

01 Public engagement feedback

Summary of comments and responses

The feedbacks from the previous public engagement events are recorded in the tables on the right. They have been summarised and put into groups, and the boards have been created to highlight how we have responded to your comments.

Previous community engagement

- Two events in October 2022 in Meriden and Hampton-in-Arden
- Over 4000 invitations sent to residents and businesses
- Attended by over 150 people
- 500 booklets printed and distributed
- 9 Weekly in-person drop-in sessions



Public Comments	Theme	Board N.	Comments and Design Responses
Retaining the rural character	Conservation	3 7 8 9	Landscape and ecology scheme in the context area close to the viaduct is designed to conserve, enhance and restore this character. One of the aims of the design is not to change the character of this working landscape so many of the design interventions have been made with this in mind.
Urbanising effect threatening the Meriden Gap	–	6 7	The assessment of impacts on the rural character of this area was considered as part of the hybrid Bill. The proposals will minimise these impacts.
Minimising disturbance to existing flora and fauna	Restoration	9	Landscape and ecology scheme in the context area close to the viaduct is designed to conserve, enhance and restore the environment for wildlife.
Tree planting adjacent to housing on Diddington Lane – to obscure views of the structure and potential graffiti	–	9 10 24 25	The design for the viaduct has been developed to work with low lying, agricultural character of this working landscape. Planting a woodland between Diddington Lane and the viaduct would alter this character and impact on the landowner. For these reasons this proposal has not been taken forward.
Reinstatement of hedgerows, trees and planting, Restoring locally important environmental features	Restoration	9	The design for the viaduct includes acoustic parapets on its western side to minimise noise impact on occupiers of properties along Diddington Lane. The landscape design includes the reinstatement of hedgerows and trees. The design for the viaduct includes proposals to integrate it into the environment through a range of planting types.
Minimising disturbance to wildlife habitats	Conservation, Enhancement and Restoration	3 7 8 9	Landscape and ecology scheme in the context area close to the viaduct accounts for a range of ecological species and restoration of local wildlife sites.
Retaining local features: footpaths, trees, planting, areas for wildlife, ponds, ditches, hedgerows and wild grassed areas for pollinators	Conservation, Enhancement and Restoration	6 7 8 9	The masterplan for the area surrounding the viaduct identifies all of these elements as important elements of the overall design.
Flooding and drainage	Enhancement	3 8 10	Flooding and the effects of constructing and operating a railway have been key considerations in the design which takes account of climate change.

Public Comments	Theme	Board N.	Comments and Design Responses
Construction traffic management	Construction Map	22 23	The design for the viaduct includes acoustic parapets on its western side to minimise noise impact on occupants of properties along Diddington Lane. Proposed construction routes will make use of internal haul road and keep as much traffic off the local road network as possible. The viaduct is designed so that the landscape retains its ability to be used for agriculture into the future.

Public Comments	Theme	Board N.	Comments and Design Responses
Visual appearance of the viaduct	Pier refinement, Diaphragm and beam refinement, Concrete finish	15 16 18 21 24 25	–
Mitigation of noise and disruption including to Diddington Lane	Acoustic Parapet	17	The design for the viaduct includes acoustic parapets on its western side to minimise impact on nearby properties.
Management of graffiti and the appearance of the concrete structure	Graffiti strategy and concrete finish	20	The materials used and their finishes have been an important part of the viaduct design development. The viaduct will be maintained in the future in line with the HS2 graffiti policy.
Maintaining views across the landscape and reducing the visual bulk of the structure	Pier refinement	15	The design will allow views through and around the viaduct and the polished concrete acoustic parapets will visually reduce the mass of the structure.
Preservation of rural countryside views	Diaphragm and beam refinement	16	The design will allow views through and around the viaduct and the polished concrete acoustic parapets will visually reduce the mass of the structure.
Integrating the viaduct into the landscape	Understanding the local context and key views Additional visuals	6 18	Landscape and ecology scheme in the context area close to the viaduct is designed to conserve, enhance and restore the environment.

Public Comments	Theme	Board N.	Comments and Design Responses
Maintenance of existing footpaths	Access around the viaduct	24 25	A number of photomontages of the viaduct are presented on these boards.
Maintaining vehicular and pedestrian access		11	Public access has been considered as part of the design proposals.
Pedestrian, cycle and vehicular access		11	The existing landscape context has been carefully considered with the design, where possible, restoring locally important environmental features. The design takes account of how people using local roads and footpaths will experience views of the viaduct.
Maintaining cycle routes and connections		11	Pedestrian, cyclist and vehicle access has been considered as a part of design, although there will not be additional access along the length of the viaduct as this is a working agricultural environment. Active travel has been considered in the development of the design.

River Blythe Viaduct

02 Understanding the local Context and Key Views

The landscape character and future views of the viaduct have been important factors in developing our design vision for the River Blythe Viaduct. This will ensure that the design compliments the character of the area and takes account of key locations where the viaduct will most visible to the public.

These viewpoints below were selected to assist in engagement and developing the design vision but may differ from those defined in the HS2 Phase One Environmental Statement



Viewpoint 1

- Taken from Meriden Road looking north-west
- Hedge line to the left to be retained
- The gap in the hedge in the far centre of the image shows the future viaduct location
- The viaduct will come across the view obliquely from the right.



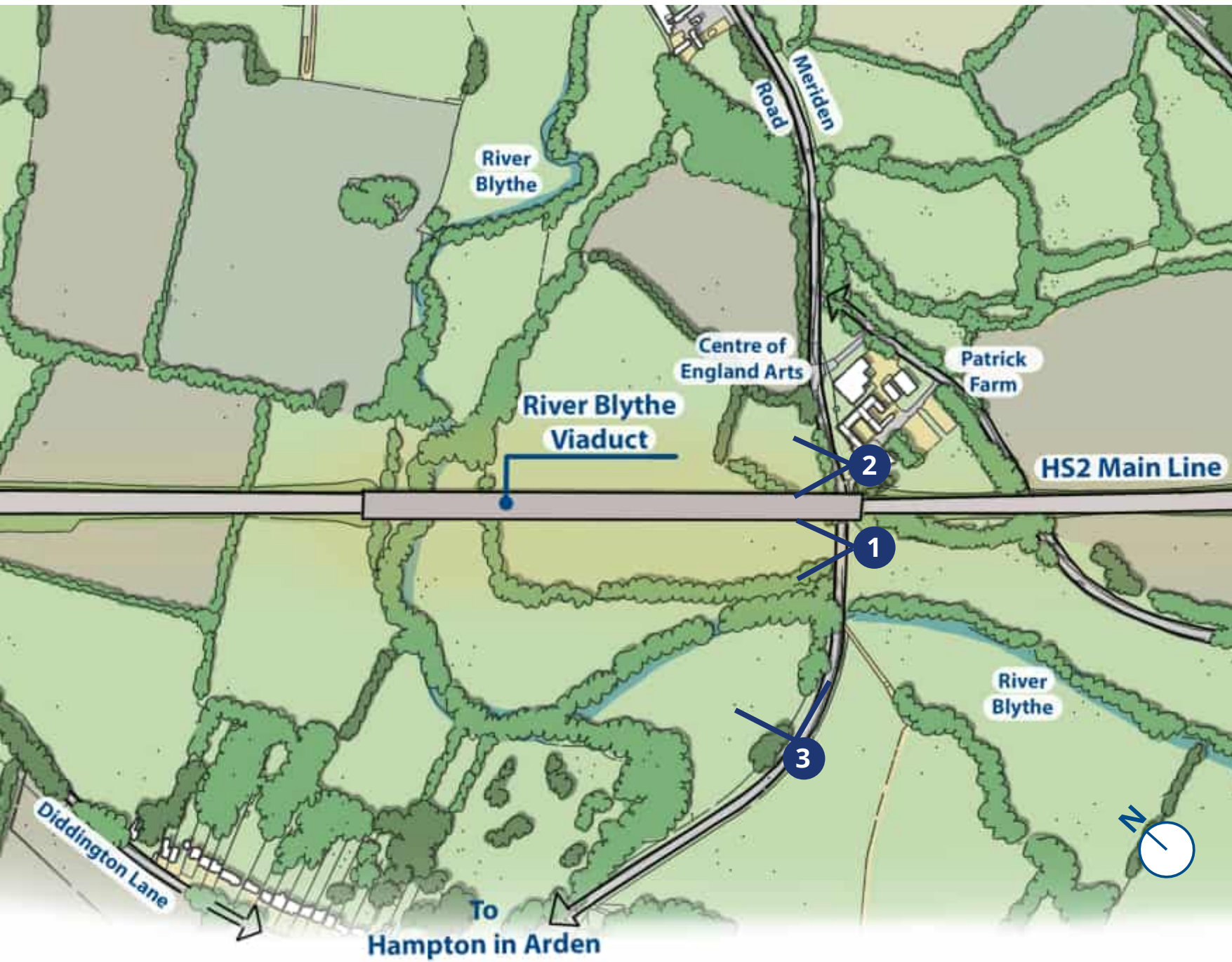
Viewpoint 2

- Taken from Meriden Road looking north-west from the junction with the Patrick Farm access
- The gap in the hedge in the far centre of the image shows the future viaduct location
- The viaduct will come across the view obliquely from the left.



