
Environment
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St Ives and Brownshill Staunch Sluices

Drop-in event

Monday 12 August 2024 16:00 to 19:00

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Why are we here today?

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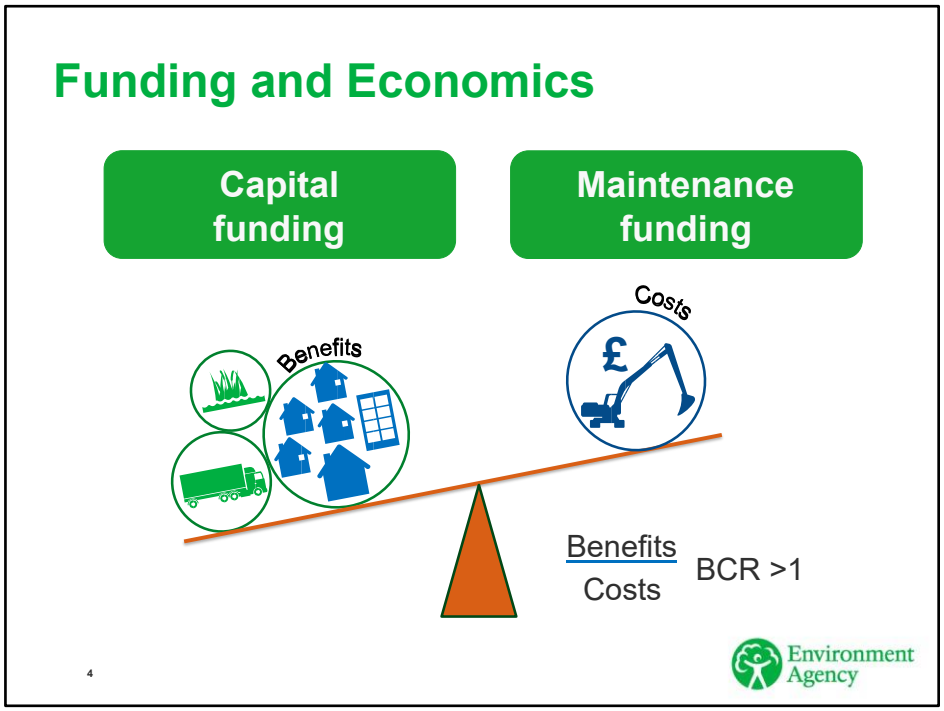
Introduction

- We're here today to talk about the St Ives and Brownshill Sluice structures.
- The objective of this event is to present and share our work done to date which has helped shape and inform the direction of the project, as well as to provide the local community the chance to ask questions on the St Ives and Brownshill Staunch structures or flood risk more generally.
- The format of the event will consist of a short presentation, followed by a Q&A. We will not take questions as part of the presentation, however colleagues spanning a range of teams are available to take questions afterwards. These includes colleagues from Operations (asset operation and maintenance), Projects (funding and flood risk), Evidence and Risk (modelling) and Waterways (Navigation).
- In addition, colleagues from Cambridgeshire County Council and the Local Resilience Forum are here and can answer any questions you may have about incident response.
- We appreciate that these structures have a high level of public interest. We'd like to remind everyone that we're trying to help find a way forward for these assets and ask that everyone is polite and respectful when discussing the structures.
- We will re-run the presentation at 17:45 and be here until 19:00 for any questions you may have.

Background on these structures

- St Ives Staunch Sluice is situated just downstream of the centre of St Ives and the Brownshill Sluice is situated ~5miles downstream
- These structures were originally built in the 16th century to aid navigation but have evolved and been rebuilt over the years and funded via various organisations under various funding policies.
- In more recent history, the sluice structures have been considered as FCRM assets and therefore funded and maintain via this route.
- Both the St Ives and Brownshill sluice structures are currently in poor condition. At St Ives Sluice, four of the seven sluice gates are in poor condition. At Brownshill Sluice, two of the three sluice gates are in poor condition.
- To manage the risk of the gates becoming stuck open, leaving us unable to maintain statutory water levels for navigation, these gates have been isolated in the closed position.
- The condition of both structures is in part due to a lack of sufficient maintenance, but they are also approaching the end of their expected life too.



