DESIGN & BENEFITS GUIDE

Environment Agency

*Delivering improved flood protection, environmental enhancements and improved community amenities for Preston and South Ribble*

# Preston & South Ribble Flood Risk Management Scheme

# CONTENTS

# FOREWORD
## Keith Ashcroft | Environment Agency Area Director

Over the years, many communities across Lancashire have experienced the devastating effect flooding can have on lives and livelihoods. The Environment Agency is always among the first services to respond to incidents, and my colleagues and I have sadly witnessed the immediate devastation and the long–term impact flooding can cause.

With climate change giving us wetter winters, and the risk of flooding set to increase, we need to act now. That's why we're taking steps and planning for the future — helping to ensure communities living close to the River Ribble are better protected and more resilient to climate change.

The Flood Risk Management Scheme will reduce the risk of flooding and improve the resilience for Preston (Broadgate and Frenchwood) and South Ribble (Lower Penwortham, Walton–le–Dale, and Higher Walton).

The £54.7m scheme will better protect around 5000 homes and businesses. However, the investment will not only bring an improved level of flood protection, it will also see improvements to community spaces, key infrastructure, and the environment. We're planting more than 16,000 trees and creating a wetland habitat for local communities to enjoy. In addition, we're improving footpaths and sports facilities, and delivering educational programmes to local schools.

This work is only the start. In the coming years, more will need to be done across the Northwest to adapt to our changing climate. This includes better planning, further protection for lives and livelihoods from flooding, and enhancing the ability to recover quickly.

The Environment Agency cannot do this alone. We'll continue to work with local communities and our partners to deliver a better place and future for the people of Preston and South Ribble.

BACKGROUND

# About this document



This document provides an overview of the Preston & South Ribble Flood Risk Management Scheme, including how it will be delivered, and what the community can expect.

The Environment Agency has started construction on the Flood Risk Management Scheme which, when complete, will provide better flood protection to homes and business.

Work on either side of the River Ribble, along Broadgate & Riversway and Riverside Road in Penwortham, is the first phase to be delivered. Further phases will improve existing defences in Fishwick Bottoms, Walton–le–Dale, and Higher Walton.  All work is currently scheduled to be complete by the end of 2024.

The construction of flood defences will not only reduce the risk of flooding but will also create a lasting benefit for the wider community and environment.


BACKGROUND

# Historical Flooding in Preston & South Ribble

There is a long history of flooding in Preston and South Ribble going all the way back to the 1700s. There have been 8 recorded floods since 1936.

The existing River Ribble defences were built between the 1920s and the 1990s. However, these defences are now reaching the end of their design life and need to be repaired, replaced or extended.