Viewpoint 3

- Taken from the junction of footpath M118 and Meriden Road looking north towards the viaduct and Patrick Farm
- Some filtering provided by roadside vegetation and the retained hedgerow on the east side of the River Blythe at a low level
- The viaduct will be seen behind the roadside vegetation and retained hedgerow with the deck and parapets visible above the piers.



River Blythe Viaduct

03 Environmental baseline considerations

The River Blythe SSSI and Local Wildlife Sites

River Blythe Site of Special Scientific Interest (SSSI):

- A 39km stretch of the River Blythe is designated as a particularly fine example of a lowland river on clay.
- The River Blythe has a wide range of natural structural features such as riffles, pools, small cliffs and meanders.
- The diverse physical features of the River Blythe are mirrored by its diverse plant communities which shows a clear succession of plant communities along its course.
- The viaduct has been designed to ensure there are no works within the River Blythe itself, where the top of the banks form the boundary to the SSSI.

Local Wildlife Sites (LWS):

- **Mouldings Green Farm LWS** — designated for its species-rich marshy grassland and ponds
- **Patrick Farm LWS** — designated for its species-rich semi-improved and marshy grassland
- **Dole Meadow LWS** — designated for its moderately diverse semi-improved grassland



River Blythe as Site of Special Scientific Interest (SSSI)



Locations of the three Local Wildlife Sites

Notable species in the area

The following protected or notable species have been recorded in the vicinity of the proposed viaduct;

- **Great crested newts** — confirmed breeding pond more than 250m away from the viaduct but within context boundaries;
- **Otter** — present along the River Blythe;
- **Bats** — noted commuting along the River Blythe;
- **Badgers**
- **Wintering birds** — populations of wintering wigeon and snipe at Marsh Lane Nature Reserve and Patrick Farm Meadow Local Wildlife Site.

The space under the viaduct will allow safe passage for a range of species including dispersal routes for badgers, bats, birds, fish, great crested newts, otters and water voles.



Great crested newt
(*Triturus cristatus*)



Otter
(*Lutra lutra*)



Common snipe
(*Gallinago gallinago*)



Wigeon
(*Mareca penelope*)



Water vole
(*Arvicola amphibius*)



Badger
(*Meles meles*)

Flood risk and watercourse

- The viaduct is located in Flood Zones 2 and 3
- Hydraulic modelling was completed at Hybrid Bill stage and updated at outline design to identify the impact of proposed scheme on flood risk in the area.
- The baseline hydraulic model has been reviewed and signed off by the Environment Agency
- The hydraulic modelling confirmed that the scheme casuses minimal detriment to the flood risk in the area. An area of additional storage has been identified to compensate for the loss of floodplain storage due to viaduct piers and embankments.



Aerial view overlooking the floodplain area



River Blythe Viaduct

04 Local heritage in your area

The historic landscape: key characteristics

The historic landscape has been shaped and defined by the River Blythe and its feeder streams. The natural course of the river has dictated land use and development. The water courses have also been adapted to provide power for milling. There were mills and related ponds at Mercote Mill and Meriden Mill. The mills have subsequently been converted to other uses and the mill ponds drained and covered in woodland.

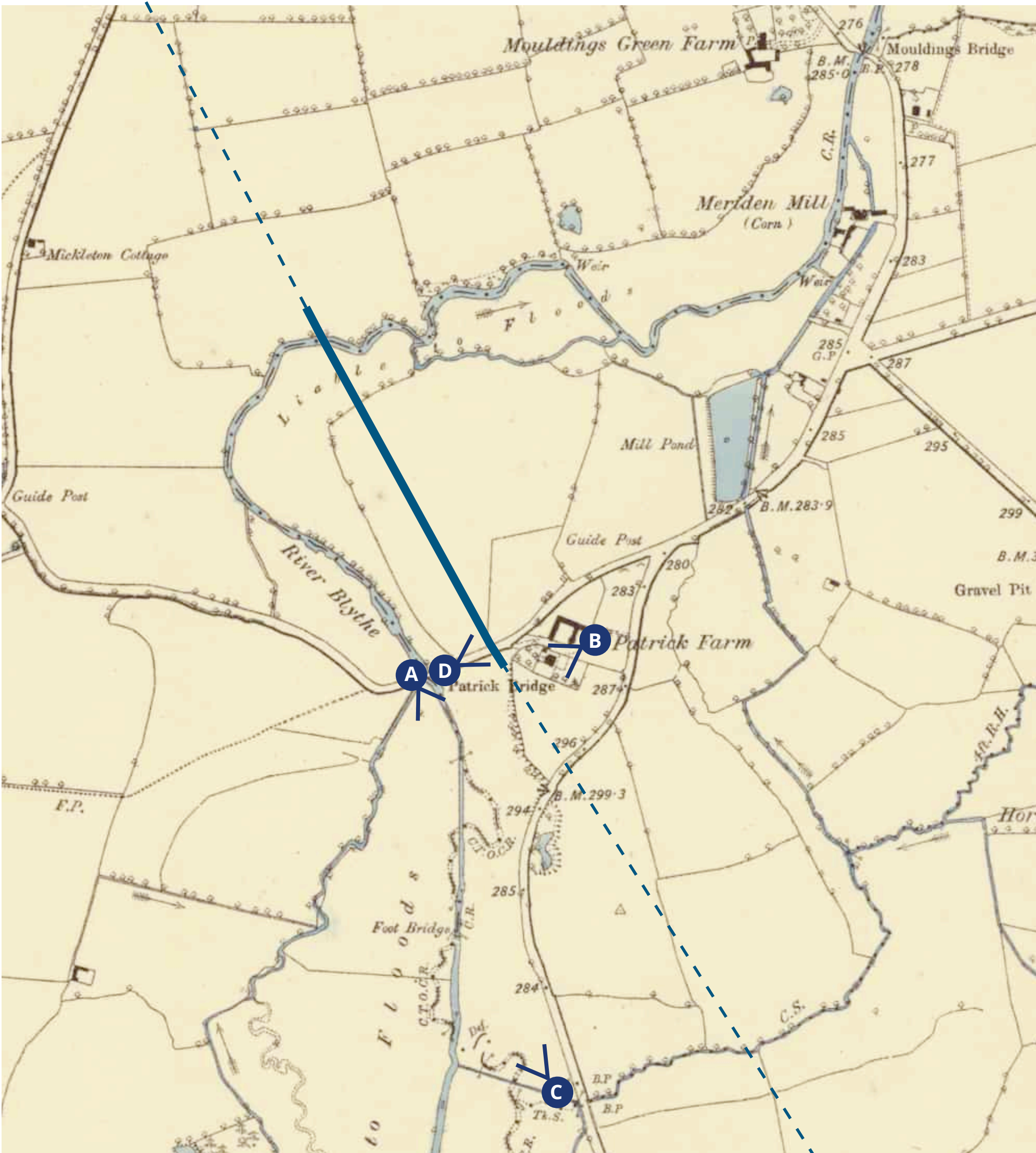
Historically the area was and remains part of the Packington Estate. However, over time the relationship with the wider estate, particularly Packington Hall, has been weakened through the construction of modern infrastructure and quarrying. This area of

the Packington Estate has historically been used for agriculture, with the pattern of the 18th century enclosure landscape still visible, particularly in areas liable to flooding. These areas have been used as pasture and retain hedgerows interspersed with mature trees. Cultivation has been restricted to higher ground where often historic hedgerows have been removed to create large modern fields.

Isolated farmsteads also contribute to the enclosure landscape character, most notably Patrick Farm and Hornbrook Farm. Patrick Farmhouse, a non-designated heritage asset, appears to be 18th century with 19th century alterations, however the current

building probably encases an earlier structure. Although visually striking from the Meriden Road with its double gable, the principal façade of the farmhouse appears to be facing towards Marsh Lane. There is a strong visual relationship between the house and associated 19th century ‘model farm’, however both have now fallen out of agricultural use.

The location of the farm buildings on the edge of a bluff, most probably for practical reasons to avoid flooding, makes them visually prominent in the landscape, particularly looking from the north or from Patrick Bridge (non-designated heritage asset) along Meriden Road.