There are two main types of FCERM funding we can use to support our assets:

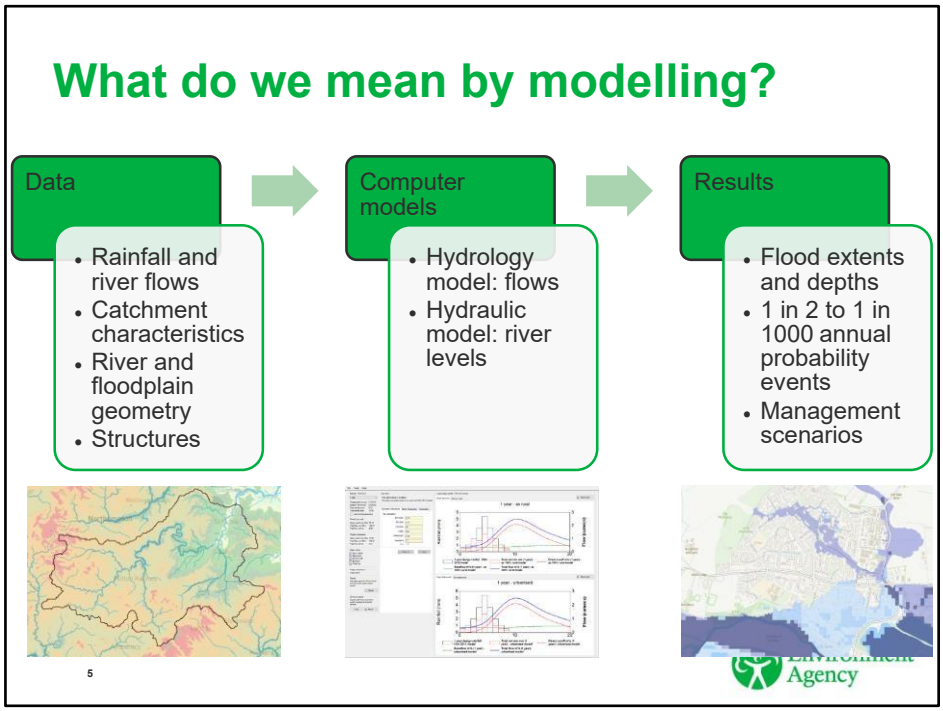
Capital funding

- This can be used for major refurbishment projects if we can evidence that the project is economically beneficial.
- The requirement for projects to be economically beneficial is set by HM Treasury and aims to ensure value for money when spending taxpayer's money.
- To demonstrate a project is economically beneficial, we compare the costs of the project (design, construction, operation and maintenance) against the value of the damages and economic losses avoided due to a reduction in flood risk (mainly to property but other aspects such as the cost of evacuation, business disruption and emergency services too).
- For a project to be eligible for government funding (FCERM Grant-in-Aid or other) it must have a benefit-cost ratio greater than 1.
- For St Ives, we've carried out modelling to assess the flood risk benefits of the St Ives sluice. The outcome of the modelling shows that the sluice gates provide very little benefit in terms of flood risk.
- This is good from one perspective as it means that the current condition of the structure isn't resulting in increased flood risk to properties. But from the other perspective, it means that we're not in a position where we can support spending public money to repair the structure as the cost of the works aren't balanced by sufficient benefits.
- We appreciate that increased river levels near the structures will have impacts on resident in other ways (i.e. access), but for support investment, it's internal property that qualifies for government funding.
- We're currently reviewing Brownshill Staunch Sluice, but early indications are that the situation is the same.

Maintenance funding

- This is used to fund regular maintenance activities and smaller maintenance projects.
- The Environment Agency tends to receive half (or less) of the maintenance funding that we bid for.
- For context, in 2023:
    a. Across the country we bid for £235.9M, £120.3M received (£115.6M shortfall).
    b. Across the Great Ouse catchment we bid for £12.4M, £4.9M received (£7.5M shortfall).
    c. For St Ives specifically, we bid for £70K, £7K received (£63K shortfall).

