Last updated: 1 August 2025

Gadebridge Park river restoration project: Frequently asked questions

Answers to frequently asked questions on the following subjects can be found below (click to navigate directly to the related questions and answers):

Chalk streams

1. I understand that the River Gade is a chalk stream, but what is a chalk stream and why are they so important?

England is home to 85% of the world's chalk streams. Unlike most rivers, chalk streams are fed from chalk aquifers – underground porous rock formations which store water. Chalk streams are directly connected to these aquifers, making their water mineral rich, clean and at a consistent temperature. This unique habitat provides the ideal conditions for a diverse range of plants and animals, including some of our most threatened species, such as the water vole and brown trout. The UK has a global responsibility to protect these rare and valuable habitats.

Because of their rarity and value, chalk streams in England have been designated a priority habitat, detailed within the qualifying criteria of the UK Biodiversity Action Plan (BAP) Priority Habitat Descriptions for Rivers. However, all chalk streams in England, including the River Gade, face vast challenges and pressures from decades of mismanagement.

Only 17% of the chalk streams in England currently meet 'Good Ecological Status'

under the Water Framework Directive (WFD). The stretch of the River Gade that flows through Gadebridge Park is currently classed as having a 'Poor Ecological Status' under the WFD.

2. What problems are chalk streams facing?

Chalk streams are a rare and valuable habitat but the problems they face are complicated and expensive to solve:

- Degraded habitats due to historical human-made impacts, such as straightening channels and barriers to fish migration.
- Low flows due to unsustainable abstraction, population growth and climate change.
- Poor water quality due to storm overflows, discharges and run-off from farms and roads.
- Invasive non-native species, such as Himalayan balsam and signal crayfish, which spread and have a harmful impact on the environment.

Historically, industry practice, dredging and structures which slow flows, have also contributed to their degradation.

Population growth and climate change exacerbate problems by increasing the pressures on water supply and reducing the resilience of chalk streams.

3. What's being done about it and how can I help?

Like-minded individuals and organisations are working together to improve chalk streams and the wider water environment. People have come together to form 'catchment partnerships', to develop a shared vision and plan for their rivers.

The catchment partnership for the Colne, the Colne Catchment Action Network (ColneCAN) ties together a number of existing groups, such as the Colne Valley Regional Park and the Chilterns Chalk Stream Project and includes partners such as the Environment Agency, water companies, local authorities, charities, anglers, conservationists and local residents to ensure catchment-wide thinking and local action. They work together to improve the River Gade and many other rivers in the area.

The Gadebridge Park river restoration project is part of Revitalising Chalk Rivers, a wider programme of projects led by the Environment Agency and Affinity Water that aims to protect and restore rare chalk streams like the River Gade. As part of this programme, Affinity Water has completed a project in the upper section of Gadebridge Park to provide new river habitats for wildlife and to improve the river's

water quality – you can find out more about this project at https://www.affinitywater.co.uk/sustainability/restoration/river-gade.

What you can do to help:

- Use the water from your tap wisely - using less water means that we can minimise the amount of additional water being taken out of our rivers and aquifers. Visit https://www.affinitywater.co.uk/saveourstreams/tips for ideas on reducing your water use.

- Toilets, sinks, washing machines or dishwashers that have been misconnected into surface drains rather than sewers cause significant pollution of our rivers and streams. Find out how to check your property at https://www.water.org.uk/developers/plumbing-and-drainage-misconnections

- Report any suspected pollution incidents to the Environment Agency incident hotline on 0800 80 70 60 so we can investigate it. Find out more at www.gov.uk/report-an-environmental-incident.

- Support the local catchment partnership, ColneCAN, by visiting http://colnecan.org.uk/.

The River Gade

4. Where does the River Gade start?

The River Gade rises from a spring in the chalk of the Chiltern Hills at Dagnall, Buckinghamshire.

5. The old river looked fine – why did it need improving?

Like many chalk streams, the River Gade faces pressure from low flows and historic modifications to its channel that limit the river's habitats and the wildlife it can support. The stretch that flows through Gadebridge Park is currently classified as having a 'Poor Ecological Status' under the Water Framework Directive (WFD).

In Gadebridge Park the River Gade flowed down an artificial channel created to supply water to the now demolished Bury Mill. The artificial channel was 'perched', meaning that it sat at a higher level than the valley bottom - the natural course of the river through the park. This meant that the river was disconnected from its floodplain. When flooding occured in the valley bottom, the water remained in the park for long periods of time because it was unable to flow back into the channel.

The river's perched position also meant it was disconnected from the groundwater table beneath its original course. Without this source, it lacked the natural

characteristics of a chalk stream. These unique characteristics – including mineral rich, clean water with an alkaline PH and a stable temperature all year round – are vital for supporting the diverse range of plants and animals that chalk streams are home to.

The artificial channel was much wider and straighter than a natural chalk stream would typically be. This often led to a build-up of sediment along the bank and associated excessive vegetation growth, which gradually narrowed the channel.

The Environment Agency's old gauging station and weir, located at the bottom of the park, was used to monitor low flows and flood flows on the River Gade. The weir, as well as other remains of historic in-channel structures, acted as a barrier to fish. These structures can also cause sediment and vegetation to build up, impacting on river habitats and wildlife.

Low flows

The River Gade in Gadebridge Park often suffered from low flows and had little resilience to drought conditions due to:

- spring flows (groundwater emerging at the surface) being diverted into an underground tunnel (culvert) rather than feeding the River Gade. The culvert was built to reduce the risk of flooding in Hemel town and discharged into the fishing lake at Kings Langley – about 5km downstream of Gadebridge Park. Spring flow was therefore lost to the River Gade until this point.

- being disconnected from the groundwater table. For a chalk stream, where over 70% of its flow is from groundwater, this can have a significant impact on its resilience during periods of low flows and to wildlife in the channel.

- water being taken (abstracted) for public water supply.

Most water we drink in the South East comes from rainwater stored deep beneath our feet in natural chalk 'aquifers'. These also feed our chalk streams. In 2018 Affinity Water reduced net abstraction in the Gade catchment by 2,342,400 m^3/year (that's an average of 6.4 million litres a day). However, demand for water in the South East remains high.