River Ribble 1936

Walton–le–Dale 2015

Broadgate c1900s

Leyland Road 1990

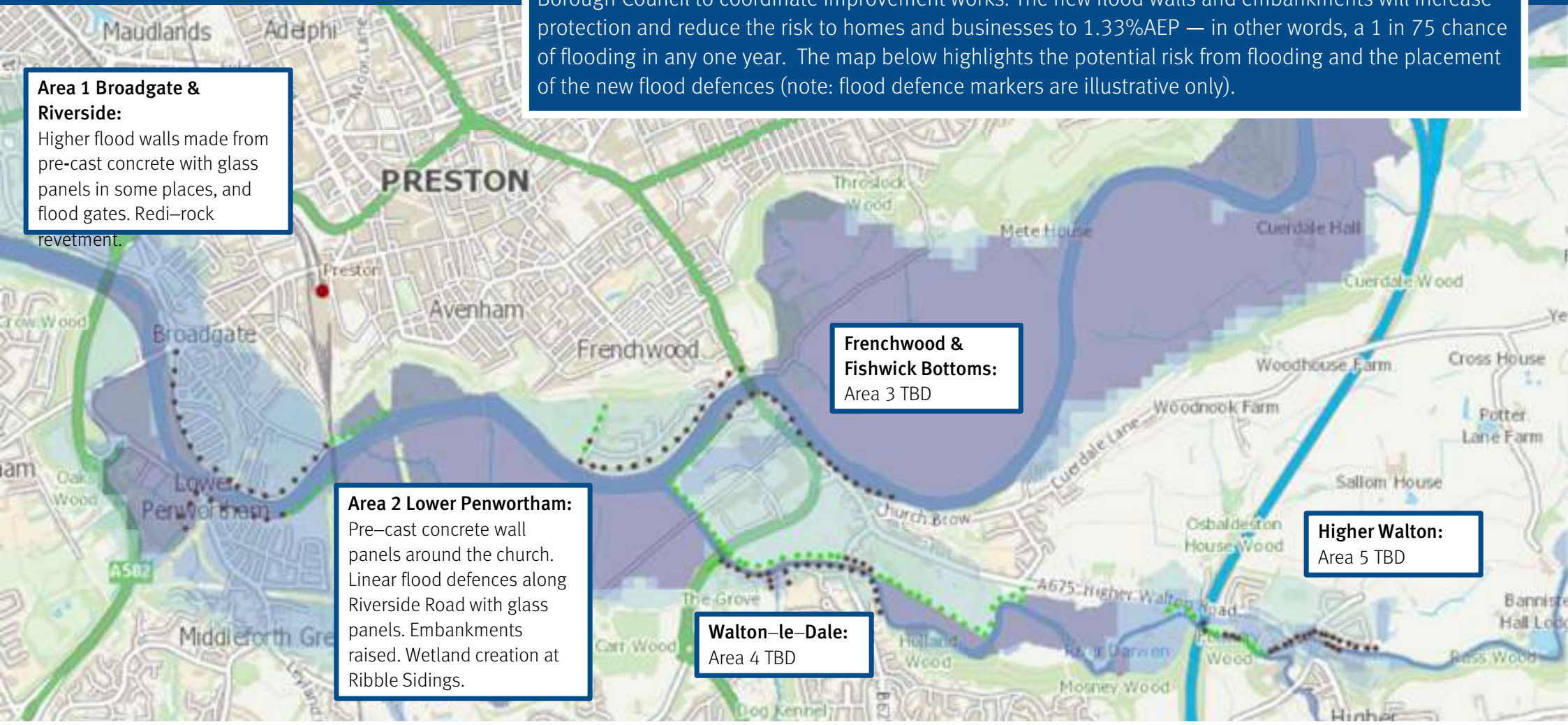
River Ribble 2015

BACKGROUND

# Our Approach

## The Flood Risk Management Scheme covers 5 areas:

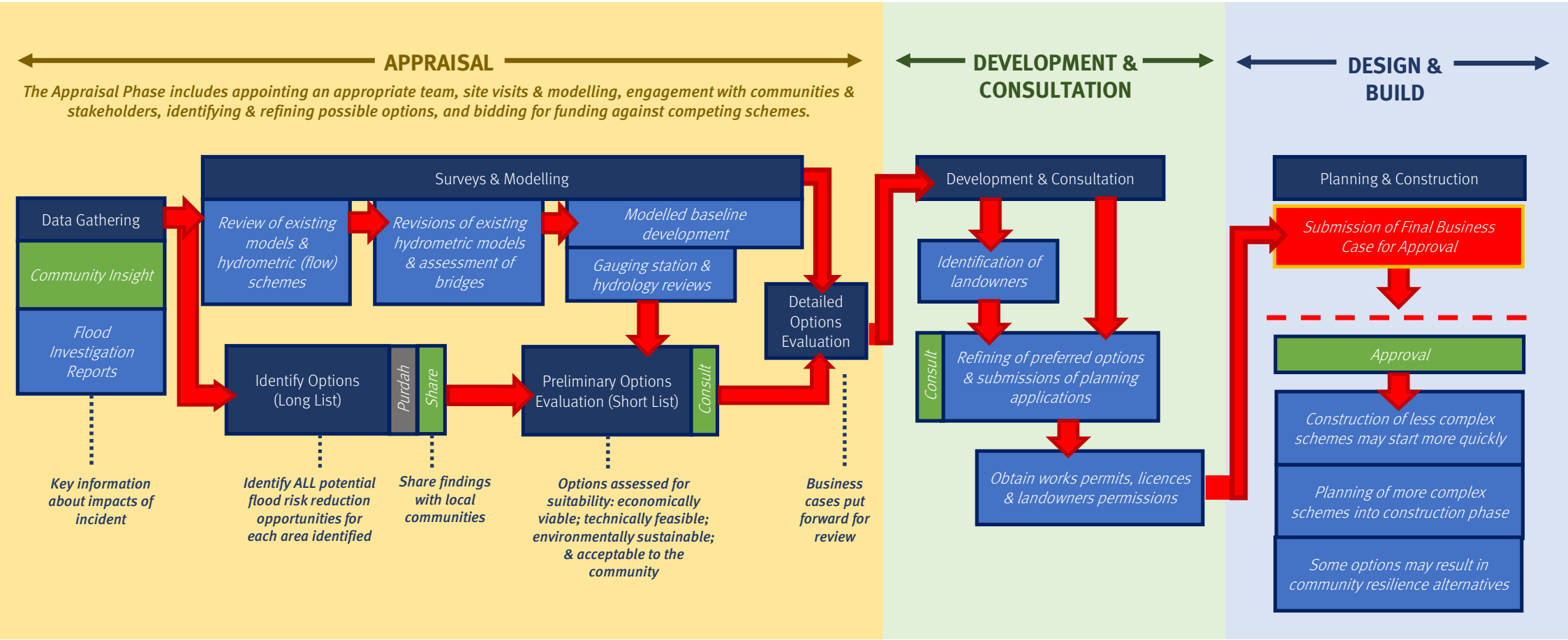
We will be working with United Utilities, Lancashire County Council, Preston City Council and South Ribble Borough Council to coordinate improvement works. The new flood walls and embankments will increase protection and reduce the risk to homes and businesses to 1.33%AEP — in other words, a 1 in 75 chance of flooding in any one year. The map below highlights the potential risk from flooding and the placement of the new flood defences (note: flood defence markers are illustrative only).



BACKGROUND

# The Flood Risk Management Journey

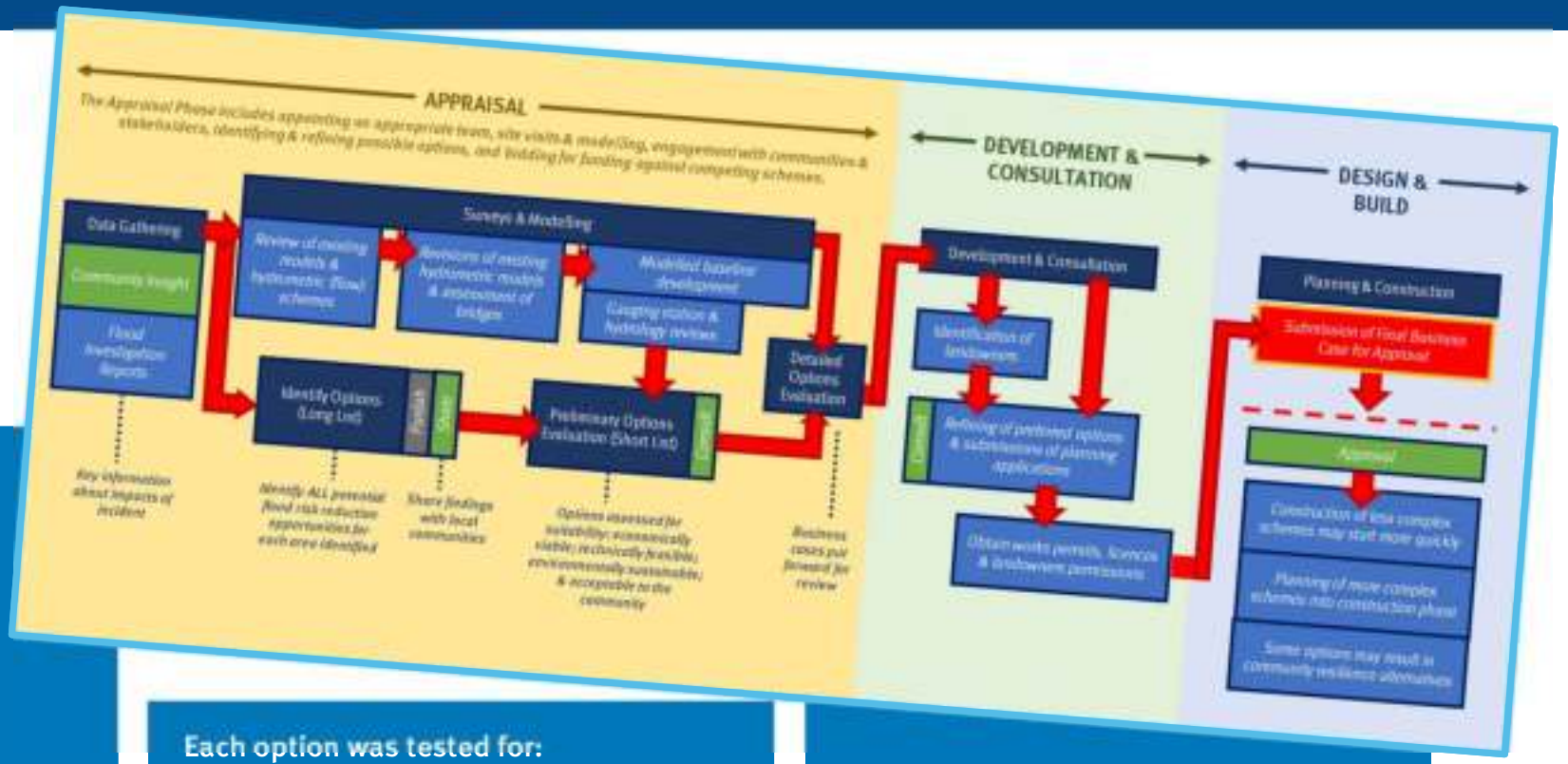
All flood schemes go through a process of public consultation, engineering analysis, environmental assessment, and economic appraisal before agreement is made on a preferred set of options. The preferred option(s) must then be approved by planning committees before any work can commence.



BACKGROUND

# The Preston & South Ribble Flood Risk Management Journey

Over 20 design options were tested against criteria leaving a preferred set of options to take forward for the Preston & South Ribble Flood Risk Management Scheme.




