Frequently asked questions
Updated July 2018
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## The Foss Barrier

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1. What does the Environment Agency have to do with flooding?
The Environment Agency is responsible for:

- Issuing flood warnings for flooding from rivers, the sea and groundwater
- Operating flood gates and pumping stations during a flood event
- Receiving and recording details of flooding incidents
- Monitoring the situation and advising other organisations and local populations
- Dealing with emergency repairs and blockages on main rivers and our own structures

2. What is the flood risk in York?
There are approximately 7200 properties at risk of flooding in York. These are a mixture of residential and business properties. 3680 are at risk of flooding from the River Ouse, with over 3500 at risk from the River Foss and other smaller becks in York.

3. How often does York flood?
The River Ouse overtops its banks a few times a year. However, on most occasions this doesn’t result in properties flooding. The largest floods in recent memory have occurred in 1942, 1978, 1982, 1991, 1995, 2000, 2012 and 2015.

4. What happened in 2015?
December 2015 was the wettest calendar month since records began in 1910. On Boxing Day we experienced a 1 in 50 year event on the Ouse (which means it has a 2% chance of occurring per year) which coincided with a 1 in 200 year event on the Foss (0.5% chance per year): a perfect storm. In total, 627 properties were recorded as having internal flooding. The vast majority of these were on the Foss.

5. Where has the £45 million come from?
Following the severe flooding of 2015, the Government allocated £45 million for improving resilience and better protecting 2,000 properties in York.

1. How much will the Environment Agency be able to achieve with £45 million?
Figure 1 York’s defences; North Street (red), Lower Ebor Street (green), Lower Bootham (orange), Acomb landing (blue), Clifton Ings (lilac), Leeman Road (purple), The Foss Barrier (yellow).
6. How many defences already exist in York?  
York relies on many flood defences working together to protect the city from flooding (see Figure 1). These include:

- **North Street (red)** – a series of flood gates and walls were constructed in 1992 to protect the surrounding area and the main trunk sewer.
- **Lower Ebor Street (green)**: Flooded in 1978 and again in 1982. A combination of flood walls with steel trench sheeting was constructed, as well as earth embankments. Valves have been installed to isolate sewage, incorporating a small pump to evacuate sewage when river levels are high. This is the oldest formal defence in York.
- **Holgate Beck** - Upstream tributaries of Holgate Beck were diverted to discharge flow directly into the Ouse downstream of York to prevent flooding in the Acomb area of York. Upstream of York, where Holgate Beck joins the Ouse, a two-pump station was built to control water levels.
- **Lower Bootham (orange)** - The 1982 flood in this residential area caused £1.2 million worth of damage to 134 properties here. The flood alleviation scheme to Lower Bootham was installed in 1983 compromising a 650 metre earth floodbank, combined with a 280 metre concrete wall, providing a defence 4.60 metres higher than the highest floodwaters of 1982. The local sewage network has been modified and isolated at three key points to allow sewage to be pumped during times of high water levels. The scheme received an award from the Institute of Civil Engineers for its outstanding excellence in concept, design and execution.
- **Acomb Landing (blue)** - This is the site of the water treatment works supplying fresh drinking water to the city. After the 1982 flood, a reinforced retaining wall was added to the existing embankments significantly raising the level of protection.
- **Clifton Ings (lilac)** - This is a natural flood plain upstream of York which can store 2.3 million cubic metres of water. In 1982 at a cost of £1.25 million, the existing flood banks were raised to provide greater storage. Sluice controls for letting water in and out of the Ings were constructed. This system is effective for medium-order floods of up to 9.27 metres above ordnance datum (AOD) For more extreme flood events, the site is designed to let banks overtop allowing the full capacity of the site to be used.
- **Leeman Road (purple)** - In 1978, 225 houses were seriously flooded. In 1980 a flood bank was constructed in front of the houses and the sewerage system improved allowing sewage to be pumped out when the river levels are high. During the 1982 flood, high winds blowing over Clifton Ings generated large waves which overtopped the Leeman road defences. The flood bank was raised in response to this.
- **The Foss Barrier (yellow)** - which prevents the Ouse from flowing back up the Foss when the Ouse is in flood.
7. What have you done since 2015?
Since 2015 we have:

- Upgraded and improved the Foss Barrier to increase its pumping capacity from 30 cubic metres per second to 50 cubic metres per second
- Begun scheme feasibility studies and assessments, including city-wide ground investigations, topographical surveys and Property Flood Resilience surveys
- Published our Long Term Plan and York Detailed model

8. Why haven’t you done more?
We want to build robust, effective defences with minimal environmental and social impact. To make sure that happens, we must look at all the available options and complete a series of feasibility studies and assessments to evidence that the method we use is the most appropriate for what we aim to achieve. We need to show that it is:

- Desirable – does it better protect properties/meet resident needs/provide wider benefits?
- Viable – are the benefits of the work greater than the cost?
- Feasible – do ground conditions/environmental conflicts/social conflicts affect the work?

