

The scheme



The **Environment Agency** has been working in partnership with Guildford Borough Council (GBC) and Surrey County Council (SCC) for several years to find a sustainable flood risk management scheme for Guildford.

Guildford has a history of flooding from the River Wey. Significant floods have caused damage to homes and businesses, as well as disrupting vital infrastructure such as roads and utilities.

The risk of flooding in Guildford will get worse with climate change and unfortunately, it's only a matter of time before we see another serious flood.

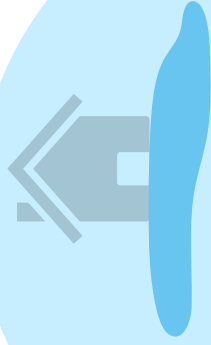
We want to ensure Guildford's communities are as protected as possible from the increased risk of flooding we'll see in coming decades. This is why we're working to develop a sustainable long-term flood risk management scheme for Guildford town centre.

The **Guildford Flood Alleviation Scheme** would reduce the high level of flood risk to the town centre. As well as directly benefiting residents, this will keep the city open for business in times of flood, helping protect Guildford's thriving economy.

Vision

“Reduce flood risk and improve the riverside environment in Guildford to enhance wellbeing, support green growth and a sustainable future”

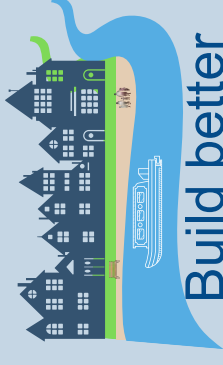
Objectives



Reduce flood risk to Guildford town centre, making it more resilient to climate change.



Develop a scheme in partnership which achieves positive outcomes for the environment



Build better connections between Guildford town centre and the River Wey



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Project progress 2014-2024

We agreed to **appraise 3 Standards of Protection**: 1 in 50 annual probability, 1 in 100 annual probability, and 1 in 100 annual probability + climate change.

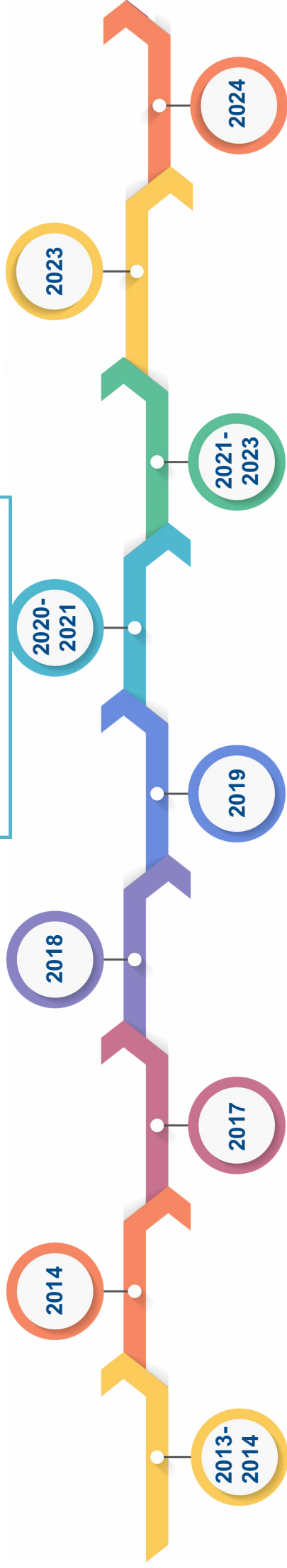
Following a review, we agreed with partners that upstream storage and Natural Flood Management are not viable options for reducing flood risk in Guildford so we will not be taking them forward.

We identified an **economically preferred option** and held a public event to present the concept design and gain feedback from stakeholders.

We identified a **number of viable options for reducing flood risk** in Guildford including permanent flood walls, temporary demountable defences and Property Level Protection (PLP) - this includes things like flood gates and airbrick covers to stop water entering people's homes.

We agreed the **Guildford Flood Alleviation Scheme objectives** to:

- Develop a scheme in partnership that reduces flood risk to Guildford town centre, making it more resilient to climate change.
- Develop a scheme which achieves positive outcomes for the environment.
- Develop better connections between Guildford town centre and the River Wey, linking communities with the environment.



The **winter of 2013/14 was one of the wettest on record** in England, causing significant flooding in Guildford as well as other communities along the River Wey. We agreed to review options for reducing flood risk from the River Wey in Guildford.

We recommended a **shortlist of options to take forward** for appraisal.

Following from our partners, we agreed to **explore options to provide a higher standard of protection** for the town, compared to the previously preferred option.

We worked with our partners to establish a **concept design alignment**.

The concept design taken forward for appraisal represents an alignment that could work, but is not the final option for the scheme.

We started the **appraisal process to find the preferred option** for the scheme design. The preferred option is identified on technical, economic and environmental grounds in consultation with partners and the community.