Historic Map 1866

Key

Approximate HS2 Line

River Blythe Viaduct

River Blythe



View A - from Patrick Bridge looking south-east



View B - towards Patrick Farm



View C - from Marsh Lane looking north-west towards Patrick Bridge



View D - from Patrick Bridge looking towards Patrick Farm

River Blythe Viaduct

05 Design vision

A low-level viaduct skimming across the landscape

- Creating a low-lying viaduct that skims the flat landscape, preserving the broad horizons
- Maintaining the separation between the underside of the deck and ground, whilst emphasising the horizontality of the viaduct
- The viaduct will emerge from tree canopies at either end as it crosses the floodplain



River Blythe Viaduct

06 our proposal

Our design principles

Our design approach for this project is focused on the three main principles of the HS2 Design Vision: People, Place and Time. In addition, three landscape design approaches, Conserve, Enhance and Restore, have been applied to the proposals based on the local landscape character.

Our Design Principles

People
Design for everyone to benefit and enjoy

- Design for the needs of our diverse audiences
- Engage with communities over the life of a project
- Inspire excellence through creative talent

Place
Design for a sense of place

- Design places and spaces that support quality of life
- Adapt to the local context whilst maintaining the national strategy

Time
Design to stand the test of time

- Design to adapt for future generations
- Place a premium on the personal time of the customers
- Make the most of the time to design

Our Landscape Approaches

Conserve

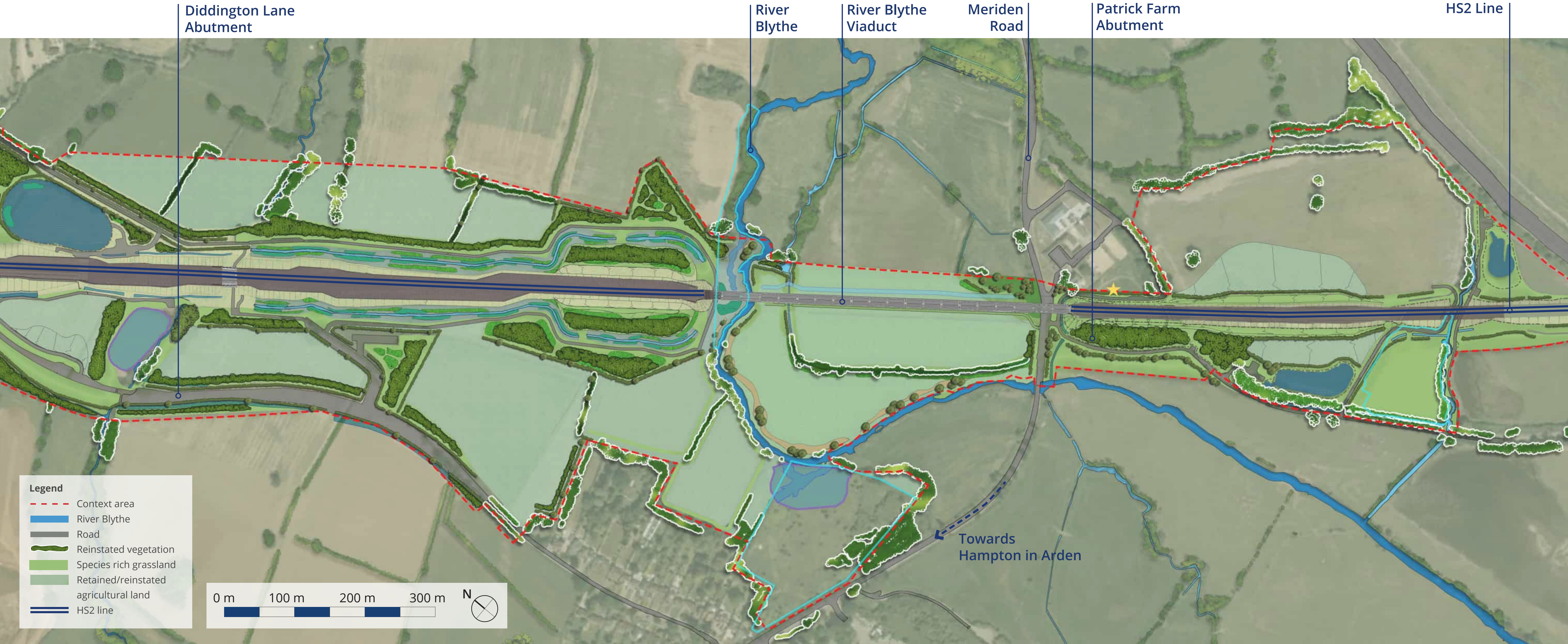
The land around the viaduct location is, and will continue to be, primarily agricultural with the design conserving the open character of the flat grazing meadows and arable land to either side of the meandering river with its riparian trees. The natural form of the river channel where the viaduct passes over will be retained.

Enhance

The design provides planting up the slopes of the abutments and approach embankments to help blend these features into their rural surroundings. The ponds and attenuation swales will mimic natural forms inspired by the meandering course of the River Blythe. Areas of species-rich grassland will provide additional ecological and landscape value close to the river.

Restore

The design aims to achieve better connectivity between existing areas of species-rich meadow as well as restoring and creating new lengths of hedgerow, whilst also allowing broad open views across the floodplain, including under the structure, to retain the visual continuity of countryside on both sides of the route.



River Blythe Viaduct - landscape and habitat masterplan

River Blythe Viaduct

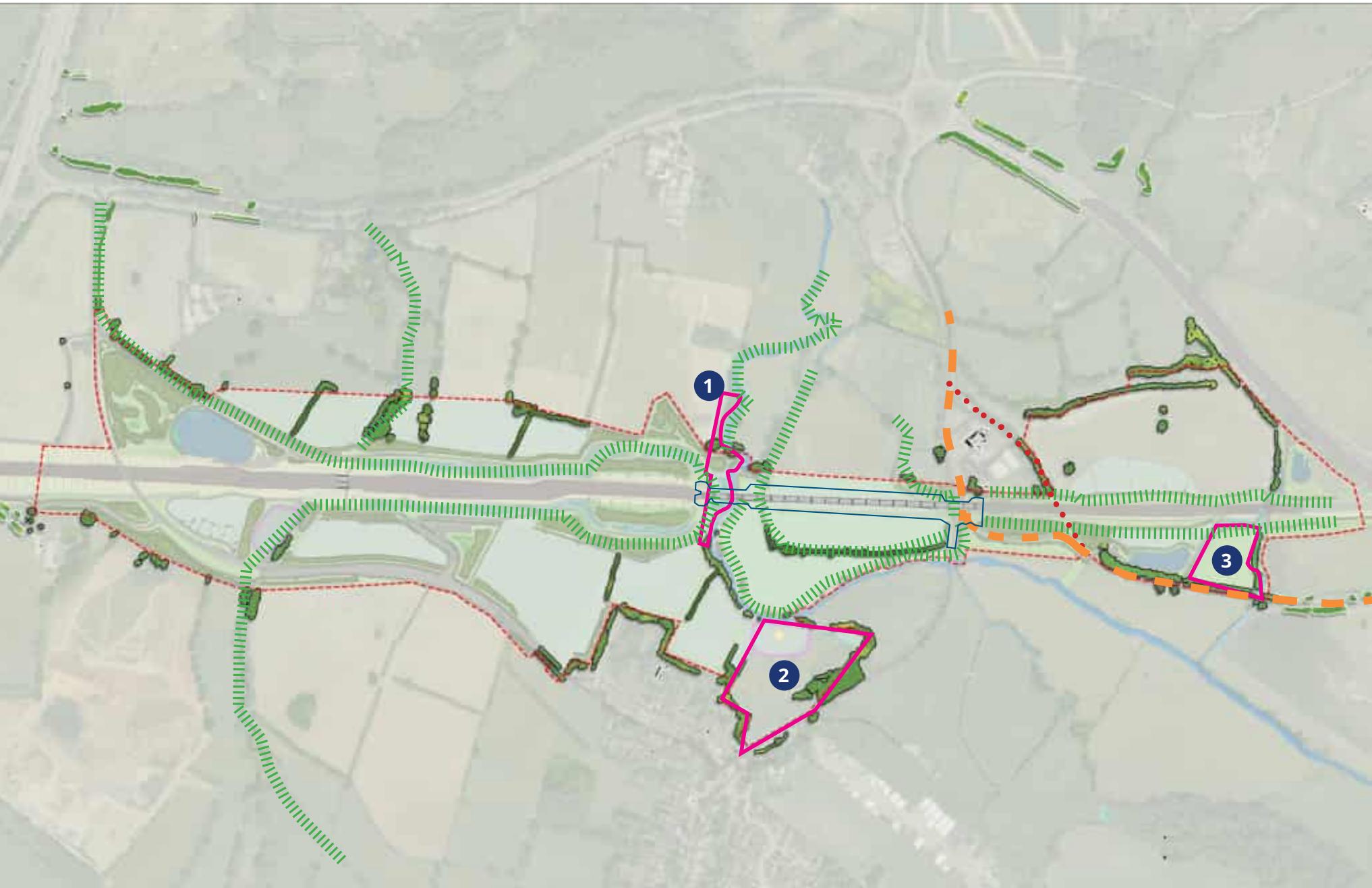
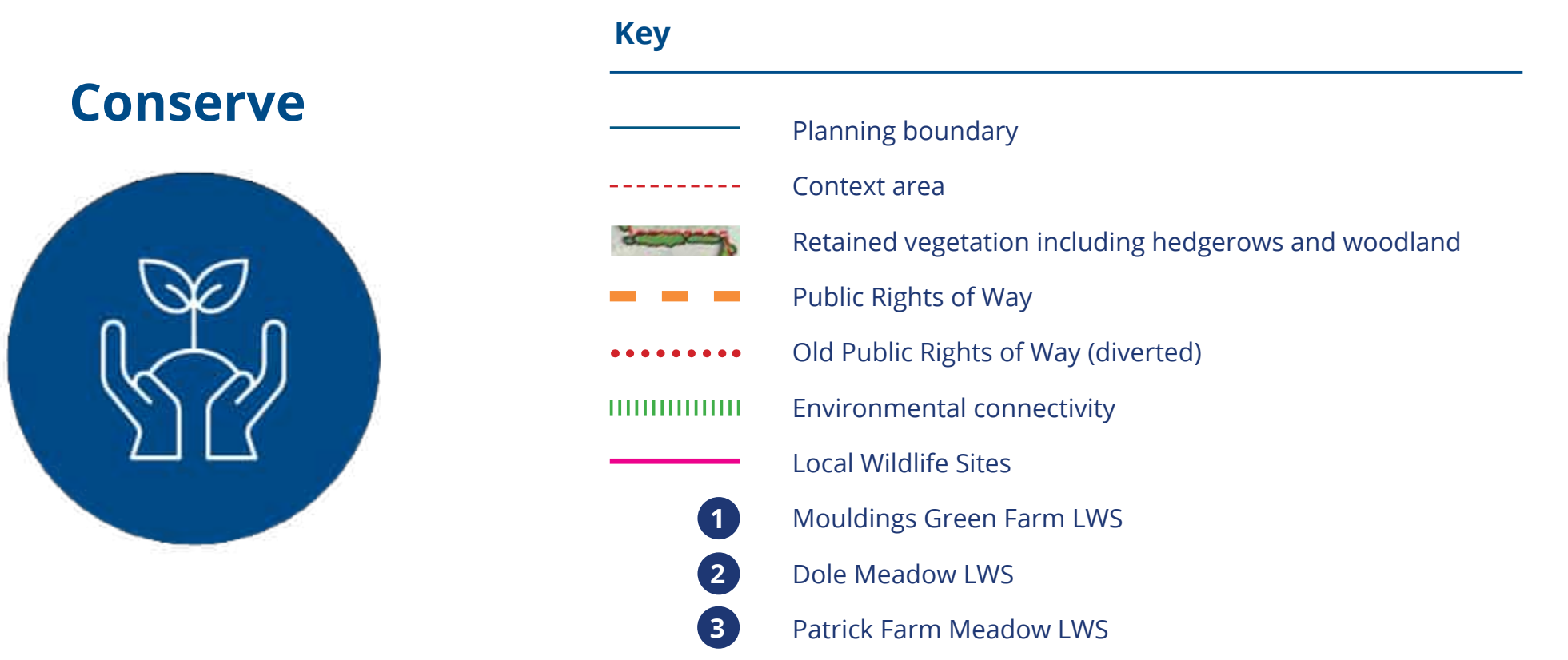
07 Conservation - what we are retaining