We collect information from topographical studies, ground investigations, community engagement events, financial analyses and environmental impact assessments. This will take our team months to collect and analyse before being reviewed by specialists within and outside of the Environment Agency.

9. What is the Long Term Plan?
‘Slowing the flow in the rivers Ouse and Foss; a long-term plan for York’ is a study looking at how river flows could be slowed and managed in areas upstream of the city to counter the effects of climate change over the next 100 years. Slowing the flow could also reduce flood risk to smaller communities in the area, and provides opportunities to enhance the natural environment, create habitat, and improve the amenity value and commercial value of land. Many of these opportunities will require working in partnership with private, public and charitable bodies to achieve multiple benefits.

10. Why is the Long Term Plan needed?
Records show that on average, the flood levels in the centre of York have been increasing annually over the last century. This increase means that the level of protection offered by York’s flood defences is decreasing over time. With current land usage patterns and climate change, predictions show that this trend will continue. Unless we can slow the flow upstream, it is predicted that in 100 years’ time the flood defences in York will need to be 80 centimetres higher just to offer the same standard of protection as they do now.
11. Why are you consulting on the Long Term plan?
We are seeking views from partners, landowners, the public and other bodies on the general principles of ‘Slowing the Flow in the rivers Ouse and Foss; a long-term plan for York’ and on our proposal for how to progress. We are also asking if you have any current or future work proposed that might be aligned with our objectives and could be developed in partnership.

12. What is Our 5-Year Plan/York Flood Alleviation Scheme?
Following the floods of 2015, the government allocated an additional £45 million to the Environment Agency to better protect 2,000 properties in York. The plan sets out how we can achieve this by providing a consistent standard of protection throughout the city.

13. What are ‘communities’ and ‘flood cells’?
In Our 5 Year Plan, we split York into 10 communities within York’s administrative boundary. These were identified using historical flooding information and knowledge of current flood defences and are divided naturally by land features such as roads, rivers and high ground (see Table 1).

<table>
<thead>
<tr>
<th>Flood Cell</th>
<th>Detail</th>
</tr>
</thead>
<tbody>
<tr>
<td>B17 Nun Ings</td>
<td>There are no properties at risk.</td>
</tr>
<tr>
<td>F1 Clifford’s Tower</td>
<td>The £17 million investment in the Foss Barrier provides additional protection in this area</td>
</tr>
<tr>
<td>F2 Hungate</td>
<td></td>
</tr>
<tr>
<td>F3 Foss Islands</td>
<td></td>
</tr>
<tr>
<td>F6 Foss Bank</td>
<td></td>
</tr>
<tr>
<td>F7 Layerthorpe</td>
<td></td>
</tr>
<tr>
<td>A5 Upper and Nether Poppleton</td>
<td>Assessment has shown that due to a very low number of properties at risk and a high cost of a solution, we cannot justify a scheme here under the current government spending rules.</td>
</tr>
<tr>
<td>B1 Millfield Industrial Estate</td>
<td>Assessment has shown that due to a very low number of properties at risk and a high cost of a solution, we cannot justify a scheme here under the current government spending rules.</td>
</tr>
<tr>
<td>B3 Clifton Bridge to Scarborough Bridge and Hob Moor</td>
<td>Improvements are being delivered outside of the York Flood Alleviation Scheme. Significant assessment of the options has taken place following meetings with local residents. As a result the preferred option for the area is to increase the resilience of Holgate Beck pumping station. Our consultants are currently considering the best way to achieve this, with construction due in 2018.</td>
</tr>
<tr>
<td>B13 Lendal Bridge to Ouse Bridge</td>
<td>There are very few properties at risk in this area and there do not appear to be any technically feasible options.</td>
</tr>
</tbody>
</table>
We have since divided them into 30 ‘flood cells’ which are hydrologically independent of each other. This means that if one area were to flood, it would not affect the other. 11 of these cells have not been taken forward due to reasons including; a) few properties at risk, b) the cost of doing work expected to be much greater than the benefit, c) existing works to reduce flood risk, d) the Foss Barrier providing adequate protection (see section on the Foss Barrier). We aim to better protect properties in the remaining 19 flood cells.

