Updating the Lower Mole Flood Alleviation Scheme FAQs

January 2021

Project Overview

What area does this project cover?

The Lower Mole Flood Alleviation Scheme is approximately 7.5km in total length, from Hersham/West End area upstream, to where the River Mole joins the River Thames opposite Hampton Court.

How will you decide what works to carry out to the scheme, is there an assessment being carried out and what information does this contain?

We are carrying out an appraisal to determine our options for the proposed works.

This appraisal establishes a range of options for updating the scheme, and compares their economic viability (costs and benefits), technical feasibility (engineering difficulty) and environmental impacts to determine the best overall option. It also incorporates feedback we received from the public and other stakeholders.

Government money will partly fund the updating of the Lower Mole flood alleviation scheme therefore the development and assessment of the options is in line with the Department for Environment Food & Rural Affairs (Defra) policy statement on Appraisal of Flood and Coastal Erosion Risk Management, which outlines the Flood and Coastal Erosion Risk Management Appraisal Guidance (FCERM-AG). This guidance sets out the steps that we need to follow throughout the project appraisal, which we must comply with in order to receive funding.

The full guidance is available here: https://www.gov.uk/government/publications/flood-and-coastal-erosion-risk-management-appraisal-guidance.

We start with a long list of options for the scheme, and try to narrow them down to a short list that has the best chance of attracting Government funding.

To evaluate options the appraisal process looks at our project objectives (for example to continue to maintain the scheme, sustaining the standard of flood protection), what constraints there might be to developing options (for example flood risk during construction) and the appraisal criteria set out in government guidance which includes: flood risk; health and safety; constructability; economics; environment; stakeholder considerations and sustainability.

This then provides us with a framework to work within when developing the long-list and short-list of options. The appraisal process uses a range of information, for example, river modelling, costs, economic benefits, condition surveys of the assets along the Lower Mole, historical information, habitat surveys and feedback from stakeholders. This is used to understand both the opportunities and constraints present.

As the project moves from the long list to the short list, the level of detail we have increases, allowing us to understand the pros and cons of each option more, and to rule out those which will not be viable for economic, technical or environmental reasons.

All of the information gained during the appraisal process is taken into account when determining the preferred option for updating the scheme.

You refer to 'whole life carbon' in the appraisal process. What does this mean?

This is a measure of the impact of a scheme on the environment. It calculates all the greenhouse gases we are expected to produce in all activities required to construct and operate the scheme and measures them in units of carbon dioxide. The purpose of using whole life carbon is to move towards a scheme that generates the lowest carbon emissions over its whole life, helping us transition to a low-carbon and more climate resilient future.

You refer to ‘benefit cost ratios’ in the appraisal process. What does this mean?

This is the ratio of the benefits of a scheme option or proposal, expressed in monetary terms, relative to its costs, also expressed in monetary terms.

Will the scheme still offer the same standard of protection against flooding as it does now?

One of our priorities is to maintain the standard of protection against flooding the scheme currently offers to householders and businesses.

All the options considered will ensure a standard of protection of 1:100 (flooding once in a hundred years annual probability over the duration of the 100-year appraisal period) allowing for the expected impacts of climate change increasing river flows. .

You mention the possibility of decommissioning some of the assets. Does this mean that the risk to flooding will increase?

No. Maintaining the current standard of protection against flooding is an objective of this project and any option which proposes the removal of assets would be carefully assessed to ensure that flood risk is not increased as a result.

Why were the sluice gates installed, surely to alleviate the risk to flooding? Is it not counter intuitive to remove them?

The Lower Mole Flood Alleviation Scheme protects around 3,000 homes and businesses in the area from flooding.

The enlarged river channel provides additional capacity for the high flows in the river during periods of prolonged and heavy rainfall.

The sluice gates were installed during the construction of the channel for amenity and recreation purposes.

The gates remain closed on a day-to-day basis to retain a fixed water level, but in times of high flow, they are opened to allow the water to pass.

The condition of the sluice gates is starting to deteriorate due to their age, and we need to act to sustain the standard of flood protection for years to come.

Should the sluice gates be removed, the flood relief channel would continue to convey flood flows as it was designed to do.

How long will the works take to complete and when are they scheduled to start?

We are not able to confirm what the timescales for the project currently are. It is important to note that this project is in its early stages as we are yet to select a preferred option.

An asset management plan for the Flood Alleviation Scheme was developed in 2017 showing that there are varying residual lives for the asset elements of the sluices and flood relief channel. The residual life of an asset is the amount of life remaining after economic life or technological life has been reached and before functional failure of that asset. The electrical elements and controls of sluices have the shortest expected residual life of up to five years, and this needs to be considered in the future planning.

Will all of the planned works take place at the same time?

Due to the area the scheme covers, it is likely that the works will be phased over a period of a few years. Although we are currently unable to offer a specific timeline, when we have more detail on the nature and scale of the works we will be able to share this information.

Some of the structures and areas of land along the scheme are owned by others. We have started discussions with those owners to understand if they have any concerns, and to work with them to move the project forward.

During the works, will the water level in the river be lowered for long periods of long time?