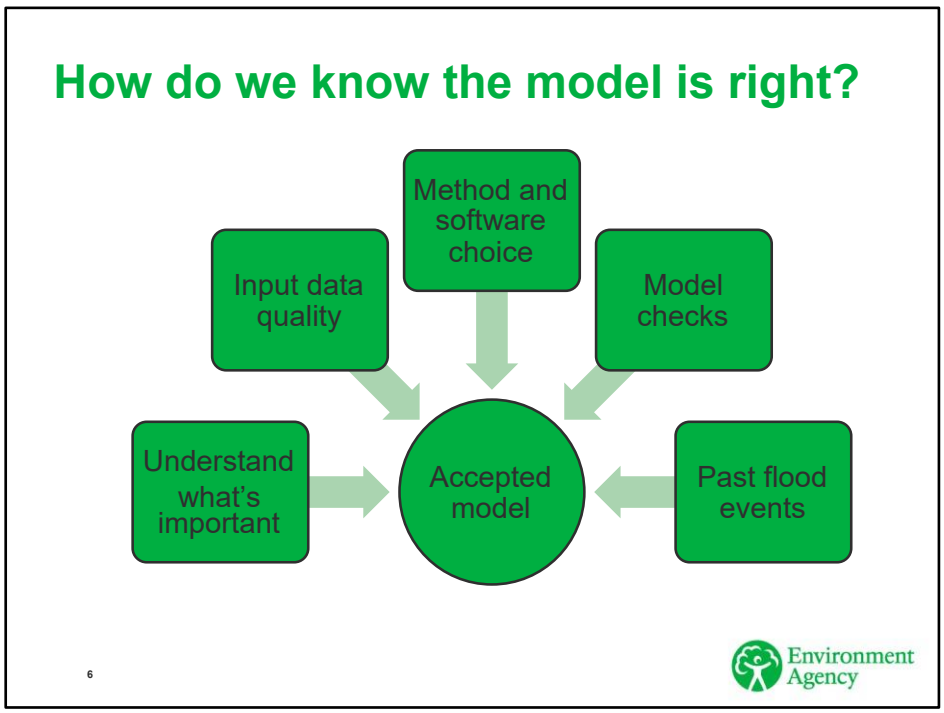
- This means that we must prioritise our maintenance activities so assets with a high level of flood benefit are at the top of the list and assets with little flood risk benefit are at the bottom of the list.
- Given our evidence shows that the St Ives Staunch Sluice provides very little flood risk benefit, we're not able to prioritise maintenance funding either.



Given that the main thing which justifies our investment on St Ives Sluice is modelling, a colleague from the National Modelling Team has come along to explain more about it.

Modelling

- Hydraulic modelling is where we use computer models to help understand the risk of flooding for different scenarios.
- Firstly, we gather data about the river and its catchment.
- Secondly, we use this data to build computer models that simulate the important aspects of how the system works under flood conditions.
- The hydrology model looks at the catchment and converts rainfall into river flow. It also includes statistical analysis on any observed flows too.
- River flow data from the hydrology model is then input into the hydraulic model, focussed on the area of interest which has the river and floodplain geometry in it, and converted into river levels.
- We then convert river level data into mapped flood extents and depths for the different scenarios we have modelled. We model a wide range of flood events from the 1 in 2 annual probability events to the 1 in 1000 annual probability events.
- We can also simulate different management scenarios, such as gate positions, and see how that changes the results.
- These results are used to calculate economic damages to properties, which then determine funding available.



How do we know the model is right?

- Before we make any decisions based on model results, we must be confident that the model is right.
- We do this in a number of different ways:

    a) We identify the most important parameters our model needs to represent for the purpose of the study (i.e. causes of flooding at a location, sensitivities to flooding) and include those in the model.
    b) We check the quality of the data we are inputting to the model to make sure its reliable and covers our key area(s) of interest.
    c) We use industry standard accepted, tried and tested methods and software for modelling, and follow best practice guidance.
    d) We independently quality assure models to ensure they have been built correctly and that we understand their assumptions and limitations, plus the outputs make sense.
    e) We check the model outputs against historic flood events and make sure the model replicates this.

- All models are simplifications of reality, but by following these steps we can have confidence that the outputs are reliable and good enough for the purpose of their study.

What is important in St Ives model

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Pauline A Marsh/ *River Great Ouse in flood*/ CC BY-SA 2.0

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St Ives Modelling

- The St Ives model was taken through all the steps on the previous slide, reassuring us that the model findings are reliable.
- At St Ives specifically, the River Great Ouse floodplain is very wide and flat. This means that any change in the amount of water that can get through the channel or structure gets spread out across a very wide area and because its spread out we only see a small increase in river levels. Therefore, the model isn't very sensitive to local conditions such as individual structure gate positions.
- We've confirmed this by comparing the most recent model to an earlier model done approx. 20 years ago. This shows very similar results so we don't believe further tweaks to the model will give significantly different results.
- The important thing is the amount of water that's coming in from the very large catchment upstream – nearly 3000 km2 at St Ives.
- Past events show that it is not only how much it rains, but how wet the catchment is beforehand that matters, and how high the river levels are to start with.
- The biggest floods are caused by rain falling on a wet catchment, giving a big volume of runoff into the river which is already high because of previous rainfall events.
- This is why local structures, such as St Ives Sluice, have minimum impact on extreme flood levels. Instead, flood management needs to reduce the amount of water coming from the big upstream catchment.

Property threshold levels

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Property threshold levels

- Property threshold levels are important for understanding exactly how many properties are at risk of internal flooding and in determining economic damage calculations.
- We've collected detailed survey of property threshold levels rather than making assumptions about their height. This has helped us more confidently estimate flood damages in areas of widespread shallow flooding.
- We've also compared modelled flood levels with property threshold data. Properties where the internal floor level is situated below the modelled flood level have been included in property count and economic damage calculations. Properties where the internal floor level is situated above the modelled flood level have been excluded from property counts and economic damage calculations.
- A household can only qualify for inclusion in property counts and economic damage calculations where a FCERM project reduces the probability of flood waters crossing its threshold.