**Options scored for their feasibility included:**

- Flood storage
- Linear defences
- Demountable temporary defences
- River conveyance improvements
- Natural Flood Management
- Urban redevelopment / re–naturalisation of the river
- Property flood resilience

**Each option was tested for:**

- ✓ Technical suitability
- ✓ Environmental impact
- ✓ Economic viability
- ✓ Social acceptability

**The final options include:**

- Linear flood walls
- Embankments
- Flood gates

# DELIVERING FLOOD SCHEME
## Key Facts

When complete, the Flood Risk Management Scheme will deliver a series of flood risk, community, environment and economic benefits to Preston and South Ribble.

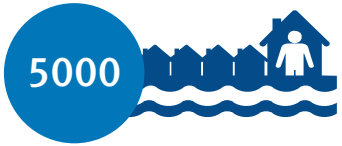
This includes enhancing local areas through landscaping, tree planting, and creating a new wetland habitat for wildlife.

We are also delivering a series of educational programmes, helping children to understand the impact of flooding and climate change.

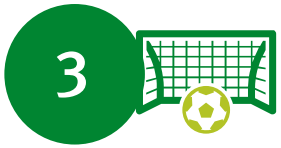

Engagement events & activities held in the communities impacted or benefitting from the scheme

### Providing flood protection & better community amenities


Defences constructed

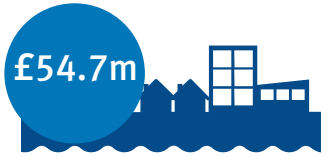



Homes & business better protected from flooding

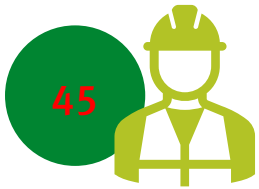



New sports pitches created for the community

### Providing better economic growth & education opportunities



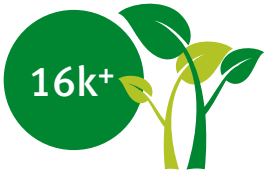

Investment in Preston & South Ribble




People employed to work on the scheme


Educational sessions to be delivered in local schools

### Protecting & enhancing the local environment




New trees planted


Hectares of new wetland created

# DELIVERING THE FLOOD SCHEME
## Wall Finishes

The design of the Flood Risk Management Scheme will be sympathetic to the local area. All the flood walls will be built and finished in a way that is appropriate for the existing buildings and landscape.

The finishes for the flood defence walls have been agreed with Lancashire County Council, Preston City Council and South Ribble Borough Council. Planning permission for Areas 1 and 2 has been granted.

The walls will be made predominantly from pre–cast concrete and, in places, topped with glass panels (see page 11).

Around 5km of flood defences will be repaired, replaced or built as part of the scheme. In addition, four flood gates will be installed to provide additional protection.

Finally, some local footpaths will be enhanced to provide better pedestrian access.  Fences will also be added along the boundary of the BAC/EE Association for safety.

Artist's impression of new flood defences along Riverside (Area 1)

DELIVERING THE SCHEME

# Glass Panels

Flood defence glass panels will be used in three locations within the scheme. There will be two sections along Riverside and one on Riverside Road.

Glass will be used where wall heights exceed 1400mm, and in residential areas where existing properties already have an unobstructed view of the river. The panels will allow residents to continue to enjoy the view over the river.

The glass will be specified as extra clear with self–cleaning properties to provide the best finish and to reduce the need for cleaning. No glass cleaning has taken place on existing schemes in the last 10 years.

The frames will be as thin as possible (typically 40–90mm) with supporting pillars of around 160mm. The frame width is dependant upon loading.

The frames will be powder coated black to match street furniture, heritage assets, and the flood gates.

Artist's impression of new flood wall and glass panels along Riverside Road (Area 2)

# DELIVERING THE SCHEME
## **Flood Gates**

Four new flood gates will be installed as part of the scheme.  As shown on page 10, the floodgates are recessed between pillars to prevent posing a risk to path users and to provide a good finish. Any path or vegetation disturbed by the works, will be reinstated.

The gates will remain open during normal times, and closed by the Environment Agency in the event of weather warnings and the risk of flooding.

Example flood gates

DELIVERING THE SCHEME

# Bank Stability

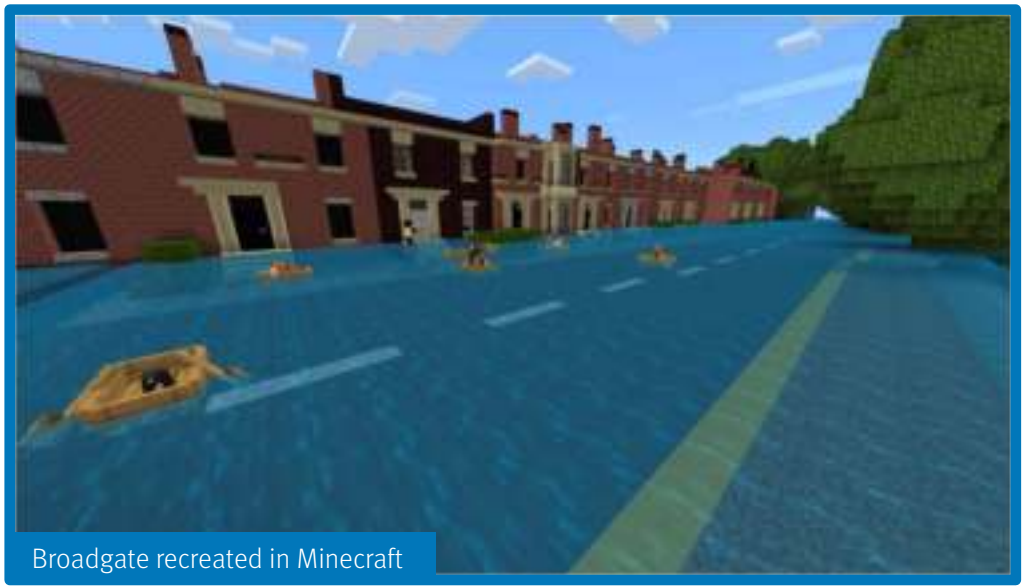
Example embankments

These are examples of Redi–rock embankments, which will be used in Areas 1 & 2 to make the riverbank more stable where required.

Made from pressed concrete with an attractive cobblestone finish, the design includes a recess within each block for planting. The embankments will then ‘green up’ over time with vegetation and this will soften the look of the blocks.

EDUCATION

# Minecraft ‘Rivercraft’



Broadgate recreated in Minecraft

Rivercraft is a unique and immersive virtual learning experience, which sees the city of Preston transformed into a virtual world within Minecraft.

Minecraft is hugely popular and most people have heard about it, even if they haven’t played it! After purchasing the rights to the game in 2014, Microsoft introduced an ‘education edition’ for schools and education establishments to use for teaching purposes.

In September 2021, the Environment Agency began working with Microsoft and Blockbuilders to design Rivercraft and create three games within a virtual Preston and based on the real life Flood Risk Management Scheme:

1. Managing Flood Risk
2. Climate Change & Flooding
3. Environment & Wellbeing

As part of game, players get to defend the city of Preston from flooding through the construction of ‘hard’ flood defences (including walls and glass panels) and developing natural flood risk management techniques.