As we are still in the process of options development, we do not know whether the watercourse will require its current level to be lowered in order to complete the works, or for how long it may be lowered if there is a need to do so. We will be able to share this information once it becomes available.

The potential lowering of water levels and the management of flows within the river whilst the works are ongoing will be carried out with both flood risk and environmental needs fully considered.

How will the water levels and flows within the River Ember and the River Mole be managed whilst the works are carried out?

The lowering of the water levels and the management of flows within the river whilst the works are ongoing will be carried out with both flood risk and environmental needs fully considered. Management of the levels and flows will be confirmed once the proposal is fully developed and the details of the works are finalised.

In the past, we have successfully managed water levels to carry out maintenance works to our sluice structures and the river channel. We can use the knowledge from previous works to help us manage water levels and flows during this project.

Will the Lower Mole be dredged?

Currently, dredging is not planned to be carried out as part of this project.

We consider each location carefully and only carry out dredging where we know it will make a difference to the management of flood risk. Understanding where dredging will, and won't, reduce flooding is the key.

Dredging has many short and long term environmental impacts such as the escape of silt plumes into the water, reducing water quality, or the removal of gravels from the river which is an important substrate on which fish spawn. In addition, this substrate helps to reduce channel erosion as it absorbs the energy of the river.

In the past, dredging was carried out periodically along the Lower Mole. However, regular surveys of the depth of silt in the river, highlighted that the accumulation of silt within the engineered channel was not significant, and was not reducing the ability of this channel to convey flood flows. Therefore dredging is not required and not the best use of our resources.

A bathymetric survey was carried out in late 2019 to assess the profile of the riverbed to offer up to date information on the depth of any silt within the river.

Are you going to be working with others on this project?

Yes. We have already made contact with the owners of those structures (Wilderness sluice and Royal Mills sluice) which are not under our ownership, to understand if there is the opportunity to work together as part of this project.

We are also speaking with Elmbridge Borough Council, Surrey County Council, utility companies, businesses and developers along the length of the scheme. We are also engaging with Surrey Wildlife Trust, South East Rivers Trust, Natural England and the Lower Mole Catchment Partnership.

By working with others, we hope to realise more benefits and achieve a better overall outcome.

Who will own the new riverbank?

A riparian owner is someone who has any watercourse within or adjacent to any boundary of their property. Where a watercourse is located between two or more property boundaries, each owner may be equally responsible.

The options under consideration will not change land ownership or boundaries to Environment Agency land, although under some of the options more land may be exposed.

Riparian owners are responsible for maintaining the river bed and banks within their section of the watercourse. It is their duty to minimise pollution and prevent obstruction to the water flow, including maintenance of the banks and fallen trees etc.

Further information on riparian ownership can be found on the gov.uk website by following this link;

https://www.gov.uk/guidance/owning-a-watercourse

What are the plans for the area around Wilderness?

Wilderness sluice is not owned by the Environment Agency. While we can still carry out work here on fish passes, it does require the agreement of the structure owners. As part of the scheme, we have a legal requirement to provide fish passage so fish can migrate from the River Thames to the River Mole catchment.

If sluice gates are retained at Molember and Island Barn sluices a rock ramp fish pass could be installed at Wilderness sluice, on the condition that we have the agreement of the landowners and the required funding is available. A rock ramp pass is a gently sloping river ramp up to the weir that fish can swim up and over. If funding is limited, a smaller fish pass could be provided.

If sluice gates were to be removed along the flood relief channel at Molember and Island Barn sluices (as in Option 6: Remove all gates, passive flood relief channel with rock ramps), fish passage would be possible along that channel and smaller scale works to reduce future maintenance at Wilderness Sluice would be investigated.

Will any new sluice gates be as quiet as the existing?

Should there be a need to replace the existing sluice gates with new ones as part of this project, we will seek to reduce the noise levels or at the minimum, maintain the current level of noise that the water makes as it passes through the sluice structures.

How will these works be paid for?

The scheme will be partly funded by central Government through the use of Flood and Coastal Erosion Risk Management (FCERM) Grant-in-Aid (GiA).

As Government funding is limited and is spent for the benefit of the Nation, we are also exploring options for funding from other sources, to ensure the works can progress.

As options to update the scheme are still being developed, only high level costs have so far been estimated to give an indication of how much it will cost to update the scheme. We should have more accurate costs as the appraisal progresses and the options are agreed on.

Following the appraisal process a business case is put forward to obtain government funding. The amount of funding will be determined by a funding calculator, which prioritises funding for projects which have the greatest benefit to people and the environment. Environment Agency projects must go through an appraisal process to fully understand the costs and benefits over the full lifetime of the schemes design, and long-term maintenance. Our economic appraisals produce both a cost-benefit ratio and a Partnership Funding (PF) score. The PF score determines the proportion of a projects costs which can be paid for using (FCERM GiA), with any shortfall in funding needing to be found from other sources. These other sources can include local authorities, water companies, private businesses and individual land or property owners.

Will the options appraisal include a financial projection of maintenance levels and costs?

It is standard practice as part of the development of a flood risk management scheme to assess the anticipated capital, operational and maintenance costs of all options and include these in the total expected cost when comparing options.