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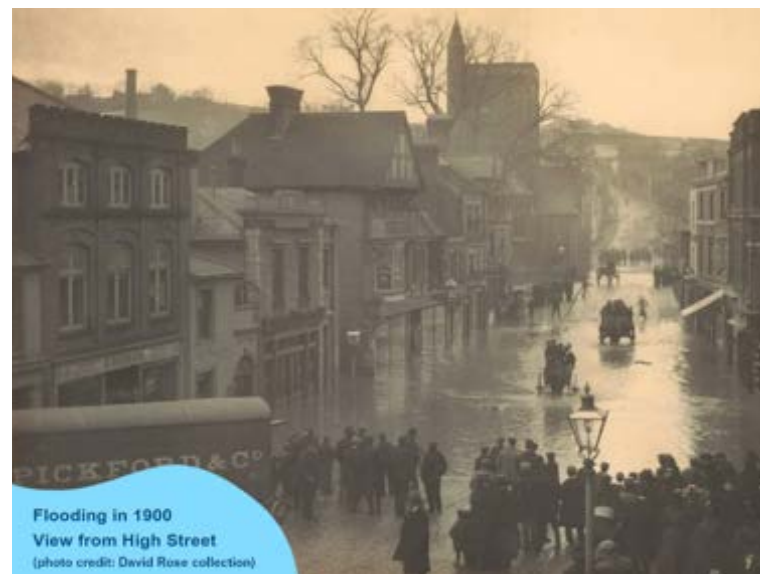
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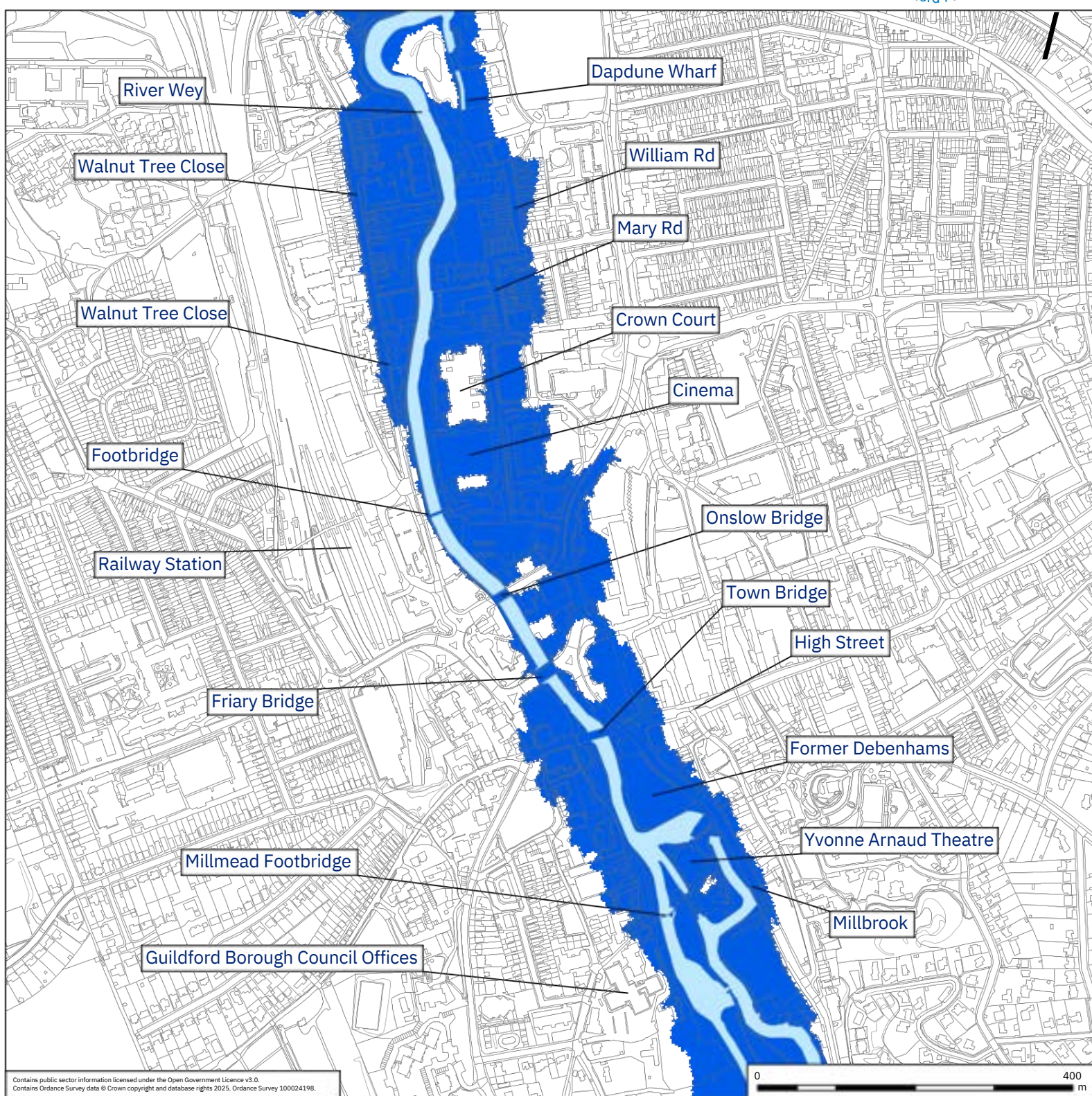
The flood problem



Here are some historic images of flooding in Guildford



Current flood risk



This map shows the extent of land that would be impacted by a significant flood that has a 1% or more chance of happening in any given year. This flood extent also considers climate change predictions.

The last significant flood event in Guildford, classified as having a 1% chance of happening in any given year, was in 1968. Our upcoming appraisal will assess different scale flood events. Our ambition is to design a scheme that will manage a flood event of this size while considering the impacts of climate change. Our formal appraisal process will determine the level of protection that can be provided.

Managing current flood risk



The Environment Agency has well tested flood-protection plans in place for Guildford, working with others, including the fire service and Surrey County Council, to help those at greatest risk. We encourage people to check their own flood risk and sign up for Environment Agency flood alerts.



We carry out annual river maintenance on the River Wey which includes vegetation management, removal of blockages and weir maintenance. This helps the river flow freely and reduces the risk of flooding to communities.

You can sign up to get flood warnings if your home or business is at risk of flooding. The service is free>>

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

Managing current flood risk



We have a temporary defence management plan for Guildford, covering Mary Road and William Road. This tells us how temporary flood barriers could be put up to protect homes and businesses in this location if property flooding is expected. The temporary defence plan was successfully deployed in December 2019 and February 2020 when flows in the River Wey were high.



Temporary flood barrier deployment.
Guildford, Mary Road, 2020

Temporary barrier deployments are subject to dynamic site safety assessments, equipment and human resource availability. The nature of the flood including the ferocity and scale of the storm that created the flood can also impact our ability to forecast and deploy defences in time to protect communities.

A permanent scheme will reduce the need for temporary flood barriers to be used each time there is a risk of flooding in Guildford. It will reduce the reliance on human decision-making and availability of resources and staff to deploy barriers. It will give residents peace of mind that a solution is in place whenever flooding may be likely to occur.

Surface water flood risk



What is the difference between fluvial and surface water flooding?

Fluvial flooding is from the river. Surface water flooding is where drainage systems cannot cope.

Guildford is at risk of flooding both from the river (fluvial) as a result of high river levels and flows exceeding the capacity of the river channel, as well as surface water flooding as a result of intense rainfall within Guildford itself, which exceeds the capacity of the urban drainage system of Guildford.

How are we working with Surrey County Council to reduce overall flood risk?

We are working with Surrey County Council (SCC), the lead local flood authority, to review how to sustainably manage surface water flood risk. SCC are carrying out modelling to better understand surface water flood risk and the volume of surface water we are looking to manage within the town. We will then be looking at how surface water risk can be reduced and integrated into areas of regeneration like Shaping Guildford's Future and the Guildford Flood Alleviation Scheme.