14. Why aren’t you spending the money on holding water upstream?
We are already planning to do this on the Foss. Some of the £45 million allocated to better protecting 2000 properties in York will cover this. Whilst slowing the flow upstream of York could reduce peak river levels and therefore reduce the risk of flooding in York, it would take a long time and a lot of work before we could measure any positive impact. The allocated funding provides an opportunity for us to build defences which previously have not been financially viable and will better protect properties in the short term.

When considering natural flood management (NFM) and upstream storage areas as options for reducing flood risk downstream, we need to take the size of the river catchment into account. The River Ouse has a large catchment and therefore we would need multiple storage areas for them to have any impact on flood levels in York. In contrast, the catchment for the River Foss is much smaller and therefore we are looking at an upstream storage area as an option for reducing flood risk to properties along the Foss.

15. What does ‘standard of protection’ mean?
A flood defence’s standard of protection (SoP) is a measure of the how much protection a flood defence gives. Many defences in York currently protect against a flood with the probability of occurring once in 25 years - we would say that they have an SoP of 1 in 25 or 1:25. We want to increase the SoP to 1 in 100 to protect against more extreme floods with a probability of occurring once in 100 years.

16. What kind of defences are you considering?
We are considering a number of defence options including embankments, walls, demountable barriers and upstream storage solutions. The design and range of defence types used will take existing defences and historic flooding into account.

17. Will you be dredging?
Dredging is the general term used for the excavation of material below water level either as a maintenance activity (when the term desilting could also be used) or as part of channel enlargement works. The main purpose of dredging and desilting is either to maintain the navigation depth or the flood capacity, or sometimes both.

Dredging is an expensive operation and can have severe environmental drawbacks. The expense is not only in the dredging operation itself but also the disposal of the dredged material, which may be contaminated and require disposal to a licensed landfill, with associated transportation costs. It is almost never a ‘one off’ operation as rivers like to maintain their natural shape. During a flood event a lot of sediment is washed through and silt is often redeposited back to its original profile after a flood.
In York dredging would not be effective in reducing flood risk. Dredging increases the depth of a river, allowing more water to travel through before coming out of bank. In an open channel, with no obstructions, this may reduce flood risk but in York this is a different story. During a flood event the bridges in York cause constrictions and limit the amount of water which can pass under them. This means the bridges, not the river channel, control the water levels.

18. What happens if there is another flood?
In a flood event, the Environment Agency will carry out its usual duties (see FAQ 1). Existing defences will continue to provide the same level of protection as provided before construction. Since 2015, the Foss Barrier has been upgraded and is now capable of pumping up to 50 cubic metres per second of water.

19. Will the plans impact on my house insurance?
When our defences are updated we also update our Flood Warning Information Service to show the change in flood risk. This information is widely available online and used by insurance companies to determine the risk of your property flooding. If we increase the standard of protection of our flood defences, there is a chance that your home insurance costs could decrease.

20. What impact will Brexit have in terms of the money?
The £45 million allocated to us in 2016 is secured and will not be affected by Brexit.

21. What action will you take for communities not in York?
The £45 million has been allocated to better protecting properties within York’s administrative boundary. Existing schemes for communities not in York will still go ahead and we will still be considering areas where new schemes can be established. Unlike York FAS, these will undergo normal funding procedures.
How we describe flood risk

Our flood maps have been produced using computer modelling together with local information, and with data collected from previous flood events. Areas are split into four categories:

**High risk** means that each year this area has a chance of flooding of greater than 3.3%. This takes into account the effect of any flood defences in the area. These defences reduce but do not completely stop the chance of flooding as they can be overtopped, or fail.

**Medium risk** means that each year this area has a chance of flooding of between 1% and 3.3%. This takes into account the effect of any flood defences in the area. These defences reduce but do not completely stop the chance of flooding as they can be overtopped, or fail.

**Low risk** means that each year this area has a chance of flooding of between 0.1% and 1%. This takes into account the effect of any flood defences in the area. These defences reduce but do not completely stop the chance of flooding as they can be overtopped, or fail.

