & Contract Management (PCM) team, primarily the EA Project Manager, acting as the *Service Manager*, and in their absence the Project Executive. Instructions may only be given by these staff.

17.1.2 The *Client* has a number of advisory departments. Instructions will only be deemed enacted from them when they are confirmed by an Instruction from the *Client*. These departments include Asset Performance, Partnership & Strategic Overview, NEAS, etc.

17.1.3 The *Client's* organisation has a regulatory function. Communications from the Environment Agency in its capacity as a regulator are not to be confused with communications as the *Client*.

18 *Client* documents the *Consultant* contributes to

18.1.1 The *Client* maintains several project documents, the *Consultant* is required to contribute to these *Client* owned documents:

- Project Risk Register.
- Project Efficiency CERT Form.
- Scheme Lessons Learnt Log.
- Carbon Strategy
- ~~Cost and Carbon Tool (CCT)~~

Appendices

Appendix 1 – BIM protocol

The *Consultant* shall adhere to the Environment Agency's Exchange Information Requirements (EIR) framework level minimum technical requirements.

All *Client* issued information referenced within the Information Delivery Plan (IDP) requires verifying by the *Consultant* unless it is referenced elsewhere within the Scope.

<https://www.asite.com/login-home>

The *Consultant* shall register for an Asite Account and request access to the project workspace to view the IDP.

Appendix 2 – Modelling technical scope

- A2.1 The *Client* requires delivery of the following outputs for review for this project, as detailed below:
- Hydraulic and Hydrological Assessment Reviews
 - These are to be completed utilising the *Client* review templates.
 - Method Statement.
 - This outlines how the *Consultant* will go about achieving the aims and objectives outlined in the Scope.
 - This will include an estimated programme and costs to complete the additional work (including topographical survey requirements).
- A2.2 A detailed outcome specification for the future model requirements will be compiled in a scope as part of the Compensation Event following *Client* review of the method statement and associated deliverables.
- A2.3 Deliverables anticipated for a future modelling project (not part of this Scope) include:
- Model Reporting (including hydrological assessment, appendices, structure and defence schedule, model coversheet, model passport, redacted versions of documents)
 - Model
 - Topographic survey
 - Flood level node shapefiles (cleaned)
 - Flood extent shapefiles (cleaned)
 - GeoTIFF 2D grid data (depth, velocity, hazard, level) (cleaned)
 - Flood zone shapefiles
 - Velocity vectors
 - Animations
 - MapEdit
 - Model (including all input information and outputs)
- It should be noted that this list is not exhaustive.
- A2.4 The *service* shall be compliant with the Minimum Technical Requirements set out in LIT 5326 Fluvial Modelling Standards and LIT 18686 NEC4 Minimum Technical Requirements for Modelling current at the Contract Date. It shall be noted that not all the listed requirements in the Minimum Technical Requirements for Modelling will apply to the first review and method statement production phase. Where the *Consultant* is unsure whether they apply, they shall consult with the *Client*.
- A2.5 Listed below are further details of additions, clarifications, and removals from the NEC4 Minimum Technical Requirements for Modelling for those sections that are relevant to this Scope. Further details on the requirements for any future modelling study will be provided in the scope with a future Compensation Event.

Model reporting and handover:

- All reports (including drafts) to be fully quality checked for spelling, grammar, formatting, continuity, and mapping errors prior to submission to *Client*. If significant numbers of defects of this nature are identified in a report, it will be returned to the *Consultant* for the report to be updated and the review will be put on hold until the report is re-provided.
- All reports (including drafts) shall be technically correct.
- All figures (including maps) and tables shall be clear, concise and enhance communication of the study.
- All recommendations shall be fully explained and justified within the final report.

Method statement and review:

- The model method statement is required to provide advice on appropriate modelling approaches to meet the *Client's* objectives, to enable the *Client* to make an informed decision. The model method statement shall include:
 - Study objectives and review of data.
 - Background to watercourses and catchment.
 - Consideration of scale and sources of flooding.
 - Review of the previous / ongoing models and hydrology reviews.
 - The Hydraulic model review needs to consider in bank and out of bank representation, structures, boundaries, calibration and verification, model stability, run parameters, results, compliance with guidance, as well as any other relevant concerns.
 - The hydrological assessment needs to consider the previous methodology, catchment schematisation, representation of key hydrological features, use of local data, calibration and verification, boundary conditions, storm durations, run parameters, compliance with guidance, as well as any other relevant concerns.
 - Methodology (including consideration of model schematisation, model naming and convention, file directory and file naming, version control, model boundaries, model outputs, model parameterisation, defence and structure representation, calibration / verification, model stability, sensitivity tests, design events, climate change and deliverables). If different options are appropriate, then the *Consultant* must evaluate the positives and negatives of each approach for *Client* discussion.
 - Proposed hydrological modelling approach (including approach to storm durations, proposed hydrologic catchment schematisation (in shapefile format), proposed flood estimation points, proposed peak flow data.
 - Review of existing survey, planning applications, flood risk permits and enforcement. Include review of key structures to ensure that existing data is sufficient for modelling these in the detail required.
 - Identification of additional survey requirements.
 - Limitations of the proposed modelling approach / existing information and recommendations for future improvements.

Model Deliverables:

- All outputs (including those specified elsewhere in the minimum technical requirements and in the Scope) shall be fully reviewed and quality assured prior to delivery to the *Client*. Outputs must be an improvement on the existing information held by the *Client* for the study area (unless by agreement with the *Client*).