You said that preserving the rural character of the area is important

Our design principles

The land around the viaduct is, and will continue to be, primarily agricultural. The design for the River Blythe viaduct will conserve the open character of the flat grazing meadows and arable land to either side of the meandering river with its river side trees. The natural form of the river channel, where the viaduct passes over, will be retained.

The project aims to retain more trees and other vegetation than envisaged at the time of preparing the Environmental Statement. The project will, where possible, retain vegetation and soils at the three designated local wildlife sites (LWS) of Mouldings Green Farm LWS, Patrick Farm Meadow LWS and Dole Meadow LWS.



1 Mouldings Green Farm LWS



- The site is designated for its species-rich marshy grassland and ponds
- Approximately 33% of the LWS falls outside of the construction boundary and will be conserved
- Best practice methods will minimise construction impact to the rest of the site during the build
- The design aims to minimise the permanent footprint within the LWS boundary allowing habitat to be restored
- Scrapes and swales are designed to keep the area wet to support specific plant communities
- Wet woodland will be planted to integrate the site with the surrounding land
- Marshy grassland will be created to compensate for its loss during construction

2 Dole Meadow LWS



- The site is designated for its moderately diverse semi-improved grassland and acts as a stepping stone to other semi-improved grasslands in the area, notably Mouldings Green Farm, 250m downstream
- The area was designated post production of the Environmental Statement
- An assessment of the site condition is proposed to determine the most suitable mitigation options
- There is a potential to implement a management regime as described in the LWS citation (see below). This will benefit the area of site that is being conserved
- LWS citation extract:

Fragility	Potential value	Recommendations:
The meadow has suffered much from neglect and is very vulnerable to scrub and bramble invasion	There is a very realistic opportunity to enhance the biodiversity of the meadow by reintroducing management, either by light grazing or mowing for hay	The meadow desperately needs some form of management, either grazing or mowing, if its biodiversity is to be maintained

3 Patrick Farm Meadow LWS



- The site is designated for its species-rich semi-improved and marshy grassland. It is anticipated that the project will have less impact on the site than originally described in the Environmental Statement meaning a greater area will be conserved. Mitigation for the impacts to this site have already been implemented. This includes:
- Translocation of existing marshy grassland and hedgerow from the LWS to an adjacent area
 - Creation of supplementary marshy grassland and hedgerow
 - Installation of bat boxes, bird boxes, hibernacula and compost heaps

