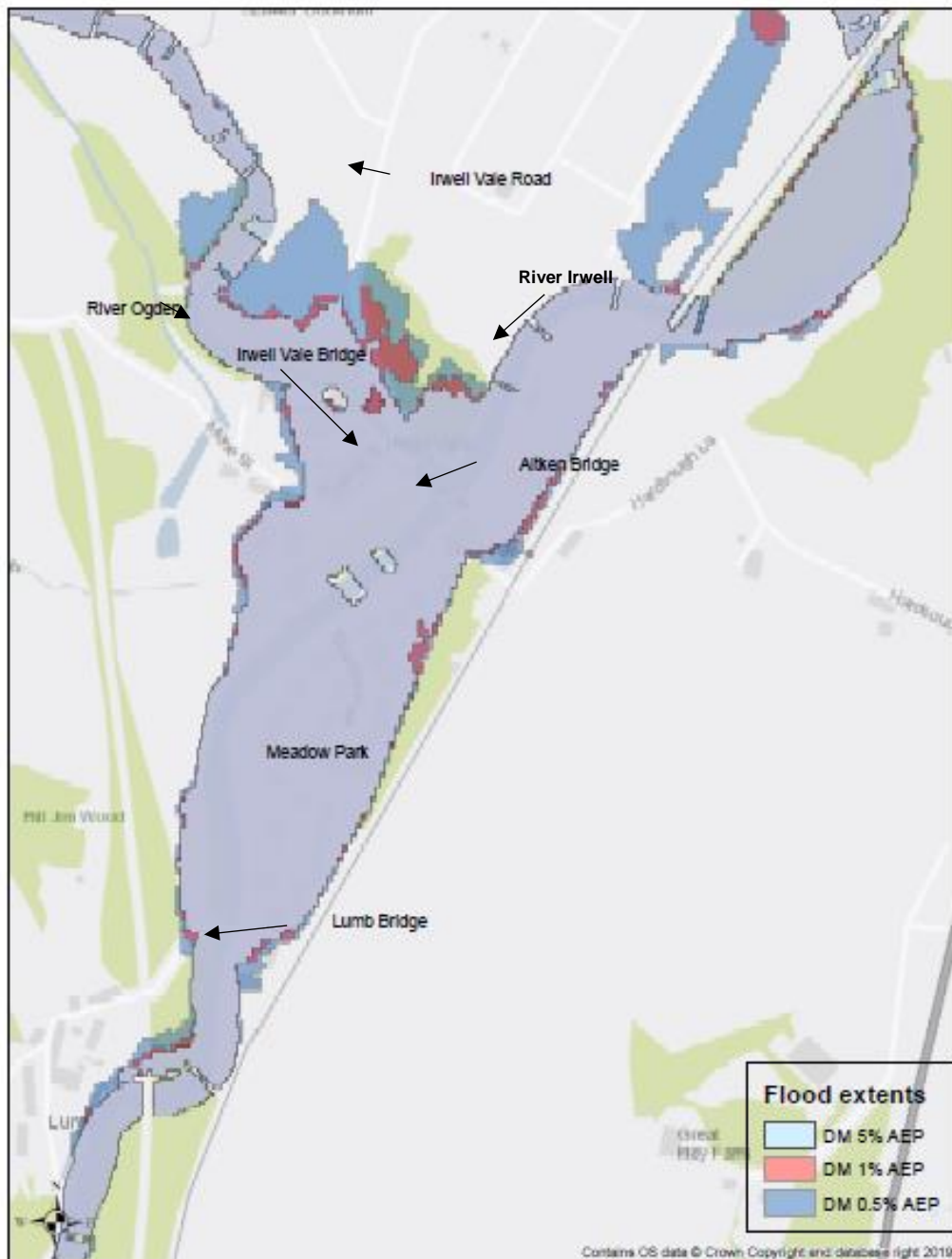


Updated Present Day Flood Risk Maps – Fluvial (Main River)