This includes maintenance of all parts of the flood alleviation scheme including all walls, embankments, surface water outfalls, sluice structures and the flood relief channel and is in line with the FCERM (Flood and Coastal Erosion Risk Management) Appraisal Guidance which is available online (https://www.gov.uk/government/publications/flood-and-coastal-erosion-risk-management-appraisal-guidance).

Has the Environment Agency already chosen the cheapest option without fully considering all factors as well as the potential costs in the event of a flood?

No option has been selected at this time.

Cost is only one of a number of factors we need to consider. In June 2019 you told us you wanted us to do more work on our proposals. Over the winter of 2019, and in response to your feedback, we carried out environmental and river depth surveys to help us better understand the Lower Mole. We would usually carry out these surveys at a later stage in the project, however we wanted to respond to public concerns over water levels and wildlife by collecting and sharing the information early, allowing us to move forward this summer and have detailed discussions with the community on our updated short-list.

How we spend public money is an important factor, however, we also review the amount of benefits an option will deliver and over what timescales those benefits occur. We call this our 'economic appraisal' and this assessment is key to selecting a preferred option in line with Government guidance.

Once we've completed an economic appraisal, we then review a host of other factors that include but are not limited to environmental and amenity impacts and opportunities, legal obligations, health and safety and carbon implications. This process means we are not bound to just select the option which provides the best economic value for money.

Options will not be selected just because one is cheaper than the other.

How is the preferred option selected?

We will review your feedback and suggestions from our conversations in early 2021, and incorporate them where possible into our options, updating our cost and carbon calculations.

Feedback from the community will be presented to the Project Board along with the costs and benefits drawn out through the appraisal process.

The Project Board is made up of senior decision makers at the Environment Agency, and they will make a decision on how to proceed with updating the scheme.

The Project Board will then review all of this information to make a decision on the future of the scheme. This means the Project Board is not bound to just select the option which provides the best economic value for money. Once the Project Board has made this decision, we will come back to the community with more information on our next steps.

Will planning permission be required to update the scheme?

As the project is still in the appraisal stage, all the information that is needed to understand if planning permission is required is not yet available. We will be speaking to the Local Planning Authority to gain their feedback and understand what permissions will be needed. Under Planning Legislation, Permitted Development rights do exist for certain types of building work, but we will have a better understanding of the planning requirements once further information is available. It is highly unlikely that we would need any additional Compulsory Purchase of land, as the proposal is to update the existing scheme.

What measures will be put in place to reduce the impact to local residents whilst the works are taking place?

As the options are still being developed, we do not yet know for certain what the works will look like, or the type of machinery required. Once we have further information, we will consult with householders and businesses who may be affected to understand concerns and share what plans will be put in place to minimise disruption.

In the past, we have carried out maintenance works to the scheme which have required the use of large machinery in areas close to houses. We consulted and notified the households that were affected, and successfully used techniques to reduce noise, vibration and dust and prevented materials or debris entering the watercourse.

Does the proposal include removing Viaduct Sluice?

One of the options being considered looks at removing all sluice gates at this structure. This is Option 6: Remove all gates, passive flood relief channel with rock ramps.

If they were removed water levels within the river will drop across the full length of the Ember channel. Immediately upstream of sluices this would be up to 2-3m but this would reduce upstream from these locations.

Why can't you put a fish pass at Royal Mills sluice and not Viaduct sluice?

We are investigating the possibility of installing fish passes at either Royal Mills or Viaduct sluice to achieve upstream and downstream fish passage. Initial plans were made for fish passage at Viaduct given complexities surrounding delivering this at a third-party owned structure, however the recent change to our understanding around our ability to carry out works at Royal Mills has led us to review this and will now be considering both structures to achieve fish passage.

Are there plans to reinforce the river banks? If so, how would updating the scheme fit with any other flood alleviation plans in the area?

All options under consideration include works to repair the channel banks, which may involve reinforcing sections along the river bank, improving their integrity and reducing the risk of damage during high flow flood events.

Do the ground anchors and ties associated with the defences form part of the project? If so, how will these be approached, will they need to be replaced?

The ground anchors and ties associated with the channel structure around Molember Sluice are integral parts of the flood risk management structure in this location and have been considered as part of this project. The Lower Mole FAS Asset Management Plan (2017) assessed the condition of the flood relief channel that includes these structures.

This inspection showed no defects associated with the ground anchors and ties therefore there is no intention to replace these in the short term.

Recreation and amenity

What do you use the land at Spa Meadow for? Can access to this and other parts of the scheme be improved?

We want to work with others to encourage walking and recreation along rivers and on our land where this is an appropriate use. For the Lower Mole, we had initial discussions with the local authorities on opening up the site at Spa Meadow. However until the future of the scheme is decided we cannot move this along any further. This is because if large-scale works are required, for example new sluice gates, we will need the land to store contractor's plant and equipment and provide welfare facilities for our teams.

We currently use the land at Spa Meadow as a storage area for materials and equipment for maintaining and operating the Lower Mole scheme. Unfortunately we have experienced several instances of break-ins and theft of equipment in the past, which is why the land remains fenced off.

We continue to meet with both Elmbridge Borough Council and Surrey County Council to keep this matter under review. Should this matter progress we will also need to consult local residents living nearby.