6. Why could you not just leave the park as it was?

There simply is not a ‘do nothing’ option. ‘Rivers, lakes and coastal waters are vital natural resources: they provide drinking water, crucial habitats for many different types of wildlife, and are an important resource for industry and recreation. A significant proportion of them are environmentally damaged or under threat. Protecting and improving the environment is an important part of achieving sustainable development and is vital for the long term health, well being and prosperity of everyone’ (Joint Nature Conservation Committee, February 2010. Read more here).

The River Gade is a chalk stream, which is a globally rare habitat. A chalk stream’s unique habitat provides the ideal conditions for a diverse range of plants and animals and they are home to some of our most threatened species, such as the Water Vole and Brown Trout. 85% of the world’s chalk streams are in England, but only 17% of these currently meet ‘Good Ecological Status’ under the Water Framework Directive (WFD). The stretch of the River Gade that flows through Gadebridge Park is currently classed as having a ‘Poor Ecological Status’ under the WFD.

The Hertfordshire State of Nature Report 2020 has identified that nature in Hertfordshire is under threat and declining at significant rates. Climate change will accelerate this trend. In a ‘do nothing’ scenario, this pattern of decline and extinction will continue to degrade our valuable habitats, such as the River Gade, that are essential for societal well-being. High biodiversity is a proven indicator of a habitat’s health and resilience to climate change and is essential to help mitigate impacts. You can read more about the state of Hertfordshire’s rivers and wetlands here: https://www.hertswildlifetrust.org.uk/stateofnature

The river improvements we’ve made as part of the Gadebridge Park river restoration project will contribute to:

- improving the River Gade towards reaching Good Ecological Status, removing the risk of deterioration and meeting the UK’s desire to improve the health of our water environment.

- meeting the Environment Agency’s obligations under the Water Framework Directive (for instance, addressing the risk of deterioration is a statutory requirement), the commitments expressed in the Thames River Basin Management Plan and the Government’s Five-Year Environment Plan.

- mitigating the impacts of climate change by establishing sustainable habitats more capable of adapting to future climate scenarios, improving resilience to

low flow events and drought conditions when water availability is reduced, and improving floodplain connectivity and drainage when rainfall is high.

These benefits are consistent with the Dacorum Local Plan to 2041 which has references to the importance of protecting chalk streams and mitigating and adapting to climate change.

Project objectives and proposals

7. What did the project aim to do?

The Environment Agency, Dacorum Borough Council and Affinity Water wanted to:

- Improve the River Gade and the adjacent parkland for wildlife.
- Provide more opportunities, accessible to everyone, for people to get closer to the river and enjoy nature.
- Improve floodplain connectivity, but reduce the impact of flooding – i.e. flood water can be stored on the floodplain when needed, but doesn't sit on the parkland for long periods of time.
- Improve the river's resilience – its ability to cope with and adapt to the pressures of low flows, high flows and climate change.
- Improve biodiversity in the River Gade, so that it supports Good Ecological Status under the European Water Framework Directive.
- Reduce the barriers to fish movement and impoundment caused by river structures, including the Environment Agency's Bury Mill gauging station.
- Improve flows in the river, to lessen the build-up of sediment and vegetation and to reduce the need for maintenance.
- Replace the Environment Agency's gauging station to improve the ability to monitor river flows and provide flood warnings.
- Provide more opportunities to learn about the River Gade, both its historical importance to the landscape and its value as a rare chalk stream.

8. What have you done as part of the river restoration project?

We have:

- Realigned the part of the River Gade located downstream of the Grade II listed White Bridge back to the valley bottom (through the centre of the park at its lowest point). This has reconnected the river to its floodplain and to the groundwater table below.

- Re-routed spring flows - which were diverted through a culvert (underground tunnel) and discharged into a fishing lake at Kings Langley 5km downstream -

into the new realigned channel. This will provide additional flow to the river, increasing its resilience to low flows, improve the river's water quality and help to restore natural characteristics of a chalk stream such as a more alkaline PH and a stable temperature all year round.

- Replaced the existing Bury Mill gauging station with a gauging station on the new realigned channel that is passable to fish and has a reduced impact on the river.

- Created vegetated riparian margins alongside the river channel and a wildflower meadow, to provide new habitats for wildlife

- Followed a Water Vole mitigation programme to ensure this species is protected during all phases of the project.

- Provided a fully accessible bridge crossing the new realigned channel from the Queensway car park to the Bowls Club and another in the centre of the park - all for people's enjoyment of the river.

- Provided a large access point to the river adjacent to the play area for people to get closer to nature.

In the future, we also plan to install information boards within the park to share the River Gade's historical importance to the landscape and help people to understand and value our rare chalk streams.

9. What has happened to the old channel?

The existing channel (mill leat) downstream of the White Bridge has been preserved in situ. Material excavated from the creation of the new channel has been used to infill the existing channel. By effectively burying the mill leat, this historical feature will remain undisturbed and suffer less erosion and human/animal damage. Its preservation allows for any future archaeological investigations to take place. Before this work was completed, a number of tests were carried out to ensure the soil was of a suitable quality. The area was then seeded with a species-rich grass mix.

Dacorum Borough Council plan to work with local groups, including the Hemel Hempstead History and Museum Society, to install an information board adjacent to the existing channel. The board will feature historical information about Gadebridge Park, including its former mill leat.

10. What does the new gauging station look like?

The equipment used for the new gauging station is housed beneath the bridge that connects the southern car park to the Bowls Club. It's hard to spot, but it will look similar to the example below. We have reduced the amount of concrete required as much as possible, but some concrete is still necessary to ensure accurate flows are recorded.

11. Why is there no river restoration planned for the area north of the White Bridge?

This area was ruled out for restoration during the feasibility and options analysis stage of the project. The valley bottom and its associated groundwater springs are located to the east of this section of the park. If we were to realign the river in this location, it would run through the middle of Dacorum Borough Council's main event space. A heritage assessment also identified that we are unable to alter the flow beneath the Grade II listed White Bridge, making it significantly more challenging to achieve realignment north of the bridge.

12. Couldn't you have just cleared out all the overgrown vegetation from the old channel?

Clearing vegetation and silt from the river is not sustainable – over time it would simply return and require clearance again. Not only would this process increase long-term maintenance costs, it would also cause damage to wildlife habitats. Any benefit from doing so would be very marginal (if any) and short-term.