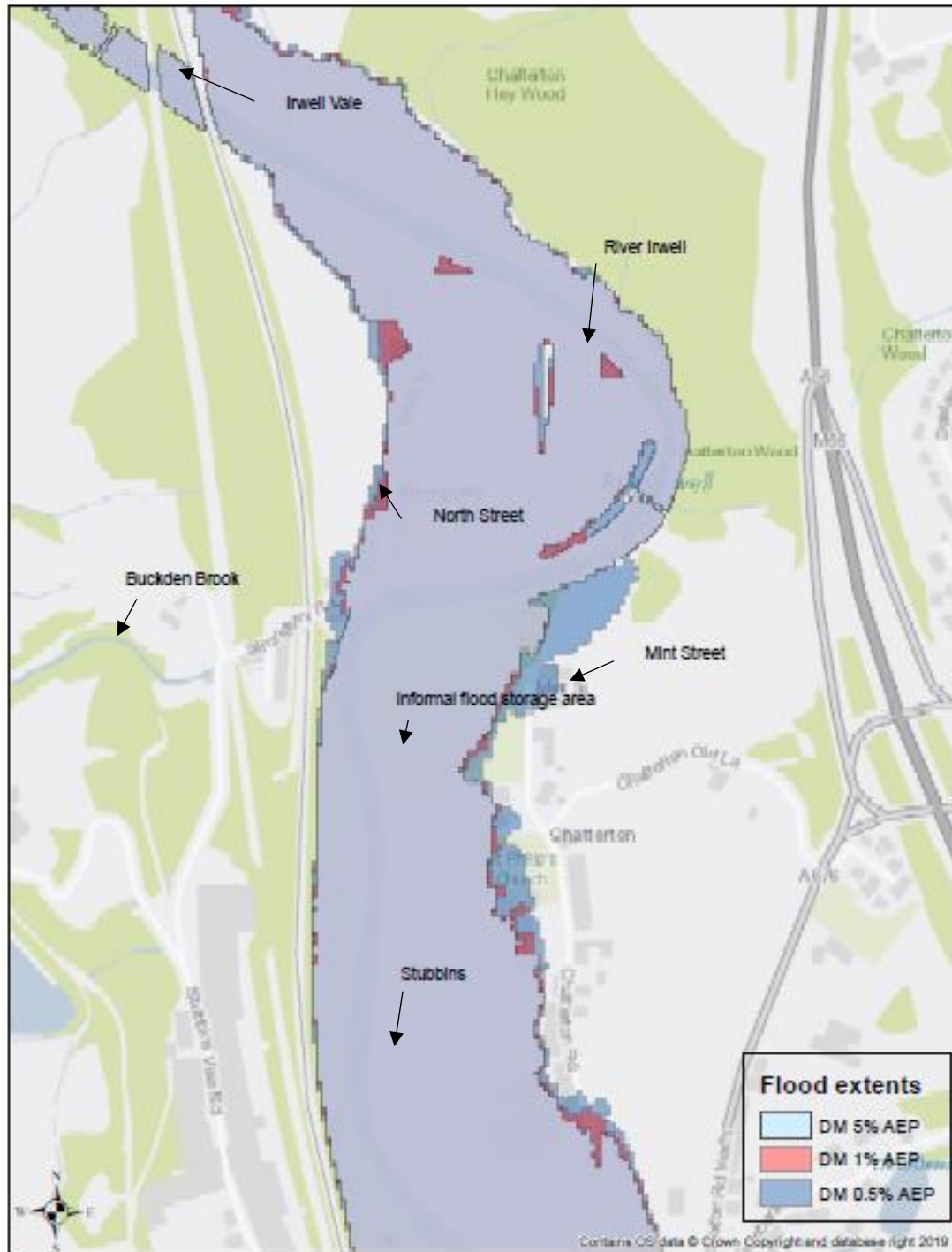
We completed our model refinement exercise in June. One of the many outputs of this exercise, is shown below (Main River flooding extents).