As we progress decisions on the future of the scheme we are very open to further discussions on the public accessibility of our land.

Will residents be allowed access to the river banks and river?

Access through the existing amenity licences will continue to run in accordance with the terms in which they were granted.

Future requests for opportunities to access the river channel within the Environment Agency's ownership will be reviewed on an individual basis.

Can the footpaths be improved? The tracks are in a poor state.

Once a preferred option for the scheme is selected, there will be the opportunity, subject to available funding, to look at this during the detailed design phase.

Are there going to be any alterations made to make it easier to use boats along the Scheme? For example, will it be possible to install a Lock at Molember?

Our priority is to sustain flood protection for residents and businesses. Installing a lock in this part of the river channel will not help alleviate any flood risk, therefore it is not being proposed as part of the scheme.

Will the boat rollers be kept at Molember if the structure is changed?

We are considering a range of options for the future management of Molember sluice. One option (Option 3: Gate Replacement) includes retaining a combination of gates and fixed crest weirs that would lead to no change in water level upstream of the sluice, therefore the boat rollers would still operate as at present.

If the options to remove the gates at Molember sluice (Option 5: Remove all gates but replace Island Barn Sluice gates and Option 6: Remove all gates, passive flood relief channel with rock ramps.) were to be selected the water level would lower, and the boat rollers would no longer be required as boats could freely pass through the former sluice gate channels.

Another option (Option 4: Molember gates replaced with fixed crest) where the structure could be fully replaced with a fixed crest weir would require water levels to be lowered, and the boat rollers to be adjusted to make it still possible to use them.

Will you consider increasing access for canoe users?

There will be opportunities to consider increased canoe access once a preferred option is selected and the detailed design stage of the project begins.

Opportunities depend upon funding available and practicalities of enhancing access.

Will land potentially exposed as a result of lower day to day water levels along the river have a right to roam status?

'Open access land' refers to some land across England which can be accessed without having to use paths.

Access land includes mountains, moors, heats and downs that are privately owned. It also includes common land registered with the local council and some land around the England Coast Path.

Your right to access this land is called the 'right to roam' or 'freedom to roam'.

Some sections of the River Ember are owned by the Environment Agency and these areas are not 'open access land', therefore the 'right to roam' does not apply. This includes land that is both exposed and not exposed by the water levels.

More information on what open access land is can be found on the gov.uk website;

https://www.gov.uk/right-of-way-open-access-land/use-your-right-to-roam

Safety and security

Can any improvements be made to the security of the scheme, to stop people trespassing onto the structures and private land?

Security is an important factor and remains a key consideration in the development of options.

We will look to improve fencing along parts of the scheme that are under our ownership. However, we also need to consider the impact further fencing would have on how the scheme looks and how the area is used for amenity purposes.

With these considerations in mind, we will seek to try and achieve the right balance between security and the way the scheme looks, as well as maintaining access to publicly accessible areas.

What impact on security will a lower level of water have for those residents with properties that back onto the river? Will it be easier to access these properties and is this being considered as part of the project process?

Security is an important factor and remains a key consideration in the development of options.

Since we spoke to residents in June 2019, we have carried out further work to understand the potential impacts of any proposed options. We will continue to update residents on our findings and will involve residents as the project moves forward.

Will the removal of sluice gates make the river unsafe for residents to use?

If the gates are removed, the flow will become more variable within the channel, but this will not cause the river to become unsafe. Any changes to the channel will be assessed and documented in the Public Safety Risk Assessment as the options development moves forward.

Will dropping the water level increase the risk to health and safety of those who access the area?

A Public Safety Risk Assessment would be carried out as the options development moves forward and would seek not to increase any risk to residents and the public. Mitigation measures would be put in place if any potential increases in risk were identified.

Water levels, landscape and aesthetics

Will any of the options make a difference to the level and depth of the River Ember?

Yes. Some of the options lead to changes in the water level and depth of water within the river channels, while other options will not result in any change. If all sluice gates are removed, as detailed in Option 6: Remove all gates, passive flood relief channel with rock ramps, water levels will drop across the full length of the Ember channel. Immediately upstream of sluices this would be up to 2-3m but this water level drop would reduce upstream from these locations.

How will the water levels around Molember be affected if the gates are removed?

The sluice gates are ageing assets and we are considering all options for the future management of flood risk at this location and within the Flood Alleviation Scheme as a whole.

One option, (Option 3: Gate Replacement) includes retaining a combination of gates and fixed crest weirs that would lead to no change in water levels upstream of the sluice as it exists now.

Another option includes replacing all gates with fixed crest weirs (Option 4: Molember replaced with fixed crest weir) that would lead to a drop in water level to ensure no increase in flood risk. Water would be retained across the full width of the channel.

If the gates were to be fully removed, as detailed in Option 5: Remove all gates but replace Island Barn Sluice gates and Option 6: Remove all gates, passive flood relief channel with rock ramps, the water level would be linked to the levels in the River Thames during times the River Thames is in high flow. In the immediate vicinity of Molember sluice, the water would be retained across the full width of the channel. Further upstream, water depths would reduce and the width of the remaining watercourse may reduce.

Will the water level be more consistent once the works are completed?