Progress since our last event



Since our last event in April 2024, we have made significant progress on the project

Surveys



Topographic surveys



Tree surveys



Ecology & biodiversity surveys

We have carried out various surveys to better understand the opportunities and constraints within the scheme area



River condition surveys



Landscape & heritage assessments



Ground investigation

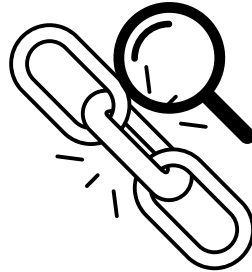
Appraisal progress



We are in the appraisal stage of the project and have been carrying out the following activities to inform the scheme design as it progresses. We have been:



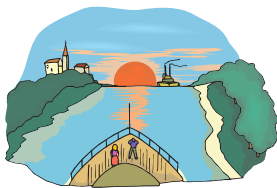
Collecting environmental data



Reviewing constraints in the scheme area



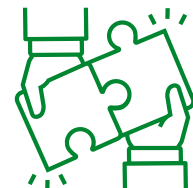
Updating the River Wey hydrology (flow predictions) and baseline hydraulic model



Working with the National Trust as the River Wey navigation authority.



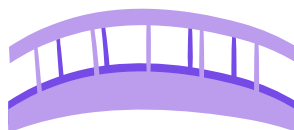
Establishing land lowering locations and testing different interventions to reduce flood risk



Collaborating with scheme partners Guildford Borough Council and Surrey County Council



Using our findings to update the defence alignment, which is now 2.2km



Finding a solution to the constrictions to flood flows at Town Bridge



Starting the outline design for the 2 new fish passes we are considering



We are continuing to work with Surrey County Council, the lead local flood authority, to review how to sustainably manage surface water flood risk.

Hydraulic modelling



What is hydraulic modelling?

Hydraulic modelling is the assessment of how water flows within rivers and the surrounding land. It uses mathematical equations, surveys of the river, structures along it and the adjacent land to show us which areas might flood when the river capacity is exceeded. This helps show how planned flood defences might work during potential floods.

How does it work?

Hydrological calculations assess how much water reaches the river, considering data such as geology, rainfall and records of past river flows. The hydraulic model then uses these calculations to simulate the flow of water into the river and assess the consequences of larger inflows which can lead to flooding.

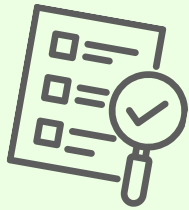
We follow best practice guidance to build and use our hydraulic model. We are required to consider the impact of climate change to ensure we do not increase flood risk to essential infrastructure. There is specific guidance on the climate change allowances we use to assess how this impacts river flows over the next 100 years, specific to the River Wey catchment.

Hydraulic modelling is key to understanding flood risk and designing a successful flood scheme.

Engagement progress



Since our last public event, we have continued to engage with stakeholders. Any feedback we receive has been considered and will inform the design of the scheme where possible. We have:



Published our feedback report
in July 2024



Held meetings with landowners,
developers and community
groups.



Supported the Environment Agency's
flood resilience team at an event to
increase flood risk awareness in
Guildford.



Attended family events at
Dapdune Wharf, National Trust.



Published 2 scheme newsletters – in
July 2024 and December 2024.



Used feedback from the public and other
stakeholders to update the proposed
defence alignment.

**We have many more engagement activities planned for 2025. Keep an eye out
for further details in our newsletter.**

Scheme latest



The Guildford Flood Alleviation Scheme will reduce flood risk for properties in Guildford. It will consist of over 2km of town centre defences and we will also lower some areas of the riverside to create more space for water. We aim to integrate the defences into the current landscaping, as well as improve connections between the town centre and the River Wey.



The defences will vary in design and style, depending on the existing urban environment. Some sections will be close to the tow path and river where there are existing buildings. Others will be set back from the river and landscaped into higher ground levels, where we can create new and improved public spaces.

There are some locations where defences will not be needed as the existing ground is high enough already.



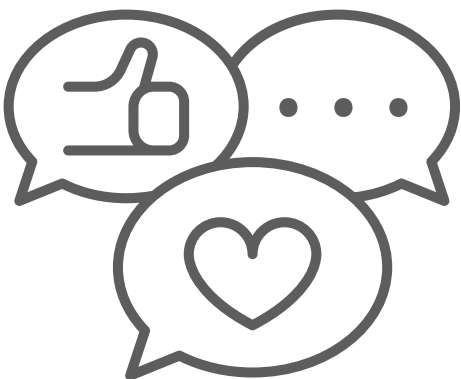
Scheme latest



Some parts of the riverside will be lowered to create more space for water. We will improve pedestrian access to and along the River Wey.



The alignment has been updated since our last event following feedback from stakeholders, including the public, landowners and partners. The height, size and final location for the defences will be established during the forthcoming appraisal process. We will be holding a further public event in 2026 where we will share the preferred design option for the scheme.



Alignment notes



1. Alignments are indicative for the appraisal to confirm that they represent a flood alleviation scheme that is acceptable and does not increase flood risk elsewhere. The alternative alignment shows opportunities for alternative set back alignments subject to landowner discussions.
2. The alignment may be subject to change in any given location. This may be due to factors such as impacts on flood risk elsewhere, landowner requirements, realisation of wider benefits beyond reduction in flood risk etc.
3. It should be noted that the alignment is the high point of the defences and does not account for the form and nature of the defences and how aspirations for the public realm may need to be integrated.
4. Alternative alignments shown represent locations where it is considered there are viable alternatives that may be more feasible to deliver.
5. The height of the flood defences relative to existing ground level has not yet been confirmed. This will be determined by the water level against which the defence provides protection and an allowance for uncertainty resulting in a higher top level than the predicted water level.