Preston students

Just like in other versions of Minecraft, players can teleport from place to place around the city while spotting some of Preston’s most famous landmarks.

The other Rivercraft games allow users to carry out an Environmental Assessment and reduce their own impact on climate change.

Rivercraft is hosted by Microsoft on their global Climate and Sustainability Minecraft Education site. It is available globally in over 25 languages for both educational and home users.

# COMMUNITY BENEFITS
## Access for All

It is important that the Preston & South Ribble Flood Risk Management scheme is inclusive. The design team has worked carefully to ensure that everyone's needs are considered and that the principles of The Equalities Act 2010 are followed.

Examples of inclusive design include:

- Providing more opportunities for pedestrians to access public open green spaces with formalised footpaths.
- Providing new tree, grass, wetland, wildflower, perennial, and shrub planting to promote mental health and wellbeing.
- Providing seating, including benches with backrests and armrests in key locations.
- Creating interesting features to promote the use of new footpaths.
- Avoiding stepped access where possible and creating ramped access.
- Avoiding awkward level changes that may cause trip hazards, and ensuring visual contrast is designed into any necessary level changes.
- Ensuring pedestrian diversions are well communicated, sign posted, and safe to use throughout the construction phase.

Together with Lancashire County Council we are identifying locations where we can create, improve, or connect into footpaths and cycle ways as part of the scheme.

# COMMUNITY BENEFITS
## Ribble Sidings Wetland, Lower Penwortham

A new community wetland located in Ribble Sidings will be created. It will cover 0.35 hectares and include:

- Woodland area with 170 native trees planted
- Orchard with 5 varieties of fruit trees
- Species rich grassland
- Native wildflowers & bulbs (incl. 450 daffodils & 450 snowdrops)
- Insect friendly habitat
- Pond dipping platform
- Network of paths through and around the site

The existing footpaths & play area will be retained. An area of amenity grassland will also be retained for informal recreation.


Willow


Hazel


Hawthorn



Snowdrop


Daffodil


Foxglove

COMMUNITY BENEFITS

# Ribble Sidings Wetland Area

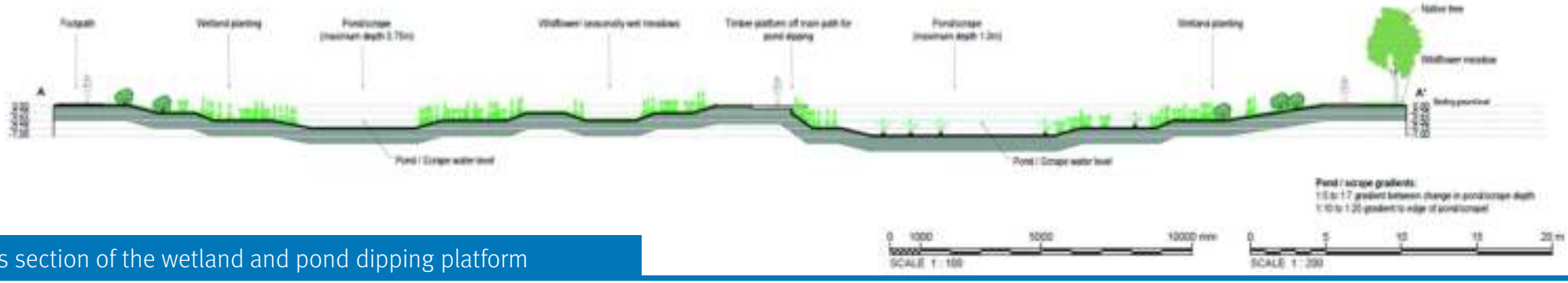
Damselfly

Toad

Newt

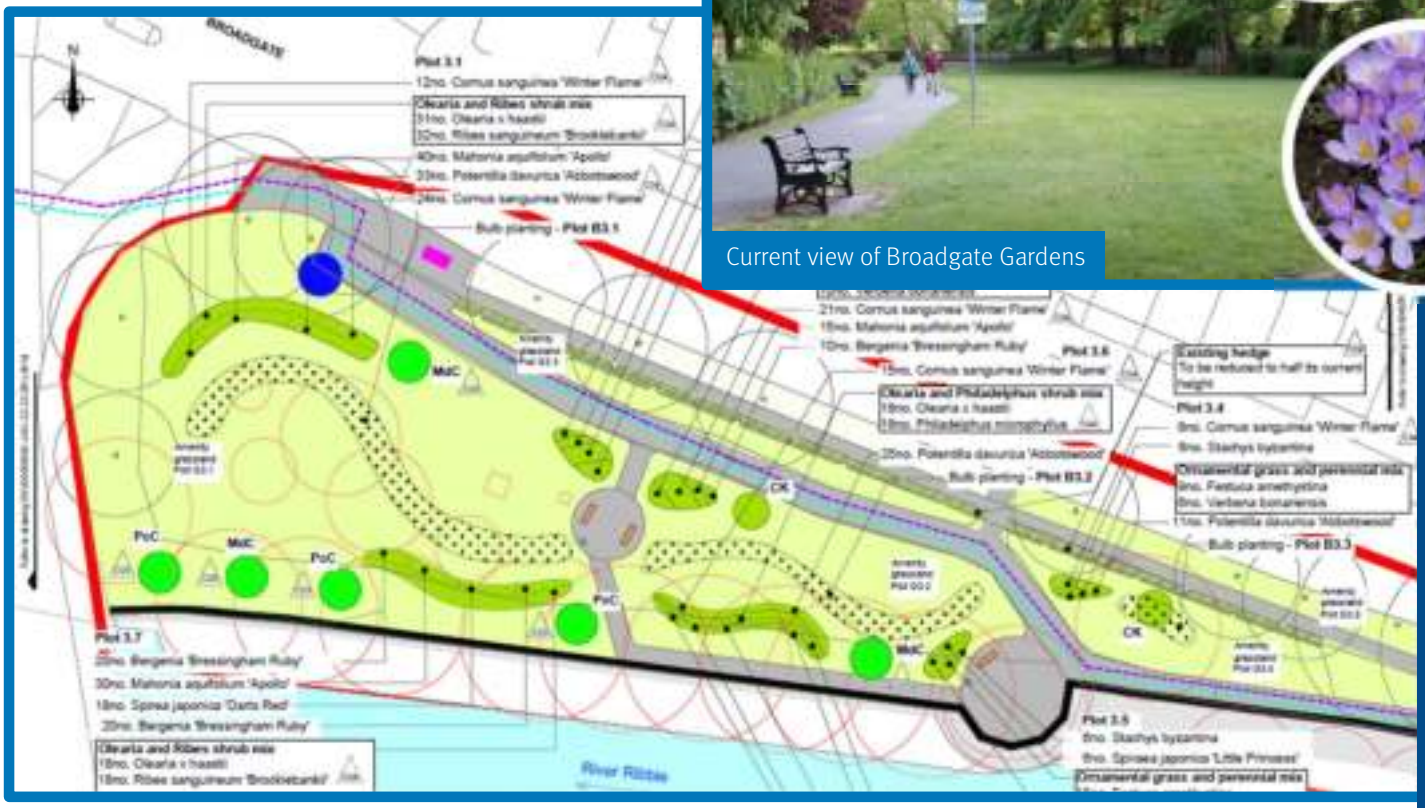
Frog

Dragonfly




Cross section of the wetland and pond dipping platform

# COMMUNITY BENEFITS
## **Broadgate Gardens**




Current view of Broadgate Gardens

In Broadgate Gardens there will be a mix of fruit trees, ornamental shrubs and amenity grassland for local residents to enjoy.