Currently water level varies as a result of changes to river flows and the way that the sluice gates are operated.

The majority of the changes in the water levels along the scheme happen following rainfall or longer spells of dry weather. We also reduce the level of water if we are carrying out certain types of maintenance or survey work. For example, when we need to inspect parts of the sluices that are normally under water.

The gates are manually controlled by Environment Agency staff at each structure to ensure river levels are kept low enough not to increase flood risk. This can lead to some variability in water levels.

If the gates were to be removed, as in Option 6: Remove all gates, passive flood relief channel with rock ramps, the water level is likely to become more variable as the gates are currently operated to maintain a target level upstream of each structure.

Will removing the sluice gates mean replacing a beautiful river with muddy banks and a stream?

The Lower Mole Flood Alleviation Scheme was primarily designed to protect property from flooding and did not consider ways for biodiversity and wildlife to flourish along the channel.

Whilst it now contains a variety of species, it does not have much variability in habitat, therefore the species diversity is quite low. With modern techniques we could create a scheme that still provides property protection and restores natural river function allowing a more diverse habitat for wildlife.

The current river channel could be considered as a slow flowing 'canal' of deep water with a limited diversity in flora and fauna. A natural meandering channel would vary in depth and width throughout due to its generally shallower nature.

Should the option to remove sluice gates be selected, a meandering channel would develop. Any muddy banks exposed in this process would be carefully landscaped and would be vegetated. These areas would be subject to flooding during higher flows to ensure that the standard of protection against flooding is maintained in the future.

If water levels are lowered significantly, what will the Environment Agency do to make visual improvements and conceal exposed concrete?

Opportunities to make visual improvements to the way the scheme looks, including the potential for the use of timber cladding and marginal planting, would be fully explored as the project develops further.

If water levels drop surely that means less water will be available to dilute the discharge from the sewage treatment works. Will this make the channel smell and sewage visible?

An Environmental Impact Assessment will be undertaken to assess the impact on water quality including discharge from the sewage treatment works. Should the volume of the receiving water body change, then there may be a need for Thames Water to have their current Discharge Permit reviewed and it may then need to be amended to align with change flow/volume regime in the river, in order to avoid water quality issues.

Environment

Management of Pennywort

Floating pennywort is a fast growing invasive species of freshwater plant. It is well established in the south and east of England and is widespread in the channels that form the Lower Mole.

Floating pennywort grows in the margins of slow flowing watercourses and drains, forming dense mats of vegetation. These dense mats grow rapidly (up to 20cm per day) and can grow up to 15m out from the bank in one season. Due to the rapid growth of floating pennywort, it can quickly dominate a watercourse, restricting flows and pushing out native plant species. Oxygen levels in the water often become reduced and this can result in fish deaths. The plant also limits the movement of animals and boats, restricting the recreational use of the river.

The Lower Mole Flood Alleviation Scheme directs the majority of flood flows through the engineered channel. This is the river channel where Viaduct, Island Barn and Molember are located, called the River Ember.

We have a limited budget within our Environment Agency Area (Kent, South London and East Sussex) that is set aside for ongoing maintenance works, including the removal of pennywort. We prioritise this maintenance spend on areas at greatest flood risk. As the River Ember channel is essential for managing flood risk, our main focus on pennywort management is the Ember channel.

We work alongside the riparian owners along the River Mole and Ember Loop to raise awareness of and manage pennywort. During the past year a number of riparian owners along both of these areas of river have carried out work to remove pennywort. We will continue to engage with and work alongside riparian owners in the future to carry on the work that has been started to manage pennywort.

We have sprayed the pennywort in the past, though we favour its physical removal by hand pulling and offsite disposal as this is an effective way to reduce the strength of the plant. We have experimented with lowering the retained water levels within the river during frosty weather to expose a greater area of the pennywort plant to frost, which has been successful and we consider using this technique again in the future if necessary.

What does naturalisation mean?

In terms of this project, it is looking for where sections of the river could be restored to a more natural state. This could include creating small meanders in some sections, planting areas of aquatic vegetation, and also changing the way it looks from a hard engineered concrete channel to one where it looks more natural. With regards to Option 6, Remove all gates, passive flood relief channel with rock ramps refers to the removal of structures and allowing the river channel to adapt into a more natural state, with greater variability in water levels.

If the option to naturalise the area is selected, what maintenance would be needed, if any?

The option to naturalise the scheme, Option 6: Remove all gates, passive flood relief channel with rock ramps, would likely involve minimal maintenance. However, we would expect ongoing maintenance to include cutting the grass on the channel banks, infrequent cutting of vegetation within the channel as well as inspection/maintenance of the sheet pile and concrete walls.

What does biodiversity net gain mean in relation to the scheme?

Biodiversity Net Gain (BNG) is an approach that aims to leave the natural environment significantly improved as a result of any development. The Department for Environment, Food and Rural Affairs carried out a consultation in 2018/18 which led to BNG becoming a mandatory element of the planning system within the UK. BNG is an approach to development that results in measurable net gains in biodiversity, having taken positive and negative impacts into account. Net gains for biodiversity are typically either an increase in overall biodiversity, or an improvement to the biodiversity which is already present.