By restoring the river to a more natural state, we will improve flows and lessen the build-up of sediment and vegetation. We do not expect in-channel maintenance such

as desilting to be needed following the project's completion downstream of the White Bridge.

13. Isn't moving the river closer to the children's playground dangerous?

Once the project is complete, flood waters will recede more quickly into the new channel. This means that flooding will have less of an impact on people's enjoyment of the park, including the play areas. Also, floodwaters can be dangerous - standing water quickly becomes a breeding ground for bacteria and insects such as mosquitos. Public Health England say children should not play in floodwater.

14. Is this all so the council can build more houses?

No. The Environment Agency is leading the project, alongside its partners Dacorum Borough Council and Affinity Water. The project will provide multiple benefits, including improved habitats for wildlife, the protection of water resources for both people and the environment, improved resilience to flood flows and climate change, and allowing local residents and visitors to get closer to the river and enjoy nature.

As landowner, Dacorum Borough Council has a duty to prevent any deterioration of a water body under the Water Framework Directive.

This project is part of Revitalising Chalk Rivers, a wider programme of environmental projects that the Environment Agency and Affinity Water are working on that aims to protect and restore rare chalk streams like the River Gade.

Project timescales

15. When did construction start?

The restoration works got underway in early autumn 2024.

16. How long will the works take?

Aside from a few remaining tasks, the works were complete in July 2025.

17. Have events in the park gone ahead during the construction phase?

Yes – we have worked closely with Gadebridge Park's managers at Dacorum Borough Council to ensure we are kept up-to-date of the park's event programme for 2025 in order to minimise disruption. Most events in Gadebridge Park use the space north of Gadebridge Lane and this has been available for use at all times.

Pedestrian access from the Gadebridge Lane car park and the White Bridge remained open during construction.

In all cases, together with Dacorum Borough Council, we have carried out risk assessments and any necessary actions, for example temporary fencing and signage, to ensure everyone's safety at all times.

Wildlife considerations

18. Why was the wetland area removed from the designs?

The proposed wetland area upstream of Gadebridge Lane was removed from our designs because we found it would be too small to function effectively. Also, it was likely to have impacted on the use of the events space in the park.

19. What are you doing to help wildlife and improve biodiversity?

By creating a narrower, sinuous river channel that is in contact with the groundwater below, we will ensure that the habitat is more resilient to climate change, providing refuge for wildlife during drought and flood events. We will create a management plan for all the habitats created to ensure they are suitably looked after in the future, ensuring the longevity of the project.

Downstream of the White Bridge, we have created vegetated riparian margins along the banks of the new channel. Riparian margins provide important habitat for many species. Their mix of semi-aquatic tall herbs, grasses and trees provide a range of services for our wildlife - for example, a habitat and a source of food for aquatic insects at different life stages, cover from predation for Water Voles and a migration corridor for Otters.

As well as providing habitat, riparian margins also play a role in filtering sediment and reducing nutrients entering the watercourse, helping to improve water quality. They slow flood flows and help to reduce erosion of banks, providing a natural flood management solution. They are also critically important in retaining the connectivity of the river environment, both laterally with its flood plain and longitudinally with upstream and downstream reaches of the river.

To help support wildlife and meet biodiversity net gain targets, we have also created a wildflower meadow with both pollen and nectar species, between the right bank of the channel and the Queensway car park.

As part of our initial ecological assessments, we discovered that the area of grassland adjacent to The Bury was the most species rich in the park for wildflowers and grasses. Wildflower meadows provide habitat for a variety of species of invertebrates (including pollinators), birds and small mammals. Since the 1930s we

have lost over 99% of our ‘unimproved grasslands’ and so encouraging the restoration of this habitat in the park is a great opportunity for wildlife.

By simply changing the management of this area, to include consistent mowing and the removal of the arisings, we will further improve this area. Removing the arisings helps to remove nutrients and create a nutrient poor area that is favoured by lots of wildflower species. Mowing also ensures that this area remains a meadow area and doesn’t succeed into scrub or woodland. We hope that including this area in the management plan produced for the site will provide clear guidance to the landowners on how to ensure the higher biodiversity is retained into the future. This area will also include a mown path, maintained March to September, to allow access and enjoyment for all.

20. How did you reduce disruption to wildlife in the existing channel during construction?

Works were carried out to our high ecologically sensitive standards and we avoided disturbance as much as possible.

Bird Nesting season as stated by Natural England is 1 March to 31 August each year, however we know that this can vary in the South East dependent on the weather. Where tree works were unavoidable during this period we carried out a bird nesting survey beforehand and appointed an ‘Ecological Clerk of Works’ to ensure minimal risk to both birds and bats. See question 22 for more details of nesting birds.

Prior to the works starting, we cut back the vegetation in the existing channel to discourage fish, mammals and invertebrates from taking up residence here over the following months. We safely transfered any fish to the new channel (see the ‘Fish’ section for more details). The new channel has a variety of in-river features and habitats that will help support a diverse range of wildlife.

We considered the timing of the construction phase carefully to balance the needs of the local ecology, the council’s events programme and school holidays.

See question 24 below for information about what we did to protect water voles.

Although there may have been short-term implications on some species currently found in the old channel during construction, the new channel provides an attractive new habitat for many species.

21. What did you do to protect nesting birds during construction?

In July 2018, ecologists from our consultant, JBA, carried out a survey of marginal

vegetation along the banks of the River Gade. The survey indicated that there is ample potential for breeding birds typical of the woodland edge and urban habitats to nest and forage in the river's reed margins (specifically waterfowl and waders). However, this is limited by people and dogs in this busy park causing disturbance, particularly in the area to the south of the White Bridge. The only exception is the short reach between the flood culvert at the Queensway bridge and the Bury Garden where there is less public access.

The park's hedges are dominated by Hawthorn and are not very dense. This limits opportunities for nesting birds.

Given the public nature of the park and the presence of trees, there is currently limited likelihood of the site being used by wintering or breeding waders.

We took particular care to protect any breeding birds during the bird nesting season, between the months of March and September. While we could have carried out the necessary tree works before March (2024), we did not have certainty at that time that the project would progress to construction. As a result, the tree works could have been unnecessary. We are confident that our approach to the tree works ensured that nesting birds were protected.