There will be a seating area in the centre with additional ornamental shrubs and bulbs

We are also restoring the riverside viewing platform, which will include new seating.

COMMUNITY BENEFITS

# Sports Facilities: Archbishop Temple C of E High School

The BAC/EE sports pitches have been temporarily incorporated into our site compound and to provide an access road for local properties. As an alternative venue, three grass football pitches have been created by the Environment Agency at Archbishop Temple High School.

- Senior Pitch – 100x64m plus 3m runoffs
- Youth Pitch (U16/U15 – 11v11) – 91x55m plus 3m runoffs
- Youth Pitch (U11/12 – 9v9) – 73x46m plus 3m runoffs

Following completion of the flood scheme these pitches will remain in place for the school and the community to use — providing a lasting, positive legacy of sports provision in Preston. Goal posts, for the new pitches, have been purchased by the Environment Agency with a partial grant from the Football Association.

May 2022

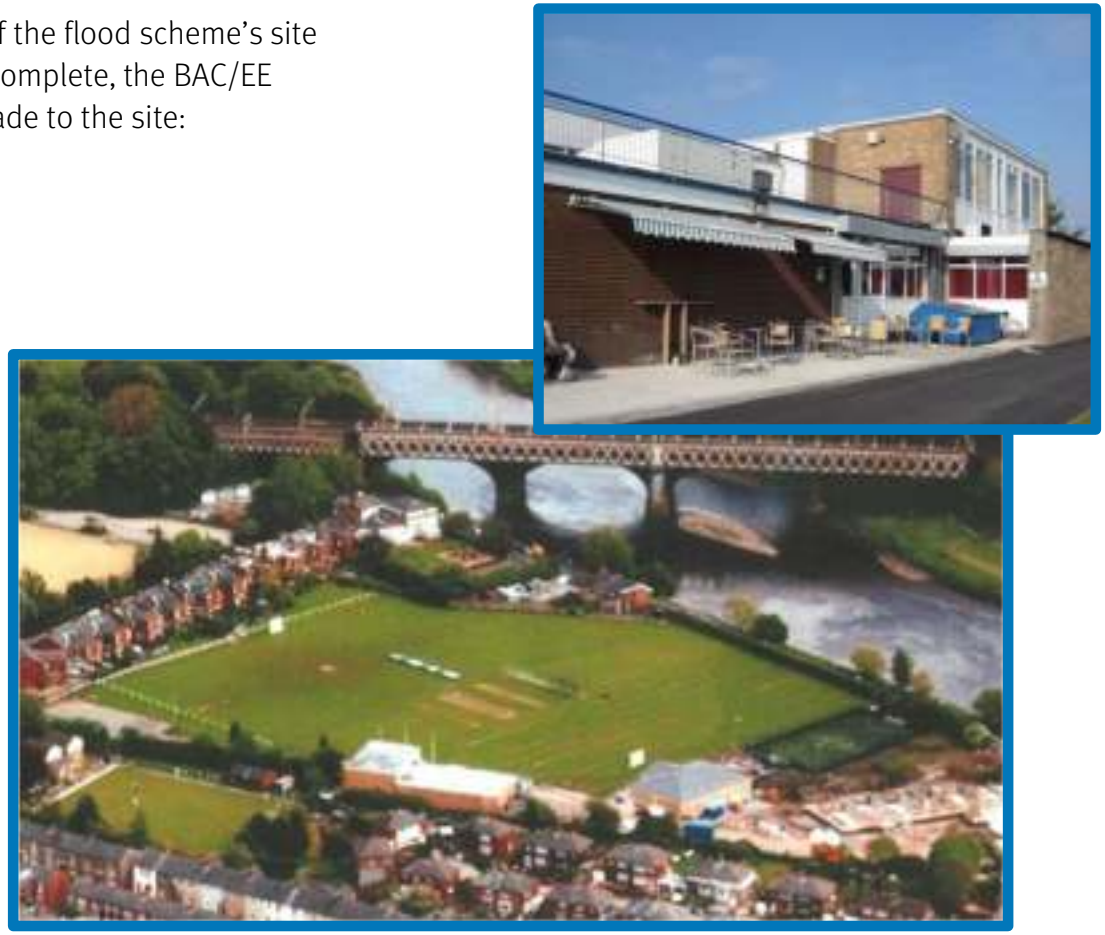
July 2022

COMMUNITY BENEFITS

# Sports Facilities: BAC/EE Preston Social & Sports Association

The grounds of the BAC/EE Association are currently being utilised as one of the flood scheme's site compounds and to provide space for an access road. Once construction is complete, the BAC/EE Association's pitches will be remediated and other improvements will be made to the site:

- ✓ The pitches impacted by the works will be reinstated to a high standard.
- ✓ The existing wooden score board will be replaced and upgraded with an electronic score board.
- ✓ The entrance and the car park currently has a large number of pot holes and the tarmac surface will be repaired.
- ✓ Lines for car parking spaces will be redrawn.
- ✓ An asbestos floor will be removed from the club house and new flooring laid.
- ✓ New floor tiles have been laid on the staircase.
- ✓ Painting and decorating in some rooms has been carried out.



# COMMUNITY BENEFITS
## Avenham & Miller Park Entrance

The entrance to Miller Park will undergo improvements as part of the flood risk management scheme.

The entrance space will be expanded towards the council depot to create a more open, welcoming space. The new area will be surfaced in resin bound material using high quality natural aggregate. The surface will be inset with ‘Welcome to Miller Park’ in black lettering.

Credit: Flickr Tony Worrall

ENVIRONMENTAL BENEFITS

# Landscaping & Planting

Detailed landscape plans have been produced for each reach of the scheme. The plans are tailored to the character and conditions of the site with moisture loving plants in the wetter areas, native species used where possible, but with more formal planting and ornamental species in certain areas, such as Broadgate Gardens.

Habitats will be improved with over 8 hectares of woodland planted along the riverbank at Fishwick Bottoms. This will not only provide ecological benefits, but will help improve water quality, store carbon, and help the area become more resilient to our changing climate.

A range of different native woodland types will be planted to provide a range of habitats, from open woodland consisting of mainly taller tree species like oak, birch and alder, to more dense woodland which includes understory shrubs and smaller trees like holly and blackthorn. Our planting and landscaping plans have been designed to improve the environment for some of our most threatened and well–loved species.

The new wetland habitat, with a diverse range of native planting and seeding, will increase biodiversity of both plants and animal species in the area. Native wildflowers will also provide a boost to pollinators.