The Environment Agency has made a commitment in its Sustainability Plan “e:mission 2030” to achieve 20% BNG on its projects, to deliver improvements across all areas of work, giving priority to natural solutions. We will be carrying out a BNG assessment during 2021 through a combination of desk studies and field work to help us understand what this means for the Lower Mole Flood Alleviation Scheme. It could include creating new marginal habitats such as reed banks, creating riffles and planting areas of trees and hedgerows.

Will groups such as the Wildlife Trusts, Greenpeace and Friends of the Earth be involved to advise on the most appropriate ways to provide naturalisation and wildlife enhancements?

We have been speaking to a number of wildlife groups and have shared our initial design concepts with them as part of the early engagement process for this project. We will continue to work with these groups as the project progresses and will seek their views and feedback. The ecologists and geomorphologists within the project team will use information provided by these wildlife groups to help when considering the potential naturalisation and wildlife aspects of any future proposal for the scheme.

If fish passage to the River Thames is being improved, will this result in a loss of fish from the River Mole to the River Thames?

As part of updating the scheme, we hope to open up over 20km of habitat to improve passage for fish. This will also improve fish populations and the general wildlife and biodiversity within the River Mole. At present, the structures along the river restricts the free movement of fish throughout the Lower Mole and also into the River Thames. This project offers an opportunity to investigate options for improving fish movement.

Improved connectivity will allow fish in the River Mole and River Thames to mix and create stronger, larger and more diverse fish populations which will benefit the fish, the fisheries and the wildlife throughout both catchments.

If the sluice gates are removed will invasive species from the Thames enter the Mole and impact on the river ecology?

Where we are opening up fish passage there is a risk that invasive fish species could enter the Mole from the River Thames. However, the design of the scheme such as under Option 6: Remove all gates, passive flood relief channel with rock ramps, is that the target flow conditions and habitats should be more suitable for native fish species.

It is very unlikely that the presence of invasive fish species will significantly offset the benefits of improving fish passage along the Lower Mole.

Have you accounted for climate change?

Climate change is expected to make flood risk worse in the future. We include the impact of climate change in our appraisal. We do this by incorporating percentage increases in river flow and/or rainfall intensity into our flood risk modelling, mapping and other calculations. These percentage increases are taken from our national guidance which utilises the latest climate change projections.

Are there plans to control mink?

We usually control invasive species that potentially damage our assets and undermine our ability to carry out our regulatory duties.

Whilst we have general duties to protect and enhance biodiversity, we do not have specific duties for water fowl and would not be looking to manage the local mink population.

A long term, sustained and concentrated effort, involving a wide range of landowners and partners would be the only effective way to control mink along the Lower Mole.

What is the foam that we keep seeing in the river?

We are recording all reports of foam and are continuing to investigate its source along the Lower Mole.

Large amounts of foam can accumulate in certain areas of the river, especially downwind and within eddies, or just downstream of turbulent water, for instance below weirs. This foam is usually harmless; in fact only about 1% of the foam is made up of the foaming agent which is usually a naturally occurring fatty acid. Most of the foam is simply air and water.

Foam seen in a river can be a natural event with no adverse environmental implications, or it can be a sign of pollution. Most foam in rivers is natural and is produced when molecules such as fatty acids act as ‘surfactants’ interfering with the surface tension of water and allowing air and water to mix more easily.

Surfactants are molecules that act in a way which interferes with the surface tension of water. There are many natural and synthetic surfactant molecules.

These surfactant molecules often float on the surface of the water as a thin film.

Turbulence from waves, currents and wind cause the surfactant molecules to trap small bubbles that make up the foam.

Naturally produced surfactants, usually a fatty acid, are released from decaying organic material, but are also released in small amounts by living organisms.

Not all foam is natural, certain manmade products such as detergents can cause foam. Although it is difficult to know for sure, foam from various sources can have different characteristics. Natural foam may start off as white but often becomes light tan or brown in colour as it collects sediment and organic matter, and has a natural, earthy, fishy or fresh cut grass smell. Manmade foam appears white in colour, and as a fragrant, perfumed or soapy smell.

How does the Environment Agency measure turbidity within the river?

The Environment Agency measures turbidity (Nephlometric Turbidity Units - ntu) at a Water Framework Directive (WFD) sampling point on the Lower Mole. The instrument used for measuring it is called nephelometer or turbidimeter, which measures the intensity of light scattered at 90 degrees as a beam of light passes through a water sample. Our data shows there has been no significant change in turbidity since 2009.

What impacts will the scheme have on fish stocks and wildlife? How will the needs of the existing fish population, which is said to include ancient carp, be considered should gates be removed?

One of the proposed options, Option 6: Remove all gates, passive flood relief channel with rock ramps, is the removal of the gates at the existing sluice structures which would mean fish populations would change. The current river channel offers a series of impounded areas of water, and the fish population reflect this. By removing sluice gates and installing fish passes we would improve the diversity of the fish populations.

A naturally flowing river with pool, riffle and glide habitats would offer a more diverse habitat for river species and an increase in fish populations and variety. The existing fish populations that prefer those slow, still waters would be able to find suitable places to live, either in the Thames, or in sections of the River Mole upstream of the Flood Alleviation Scheme.