What about the 100-year flood?

- This is a flood that occurs on average once every 100 years. However, that's on average, over a very long timescale of thousands of years.
- This means that in any individual 100-year period you could have several 100-year floods, or you could have none.
- Another way of thinking about it is that this flood has a 1 in 100 chance of occurring in any single year. Therefore, every year there is a 1 in 100 chance of this flood occurring.
- For extreme floods of this size, the model estimates are uncertain. This is because we don't have thousands of years' worth of data to base our models on (we have 30 to 40 years). We therefore use statistics to extrapolate up and get a best estimate that we use for designing flood defences such as walls. However, there will always be uncertainties.
- We are always updating and improving our best estimates as we collect more data and develop better models. This means that what we thought was the best estimate when we did calculations 20 years ago, might not be the same as the best estimate if we re-do the calculation today.
- In terms of Standards of Protection of flood defences, we should be aware that the Standard of Protection in terms of flood probabilities will change over time. Therefore, a flood wall will always protect against a river level of so many metres high, but our understanding of whether that's a 1 in 50, 1 in 100 or 1 in 200 probability events will change, and may continue to change in the future due to the potential impacts of climate change.

What are we doing now?

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What are we doing now?

- We're investigating whether these two structures could be considered as special cases for investment given the statutory navigation requirement that the structures do provide.
- We've also investigating alternative funding from the navigation side of the EA.
- In the meantime, we are continuing our inspection regime at both structures to ensure they remain safe and to monitor their condition.

Stay up to date

(https://consult.environment-agency.gov.uk/east-anglia-c-e/st-ives-and-brownshill-staunch-sluices-information/)

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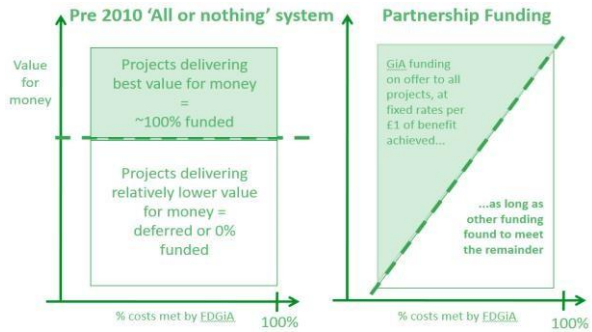
Annex 1 (if needed): Capital Funding rules

Flood and coastal resilience Partnership Funding (PF) is the current policy used in allocating capital funding to flood and coastal erosion risk management projects. It was introduced by Defra in May 2011. Prior to this only projects which delivered the best value for money were completely funded by GiA. Those that did not meet a certain threshold were either deferred or not funded. This was the priority scoring system. Now the costs of projects are shared between national and local funding sources.

The main objectives of partnership funding is to offer communities the opportunity to invest in (and benefit from) local flood and coastal erosion risk management (FCERM) measures that could not be afforded from central GiA funding alone. Grant payment rates are linked to planned outcome measures set by Defra. Payment rates were updated in 2020.



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Instead of meeting the full costs of a limited number of schemes, Partnership Funding (PF) means that GIA can be allocated to contribute to the costs of any worthwhile scheme with a BCR>1. The amount of money the Government can allocate to a scheme is based on the value of all qualifying benefits and outcome of the scheme in relation to the cost and according to the PF Principles.

The PF approach encourages external contributions to be sought wherever possible and allows for a greater number of schemes to be delivered using the FCERM GiA available.

The PF calculator is used to estimate how much FCERM Grant in Aid a scheme is eligible for.

The raw PF score of a scheme is the percentage share of costs that could be funded by DEFRA based upon the qualifying benefits and outcomes of the scheme and the respective payment rates. The rates and definitions are available on the Partnership funding for FCERM projects section of the .gov.uk website. The 'raw' PF score expresses the maximum percentage share of GiA that a scheme can attract.

A project needs a PF score of at least 100% to be considered for allocation of FCERM GiA. However, in many cases the raw score will be below this threshold. In this instance a project will need to either reduce the costs of the scheme or increase contributions. Adding contributions to the scheme will allow the PF calculator to create an 'adjusted' Partnership Funding score and this often referred to as simply the PF score. A PF score of 100% will not guarantee funding of a scheme due to the finite amount of FCERM GiA available to fund the programme. However, the higher the score, the more likely to secure GiA investment.