River Blythe Viaduct

08 Enhancement

You asked what we are doing about water and flooding risk

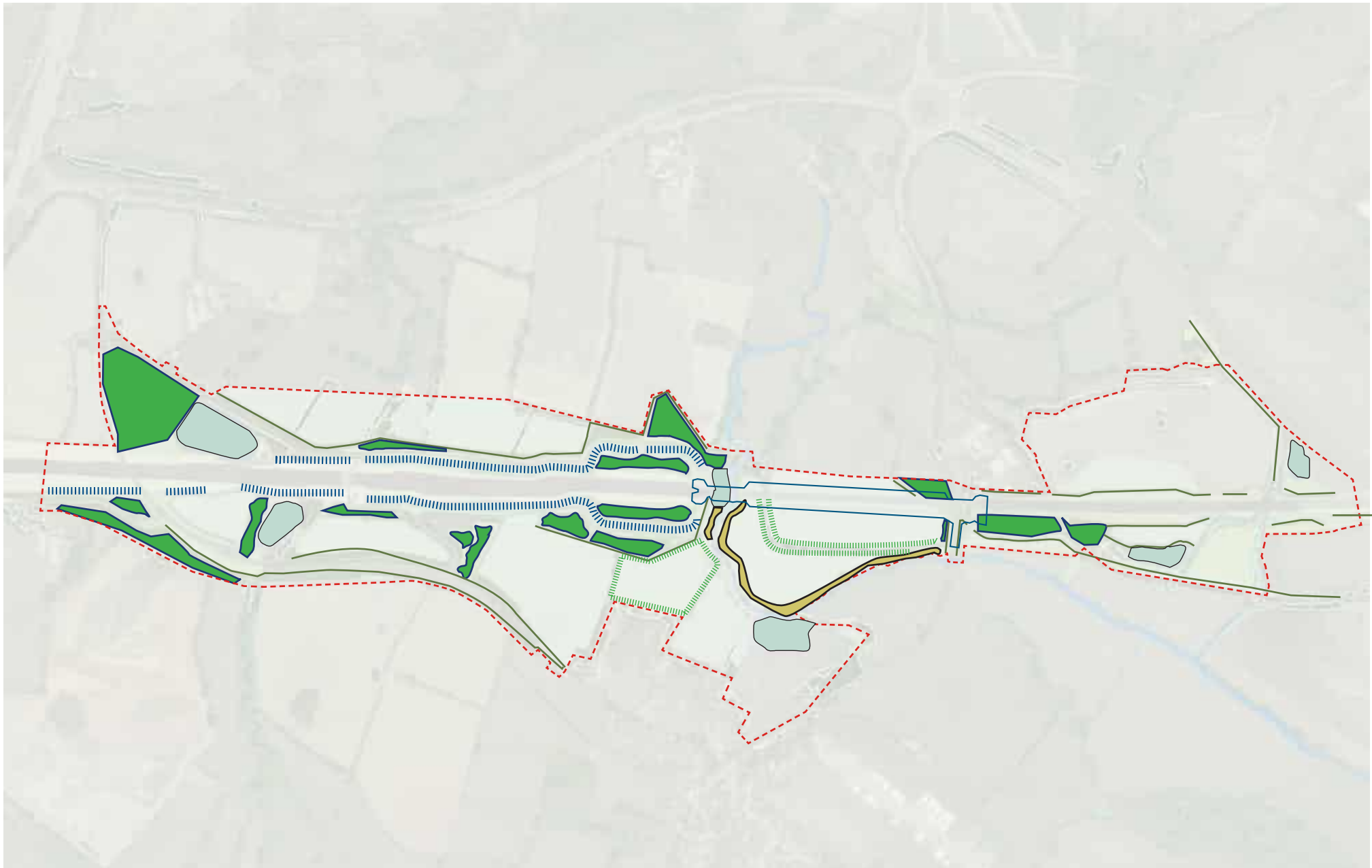
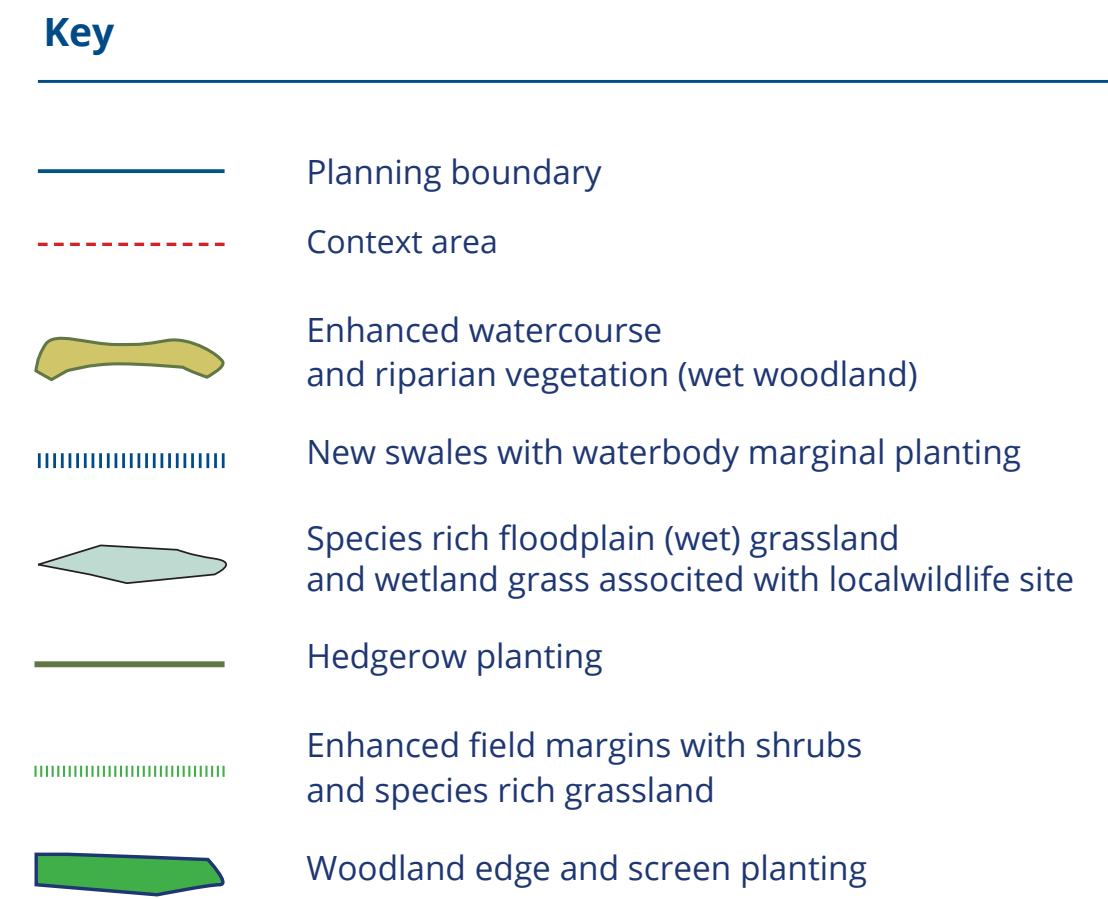
Our design principles

The River Blythe, as an SSSI, is the key feature in this landscape. In 2017 the River Blythe Restoration Plan report was produced seeking to put in place a restoration plan for the river. We have used the principles set out in this report for the ‘Meriden reach’ to deliver a holistic system based approach to water and landscape enhancement.

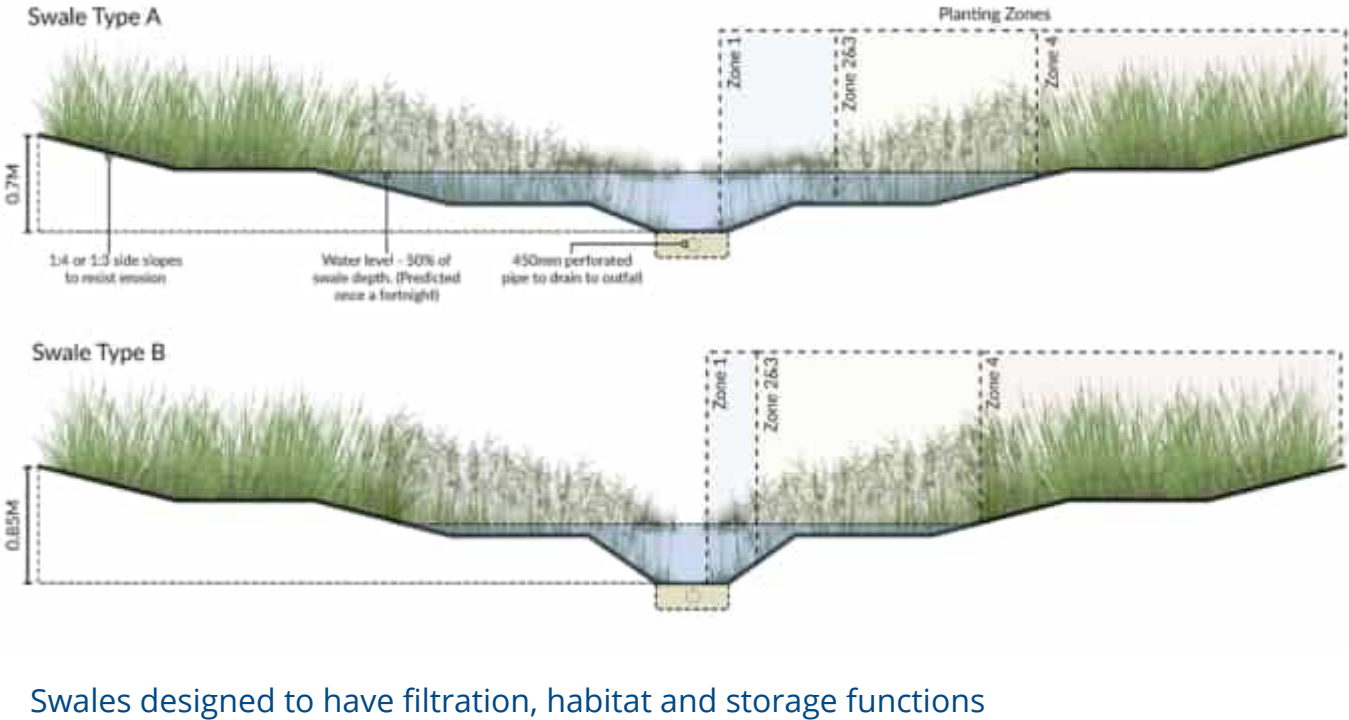
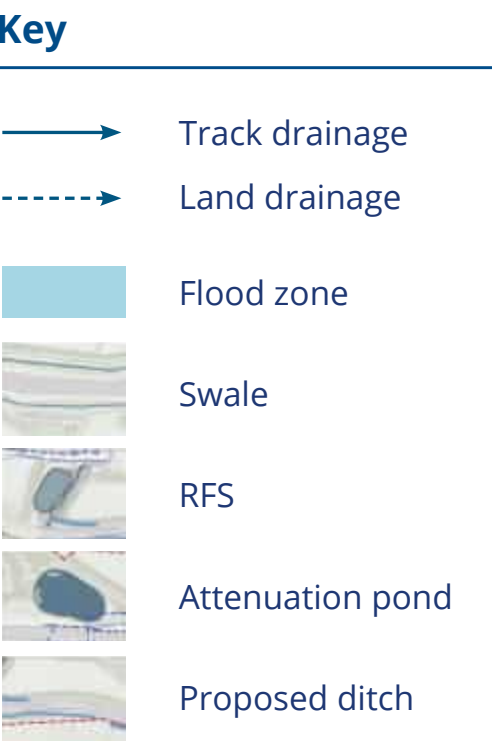
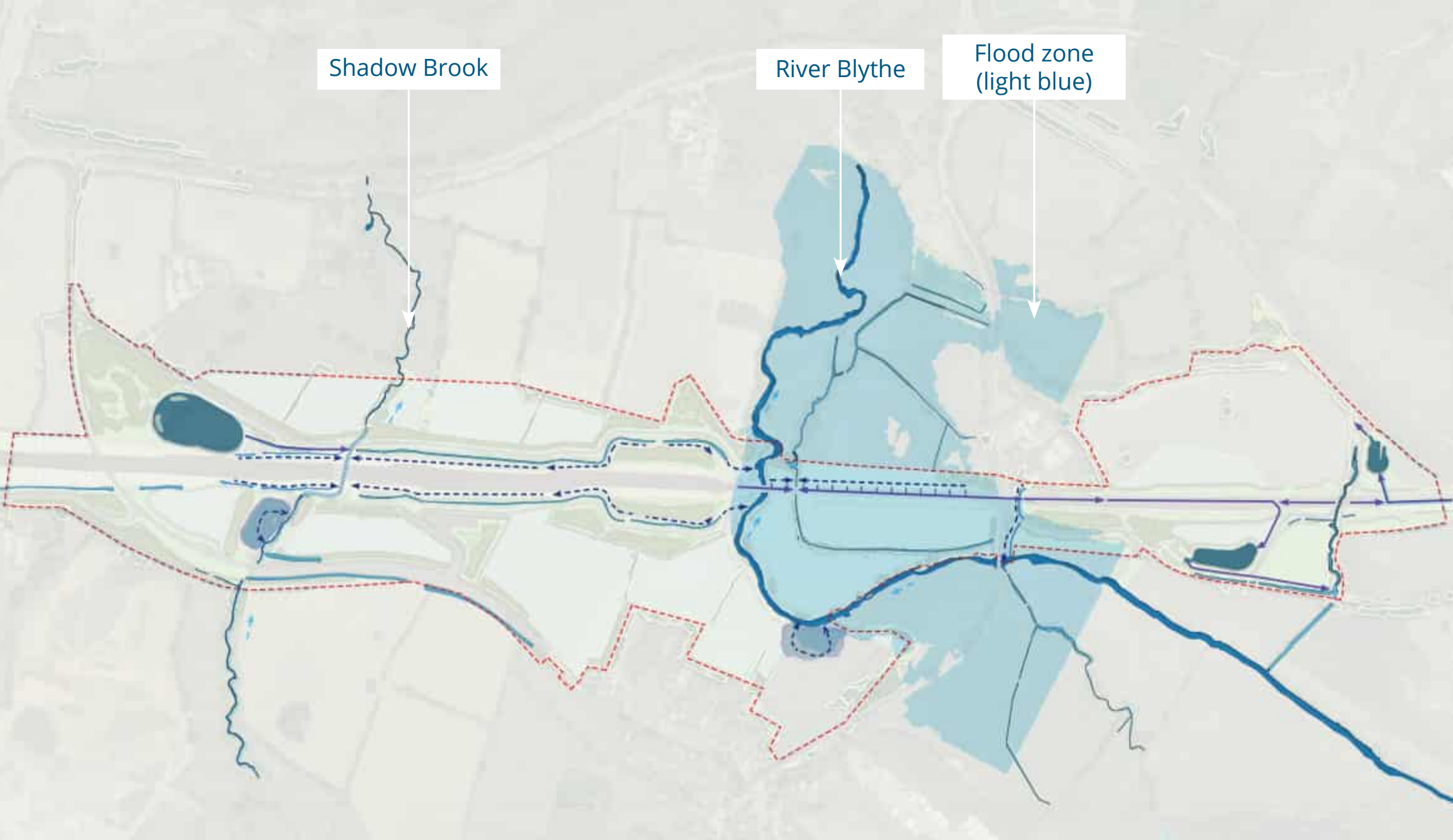
Below we set out the key strengths and weaknesses identified in this reach and highlight the recommendation for enhancement contained in the report.