We carried out fish and invertebrate surveys to understand what the current baseline conditions are and to give us up to date information. The survey findings will be reported in a Preliminary Environmental Information Report (PEIR) which we will make available in 2021.

We will use the results of the latest fish and invertebrate surveys to help inform the options design.

Will the scheme bring about opportunities for naturalisation and natural flood management?

The Lower Mole Flood Alleviation Scheme was primarily designed to protect property from flooding.

Natural flood management is typically implemented either in upper river catchments where water is retained in wet woodlands, bogs, in rural/parkland, or is encouraged to flow onto the floodplain to make full use of this area. Almost all of the floodplain around the Lower Mole is urbanised meaning there is very limited option for this here.

The current river channel could be considered as a slow flowing ‘canal’ of deep-water with limited diversity in flora and fauna. A naturalised meandering channel without sluice gates would vary in flow, depth and width throughout due to its generally shallower nature. A naturally flowing river with pool, riffle and glide habitats would offer a more diverse habitat for river species and an increase in fish populations and variety.

Will the scheme encourage establishment of marginal aquatics, reed beds, digging offline ponds, and wet woodland?

The current slow flowing ‘canal’ which is the Ember in its present state has some partially submerged vegetation (marginal aquatics) and reedbed. A naturalised meandering channel would have a greater variety of habitat types including further stretches of marginal aquatics and backwaters.

Will there be improvements of shelter and access for wildlife, such as kingfishers?

There would be potential additional space to design and engineer features to benefit wildlife such as banks for sand martins and kingfishers.

Will there be improvements to assist the passage of fish and eels? If so, would this result in a loss of fish from the River Mole to the River Thames?

Fish will be able to move in both directions, into and out of, and between the River Thames and the River Mole. This is perfectly natural for all sorts of species of fish, many of which will travel for several kilometres in a day to find food, habitat or refuge. The expectation is that with improved habitat and free passage, fish populations in the Thames and Mole will improve and there will be more fish available for anglers to catch.

Will there be multi-species fish passes installed on the structures, ideally as bypasses rather than just attached to the main structures?

The aim is to install multispecies fish passes and passes that allow the migration of eel. Given the existing infrastructure including roads and residential properties and the drop in water level between structures, it would not be feasible to create natural bypass channels. For all options except Option 6: Remove all gates, passive flood relief channel with rock ramps, Technical fish passes will therefore be necessary, which can also have very high efficiency and effectiveness.

Would removing the gates affect the safety of the trees along the river bank, as they depend on the water level to keep their roots wet and embedded in the river bank?

A tree survey will be carried out to assess the impacts to trees as part of the options development process.

General Information

Why was the Lower Mole Flood Alleviation Scheme built and why are these works being proposed?

The original Lower Mole Flood Alleviation Scheme was designed to reduce the risk to flooding in the lower reaches of the River Mole catchment, following a significant flood event in September 1968. The River Mole has a history of flooding, though the September 1968 event is still considered to be the largest and most severe recorded flood event along the River Mole. It has been estimated that several thousand properties in the lower reaches of the River Mole were flooded during that event.

We then started to consider options to reduce the future risk of flooding along the lower reaches of the River Mole. These options included:

- creating flood storage areas in the middle area of the river catchment
- a tunnel scheme to carry water from the Hersham area to the River Thames
- a pump scheme that would move large volumes of water through the lower reaches of the River Mole
- widening and engineering of the river channel from Hersham down to the where the River Mole connected with the River Thames.

An engineering assessment was carried out to gain a better understanding of the magnitude of the flood that occurred in September 1968, and to determine which of the proposed options could offer the best overall solution to reducing flood risk in the future. This assessment concluded that the scheme should offer protection against flooding if an event of similar magnitude to September 1968 was experienced again, due to the significant damage and disruption caused. The option that was taken forward for design, and ultimately construction, was the widening and engineering of the river.

A Public Inquiry was held in 1972 to discuss the planning application. As part of the proposed works, a Compulsory Purchase Order for areas of land, and a number of properties, was submitted for consideration. This land was needed to allow for the widening of the river channel. Objections from local residents, and others who would be affected, were made to the original proposal at the planning stage. The large scale nature of the scheme, the proposed changes to the existing river system and landscape, the loss of amenity, concerns over privacy and future access, were some of the concerns highlighted.

During the course of the Planning Inquiry, a number of recommendations and revisions were made to the proposed scheme in order to address the concerns and objections raised and to try and reduce the impact the works would have on the area. After consideration of all of the information, planning permission was granted for the Scheme in 1974.

The construction of the scheme took a number of years, with the works being completed during the 1980s. The scheme is now reaching the end of its design life and needs to be updated to maintain its standard of flood protection and to ensure it is the best scheme for the environment, people and wildlife.

Who owns the various flood control sluices?

The Environment Agency (as statutory successor to previous organisations) owns Molember sluice, Island Barn sluice, Viaduct sluice and Zenith sluice. Wilderness sluice and Royal Mills sluice are owned by third parties.

Why does the Environment Agency remove the vegetation along the walkways at Molember?

We manage the vegetation around Molember so we can clearly see the walls and walkway when inspecting the condition of these assets. We have a regular programme of asset inspection. We check for any possible defects and are able to keep a record of the condition of the current flood alleviation scheme. This allows us to plan for any maintenance works which may be required.