Before the tree works, a suitably qualified ecologist carried out a nesting survey to identify active nests that may be disturbed or destroyed. Where active nests were present, a buffer surrounding the nest was left in place until the young birds had fledged. Site clearance activities, including vegetation management within the channel, have deterred any further habituation during the works. The site clearance activities took place in the presence of a suitably qualified ecologist.

22. What about water voles?

Water voles are a protected species so it was important that we understood whether there was a population living in the River Gade in Gadebridge Park before we began construction.

Water vole were spotted in the park for a few weeks back in Autumn 2020 following their reintroduction further upstream on the River Gade by the Box Moor Trust. In 2021 our officers also found potential signs of their presence in the park, including possible footprints. As a result of these sightings we arranged for a comprehensive water vole survey to be carried out in September 2021 to establish whether water voles had migrated into the park. Despite the possible sightings, however, the survey found no current signs of water vole.

We arranged for another survey to take place at the end of May 2022. The survey found a ‘probable’ sighting of a water vole. Although it was a very brief sighting, the mammal’s tail suggested it was much more likely to be a water vole than a rat. The survey also found feeding remains which provides further evidence to support a positive sighting.

As a result, we developed a water vole mitigation programme to ensure this species was protected during all phases of the project. As part of this programme, we carried out a survey in September 2023 to reassess the population size and any mitigation measures required. This survey didn’t find any conclusive evidence to suggest that a resident water vole population was present within Gadebridge Park. As a result of the findings (or lack of), we decided to carry out more detailed and continuous monitoring, including the use of temporary rafts (platforms that water vole can use as feeding stations or territory markers) and camera traps. This, too, did not reveal any signs of water vole. Taking account of previous surveys, we think this supports the view that the leat is being used as a migration corridor, with any water vole presence being intermittent and due to the occasional animal passing through. As a result, relocation of water vole prior to construction was not necessary.

By restoring this stretch of the River Gade and providing suitable habitats, we hope that water voles will be spotted here much more regularly in the future!

23. By adding river access points and encouraging children and dogs to enter the river, will this not damage the river and harm wildlife?

We want to protect the river and its wildlife, but we also want to help people get closer to the river and enjoy nature. It is a careful balance. Access to the existing river is uncontrolled and is causing significant localised damage.

We have created a large area of gravel near to the adventure playground to provide designated access for people and dogs to enter the river. The riverbank next to this access point has been designed to be less susceptible to erosion.

In other areas, a ‘buffer zone’, between 5 and 10 metres from the riverbank, will help protect the river’s wildlife. The buffer zone must remain undisturbed by development, with no fencing, footpaths, lighting, formal landscaping or other development. Any mowing will be limited to allow plants to flower. This area will provide multiple benefits including the protection of water vole burrows up to 5 metres within the bank, natural flood management, a link for habitats to benefit local biodiversity, and a more attractive river for the enjoyment of the park’s visitors.

Our future plans also include the installation of information boards, including one specifically about chalk streams. We hope this will help people to value and protect these important habitats.

24. How did you prevent the spread of non-native invasive species like Orange Balsam and American Signal Crayfish during construction?

Being vigilant is important. We ensured that regular ‘toolbox talks’ (involving short presentations and informal discussions) were provided to on-site staff and all visitors concerning non-native invasive species.

The main risk in spreading these species is when vehicles and people leave the park, including the public, carrying propagules (eggs and pieces of vegetation) to other rivers, streams and ponds. Throughout construction, our contractors adhered to a strict biosecurity plan, including the ‘check clean dry’ methodology and the use of wheel washes and exclusion zones.

The new channel will not remain free of non-native invasive species as they will be carried into it by the flow of the River Gade. The continued vigilance of the Parks and Recreation Team at Dacorum Borough Council will be required to eradicate any new infestations - as they have successfully done to date.

Fish

25. Were fish in the old stretch of river? How will the project help fish?

In the stretch of the River Gade we have restored, our last fish survey from 2021 described the results as ‘near desolate’. 100 metres upstream (in the stretch already restored by Affinity Water), results were better with a few minor species and 8 Brown Trout from a range of size classes (including one very small juvenile).

In November 2024, however, our specialist contractors, Five Rivers, caught and safely relocated 540 fish between the White Bridge and the Queensway Bridge, including trout, perch and bullhead. The biggest was a 50cm long brown trout!

The stark contrast in these results show how the river in 2021 was still suffering from the effects of prolonged dry weather and drought. The river did not have the resilience needed during periods of low flows to be able to support a healthy population of fish.

The new re-aligned channel has been designed to create a natural chalk stream and includes a variety of features such as riffles, pools and berms. Its improved natural

geomorphology (the river's form and processes) and increased groundwater connectivity will improve its resilience during periods of low flows.

Fish have different habitat requirements throughout their life cycles. By providing a diverse channel, we will give fish the best chance possible at each life stage and create a habitat that can support a self-sustaining population. For example, marginal planted areas will provide refuge from predators for juvenile trout. Adults will benefit from the deeper pools for cover as well as riffles and clean gravels for spawning.

Overall, the improvements to this stretch of the Gade should mean that we see a more stable fish population in the park long-term. This will benefit the entire reach of the river, as the new gauging station will no longer act as a barrier to fish movement and its habitats and spawning areas will be significantly improved.

26. How did you transfer fish to the new channel?

Fish were moved from the old channel to the new one using a method called electro-fishing. This is a well-known technique that fisheries scientists use to monitor fish populations. We use it many times each year to provide an indication of the ecological quality of our rivers.

Electro-fishing involves walking upstream with equipment that creates a mild electrical current within the water. This causes a response in fish making them swim towards the source of the electrical current where they can be safely caught. A high level of training is required to ensure that fish are not harmed in the process.

27. Will you restock the new re-aligned channel with fish following project completion?

We don't expect this to be necessary. One of the main aims of the project was to remove the barriers to fish movement, for example by replacing the current gauging station with one which allows fish passage. The relocation of the River Gade to valley bottom and the installation of a new, more sustainable structure allows wild fish to recolonise the area, with the aim that a self-sustaining population will become established without the need for stocking. We will carry out a fish survey shortly after the work has been completed, and again once the new channel has established, to understand how the fish population has changed following the habitat enhancements.