The refinement exercise also enhanced our understanding of how Main River flooding progresses during storm events. Animations showing how Main River flooding progresses in Irwell Vale, **Strongstry** and Chatterton **can be found at:** <https://consult.environment-agency.gov.uk/gmmc/irwell-vale-chatterton-and-strongstry>



Note: Annual Exceedance probability (AEP) - Probability of a storm occurring in a given year.

Figure 1: Updated Present Day Main River Flood Map for Irwell Vale



Note: Annual Exceedance probability (AEP) - Probability of a storm occurring in a given year.

Figure 2: Updated Present Day Main River Flood Map for Strongstry and Chatterton

Sources of flooding

What is 'Pluvial Flooding', 'Fluvial Flooding' and 'Groundwater Flooding'? What are the differences?

'Pluvial Flooding' is also known as 'Surface Water Flooding'. This occurs when rainfall hits a surface, is unable to soak in the ground and therefore runs overland to a low point - causing flooding. This can happen in rural areas (where the soil is already full of water) or urban areas (where there are paved surfaces and drainage is required to remove flooding).

'Fluvial Flooding' is when Ordinary Watercourses or Main Rivers over-top their banks. This is when high water levels in the rivers occur due to snowmelt or a local intense storm higher up in the catchment.

'Groundwater Flooding' is flooding which occurs through the ground. This happens in areas where the soil contains lots of voids/air pockets, allowing water levels to build within the soil.

What is the difference between 'Ordinary Watercourses' and 'Main Rivers'?

Main rivers are usually larger rivers and streams. Other rivers and streams are called 'Ordinary Watercourses'. For example, the River Irwell and River Ogden are Main Rivers and the Kenyon Clough and Buckden brook are Ordinary Watercourses.

What are the sources of flooding in Irwell Vale, Strongstry and Chatterton?

Towns in Rossendale Valley have developed within narrow, steep sided valleys adjacent to one or more watercourses. They have a long history of flooding from the river, urban drainage and from surface water run-off (i.e. rainfall hitting fields and moorlands and flowing down towards towns and villages). The communities of Irwell Vale, Strongstry and Chatterton are at flood risk from the following sources:

- Irwell Vale – Fluvial flood risk (from Ordinary Watercourses and Main River), Surface Water Flood Risk and Groundwater Flood Risk at Meadow Park.
- Strongstry - Fluvial flood risk (from Ordinary Watercourses and Main River) and Surface Water Flood Risk.
- Chatterton - Fluvial flood risk (Main River).

Our 'fluvial' modelling indicates that out of bank flows occur from the River Irwell during events with a 20% chance of occurrence in any 1 year (also known as a 1 in 5 return period - a relatively regular storm).

The areas also suffer from surface water flooding. High intensity rainfall events lead to a lot of run off from the steep hillside. These overland flows charge down the hillside towards the residential properties in Irwell Vale and Strongstry and are unable to get into the drainage network. This, combined with surcharged manholes at the low point, create surface water flooding.

There is also a risk of groundwater flooding to properties at Meadow Park due to seepage flow-paths under the railway embankment through the underlying gravels. During a rainfall event, surface water flows down the eastern hill. If the culvert underneath the railway embankment is blocked/at capacity, this water ponds adjacent the railway embankment and seeps through to Meadow Park.

Are there any surface water flood maps? What are the hotspots for surface water flooding?

Yes. There are surface water flood maps available online at <https://flood-warning-information.service.gov.uk/long-term-flood-risk/map>. Please note that LCC are looking to update provide updated maps in the future.