**Very low risk** means that each year this area has a chance of flooding of less than 0.1%. This takes into account the effect of any flood defences in the area. These defences reduce but do not completely stop the chance of flooding as they can be overtopped, or fail.

This information feeds into our Flood Warning Service, which is made up of three separate levels of warning message:

**At Flood Alert** level we encourage people to ‘prepare’. These Alerts cover large areas (e.g. the entire Foss catchment) and alert customers to rising levels that could flood low-lying roads, car parks, sports fields and agricultural land. An important point is that **we do not expect residential property to flood at an Alert level**. Depending on the flood risk faced by a customer, some people have to take specific action when they receive a Flood Alert (farmers may have to move livestock, riverside property owners may need to move their cars, etc) while others may simply need to check the weather forecast more frequently and keep an eye on the information we put online ([flood-warning-information.service.gov.uk/warnings](https://flood-warning-information.service.gov.uk/warnings)).

**At Flood Warning** level we encourage people to ‘act’. Flood Warnings cover specific communities that experience flood risk from the same source (e.g. river, beck, coast or groundwater source) and at this level flooding of residential property is expected, based on the information we have from our rainfall and river forecasts and our river level monitoring system (a large amount of this information can be seen online [flood-warning-information.service.gov.uk/river and sea levels](https://flood-warning-information.service.gov.uk/river-and-sea-levels)).

**At Severe Flood Warning** level we encourage people to ‘survive’. Severe Flood Warnings cover the same area as the corresponding Flood Warning. These are not issued at a specific time or level and could be issued when levels are receding but the community have been significantly impacted (e.g. bridge collapse, major flooding causing building collapse, etc) or if flooding is causing a risk to life (such as in flash flooding) or where the level of risk is significantly higher than at the flood warning level and immediate warning notification is needed.
**The Foss Barrier**

22. What does the Foss Barrier do?
The Foss Barrier is located at the confluence of the River Foss and the River Ouse in the centre of York. During a flood, there is a risk that water from the Ouse could flow back up the Foss and flood the surrounding properties and businesses. The Foss barrier prevents this by blocking the channel of the Foss. During a flood, the barrier gate is lowered and pumps at the barrier pump water from the Foss around the gate and into the Ouse.

23. What is happening with / at the Foss Barrier?
Following the events of Boxing Day 2015, £17 million was allocated to upgrade the Foss Barrier. We have since installed 8 new pumps, increasing the pumping capacity from 30 to 50 cubic metres per second. The electricity supply has been upgraded and all electrical equipment moved to the first floor. We will also be carrying out work to increase the height of the barrier gate in the coming months.

24. Will the Foss Barrier stop me flooding?
The Foss Barrier reduces the risk of flooding to communities in the Foss catchment by preventing the Ouse from flowing back up the Foss when the Ouse is in flood. The Foss catchment itself is very flat and constrictions in flow, such as the size of the channel and height of bridges, can determine how quickly water flows downstream. This means that the barrier can only provide protection to properties up to the roundabout between Monkgate and the A1036 (see Figure 2); beyond this, the river level is not influenced by the pumping capacity of the barrier.

25. When is the barrier lowered?
The barrier is lowered when the river level on the Ouse reaches 7.4 metres Above Ordnance Datum (AOD) with ‘Ordnance Datum’ usually referring to sea level.

*Figure 2* the flood cell area which is protected by the Foss Barrier.
Copping Farm to Scarborough Bridge

26. Do the existing flood defences still work?
Yes, but they only provide a standard of protection of 1 in 50 (equal to the December 2015 floods). We want to raise this standard of protection to 1 in 100 + climate change. This means that when choosing the new defence heights, we have taken the average annual rise in river levels into account so that the defences will still provide the same standard of protection in 20 years’ time. After 2039, we plan to have natural flood management measures in place to reduce the rise in river levels. This will provide protection against more severe flooding which has a 1% chance of occurring in any given year.

27. Why do you need to increase the height of the defences?
Historic records show that the annual peak river level on the Ouse is rising by 8 millimetres a year on average. This is likely due to a mixture of climate change and a change in upstream land management. Whilst our Long Term Plan aims to slow the flow of water upstream of York, this will take a long time and a lot of work to put in place. By increasing the height of the existing defences, we can better protect more properties in the meantime.