Around 8 hectares of wetland habitat, woodland, and recreational space

# ENVIRONMENTAL BENEFITS
## Tree Planting & Wildlife


Bee


Hedgehog


Damselfly


Bat


Otter


Vole

The new Ribble Sidings wetland area has been designed to attract invertebrates such as damselflies and dragonflies, butterflies, moths and bees. It will also benefit woodland birds, bats, hedgehogs, voles and amphibians, such as newts, frogs, and toads.

The proposed tree planting at Fishwick Bottoms is providing mitigation for the trees lost to the scheme. The benefits will be far ranging, the trees along the riverbank will provide shade and bank stability in an area most needed upstream of the defences. Once established the trees will help the water quality and benefit fish, and provide habitat for bats, otters and bird species.


Newt


Chub

We are also looking to install large woody material (tree trunks and root plates, which are to be lost to the scheme) on the south bank of the Ribble, parallel to the Ribble Sidings wetland area. This will mitigate the river encroachment and provide habitat and refuge for fish, which may also benefit the otter population.

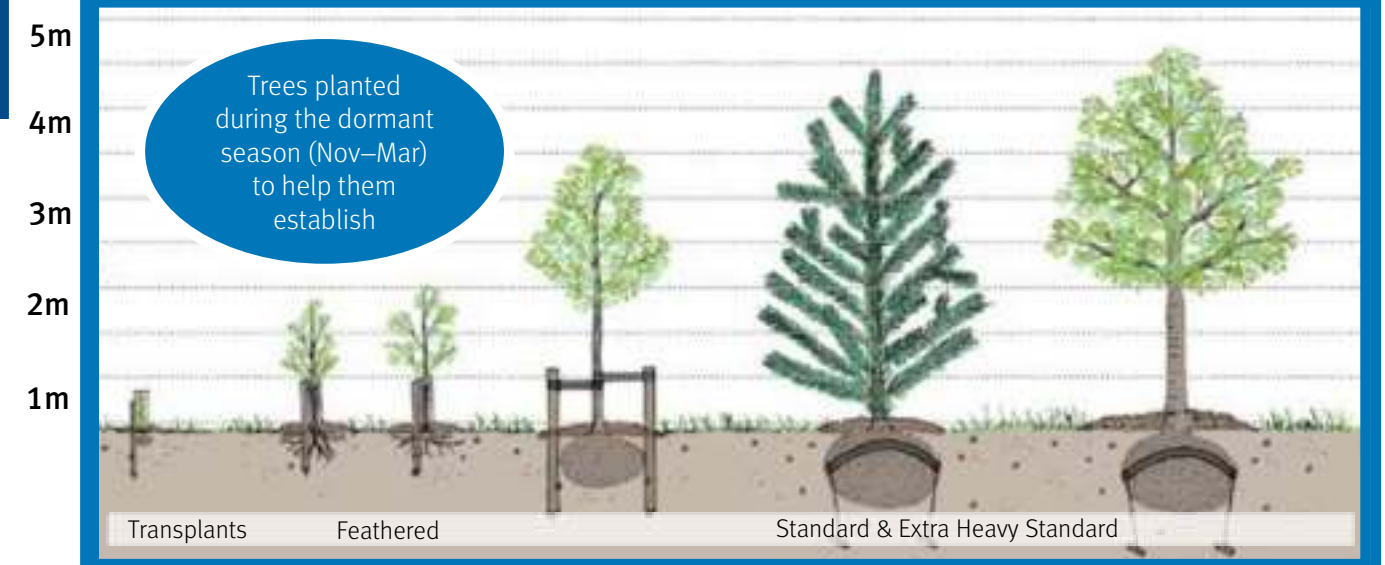
# ENVIRONMENTAL BENEFITS
## Trees

Unfortunately, around 900 trees have had to be removed to allow construction works to take place. In most locations it will not be possible to directly replace the trees removed due to buried services (e.g. sewers, electricity cables, etc.) and the proximity to the flood wall foundations.

However over 13,000 new trees will be planted to create a habitat rich woodland along the river at Fishwick Bottoms, with an additional 2000 trees planted at Ribble Sidings. A smaller number of trees will be planted along Riverside.

Different sizes and species of trees will be planted in order to serve different functions and to best suit certain locations. For example, native species will be planted where habitat creation is important, while in Broadgate gardens more ornamental species have been selected to suit the character and purpose of the area.

Tree survival rates depend on many factors, including planting, soil condition and aftercare. If good practice is followed and weather conditions are normal, then a 95% survival rate is expected in the first year.



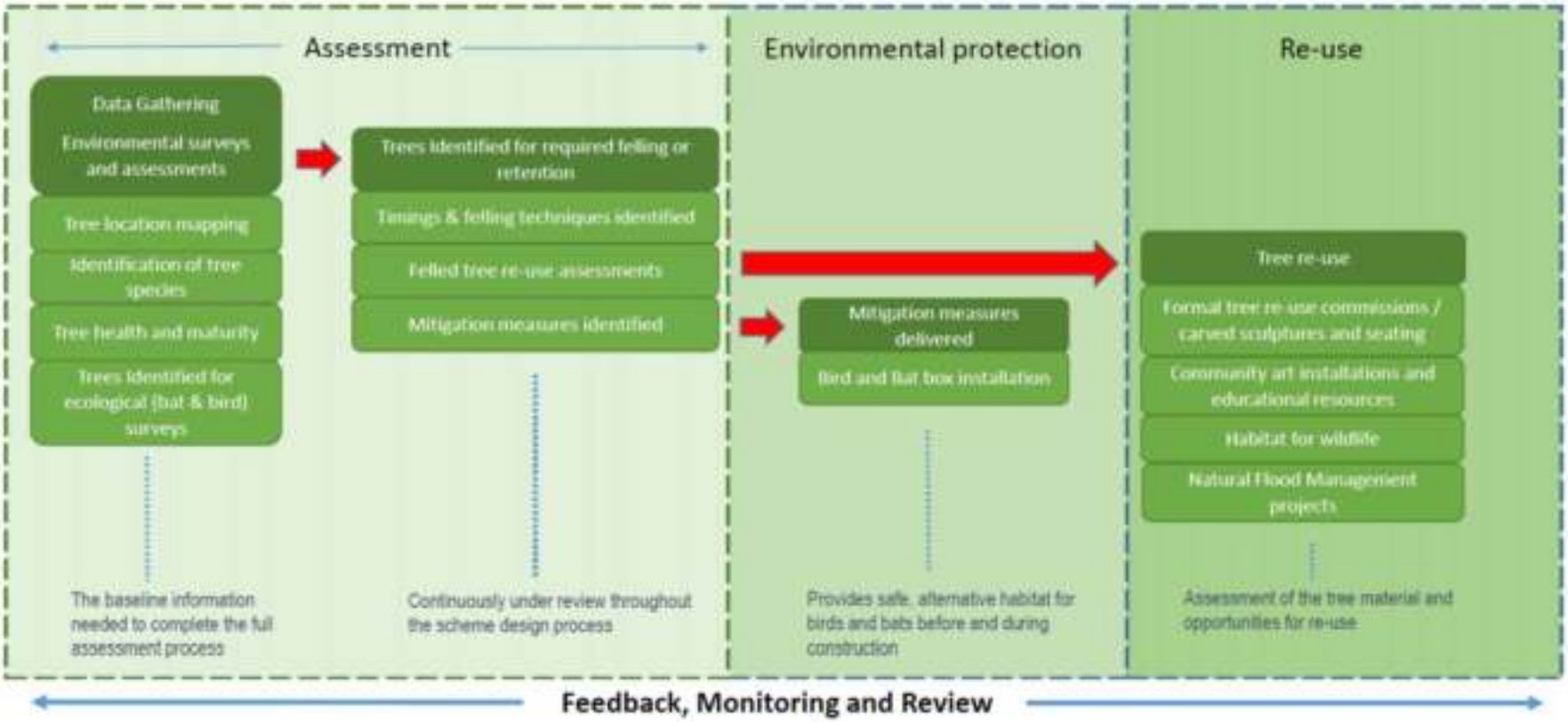

This table shows the various sizes of trees that will be planted.