Extent of flooding from surface water

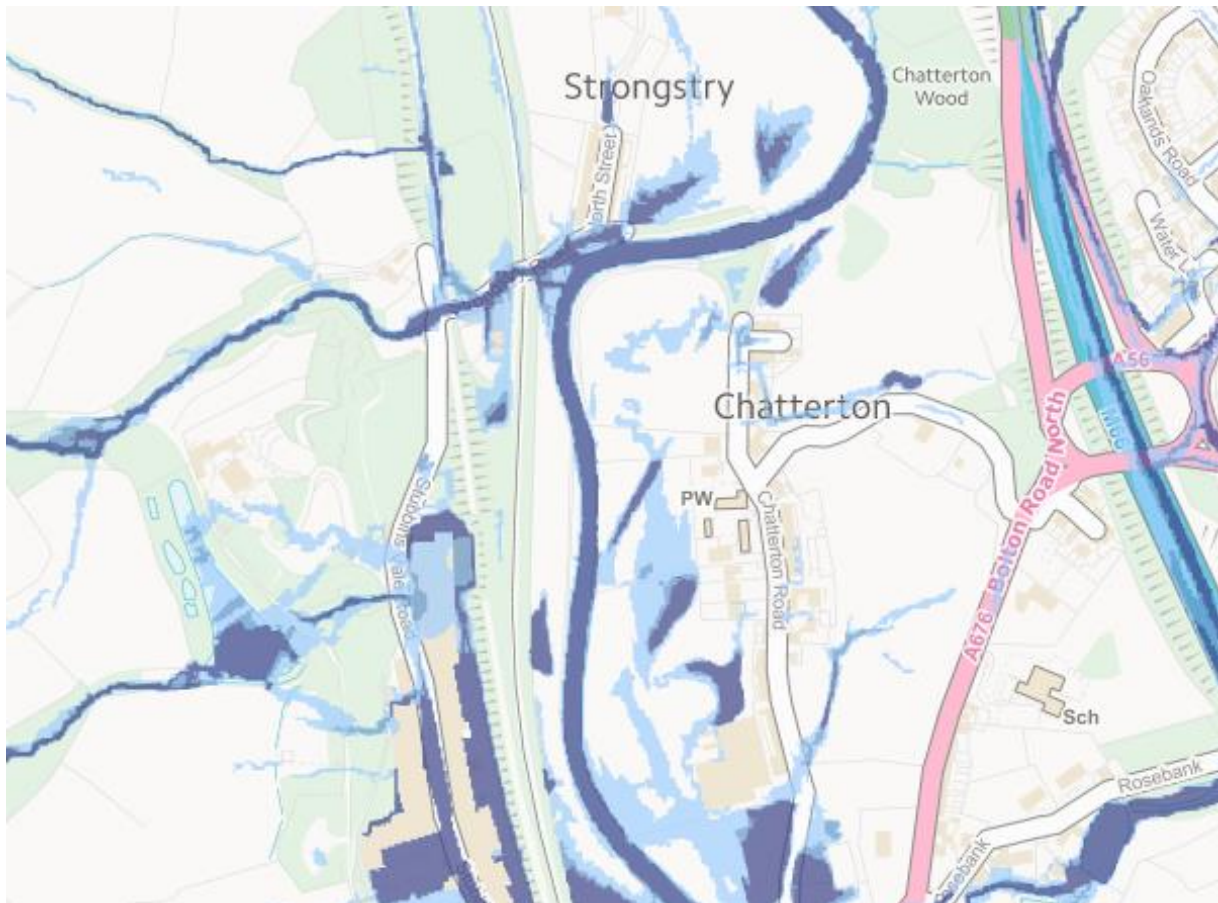
● [High](#) ● [Medium](#) ● [Low](#) ○ [Very low](#)

Note: The map shown does not show the benefits provided by the surface water pump installed by LCC at Meadow Park.

Figure 3: Surface water Flood Risk at Irwell Vale

Figures 3 and 4 show the surface water flood risk at Irwell Vale, Strongstry and Chatterton.

Although there are areas of low flood risk (a 1% chance of occurring every year or less frequent) in Irwell Vale, there are areas of high flood risk (a 3.3% chance of flooding or more frequent - every year) behind the railway line at Meadow Park and around Milne Street / Aitken Street. This high flood risk is also prevalent at North Street in Strongstry.



Extent of flooding from surface water



Figure 4: Surface water Flood Risk at Strongstry and Chatterton

What are we, the Environment Agency, doing about all these problems?

The Environment Agency carries out maintenance, improvement or construction work on Main Rivers to manage 'fluvial' flood risk. We are also a statutory consultee as part of the planning process to ensure future development appropriately mitigates 'fluvial' flood risk. Our powers to carry out flood defence related work apply to Main Rivers only.