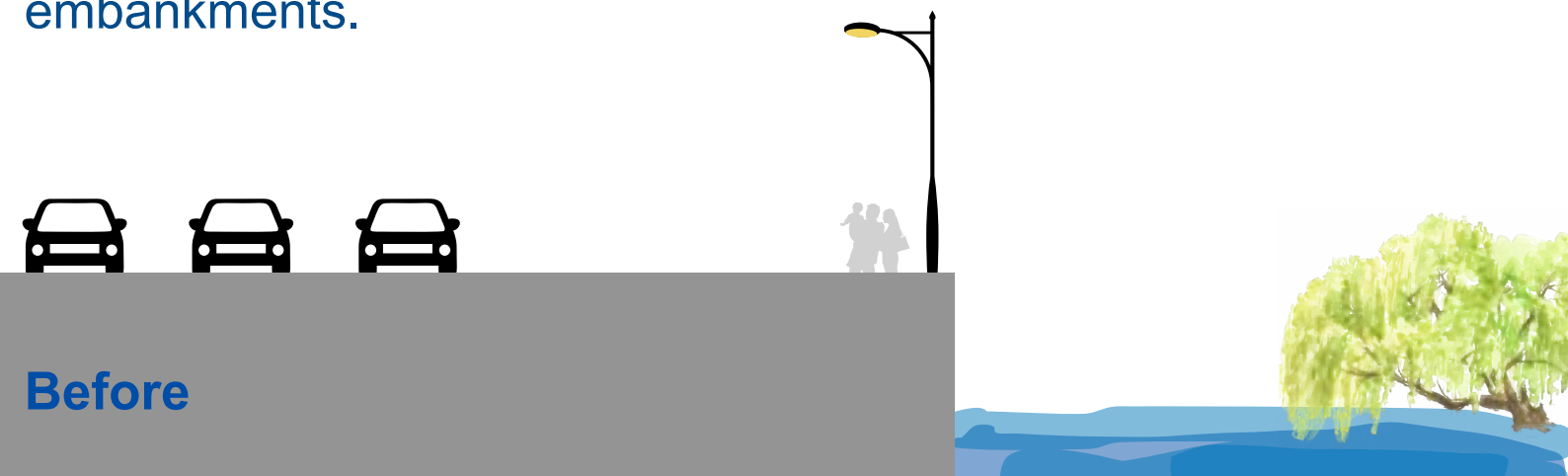


What do we mean by 'Land lowering'?



Land lowering involves removing material, such as soil and concrete, to create a lower area of land around a river. This restores a lower, more natural flood plain. These areas provide more space for water, helping to reduce flooding.

Areas of land lowering could include planted flood plains to create new habitat, which can add enhanced benefits to a flood scheme. We also look at how we might be able to reuse the material we remove, for example to be recycled into embankments.



Examples of other schemes



Here are some pictures of other Environment Agency schemes give an idea of how flood defences can be integrated into an urban landscape.



What could it look like?



These sketches give an idea of what could be possible in some locations. They do not represent the preferred option for the scheme design, but show what these areas could look like.

Please tell us what you think. You can complete a feedback form today or complete our online feedback form on our website.

Your feedback will be considered and will help us to develop the preferred option for the scheme.

The proposals are subject to change in any given location. This may be due to factors such as impacts on flood risk elsewhere, landowner discussions, affordability, ensuring positive environmental outcomes, etc.