Archaeological finds

28. What did you find during the archaeological works?

Between 4 and 10 March 2020, we arranged for archaeological trenching to be carried out along the proposed route of the new channel to ensure our planned

works would not affect any undiscovered historical structures or artefacts. A number of interesting pieces were found, including a brick culvert, most likely related to the water gardens or mill known to surround the site, a handle shard from a late 18th to early 19th century Creamware jug, a large nail, and a horseshoe!

The size and dating of these finds mean they are of little archaeological value and there were no recommendations for any further archaeological work.

Flood risk

29. Won't connecting the river back to its floodplain make flooding worse?

In Gadebridge Park the River Gade flowed down an artificial channel created to supply water to the now demolished Bury Mill. The artificial channel was 'perched', meaning that it sat at a higher level than the valley bottom - the natural course of the river through the park (the channel was half a metre higher than the bottom of the valley). This meant that the river was disconnected from its floodplain. When flooding occured in the valley bottom, the water remained in the park for long periods of time because it was unable to flow back into the channel.

The new channel is connected to the floodplain and is designed to cope with high flows. Our flood modelling in November 2021 showed that our proposals will reduce flooding in the park and will not increase flooding elsewhere. This has been confirmed through remodelling in line with changes to our designs and through a sensitivity analysis we carried out in May 2022.

The figures below show a comparison of the flood outlines pre and post restoration. Before, a portion of the park flooded when water spilled eastwards from the perched channel. This created a shallow area of flooding, which frequently ponded because water couldn't flow back into the channel. Following restoration, the flood risk within this area of the park will be reduced as the floodplain and river channel will be better connected. Flood water will be able to drain back into the channel as flood water recedes.

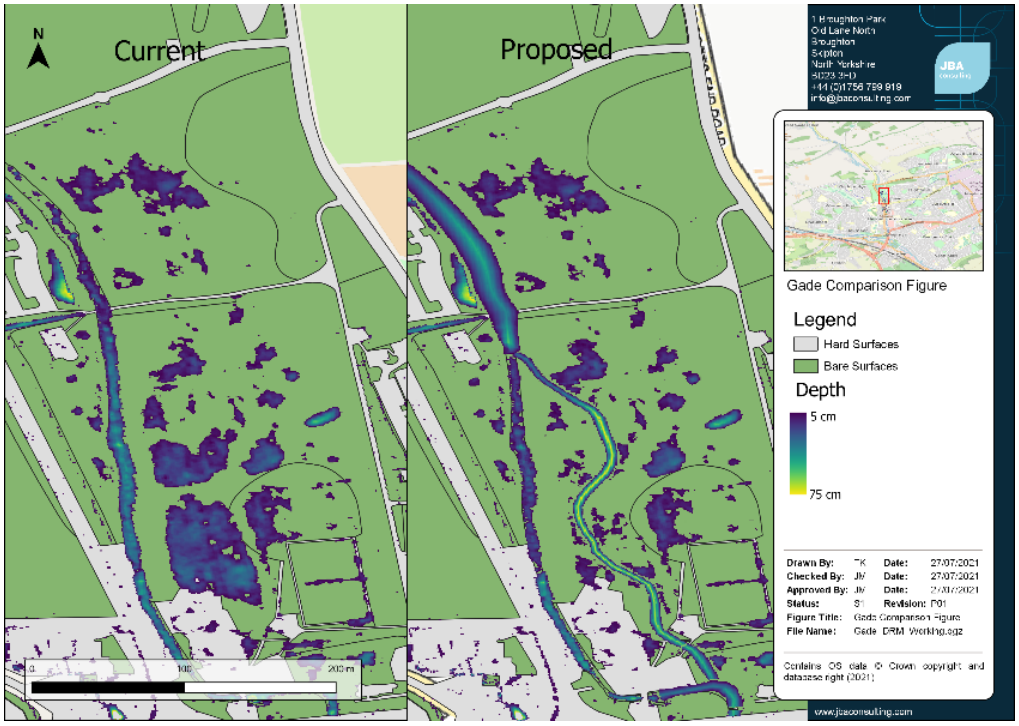

Figure 1: Maps showing the pre-restoration surface water flooding risk in the park (pooling following heavy rainfall) on the left-hand side and the improved situation on the right-hand side.

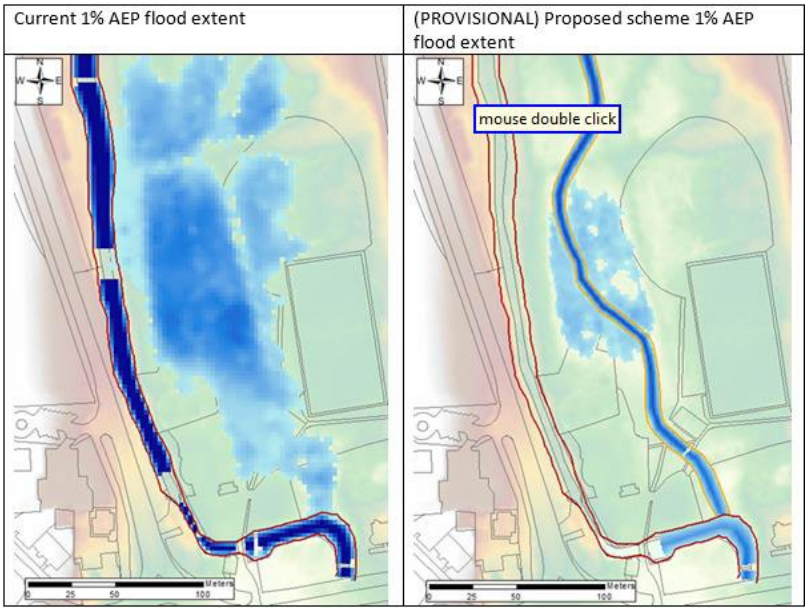

Figure 2: Maps showing the pre-completion and post-completion extent of flooding in Gadebridge Park during a flood event which has a 1% chance of happening in any one year.

The flood culvert that was built to stop Hemel town from flooding remains operational, however the flow of the River Gade into it is now from East to West rather than West to East.