- "Transplants" are the name for young trees that get "transplanted" from the seed bed.
- "Standard trees" are typically 2 metres tall with a clear stem supporting a well–branched crown.
- "Extra Heavy Standard" are more established trees giving more immediate impact in the landscape.

| Technical name of tree size/form | Transplants | Standards | Extra Heavy Standards |
|---|---|---|---|
| **Total Number:** | Approx. 16,200 | Approx. 30 | Approx. 60 |
| **Location Use:** | Areas 1&2 (2,800)<br>Fishwick Bottoms (13,400) | Areas 1&2 | Areas 1&2 |
| **Planted Heights:** | Transplants: 40–60cm | Standards: 1.5m–2m | Extra Heavy Standards: 3.5–4m |

# Tree Assessment & Appraisal

The tree assessment process is detailed and ongoing throughout the design and construction phases. As part of the assessment process, mitigation measures are identified ahead of any construction works and to determine if there is an option to reuse the wood from felled trees. We intend to use some of the felled tree trunks to create wildlife habitat at Ribble Sidings.



ENVIRONMENTAL BENEFITS

# Biodiversity & habitat creation for Ribble Sidings

## Native trees


Silver Birch


Hazel


Hawthorn


Oak


Wych Elm


Alder


Goat Willow

## Native wildflowers


Loosestrife


Hedgenettle ‘Betony’


Foxglove


Ragged Robin

## Native bulbs


Daffodil


Snowdrop

## Orchard fruit trees


Conference Pear


Damson Plum


Victoria Plum


Cherry


Cox’s Apple

Over 2000 native trees along with native plants will be planted at Ribble Sidings to compliment the riverside setting and to provide food and shelter for wildlife.

ENVIRONMENTAL BENEFITS

# Biodiversity & habitat creation for Broadgate Gardens

## Shrubs, grasses & perennials


Fescue Grass


Ryegrass


Red Fescue


Dogwood ‘Winter Flame’


Meadow Grass


Common Bent


Japanese Spirea ‘Dart’s Red’


Lamb’s Ear


Oregon Grape ‘Apollo’


Cinquefoil ‘Abbotswood’


Bergenia ‘Bressingham’


Japanese Spirea ‘Little Princess’


Bergenia ‘Siberlicht’


Daisy Bush


Verbena

These are some of the trees, shrubs, grasses, perennials, and bulb species that will be planted. Species are selected based on size and what will provide seasonal interest and value to wildlife, such as supporting pollinating insects and birds.

## Fruit trees


Cox’s Apple


Conference Pear

## Native bulbs


Crocus


Daffodil

ENVIRONMENTAL BENEFITS

# Biodiversity & habitat creation for Fishwick Bottoms

At Fishwick Bottoms around 13,000 trees will be planted along the edge of the river. The trees will provide stability to the riverbank as well as many ecological benefits. The woodland will include around 15 native trees species including oak, birch and willow.

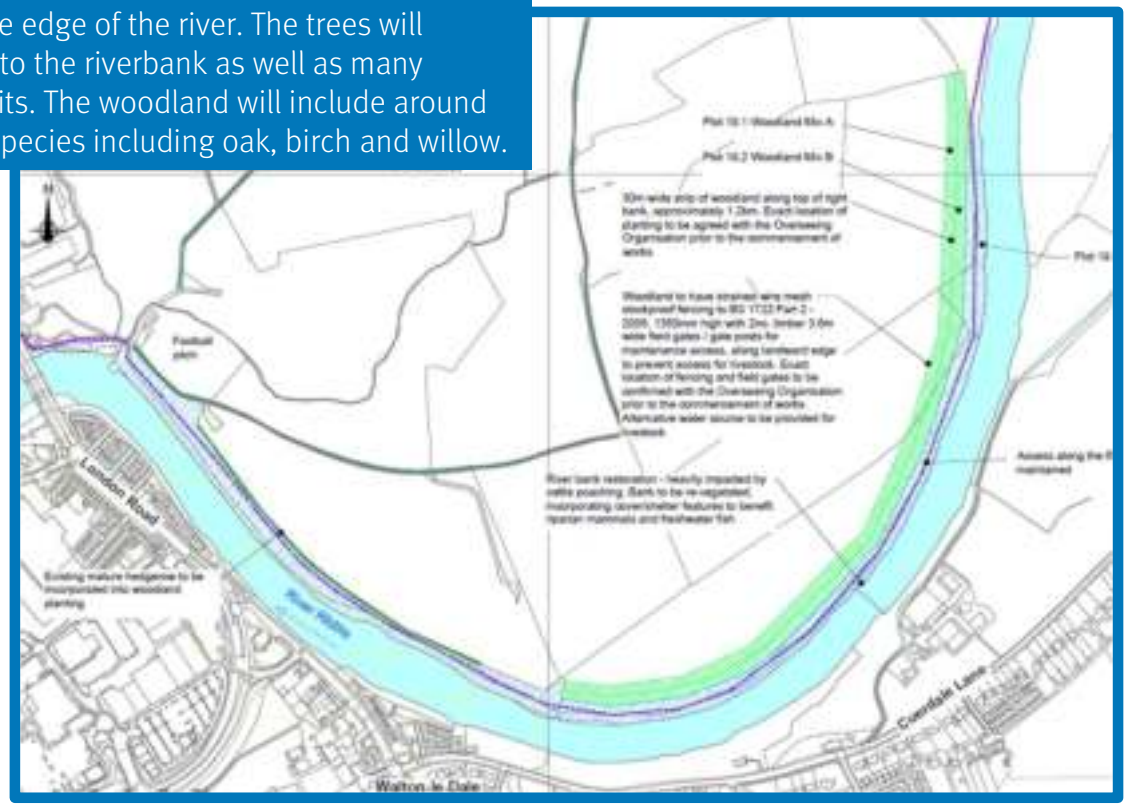

Oak


Hazel


Silver Birch


Hawthorn


Alder





Grey Willow


Wych Elm


Crack Willow


Blackthorn


Elder


Holly

# SCHEME CONSTRUCTION
# Working Arrangements

### Preparing for construction

In some locations we are able to deliver the construction works more easily due to larger working areas, the works not being complex in their nature, or because there is little interference from underground services.