Lead local flood authorities, district councils, internal drainage boards and water companies carry out flood risk management work on Ordinary Watercourses & solve 'Pluvial' flooding issues (Surface Water flooding). We are in constant communication and form a strategic partnership to ensure all flooding issues are investigated (see the 'Collaborative Working with Partners' section).

We are working on a business case to promote a scheme for the communities at risk from Main River flooding. We are also working alongside partners (LCC) to ensure that all sources of flooding are understood including from Non-Main River and Surface Water. Once the business case is approved and funding is in place, we will progress towards detailed design, the planning application process and construction of a Flood Risk Management scheme.

Options Long-List to Short-List

When we last engaged with you, we shared our Long List of options. Taking into consideration your views, coupled with our multi-criteria assessment, we have reduced our long list of options to three short-listed options. The criteria we use in our assessment can be summarised as follows:



Flood Risk

How does the option address flood risk?



Environment

What are the environmental impacts (natural & built)?



Buildability

How easy is the option to build?



Economics

What are the costs and benefits of the option?



Health & Safety

Will it be safe to build, use and operate?

The primary Long List option components dropped



- **Online and offline flood storage on the River Irwell** – 1.7 million m³ of storage was required to protect properties from Storm Desmond (December 2015). A 100,000m³ flood storage area can cost between £6.5m-£8.5m.
- **Diversion of the River Ogden** – Will result in a significant cost to divert the main river. Flooding from the River Irwell will still require addressing.
- **Channel Widening** – to accommodate such large volumes of water, considerable widening is required.








- **Flood storage on the Ogden** – Ogden flows are a small portion of the total flow – i.e. a large amount of flooding is caused by the River Irwell (see 'FAQs' section).
- **Drawdown of UU reservoirs on the Ogden** – will only impact a small portion of the Ogden flow. Ogden flows are a small portion of the total flow (see 'FAQs' section).
- **Property Level Protection (resilience & resistance)** – these are already in place in an area where a higher standard of protection is clearly required.
- **Enhanced gravel dredging regime** – Will have little impact on flooding due to the excessive volumes of water which requires managing in a flood event. The high debris load in the Irwell will also limit the impact of this option.
- **Flood Warning improvements** – This will provide little benefit due to fast catchment response times.
- **Pumping** – 'Fluvial' flooding occurs from the River Irwell backing up from downstream areas and due to significant flood volumes (1.7 million m³ of storage required during Storm Desmond), limited benefit will be provided. However, pumping can prove useful when mitigating 'Surface Water' flooding.



- **Temporary flood defences** – As the catchment is extremely responsive, there is little time in which temporary defences can be constructed (approximately 2-3 hours).

Option components taken forward to the Short-List

  	<ul style="list-style-type: none"> • Linear defences in Irwell Vale, Strongstry & Chatterton – Will protect properties from flooding but may need to be used with other option components to reduce defence heights. • Flood relief culvert through Lumb Bridge – Will reduce the effect of blockages and provide more capacity for flows to pass downstream. • Removal of weir(s) on the River Irwell – Will help in reducing water levels at a low cost. • Replacement of Lumb Bridge – Will reduce the likelihood of blockages and provide more capacity for flows to pass downstream. • Trash screen around the inlet of the culvert running under the heritage railway embankment – Will reduce the likelihood of blockages
 	<ul style="list-style-type: none"> • Natural Flood Management – Although the storage provided by this option will provide small benefit, the environmental benefits associated with the construction of wetlands, scrapes and woodland can offset impacts caused by the construction of hard engineering. This will help us meet our Water Framework Directive objectives. <p>NFM measures are now being progressed outside of the short-list options appraisal.</p>

Our three Short-Listed options

Our three short-listed options take into consideration the criteria and points discussed above. They are as follows:

<p>Do Something 1</p>	<ul style="list-style-type: none"> • Linear defences at Irwell Vale* <p>This option will protect properties from storms up to a 5% chance of occurrence in any given year**, or more frequent.</p>
<p>Do Something 2</p>	<ul style="list-style-type: none"> • Linear defences at Irwell Vale* providing a higher Standard of Protection <p>This option will protect properties from storms up to a 2% chance of occurrence in any given year**, or more frequent.</p>
<p>Do Something 3</p>	<ul style="list-style-type: none"> • Linear defences at Irwell Vale, Strongstry and Chatterton* <p>This option comprises protecting properties in the above mentioned areas based on Do Something 1 or Do Something 2.</p> <p>The justification of delaying this is that it will allow Do Something 3 to take account of any downstream impacts from Do Something 1, or, Do Something 2.</p>

* The best performing Do Something option will be optimized by considering the impacts of removing the weirs and Lumb Bridge.

** Based on UK Climate Projections data, it is expected that the envisaged standard of protection will deteriorate over time.

Options alignment

Figures 5 to 7 below present the linear defence alignment for the above-mentioned Do Something options. Please note that this indicative linear defence alignment has been developed to support flood modelling and the economic feasibility assessments only. Buildability assessments and third party (stakeholder) comments would be required to finalise any defence alignment when developing the preferred option.

Buildability assessments will assess the best measures for the linear defences. For example, where the alignment crosses roads, the buildability review will highlight whether ramps or flood gates would be adequate in these locations.



Note: These alignments are indicative only to support the modelling and economic process.