30. What's wrong with just letting the park flood? Where will the flood water go now the project is complete?

Our flood modelling in November 2021 showed that our proposals would reduce flooding in the park and not increase flooding elsewhere. This was confirmed through remodelling in line with changes to our designs and through a sensitivity analysis we carried out in May 2022. After heavy rainfall flood water will still divert to the existing flood relief culvert, built to reduce flood risk to Hemel Hempstead back in 1959. Flood water flows through the culvert, bypassing the town, and eventually flows into the fishing lake at Kings Langley, about 5 kilometres downstream of Gadebridge Park. This system will still work in the same way.

Reducing the risk of flooding to the park is just one of the multiple benefits the project provides, however.

The River Gade is a chalk stream, a rare and valuable habitat. Unlike most rivers, chalk streams are fed from chalk aquifers – underground porous rock formations which store water. Chalk streams are directly connected to these aquifers, making their water mineral rich, clean and at a consistent temperature. This unique habitat provides the ideal conditions for a diverse range of plants and animals, including some of our most threatened species, such as the Water Vole and Brown Trout.

85% of the world's chalk streams are in England, but only 17% of these currently meet 'Good Ecological Status' under the Water Framework Directive (WFD). Although the River Gade in Gadebridge Park may have looked fine, this stretch is currently classified as having a 'Poor Ecological Status' under the WFD.

31. Why was there no restoration planned for the area north of the White Bridge? The river often overtops the banks in this location, causing flooding to the children's playground and other areas.

This area was ruled out for restoration during the feasibility and options analysis stage of the project. The valley bottom and its associated groundwater springs are located to the east of this section of the park. If we were to realign the river in this location, it would run through the middle of Dacorum Borough Council's main event space. A heritage assessment also identified that we are unable to alter the flow beneath the Grade II listed White Bridge, making it significantly more challenging to achieve realignment north of the bridge.

We are aware that the river often overtops the banks north of the White Bridge, causing water to pool. During high flows the White Bridge restricts flows heading downstream, which causes water to back up and overtop the banks. The pools in this section of the park are directly linked to the level of the water in the river, and quickly recede once river levels reduce. As we are unable to alter flows beneath the bridge, our original proposals aimed to utilise this 'pooling' by constructing a wetland area in this location. However, this was later removed from our designs because we

found it would be too small to function effectively. Also, similarly to the option of a full realignment of the river here, it would have impacted on the use of the council's main events space. While we could investigate other options to alleviate flood risk here, any option would require ongoing maintenance. The associated costs would be difficult to justify given that the overtopping is occurring in the river's natural floodplain and no properties are impacted.

Following completion of the project, while the overtopping currently occurring in the area north of the White Bridge is unlikely to reduce, it will also not be made any worse – water will recede back into the channel as it does now. Despite improvements downstream to reduce the build-up of vegetation and silt, flow conditions will remain the same upstream due to the impact of the White Bridge. The park south of the White Bridge, however, will benefit from reduced surface water flooding as part of the project, including areas near to the children's adventure playground (see Figure 1 below).

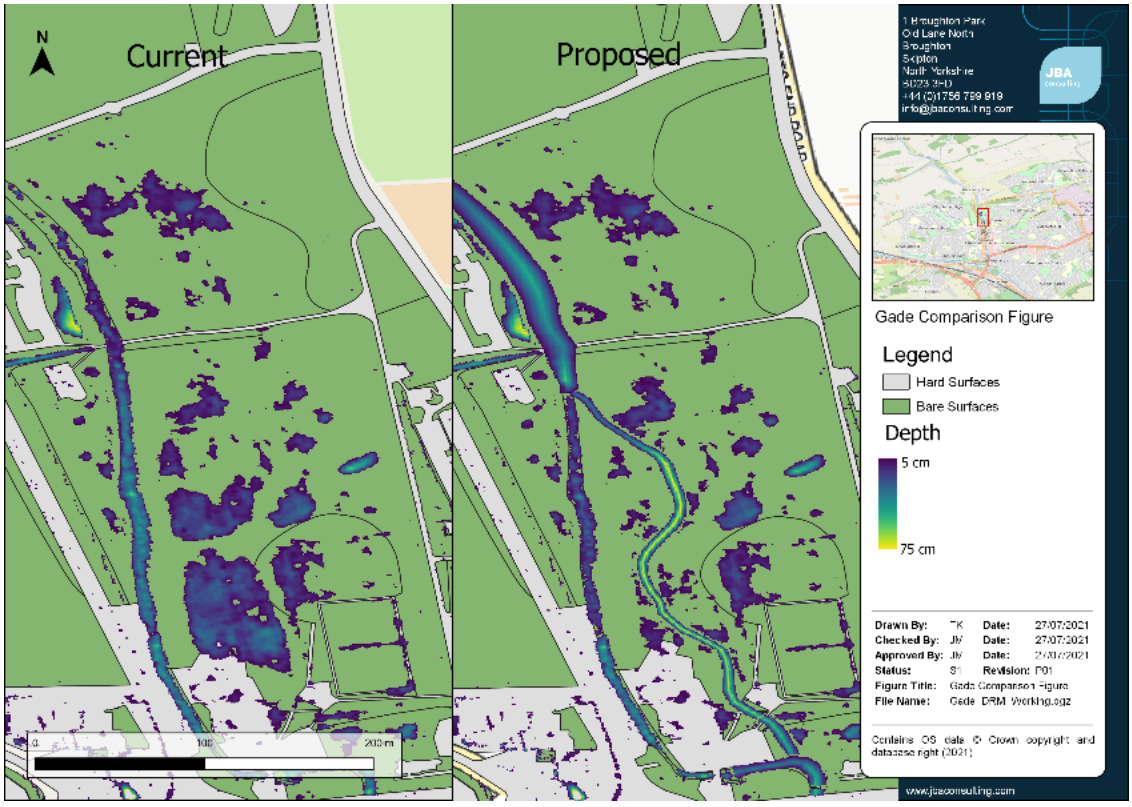

Figure 1: Maps showing the pre-restoration surface water flooding risk in the park (pooling following heavy rainfall) on the left-hand side and the improved situation on the right-hand side.

Surface water pollution

32. What's a surface water outfall?

Surface water outfalls are where rainwater, for example from roads, enters a river. The water quality from surface water outfalls can be poor as the rain water can carry pollution into the river.

33. What impact will surface water outfalls have on the new river?

A set of manholes located in the centre of the park (visible between the Queensway car park and the path between the Bowls Club and the coffee kiosk) collect the spring flow entering the existing floodplain within the park from the valley sides i.e. the flow that cannot drain naturally.