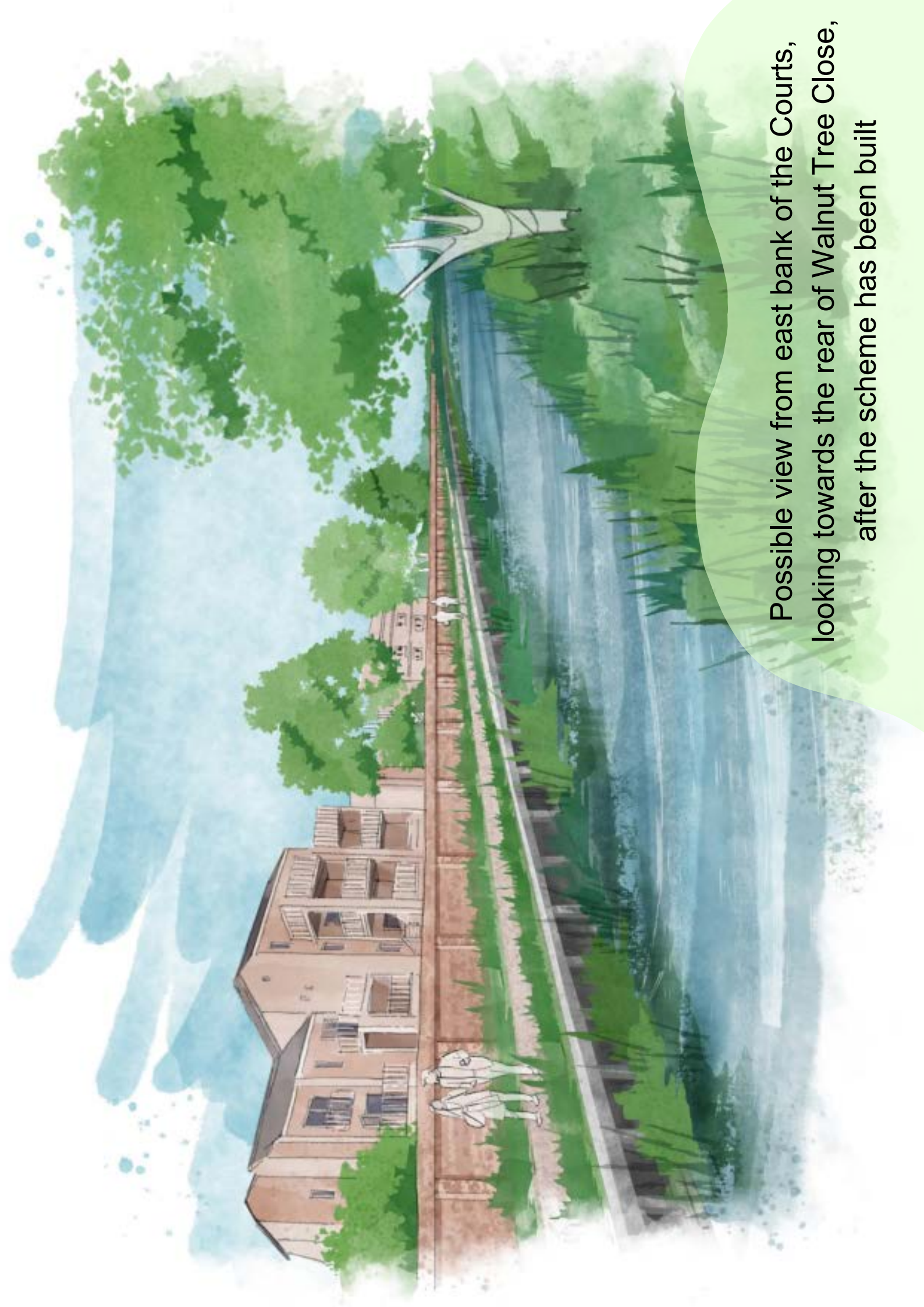




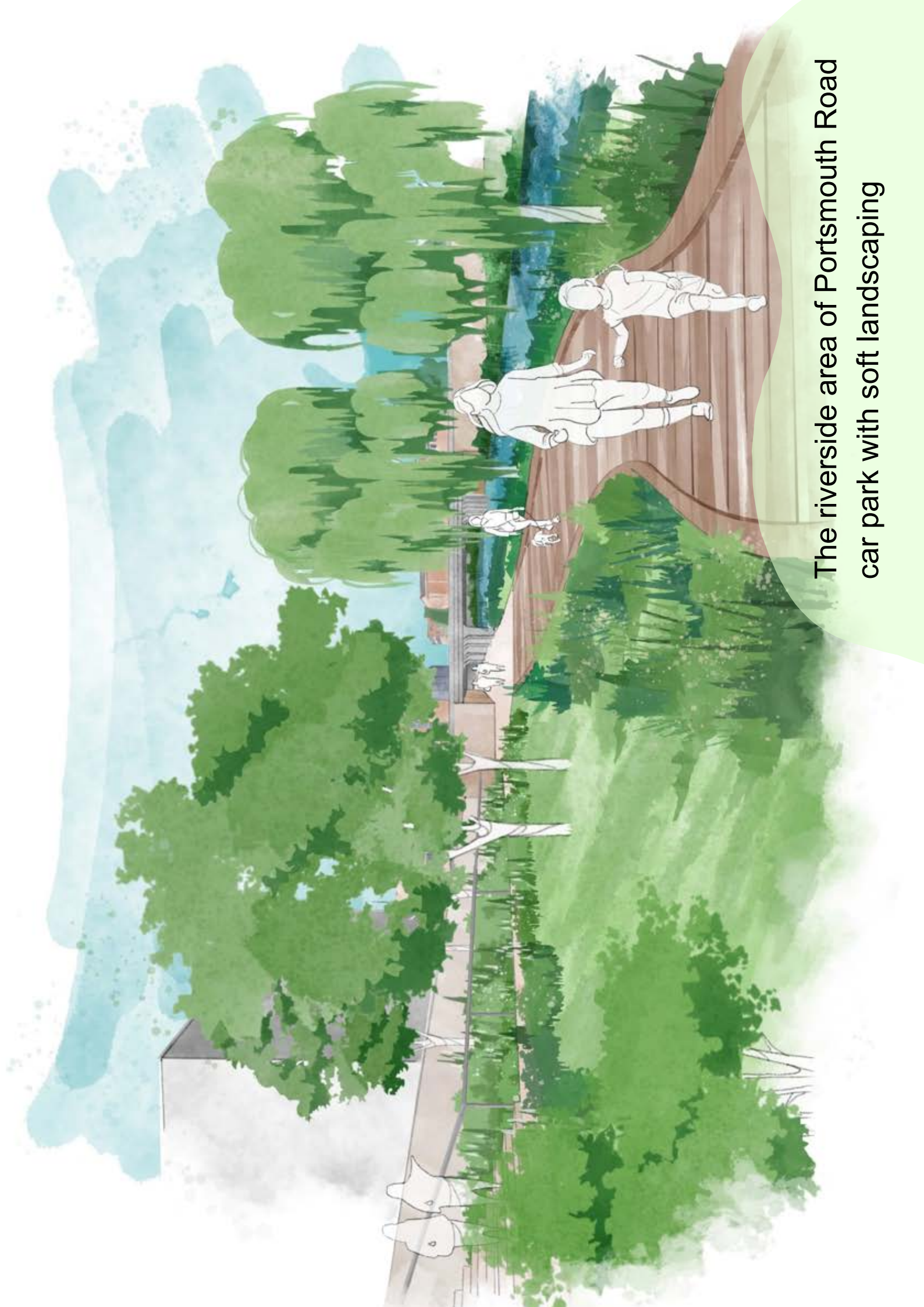
An idea of what Bedford Wharf could look like
after the scheme has been built



Existing view from east bank of the Courts,
looking towards the rear of Walnut Tree Close



Possible view from east bank of the Courts,
looking towards the rear of Walnut Tree Close,
after the scheme has been built