Using this as our guide we have worked hard to create a system based approach to water management in the context area. This has led to the creation of a number of different wetland features, including balancing pond, replacement flood storage (RFS) areas, swales, scrapes and paleo-channels which form the basis of our design.

We have then applied the principles of ‘enhance’ and ‘restore’ to these new habitats to strengthen the planting design which will integrate the viaduct into the landscape.



Blue infrastructure and flood zone



Swales designed to have filtration, habitat and storage functions

Paleo-channel, Mouldings Green Farm LWS and RFS



Aerial imagery shows remnants of previous river alignments within the floodplain. Shallow channels (200-400mm) within the replacement flood storage area and the shaping of the swale in Mouldings Green LWS site will continue this narrative.

River Blythe Viaduct

09 Restoration

You said that tree planting and the environment are important to local people

Our design principles

Building on the blue infrastructure which we have created through a detailed understanding of water management in this landscape we have overlaid a number of different planting types to integrate the viaduct into the landscape. These planting type provide a number of different functions including:

- Enhanced habitat and biodiversity connectivity on each side of the viaduct.
- Limiting ‘poaching’ alongside the River Blythe by cattle.
- Enhancing the historical character of the landscape.
- Creating wooded embankments at either end of the viaduct so that trains will emerge onto the viaduct from a woodland canopy.
- Providing mitigation screening from certain viewpoints.

New lengths of hedge will be planted and existing ones reinforced by ‘gapping up’, including along Diddington Lane, around ponds and adjacent to Patrick Farm.

Heritage integration

The heritage integration plan for Patrick Farm aims to preserve the site’s natural beauty and rich history through several key components. These include;

- Conserving the natural and managed water character, retaining the ability to understand historic water management
- Conserving historic pasture in the flood plain and river valley
- Restoring orchard planting to reflect probable historic orchard associated with Patrick Farm - Typically this type of small orchard would have been for family use and consisted of species such as walnut, cherry, hazel, apple and damson.
- Enhancing views of Patrick Bridge by using planting designed to create and frame views from the diverted Marsh Lane



Walnut and apple

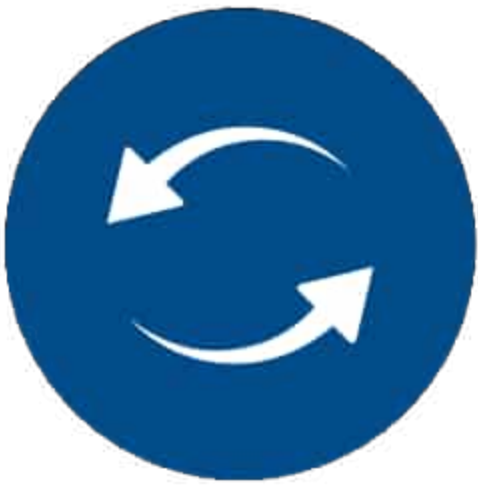


Damson and hazel



Cherry

Restore



Key

- Planning boundary
- Habitat linkage
- Views across landscape
- Heritage orchard



Species - Botanical name	Species - Common name
<i>Alnus glutinosa</i>	Common Alder
<i>Frangula alnus</i>	Alder buckthorn
<i>Ilex aquifolium</i>	Holly
<i>Prunus spinosa</i>	Blackthorn
<i>Rhamnus cathartica</i>	Purging buckthorn
<i>Salix caprea</i>	Goat willow
<i>Salix cinerea</i>	Grey sallow
<i>Salix fragilis</i>	Crack willow
<i>Salix purpurea</i>	Purple willow
<i>Salix triandra</i>	Almond willow
<i>Salix viminalis</i>	Osier
<i>Sambucus nigra</i>	Elder
<i>Viburnum opulus</i>	Guelder rose

Wet woodland planting In damper areas of the site along the banks of the river a different version of the mixed native woodland mix will be used. This will reinforce and conserve the local pattern of riparian vegetation, provide riverside habitat and help to protect the banks from erosion by livestock.



Species - Botanical name	Species - Common name
<i>Acer campestre</i> (main hedge planting and intermittent tree)	Field maple
<i>Cornus sanguinea</i>	Dogwood
<i>Corylus avellana</i>	Hazel
<i>Crataegus laevigata</i>	Midland hawthorn
<i>Crataegus monogyna</i>	Hawthorn
<i>Ilex aquifolium</i>	Holly
<i>Ligustrum vulgare</i>	Wild privet
<i>Populus nigra</i> (intermittent tree)	Black poplar
<i>Prunus spinosa</i>	Blackthorn
<i>Quercus robur</i> (intermittent tree)	Pedunculate oak
<i>Viburnum opulus</i>	Guelder rose

Hedgerow planting This type of planting will reinstate gaps or reinforce those hedgerows with currently poor connectivity. In accordance with the local Arden character the hedgerow planting will incorporate intermittent standard trees, mainly of pedunculate (English) oak and field maple. The proposed typical mix is based on species found in the local hedge network.