Figure 5: Do Something 1, 2 and 3 option alignment at Irwell Vale



Figure 6: Do Something 3 option alignment at Strongstry

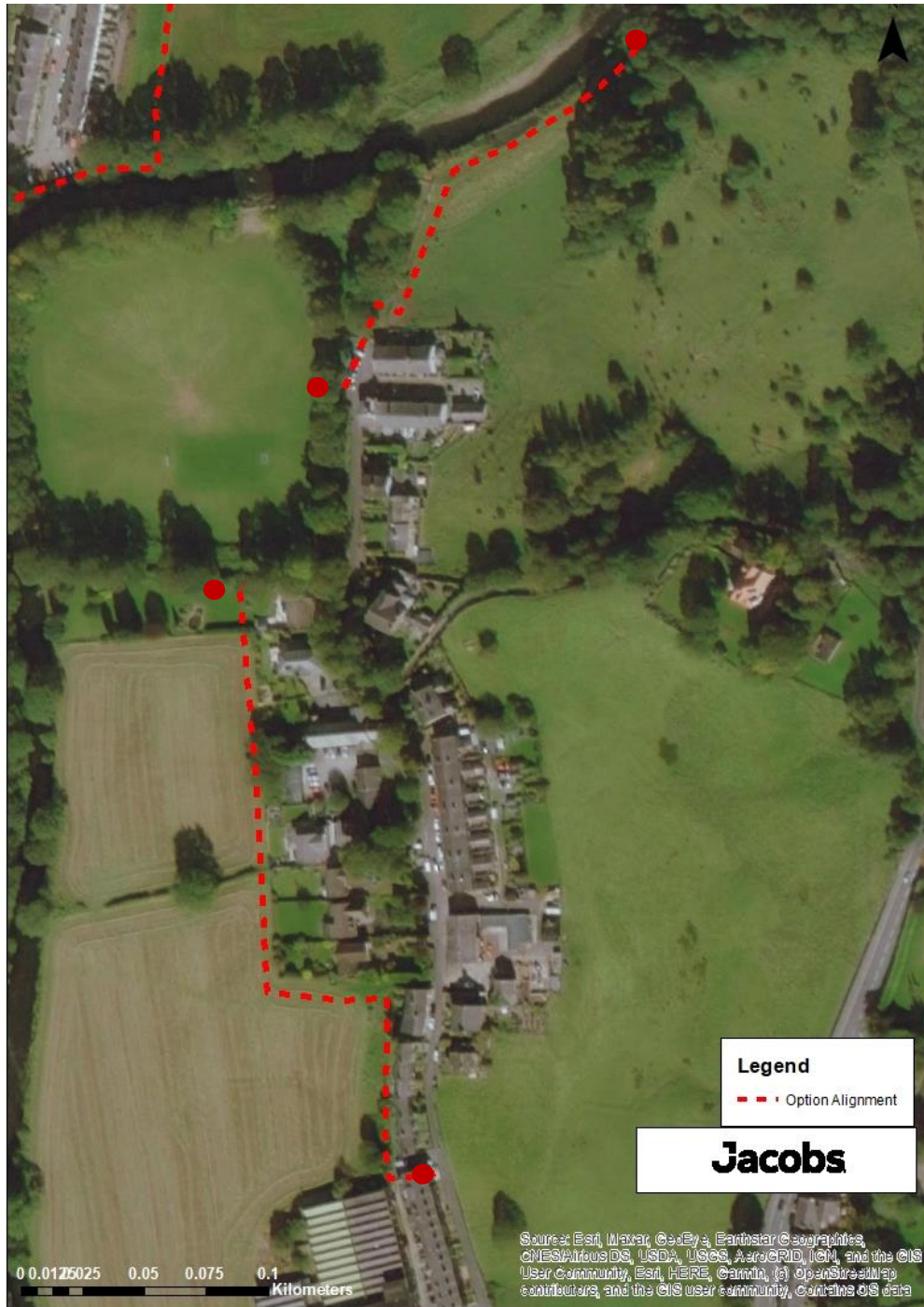


Figure 7: Do Something 3 option alignment at Chatterton

How is the preferred option chosen from the short-list of options?

The options in the short-list are developed and refined to ensure as much is captured of the project objectives and Defra's wider Making Space for Water objectives. The preferred option is then chosen by following a similar multi-criteria assessment to that undertaken at long-list to short-list stage, and this will involve technical, economical and environmental considerations for each option:

Technical considerations will include:

- whether the option can be operated safely
- what standard of flood protection the option will provide
- how the option will affect surface water flooding of the surrounding land

Economic considerations will include:

- the cost of the damage caused by flooding if no flood alleviation works are undertaken
- the reduction in these damages provided by the option (i.e. the benefits)
- the cost of constructing and operating the option

Environmental considerations will include:

- opportunities to enhance the area provided by each option (this also depends on the economic benefits provided by each option)
- the impact of each option to the character of the area
- the degree of visual intrusion impact caused by the implementation of each option
- opportunities to implement Natural Flood Management measures (such as wetlands and scrapes)

What part can Natural Flood Management play?

Natural Flood Management (NFM) is when natural processes are used to reduce the risk of flooding. For example, the use of wetlands can provide both flood storage and increase biodiversity.

Our calculations show that Storm Desmond (December 2015) was almost equivalent to a storm which had a 2-3% probability of occurrence in any given year. The storage required to alleviate flooding caused by Storm Desmond was approximately 1.7million m³. Construction of such storage would be economically infeasible and cannot be provided by NFM measures alone.

NFM does however bring Environmental benefits. We will be looking to use NFM to provide some fluvial benefits, amenity enhancements and to help us meet Water Framework Directive requirements.

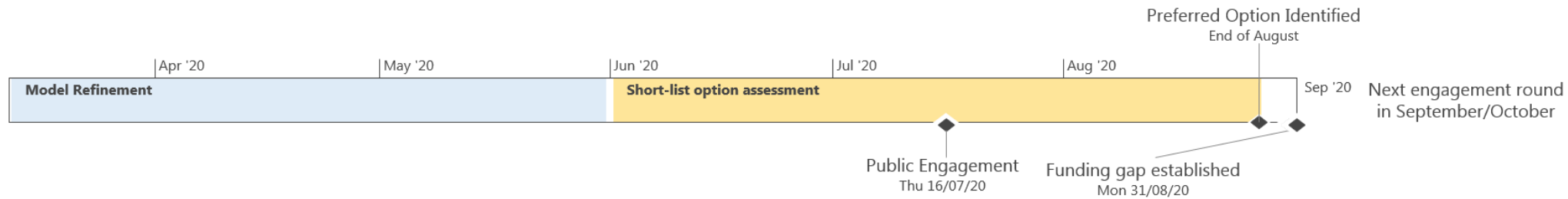
We are pleased to announce that Natural Flood Management work has started to restore Holcombe Moor. This year will see the beginning of a programme of work to improve Holcombe Moor peatland using several methods:

- Creating permeable dams by lifting stones into eroded gullies to restrict the flow of flood water.
- Using excavation methods to create bunds and pools in select areas. This will also help in reducing the free flow of water across the moorland plateau.
- Re-introducing sphagnum moss in newly rewetted areas. This will eventually make the top layers of the peat much more permeable and able to retain more water.

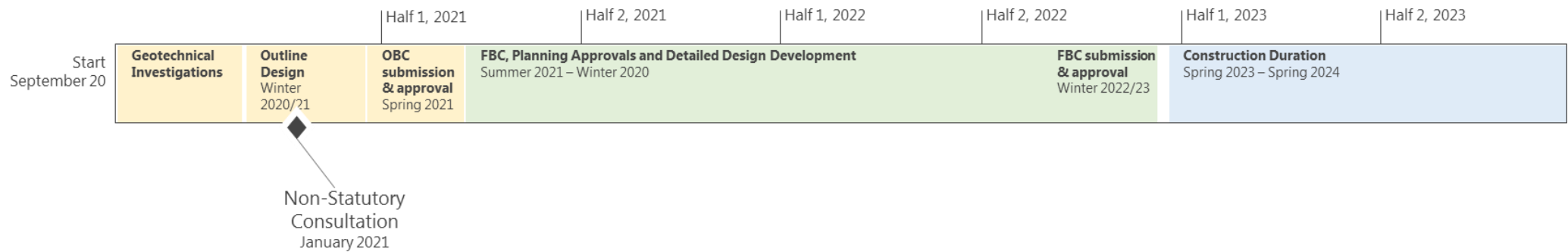
We are also currently investigating natural floodplain reconnection with project partners. This investigation is looking at identifying areas upstream of Irwell Vale which will provide some flood storage benefit and in turn will reduce 'fluvial' flows downstream. We hope to share more information about this in the next community update.

Proposed Programme

Current Programme (to end of summer)



Whole life programme (if the majority of the preferred option costs have allocated funding)



Funding Explained & Collaborative working with partners

In 2011, the Department for Environment, Food & Rural Affairs (DEFRA) published updated rules for funding flood risk management projects. This was further revised in early 2020. The Flood and Coastal Resilience Partnership Funding guidance sets out criteria which assigns a percentage score to each project.

The higher the score of the project, the more likely it is to receive a greater proportion of Government funding, known as Grant in Aid (GiA). Funding is allocated on an annual basis and the score of a project is considered against other projects around the country.

This process ensures that tax payer's money is spent where it can deliver most benefit for least cost. Anyone can contribute to schemes that do not qualify for 100% government funding.

Grant in Aid funding (GiA)

The majority of our schemes are funded by Government Grant in Aid. The amount of funding a scheme (preferred option) receives depends on the following:

- The quantity of damage avoided by implementing a scheme. This considers both direct damage and in-direct damage avoided. An example of in-direct damage is the damage to mental health caused by flooding.
- The number of properties which move flood risk band after implementation of a scheme.
- The environmental benefits provided by a scheme (e.g. habitat improvement).

The Partnership Funding score is then calculated as: the total Government GiA funding eligible for the option / the option cost. Projects which have a score of greater than 1 (i.e. eligible for over 100% funding) can progress.

Other sources of funding

Our partners:



Partnership funding means that the costs of FCERM projects are shared between national and local sources of funding. If the eligible GiA does not cover all the costs of a project, extra money needs to be raised from partners through contributions.

Anyone who benefits from an FCERM project can be a partner, including:

- local communities
- businesses
- developers
- local councils

The project team has already secured some additional funding from the North West Regional Flood and Coastal Committee (NW RFCC), and is committed to working with other partners including Lancashire County Council and Rossendale Borough Council to identify other possible sources of funding.