The riverside area of Portsmouth Road
car park with soft landscaping

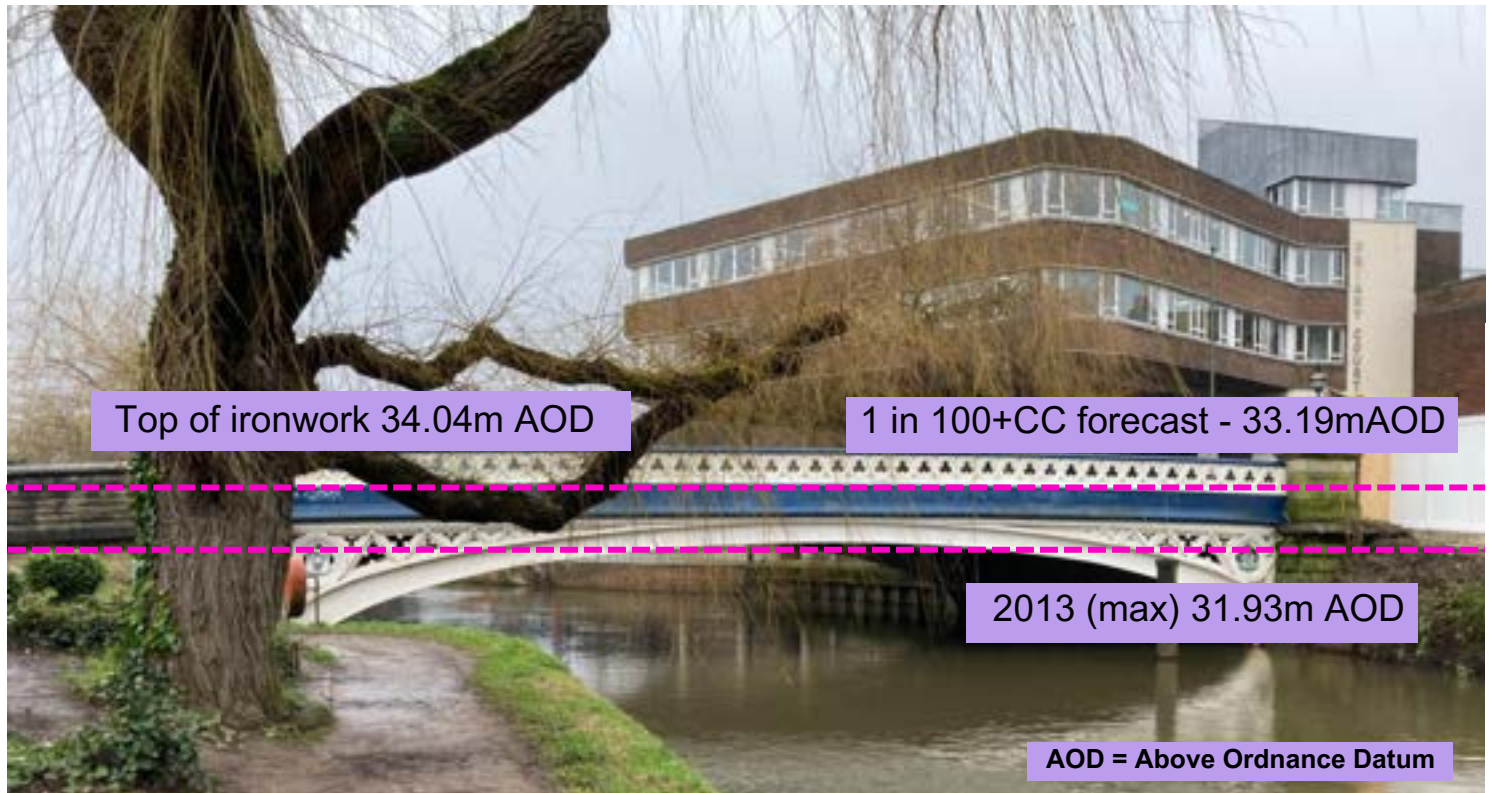


The riverside area of Portsmouth Road
car park with hard landscaping

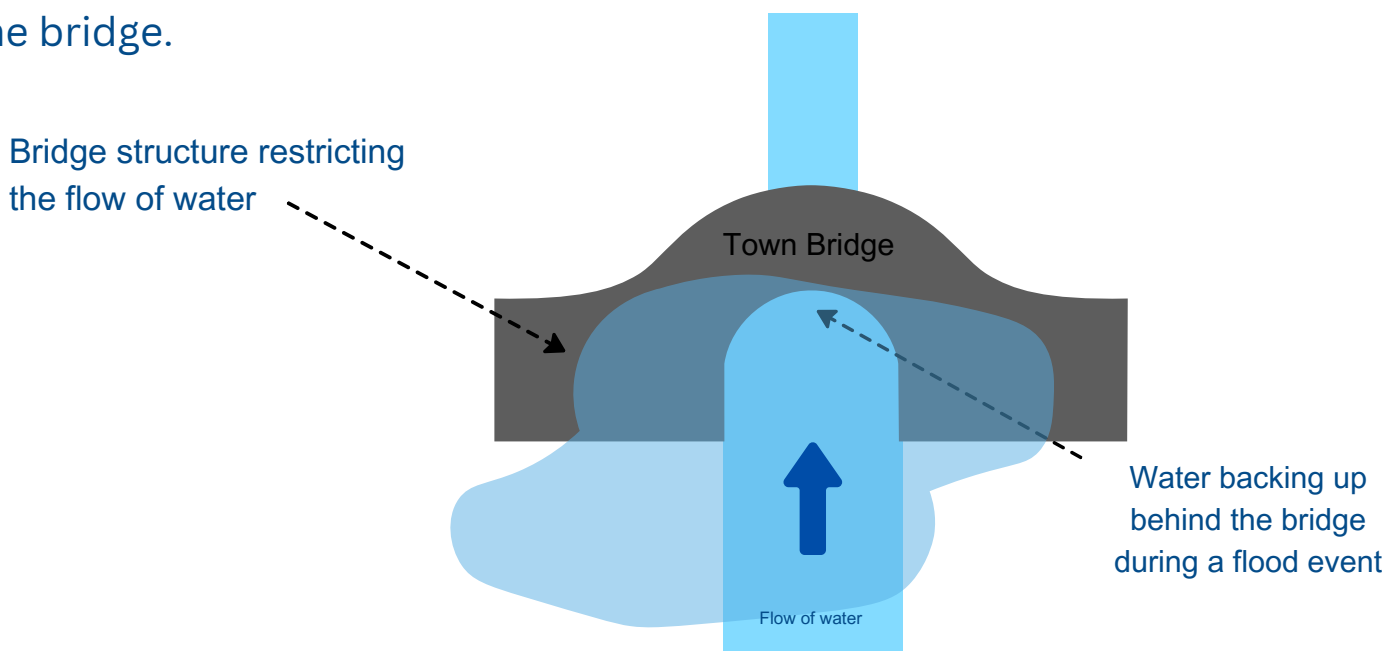
Constrictions to flood flows



Town Bridge and Millmead footbridge are constrictions to flood flows at the point they cross the River Wey. This constriction in the river causes flood water to back up and increase the depth of flood water upstream of these structures.



This bottom dotted line shows the flood level during the 2013 flood. The top line shows the level for a 1 in 100 flood with an allowance for climate change. You can see that the water level would reach the top of the ironwork beneath the bridge.



Constrictions to flood flows



The old Town Bridge was destroyed during the 1900 flood. With the current bridges, flood water backs up and floods the local area. The new flood defences in the area will help reduce the impact of this flood water. However, without modifications to Town Bridge and Millmead footbridge, upstream flood risk will increase, due to the new flood defences containing the flood water within the river.

We have reviewed several options at the 2 bridges to reduce the constrictions as far as possible in a cost-effective way and reduce flood risk overall.

What are the options?



Using data from our hydraulic modelling, we have looked at different options for reducing the impact of the constrictions at Town Bridge and Millmead footbridge. Here is an overview of some of the options we have considered.

Road lowering between St Nicholas Church and the White House pub

This option would provide limited flood risk benefits and would not reduce upstream water levels significantly.

We may need to move numerous buried pipes and cables which are located in this area.

There would be a potential impact on the stability of nearby buildings, such as the church and pub.

This would require changes to the levels and gradients of Town Bridge and the road north of the church.

Culvert beneath western side of Town Bridge

This only provided a small amount of additional capacity and therefore minor flood risk benefits, and it would not reduce upstream water levels significantly.

We may need to move numerous buried pipes and cables which are located in this area.

We would also need to lower the ground between the bridge and the pub so water could enter the culvert, which would impact access to the pub.

We would need to replace the western ramp and parapets onto Town Bridge.

The culvert entrance would need a trash screen, and regular inspection and maintenance would be needed to limit the risk of blockages.

What are the options?



Demolition and replacement of Town Bridge

It would be a significant challenge to connect existing land levels on both banks of the river. It is likely we would need to raise existing roads on both sides of the river or put in steep ramps, which would be unacceptable.

The demolition and construction would cause major disruption to the town centre.

It would be very expensive compared to other options.