Species - Botanical name	Species - Common name
<i>Corylus avellana</i>	Hazel
<i>Crataegus monogyna</i>	Hawthorn
<i>Frangula alnus</i>	Alder buckthorn
<i>Ilex aquifolium</i>	Holly
<i>Malus sylvestris</i>	Crab apple
<i>Prunus spinosa</i>	Blackthorn
<i>Rhamnus cathartica</i>	Purging buckthorn
<i>Salix caprea</i>	Goat willow
<i>Salix fragilis</i>	Crack willow
<i>Salix viminalis</i>	Osier
<i>Sambucus nigra</i>	Elder
<i>Viburnum opulus</i>	Guelder rose

Woodland edge and screen planting Planting along the embankments at Patrick Farm to the south of the viaduct and Diddington Lane at the north will help to integrate these earthworks with the locally characteristic pockets of woodland nearby. The inclusion of shrubs, including the evergreen holly, will help to provide a gradation of planting heights and foliage cover through the year and assist with visual screening.

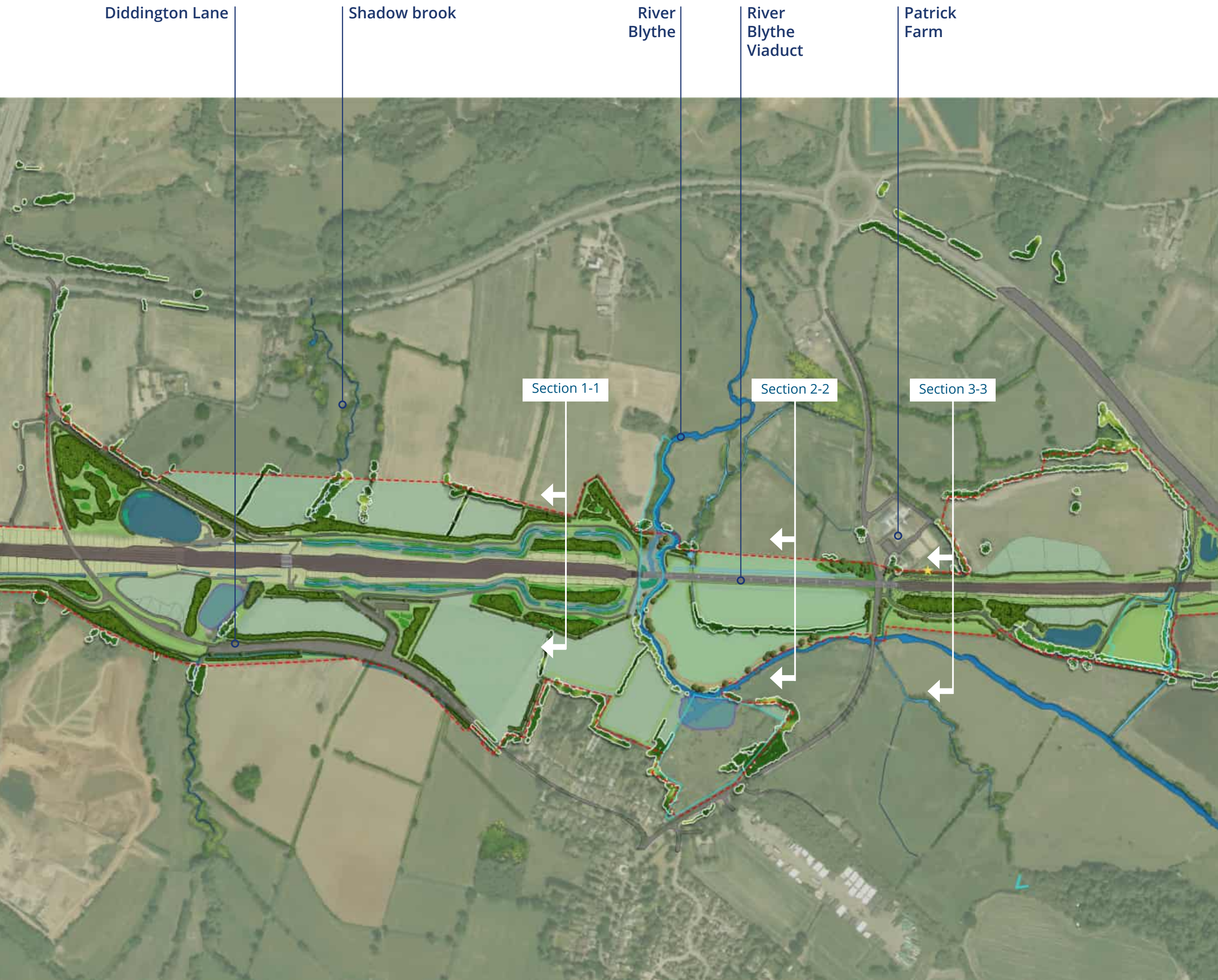


Species - Botanical name	Species - Common name
<i>Alnus glutinosa</i>	Common alder
<i>Betula pubescens</i>	Downy birch
<i>Ilex aquifolium</i>	Holly
<i>Quercus robur</i>	Pedunculate oak
<i>Salix alba</i>	White willow
<i>Salix caprea</i>	Goat willow
<i>Salix fragilis</i>	Crack willow

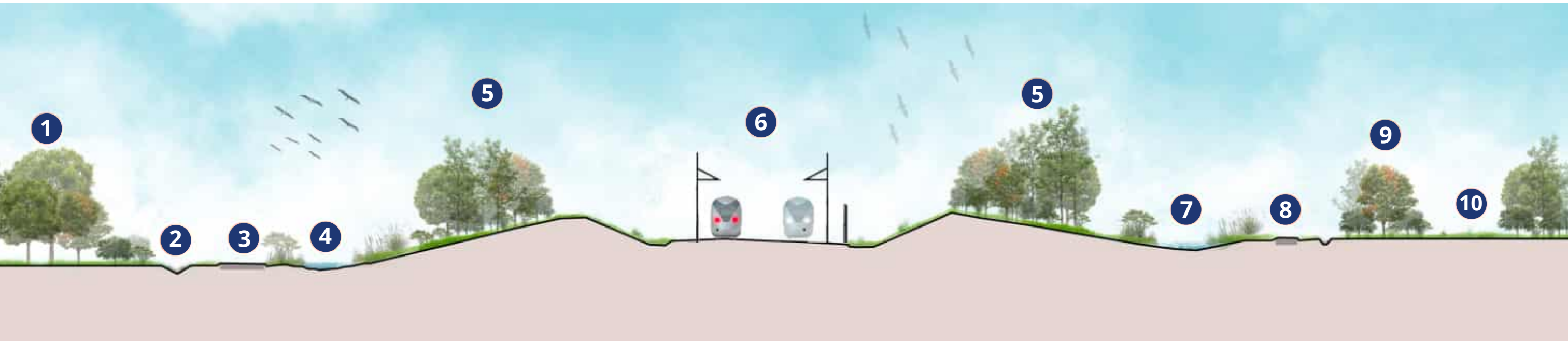
Mixed native woodland planting This type of planting compensates for the loss of woodland habitat due to HS2 and will maximise the use of native species that are characteristic and appropriate to the area; and provide some visual screening of the railway and passing trains.

River Blythe Viaduct

10 Landscape masterplan



Key	
	Area within HS2's influence
	Retained vegetation
	Species rich grassland
	Low maintenance grassland
	Retained/reinstated agricultural land
	Woodland edge and screen planting
	Wet woodland
	Native woodland
	Hedgerow
	Waterbody marginals (swales)
	Individual trees
	Location of potential boundary wall
	Location of paleo channels
	Replacement Flood Storage area (RFS) planting with wet grassland
	Balancing (attenuation) pond planted with wet grassland
	Maintenance access



Section 1-1



Section 2-2



Section 3-3

Key — Section 1-1	Key — Section 2-2	Key — Section 3-3
Mixed native woodland planting	Existing pasture	River Blythe
Drainage ditch	Wet woodland planting	Existing pasture
Maintenance access track	River Blythe	Native hedgerow with trees
Swale	Species rich grassland	Farm access route
Mixed native woodland planting	Mixed native woodland planting	Mixed native woodland planting
HS2 track	Return to agriculture	Noise barrier
Swale	Maintenance access strip	HS2 track
Maintenance access track	Return to agriculture	
Mixed native woodland planting	Species rich grassland	
Species-rich grassland		