The walkways are accessible to the residents. Removing vegetation and keeping the walkways clear of moss, reduces the possibility of trips and slips during wet weather. This also helps our staff access these areas during the night to monitor water levels and operate the sluice during high flows.

We are happy to discuss whether there are any changes to our current ways of working which will allow a better balance between the operational needs of removing the vegetation, and the way that the scheme looks.

Why are there fences around the structures and along parts of the scheme?

When the scheme was designed, there was a requirement to carry out a Public Safety Risk Assessment (PSRA) as parts of the scheme are located within a residential area, and many areas of the scheme and its structures are accessible to the public. This assessment determined that fencing was required in certain locations to protect the public from coming into contact with moveable parts on assets, such as sluices, and the edge of the river, which could be hazardous.

Fences have been raised from their original height at the request of residents as in some areas, illegal access and activity around the scheme was causing them a disturbance.

Can more be done to stop illegal fishing?

We have installed security fencing and placed signs along the scheme to deter illegal fishing on land under our ownership, and our staff will discourage this activity if we see this taking place. We seek to achieve the right balance between security and the way the scheme looks, as well as maintaining access to publicly accessible areas.

Unfortunately our resources for tackling illegal fishing are limited, but we will continue to discourage illegal access for fishing by making the best use of the resources that we do have, and through the upkeep of appropriate fencing and signage.

What do the safety booms do and why are they there?

The safety booms were installed to safeguard canoeists and boat users from being swept into the sluices. There is a risk that people travelling on the river could be swept over the sluice structures or get into difficulties with the turbulent flows on the downstream side of the structures. A risk assessment carried out on similar structures on the River Medway following an incident where a river user was injured recommended that safety booms were installed on other sluices. The booms also prevent large debris from coming into contact with the sluices and either blocking or damaging them, especially during times of higher flows.

Are there any plans to install hydropower along the Lower Mole Scheme?

The potential use of hydropower along the Lower Mole Flood Alleviation Scheme has been discussed by residents before, however initial workings indicated it would not generate enough electricity to justify the investment. Hydropower generation requires strong river flows all year round, something this stretch of river cannot provide.

While the Environment Agency issues the required permits and regulates hydropower schemes, we do not fund or install them and strongly advise contact with a specialist when developing a proposed hydropower installation. We are supportive of sustainable hydropower schemes and we work closely with scheme developers to make sure their plans do not harm the environment or impact on flood risk.

Does the Environment Agency make changes to the water levels within the scheme during the year or does this occur naturally?

The majority of the changes in the water levels along the scheme happen following rainfall or longer spells of dry weather. We do reduce the level of the water if we are carrying out certain types of maintenance or survey work, for example, when we need to inspect parts of the sluices that are normally under water.

Over the past couple of years, we have reduced the water level by 300mm at the start of the winter. This creates more volume within the river channel and helps to manage higher flows. We have also used the lowering of water levels over the winter season to help with the management of pennywort. This action has successfully helped to reduce the amount of pennywort regrowth along the Ember channel.

Will those with Abstraction Licences be able to continue to abstract?

The Environment Agency will work with existing Abstraction Licence holders, subject to the preferred option, to continue abstraction.

Will replacing or removing the gates affect the value of my house?

The Environment Agency is unable to advise on the effect on house prices as a result of any changes to the Scheme.

In recent years surface water flooding seems to have increased. How will the scheme deal with surface water flooding?

This scheme aims to ensure the standard of protection against flooding from the rivers is maintained, therefore is not specifically seeking to address flooding from surface water.

However, if gates are removed and water levels within the river are lowered on a permanent basis, surface water drainage would be able to discharge more freely into the river.

The responsibility for managing flood risk from surface water is held by the Lead Local Flood Authority which is Surrey County Council.

More information on the activities they undertake to address surface water flood risk is available on their website (https://www.surreycc.gov.uk/people-and-community/emergency-planning-and-community-safety/flooding-advice/more-about-flooding).

Would it be possible to inform people of when alterations to water levels are planned to take place?

We would be happy to let people know when we are planning to alter river levels. Please let us know if you would like to be kept informed. We would like to hear from you how best to communicate these messages.

Riparian ownership and responsibilities

A riparian owner is someone who has any watercourse within or adjacent to any boundary of their property. Where a watercourse is located between two or more property boundaries, each owner may be equally responsible. Riparian owners are responsible for maintaining the river bed and banks within their section of the watercourse. It is their duty to minimise pollution and prevent obstruction to the water flow.

Further information on riparian ownership can be found on the Gov.uk website by following this link: https://www.gov.uk/guidance/owning-a-watercourse

Do you offer a flood warning service for this area?

Yes, we do. We operate a comprehensive free flood warning service. We would encourage householders and business owners to sign up for our flood warning service if they have not already done so. You can check if you are considered to be at risk to flooding by checking on Gov.uk using the link;

https://www.gov.uk/check-flood-risk

If you are located in an area at risk to flooding, you can sign up to get flood warnings by providing some contact details, the process is set out on the Gov.uk website;

https://www.gov.uk/sign-up-for-flood-warnings