Providing a larger culvert beneath the raised walkway on the eastern side of Millmead Footbridge

This would provide limited flood risk benefits and would not reduce upstream water levels significantly

Removal of the decorative ironwork under Town Bridge Removal of the abutment walls on the left bank of Town Bridge Replacement of Millmead footbridge

These 3 interventions would provide sufficient flood risk benefits and reduce upstream water levels by the required amount.

There would be some disruption caused during the works.

There would be a change in the look of Town Bridge.

We would need to widen the channel upstream of Millmead footbridge. There would be a change in the look of the bridge.

What is the solution?



We need to do something to solve the problem caused by the constrictions to flow at both Town Bridge and Millmead footbridge.

We have investigated and modelled each of the options and the combination of the following 3 interventions are the best solution: removal of the decorative ironwork on Town Bridge, removal of the west side parapet walls on the abutment, and replacement of Millmead footbridge.

These changes will increase flow capacity and will also help to reduce the height of the defences upstream of the bridges.

These proposals are necessary for the scheme to go ahead and for us to reduce flood risk to Guildford town centre.

Removal of ironwork

Currently, the decorative ironwork under Town Bridge blocks flood water, making flooding to the town centre worse. We are proposing to remove the ironwork to increase the flow capacity in the channel, allowing more water to pass through under the bridge.



Original image credit: David Dixon 2015

This image shows what Town Bridge could look like with the decorative ironwork removed.

Removing brick abutment walls



We would also remove the brick abutment walls that are currently on the left bank of Town Bridge. This will allow larger scale floods to flow overland and back into the channel downstream of the bridge. There is a possibility these could be replaced with open railings for water to move more easily through.

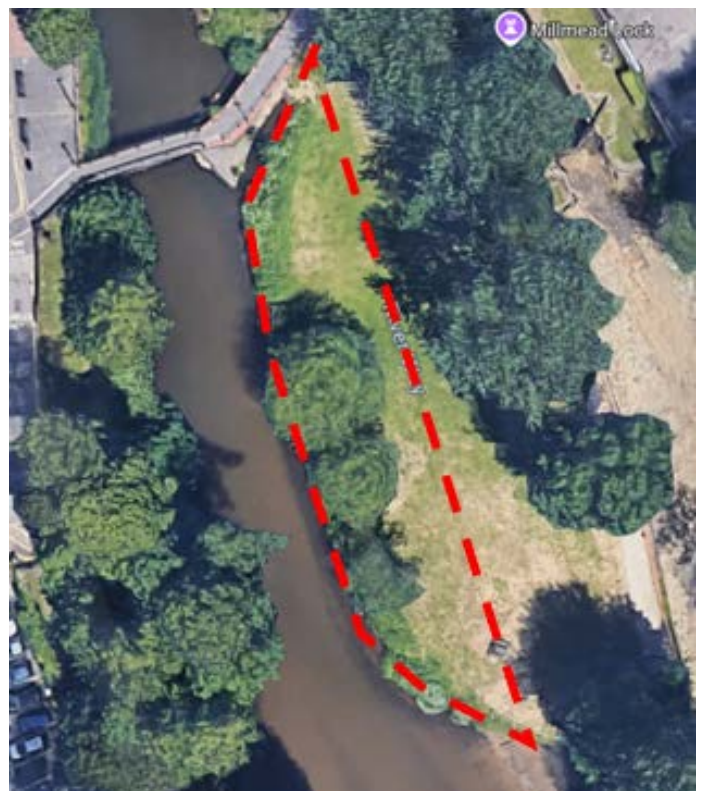
Millmead footbridge



We would also need to replace Millmead Footbridge. We would replace the bridge and the brick structure immediately to the east with a longer, clear-span footbridge. We would also modify the riverbank upstream of the bridge, allowing more space for water to flow through.



We would also need to widen the river upstream on the right bank to allow us to successfully widen the bridge. This will also help support the safe and efficient movement of water.



Surface water scheme update



Surrey County Council, as Lead Local Flood Authority, is carrying out a feasibility study for a surface water flood alleviation scheme in Guildford. This would run in parallel with the fluvial flood alleviation scheme on the River Wey.

Surrey County Council have engaged its Technical Services provider (AtkinsRealis) to produce a computer model of the potential surface water flood risk in the area. This particular flood risk is associated with the water that flows into the town centre from the outskirts of town, through pipes and ditches that are unable to cope during heavy rainfall events.

AtkinsRealis will create a computer model which will feed into the fluvial flood scheme model. This will ensure that both schemes work together to achieve the most efficient methods of addressing both fluvial and surface water flood risk. The study has already identified numerous surface water routes that travel into the town centre either along roads or through gardens and properties.

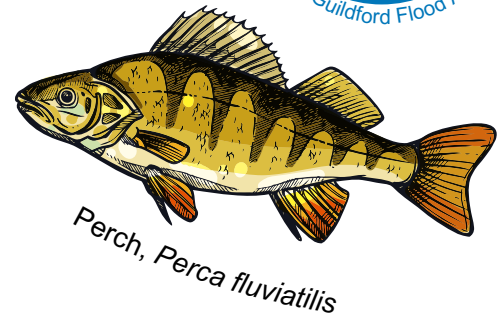
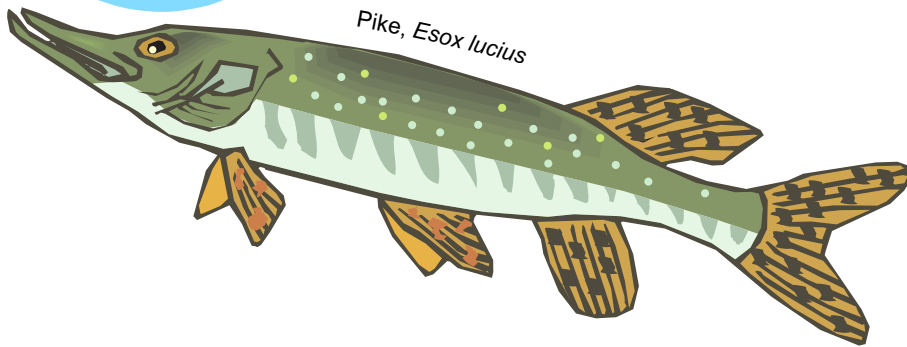
In addition to its work on the proposed scheme, Surrey County Council is carrying out investigations on recent flooding incidents and working with developers to maximise the surface water attenuation they can provide to town centre.

Surface water flood risk map

This map is based on data available January 2025. The surface water flood risk modelling for Guildford is being updated and we will have more up-to-date maps available in the near future.