28. When will you be doing the work?
We plan to start construction in the summer of 2019.

29. Will I still be able to cycle along the river?
Whilst our proposals will not directly impact the cycle path in the long term, it is likely that access will be affected during construction. We will ensure that cyclists are made aware of any changes to access before the works go ahead. This will likely be in the form of physical signposts in the area, updates via our Facebook page and in the local press.

30. Are you aware of what is happening on the boat house site adjacent to Almery Terrace?
The current landowners have made the Environment Agency aware of their plans to develop the site. These include a reinstatement and increase in height of the existing flood wall. We will continue to work with the landowner to ensure that this ties in with the improved line of defence we are building.

31. Are you doing anything about the pooling of water behind Longfield Terrace?
Anecdotal evidence suggests that water regularly pools in the area of low ground behind Longfield Terrace. We are currently looking into the causes of this and will consider options for reducing flood risk in this area if our evidence supports it.

32. Will fixing Burdyke Pumping Station increase the risk of the embankment overtopping?
During a flood, Burdyke Pumping Station pumps water from the beck and into the River Ouse. If the pumping capacity of the pump is increased this will enable more
water to be pumped into the Ouse and reduce flooding behind the embankment. It is important to note that when in flood, the River Ouse flows at 600 cubic metres per second—over 600 times the flow of Burdyke! Therefore, it is unlikely that water pumped from Burdyke will significantly increase the river level on the Ouse.

33. Are you doing anything to Sycamore Terrace pumping station?
Anecdotal evidence suggests that the pumping station on Sycamore Terrace failed in 2015 and was the cause of flooding in that area. Yorkshire Water have since carried out works to upgrade the pumping station and we are talking to them about how we can further improve the pumping station to reduce the risk of flooding in this area.

34. Does the degraded state of the riverbank impact flood risk?
Due to the size and flow of the River Ouse, it is unlikely that the degradation or loss of vegetation on the bank will have a significant impact on flood risk in the area.
Clementhorpe and South Bank

35. Why don’t you use the aquabARRIER on Clementhorpe Road?
In 2008, an aquabARRIER was adopted on a trial basis by City of York Council and installed at the bottom of Clementhorpe Road by AquabARRIER Systems. Whilst it reduced the consequence of flooding to residents in the immediate area; water found its way under the road and came through its surface and kerb stones. As a result it has not been used since due to the risk of catastrophic failure.

36. Why have you let Roomzzz knock down the floodwall in Clementhorpe?
As part of the construction of the hotel, Roomzzz have agreed to raise the existing flood wall behind the site. This will involve removing and replacing the bricks on top of the wall which currently do not act as a flood defence. To mitigate the risk of building in a flood risk area, Roomzzz are required to meet a number of conditions. These include keeping the undercroft parking area free to store flood water during a flood, raising floor levels, and providing safe escape routes for guests during floods.

37. Are you going to defend the Caravan Park from flooding?
No. The caravan park acts as an important area of flood plain which, if defended, could increase the risk of flooding elsewhere. Instead, the caravan park follows an emergency plan which involves evacuating guests when informed by the Environment Agency and City of York Council.

38. Are you going to make Millennium Bridge accessible during a flood?
We recognise that Millennium Bridge is an important transport link to the city and that its closure during a flood cause disruption. However, our objective is to protect properties in York rather than transport routes so making Millennium Bridge accessible during a flood is not our priority. However, we are working closely with City of York Council on how the raising of access to Millennium Bridge above flood levels may be achieved.

39. What is property flood resilience?
Property flood resilience provides property owners with practical and cost effective steps to help lower flood risk, through the use of affordable bespoke products. Examples include flood-resistant doors, air block covers, water resistant paint and sump pumps. The approach aims to identify products and measures that are appropriate for the person, flood and property together, helping to reduce flood damage and increase peace of mind.

40. Am I eligible for property flood resilience?
There are two ways that we determine PFR eligibility:

1. threshold surveys to identify properties at risk of flooding. This involves measuring the lowest point at which water may enter a property, and comparing this against our flood models;
2. asking residents whether they have experienced flooding in the past to contact us with evidence.

We completed threshold surveys of the flood zone in the South Bank area in 2017. A map showing the results of these surveys can be viewed on our Citizen Space page for Clementhorpe. PFR. If your property is not shown on the map as being eligible, but you have experienced flooding in the past and can provide evidence of this, then please contact us at yorkfloodplan@environment-agency.gov.uk.