However, there are a number of locations where preparatory works are needed before construction can begin.  All the working areas need to be free from utility services and street furniture, such as seating, bins and street lighting, before construction can begin.  This requires preparations to be agreed with the service providers to divert or undertake removal and relocation works.

Some of the major relocation and service diversion works may require road or footpath closures and diversions.

### Working hours

The working hours approved through planning permission are 8am to 6pm Monday to Friday and 9am – 2pm on Saturdays. We do not expect to work on weekends or public holidays.

### Minimising construction noise & dust

Throughout the construction of the scheme, we will monitor and manage noise, vibration, and dust levels to reduce any impact on homes, businesses, public areas, and the natural environment. Several monitoring techniques will be used and there will be a range of measures to provide visual screening, which will assist with reducing noise and dust levels.

To manage any debris on the roads, created by construction traffic, a full clean of the carriageway will be undertaken by a road sweeper or similar, as appropriate.

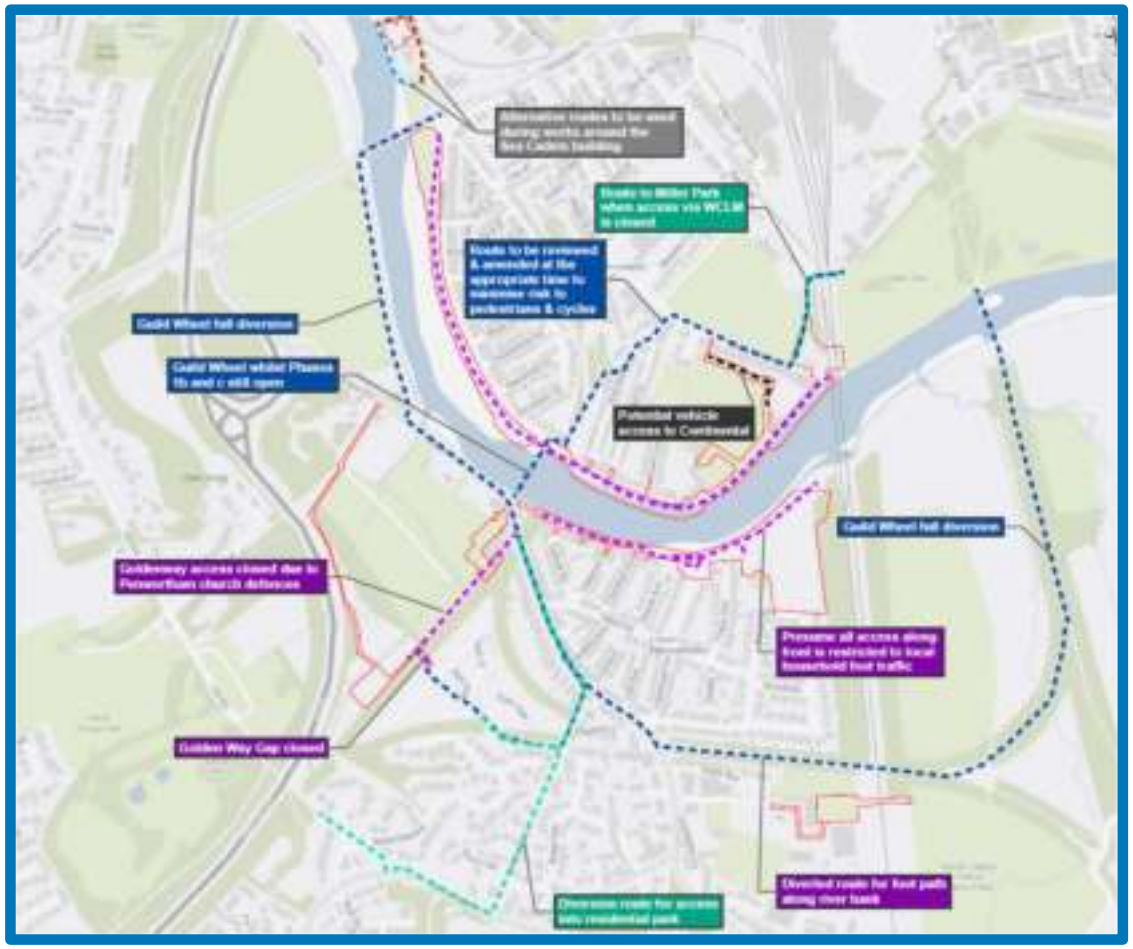
### Construction traffic

Works will be carried out in phases to reduce disruption to residents. However, residents are likely to notice an increase in construction traffic in the local area.

While work is ongoing, construction compounds will be in place. These will be sited at various locations including Broadgate Gardens, Margaret Road, Hartington Road, and South Meadow Lane. Staff will work from some of these locations and materials will also be stored there.

SCHEME CONSTRUCTION

# Vehicle, Cycle & Footpath Diversions



The primary aim throughout the construction work is to ensure residents can access their properties and businesses can continue to function. However, some of the working areas are compact, and we have to balance the need to keep contractors safe while minimising any disruption to the community.

We will need to close some roads in the local area temporarily and diversions will be in place. Pedestrian access to residential properties will be maintained for the duration of the road closures.

As a result of these closures, there will inevitably be some disruption to the current parking arrangements for some local residents. Alternative parking will be provided, where possible. We are working closely with residents to address accessibility requirements.

There will be diversions to the Guild Wheel cycle route.

Footpaths will remain mostly open, but there will be some diversions.

The Traffic Management Plan has been developed in conjunction with Lancashire County Council Highways, who will ensure any temporary road closures or lane closures are managed appropriately to minimise traffic disruption.

# SCHEME CONSTRUCTION
# Carbon & Sustainability

## Carbon Reduction

The Environment Agency has a 40% carbon reduction target for its capital schemes between initial business case and construction completion.

Our initial estimate of scheme carbon emissions was identified within our business case.  This is termed the "carbon baseline".

We are working to reduce our carbon emissions through:

- Use of electric vehicles & solar powered site cabins;
- Low carbon materials in our construction; and
- Material reuse, where possible.

Carbon decisions will be monitored, and they will be recalculating the scheme's carbon emissions at regular intervals.

## Carbon Offsetting

Carbon offsetting is additional to our 40% efficiency target and will help us to achieve the Environment Agency's "net zero by 2030" objective.

Additional carbon will be offset through the creation of new environmental areas, including tree planting.

CEEQUAL is the leading international evidence based sustainability assessment and awards scheme for civil engineering, infrastructure, landscaping and works in public spaces.

The assessment is an ongoing process throughout all aspects of the scheme from business case stage to construction completion.

The Environment Agency minimum CEEQUAL sustainability target is 60% ("very good").

We will be aiming to reach a higher score of 75% ("excellent").

MORE INFORMATION

## Contact the Environment Agency

Visit our website: www.thefloodhub.co.uk/psr

Follow us on Twitter: @EnvAgencyNW

Email the team: psr@environment–agency.gov.uk

Come & see us at our Information Centre:
BAC/EE Preston Social & Sports Association
South Meadow Lane, Preston

Open from September 2022 – visit our website for further details.

Environment Agency

North West Regional Flood & Coastal Committee

Jacobs

VolkerStevin