During construction, this main pipe was blocked upstream of the car park where it passes underneath the new channel. This allowed the spring water flow from upstream to recharge the river channel and groundwater in this location - this spring water flows 365 days a year and can be seen on the east side of the entrance to the flood culvert from the bridge into the Queensway car park.

The downstream section of this pipe collects surface water flow from the Queensway car park and has been kept open.

River flows and groundwater

34. Why was it important to divert the spring flow into the new channel?

Spring flows occur where groundwater emerges at the earth's surface. Spring flows are an important feature of chalk streams. Unlike most rivers, chalk streams are fed from chalk aquifers – underground porous rock formations which store water. Natural chalk streams are directly connected to the chalk aquifer, making their water mineral rich, clean and at a consistent temperature. This unique habitat provides the ideal conditions for a diverse range of plants and animals.

35. How will you ensure the correct flow travels down the Gade into Hemel Hempstead?

As the River Gade flows down its new route through the Bury Garden, it will reach a culvert (an underground tunnel) under the Queensway bridge. This culvert only allows a limited volume of water to flow through to Hemel Hempstead, protecting the town from flooding. At higher flows, where the maximum volume has been reached, water will back-up into a grassed swale (an area of low ground adjacent to the main river channel designed to convey floodwater). The swale runs parallel to the

Queensway bridge and has been designed with a gentle slope to direct flows towards the existing flood relief channel, bypassing the town centre. The swale will only convey water at high flows and will remain dry for the majority of the time. We have run computer modelling to test the design of the channel, ensuring there is no increase in flooding within the park or downstream.

By realigning the channel through the centre of the park, the river will approach the culvert under Queensway Bridge from the Bury Garden, rather than its current route along the gauging flume, between the Queensway car park and Leighton Buzzard Road. Previously, retention boards had to be manually inserted into slots at the top of the flood weir during periods of low flow to ensure enough water remained in the River Gade and was not lost to the flood relief channel. This will no longer be required following the realignment – during periods of low flow, the River Gade will naturally retain all its flow.

The image below explains this in more detail. The blue arrows show the flow of the realigned river through the Bury Garden into the culvert under Queensway Bridge. The yellow arrows show the previous route past the flood weir, where flow was lost to the flood relief channel (purple arrow). The thick red arrow shows the location of the new grassed swale area where water will back up in times of high flows and flow towards the existing flood relief channel.

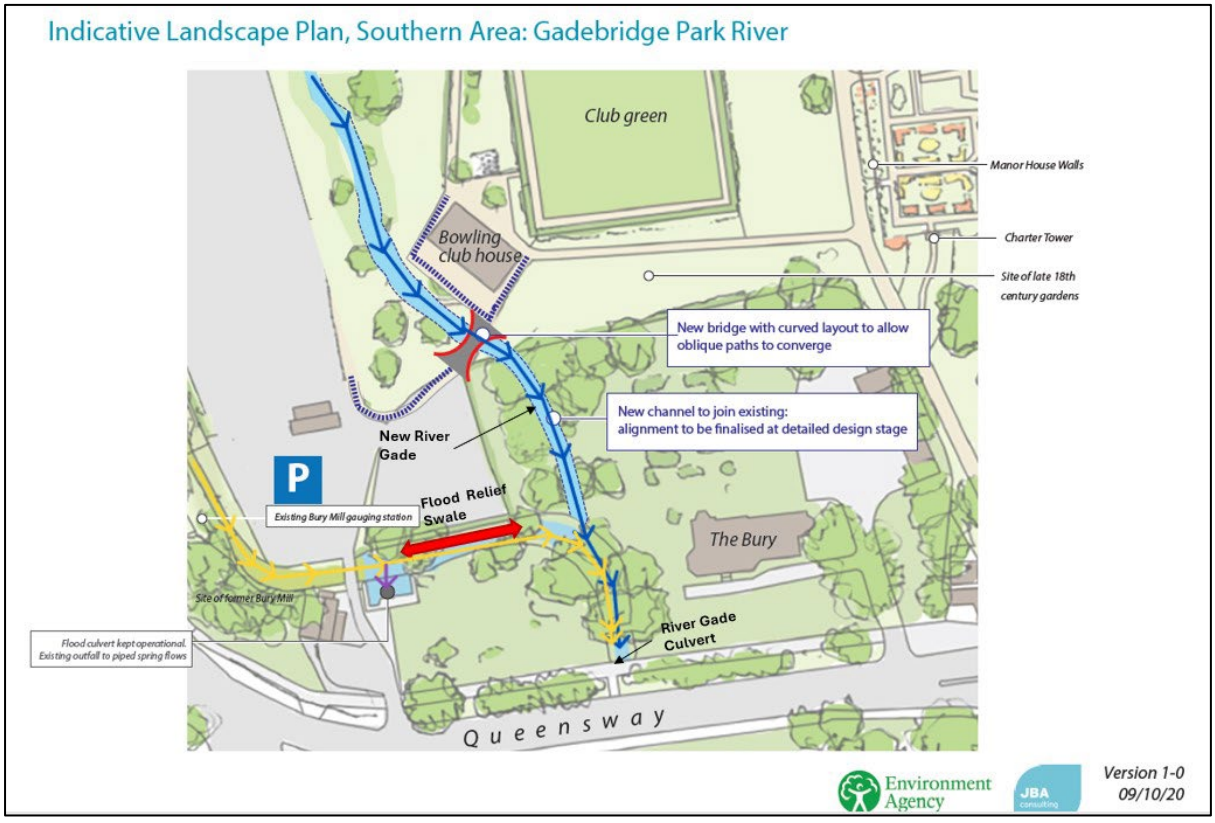

Image showing new route of River Gade into the culvert under Queensway Bridge.

Image showing flood weir and where retention boards were inserted (red box) during periods of low flow.

36. How will river flows be affected? Will the new channel dry out?

The old channel lost water through its bed due to its perched position to one side of the valley bottom.

We identified a number of springs that discharged into the bed of the old river channel near the Queensway car park. Although this shows that there was a connection between the old channel and the groundwater below in this location, the new channel through the valley bottom is likely to intersect more with its groundwater and the deculverted springs from the north east of the park. This should result in an improved, more natural flow. Flows will always be dependent on weather conditions each year, however, and how much rain falls each Winter.