Progress on fish passes



There are a number of fish species in the River Wey, including chub, trout, roach, perch and pike. They are essential for keeping the ecosystem balanced and maintaining river health.

Numerous weir structures have been built on the River Wey over the centuries. This has created significant obstacles to fish passage.

The Guildford Flood Alleviation Scheme is considering 2 new fish passes, upstream of Guildford. Locations are:

- St Catherine's Weir (near Shalford)
- Unstead Weir (near Peasmarsh)

Since our last public event in April 2024, we have

- Undertaken ground level surveys of the sites to help inform where a fish pass would perform best
- Completed initial ecological surveys to identify area of habitat to avoid or improve
- Explored how we can meet our fish pass requirements and the navigation requirements with the National Trust
- Held constructive discussions with Natural England to explore requirements for working in a Site of Special Scientific Investigation (SSSI)

For more information and to stay up to date with our progress on fish passes along the River Wey, please sign up to receive our project newsletter.

Fish passes on the Wey



Why do we need fish passes ?

Rivers form networks like roads. Fish need to move up and down river to access food, shelter, and reproduce.

There are at least 10 human-made obstacles to fish movement in this image.



SALMON NEED TO GET FROM THE SEA TO UPRIVER HABITATS TO SPAWN.



JUVENILE EELS NEED ACCESS UPRIVER TO GROW INTO ADULTS BEFORE RETURNING TO THE SEA TO SPAWN.



ROACH NEED TO MOVE THROUGHOUT THE RIVER TO SPAWN AND SEEK SHELTER FROM FLOODS AND PREDATORS.



BREAM NEED ACCESS TO FOOD THROUGHOUT THE RIVER NETWORK.



More than 50,000 obstacles impede fish movement in English rivers.

Human-made obstacles are being removed to improve rivers for fish and people. Some can't be removed, meaning fish passes are needed so fish can swim past these obstacles.



Solutions for Fish Passage

Removing human-made obstacles is the best option for restoring the free passage of fish and other wildlife but is not always possible.

When an obstacle cannot be removed, a fish pass can be constructed to provide a route for fish to swim past the obstacle.



The type of fish pass constructed is dependent on the environmental and site conditions and the fish species that need to use it.

EEL PASSES HAVE ARTIFICIAL SUBSTRATE AND TRICKLING WATER FOR EELS TO CRAWL UP



Floodbanks can be breached or moved further from a river to provide space for fish to seek shelter during floods.



Flood gates can be automated to allow fish to move freely up and down river when it is not in flood.



ROCK RAMP PASSES ARE BUILT UP TO AN OBSTACLE TO PRODUCE A SUITABLE SLOPE AND WATER DEPTH FOR FISH TO SWIM UP.



Bypass channels resemble river channels and can restore habitat and free passage for fish and other wildlife.



Deep Vertical Slot passes slow water into a series of pools.



REMOVAL OF ALL HUMAN-MADE OBSTACLES ALLOWS A RIVER TO CHOOSE WHERE IT FLOWS, CREATING RIFFLES, SHALLOWS, POOLS, AND WETLANDS FOR ALL WILDLIFE AND PEOPLE



Weir removal



Baffle passes have a series of baffles on the wall or floor of a constructed channel to slow the water flow.



Options we are no longer considering



Upstream storage in the Wey catchment

We have carried out an assessment of upstream storage in the Wey catchment, upstream of Guildford. Upstream storage provides minimal benefit to Guildford with only very small reductions in flood depths.

There are also significant challenges in providing the required scale of upstream storage that would be needed to reduce flood risk in Guildford during large flood events. These include:



Unsuitable topography to create large storage within the landscape



Environmental impacts on important habitats and designated sites



The costs of upstream storage would be high in comparison to the benefits delivered

This means it would not be viable to take this option forward.

Millbrook car park

Guildford Borough Council, as the landowners for this location, have confirmed that the indicative defence alignment around the Millbrook car park is no longer necessary.

The Millbrook car park area has no properties to protect, so is not a flood risk management priority. The Guildford Flood Alleviation Scheme is being designed to protect existing properties at risk of flooding from the River Wey.

Options we are no longer considering



Natural Flood Management

We have assessed the potential for Natural Flood Management (NFM) measures in the Wey catchment, upstream of Guildford. NFM means using natural processes, such as managing soil and land and managing woodland, to help slow and store water.

It typically works best on smaller watercourses higher up in catchments and for smaller floods. NFM measures in the Wey Catchment would provide very minimal benefit to Guildford during large floods due to the volume of water and the specific features of the catchment.

While NFM is not a practical or cost-effective solution for the expected impacts of flooding and climate change in Guildford, we will consider aspects of it to support the scheme.



We will consider NFM to help meet biodiversity net gain and carbon offsetting targets.



The Environment Agency and partner organisations are delivering NFM elsewhere and working to change farming practices in the catchment which will benefit other communities.

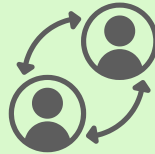
What happens next?



We are focusing on finding a feasible and fundable option that meets the project objectives.



Feedback from this event will help to inform the outline design of the scheme.



We will continue to engage with the public, landowners, developers and community groups.



We will undertake ground investigation works and further environmental surveys.



As part of our outline design work, we will establish the height, size, type and location of the flood defences. We will share further information when it is available and at our next public event.



The proposals will be designed to visually integrate into existing areas of the river corridor. We will also consider Guildford Borough Council's regeneration aspirations.



Once the outline design is complete, we will update the cost estimate and economic benefits for the scheme. This will enable us to establish the preferred option (including Standard of Protection). The scheme can only be progressed once the necessary funding has been agreed with partners.

Once all the above is completed, we will submit our Outline Business Case. This is a document detailing:

- the justification for the scheme based on the existing flood risk problem
- the proposed solution
- the benefits it could deliver compared to the anticipated costs
- how it could be funded and delivered in order to secure Environment Agency approval to commence the next stage (detailed design).

We are aiming to submit our Outline Business Case before the end of 2026.

Project progress



Assessment

Appraisal

The target date to complete appraisal is 2026. This includes identifying the preferred option which meets project objectives. This will need to be fundable and feasible.

Detailed Design

& Planning

Permission

The duration of this stage will depend on the preferred option and obtaining planning permission

Construction

The duration of construction will depend on co-ordination with developer proposals and Guildford Borough Council aspirations.



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Contact us



guildfordfloodscheme@environment-agency.gov.uk



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[www.consult.environment-](http://www.consult.environment-agency.gov.uk/thames/guildford-flood-alleviation-scheme)



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scheme survey and let us know what you think.