We carried out modelling to determine the likelihood of water losses once the new channel was complete. The modelling showed that water loss will be no worse than from the old channel, and the river would, to some extent, run dry in a range from 1 in 10 years to 1 in 20 years. The channel will need a period to ‘bed in’, and for the first 5-6 years following the project’s completion, while sediment seals the bed, the river could potentially run dry once a year. A natural feature of chalk streams is that they on occasion run dry, again, depending upon weather conditions and rainfall.

37. What about abstraction by Water Companies? Will this affect flow in the river?

Prior to 2018 Affinity Water abstracted up to 20.5 million litres of water per day from two sites in the area; one upstream of Gadebridge Park and one downstream in the

town. The water is not taken directly from the river, but from the groundwater which feeds the river.

Affinity Water agreed to voluntarily decrease their abstraction from 2018, reducing the total water abstracted from both sites by an average of 6.4 million litres per day, down to an average of 14.1 million litres per day. Following the redevelopment of the Civic centre, a permanent change to the conditions of Affinity Water's abstraction licence will further reduce the water abstracted upstream of Gadebridge Park, while allowing for an increase downstream. This won't change the overall reduction in abstraction, but will mean significantly less water will be taken in the more sensitive upper reaches of the river, benefitting flows in the River Gade through Gadebridge Park.

38. What impact will the project have on water levels in the aquifer? If floodwater just flows back into the river then it won't filter down and recharge the aquifer?

Overall the project will not have a negative impact on aquifer recharge. The existing spring water culvert under the park will be intercepted and the flows that are currently lost to the River Gade upstream of Hemel new town will be restored to the river/ groundwater system in Gadebridge Park. This is likely to have a positive impact on water levels within the underlying aquifer, although small.

Trees

39. Why did you cut down trees as part of your plans?

Although we designed the new channel to avoid trees wherever possible, the proposals required the removal of a small number of individual trees and a group of 6 saplings.

We pruned around 20 other trees, to improve their form and their relationship to the river and removed a small section of hedge from around the Bury to allow the River Gade to flow through.

All other trees were protected in accordance with BS5837:2012 for the duration of the works. We plan to plant additional native trees to replace those that we have removed.

Post-completion monitoring, maintenance and fencing

40. Who will maintain the new channel?

Dacorum Borough Council will continue to manage any required maintenance in the park, including the new river channel. This will be carried out in-line with an agreed

maintenance plan. Following completion of the project, however, we expect there to be minimal maintenance required.

By restoring the river to a more natural state, we will improve flows and lessen the build-up of sediment and vegetation. We do not expect in-channel maintenance such as desilting to be needed following the project's completion.

The project completed by Affinity Water on the Upper Gadebridge Park reach of the river demonstrates that once the natural shape of the channel has been restored, there is less need for maintenance. The narrower, faster flowing channel has become self-sustaining - the river gravels are visible and silt deposition and plant growth is mostly limited to the margins.

41. When will the fencing around the newly seeded grass and planted areas be removed?

The remaining fencing is essential to give the thousands of young plants and freshly seeded areas the time and space they need to properly establish. We can't give a timescale to when this will be removed right now. We're keeping a close eye on these areas, especially given the hot, dry weather we've been experiencing.

Initially, we didn't water the seeded areas, as it's recommended to leave the seed to germinate naturally once the conditions are right. Until this time, the seed will remain dormant. Following a period of rain, quickly followed by very high temperatures, we investigated the possibility of using sprinklers, however the areas were deemed too large to irrigate successfully. Any water would likely just evaporate on hot days. We also felt it was inappropriate to use such large volumes of water while advising others to conserve water at this time.

Instead, and in agreement with Dacorum Borough Council, we will monitor the establishment of the grass and decide in autumn 2025 whether reseeding is necessary - at which point, conditions should be more favourable for growth. For now, we'll keep the fences in place to protect these areas.

42. How will the new Bowls Club bridge be maintained?

Dacorum Borough Council will be responsible for the maintenance of the Bowls Club bridge, in line with an agreed maintenance plan.

43. Is there a group I can join to help look after the park?

Yes, Friends of Gadebridge Park. For more information, contact Rob Cassidy at robert.cassidy@dacorum.gov.uk or phone 01442 228 853.

44. How will you monitor improvements?

We will track improvements made to the river from the restoration project by carrying out several monitoring programmes, including vegetation surveys, water quality monitoring, fisheries surveys and aquatic wildlife surveys. In July 2025 we carried out several surveys to establish a baseline for our records.

We also plan to monitor changes that occur from the additional spring flow being introduced to the channel downstream of the White Bridge.

Our field teams will also be carrying out monthly spot flow gauging to ensure the new gauging station equipment is accurately recording river flow data. Spot flow gauging involves measuring the discharge (the volume of water) at a specific point in time.

Impact on the park's existing services

45. Have utilities been affected?

No. There is a water main from the Queensway car park to the kiosk and splash park which is at a depth of over 4 metres below the current ground level. Due to its depth, it was not impacted by the project.

46. Will the children's play areas be impacted?

No. The construction of the new channel did not restrict access to the play areas.

Now that the restoration is complete, flood waters will recede more quickly into the new channel. This means that flooding will have less of an impact on people's enjoyment of the park, including the play areas.

47. Will the construction of the new channel permanently remove any car parking spaces?

No - the new channel does not cut across any car parking spaces.

New footpath

48. Will there be a new footpath next to the river?

Yes, this is still being delivered - just slightly later than originally planned. While it was part of our early designs, we needed to find some efficiencies to ensure we could prioritise and complete the key environmental elements of the project. As a result, the footpath is now being funded and delivered as a separate piece of work, led by Dacorum Borough Council.

We're really pleased to be working with the council to make sure this part of the park is accessible to everyone. They've secured funding and are aiming to install the footpath as soon as possible.

Other

49. I have a question/concern about the restoration works that were completed north of the bridge. Who can I contact?

The restoration project north of the White Bridge is now complete and Dacorum Borough Council is responsible for the area's maintenance.

You can find out further information about the project at https://www.affinitywater.co.uk/sustainability/restoration/river-gade. To ask a question about the area now, including its maintenance, please contact Dacorum Borough Council at robert.cassidy@dacorum.gov.uk.