River Blythe Viaduct

11 Access around the viaduct

You asked if we can improve access

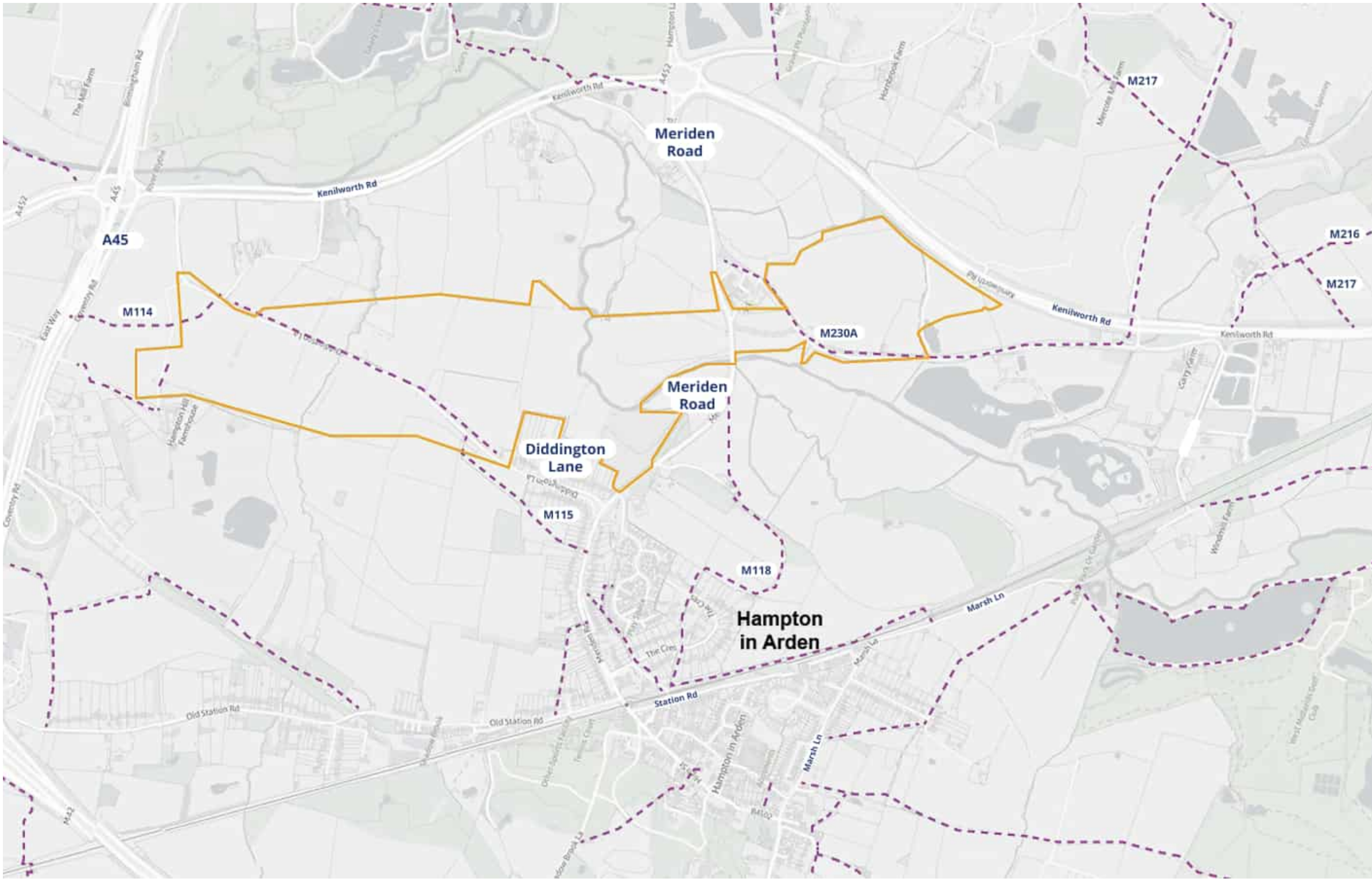
Access

Apart from along Meriden Road, there are currently no public rights of access to the land to be crossed by the viaduct. Along the former Marsh Lane is a public right of way (PRoW) bridleway which links to Meriden Road near Patrick Farm. A further PRoW links to Hampton-in-Arden, joining Meriden Road just west of Patrick Bridge. Most of the land here is farmed which involves access and circulation of agricultural vehicles and as a working landscape is

not suited to increased public access. Given the current network of public rights of way, public access on foot close to the structure will be limited to where the footway along Meriden Road will pass under the southern end of the viaduct and the adjoining rerouted PRoW bridleway (along the landowner access track linking to Marsh Lane).

The footpath that follows the old alignment of Diddington Lane will be maintained, with a short 'Z' shaped diversion under the line of HS2. Additionally, the new alignment of Diddington Lane will include a footpath linking Hampton-in-Arden to the north. HS2 are currently working with the Department for Transport

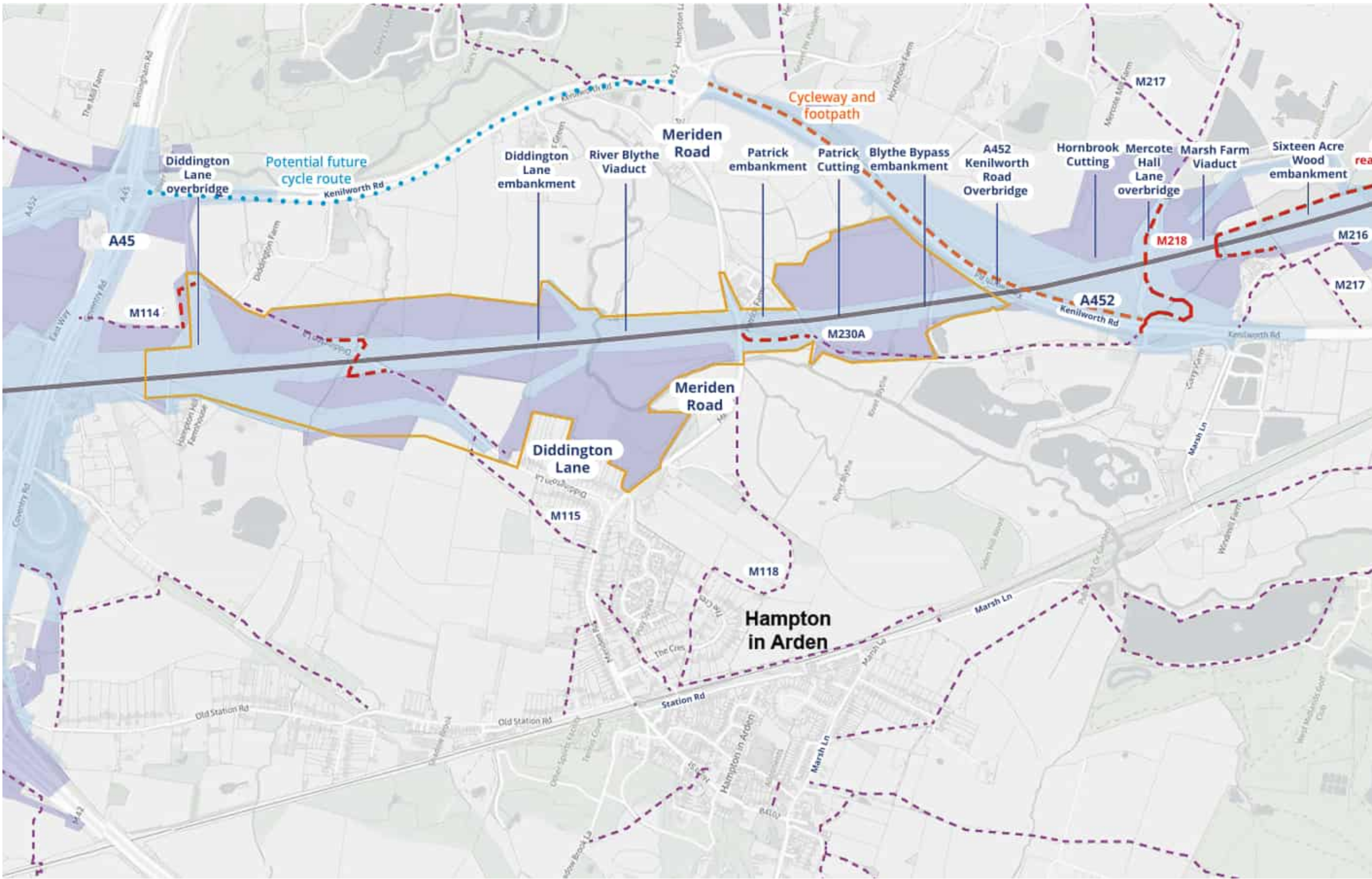
on a wider Active Travel study. This has the potential to develop a long distance cycle route which broadly aligns with the HS2 scheme. In this area the current proposals are for an offline cycle route following the A452 to the west of the River Blythe viaduct.



Before HS2

- Key
- Context area

Existing public right of way



After HS2

- Key
- Context area

Existing public right of way

Proposed public right of way

Potential cycleway and footpath

Potential future cycle route

Limits of Deviation

Limit of Land to be Acquired or Used

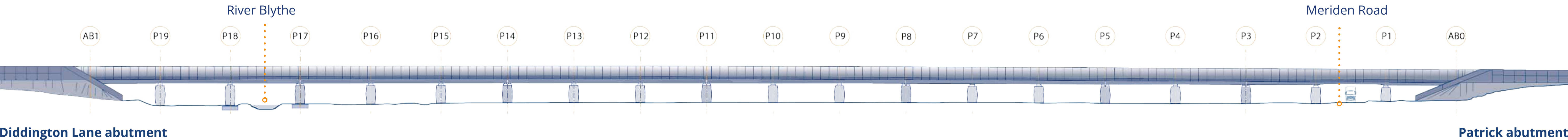
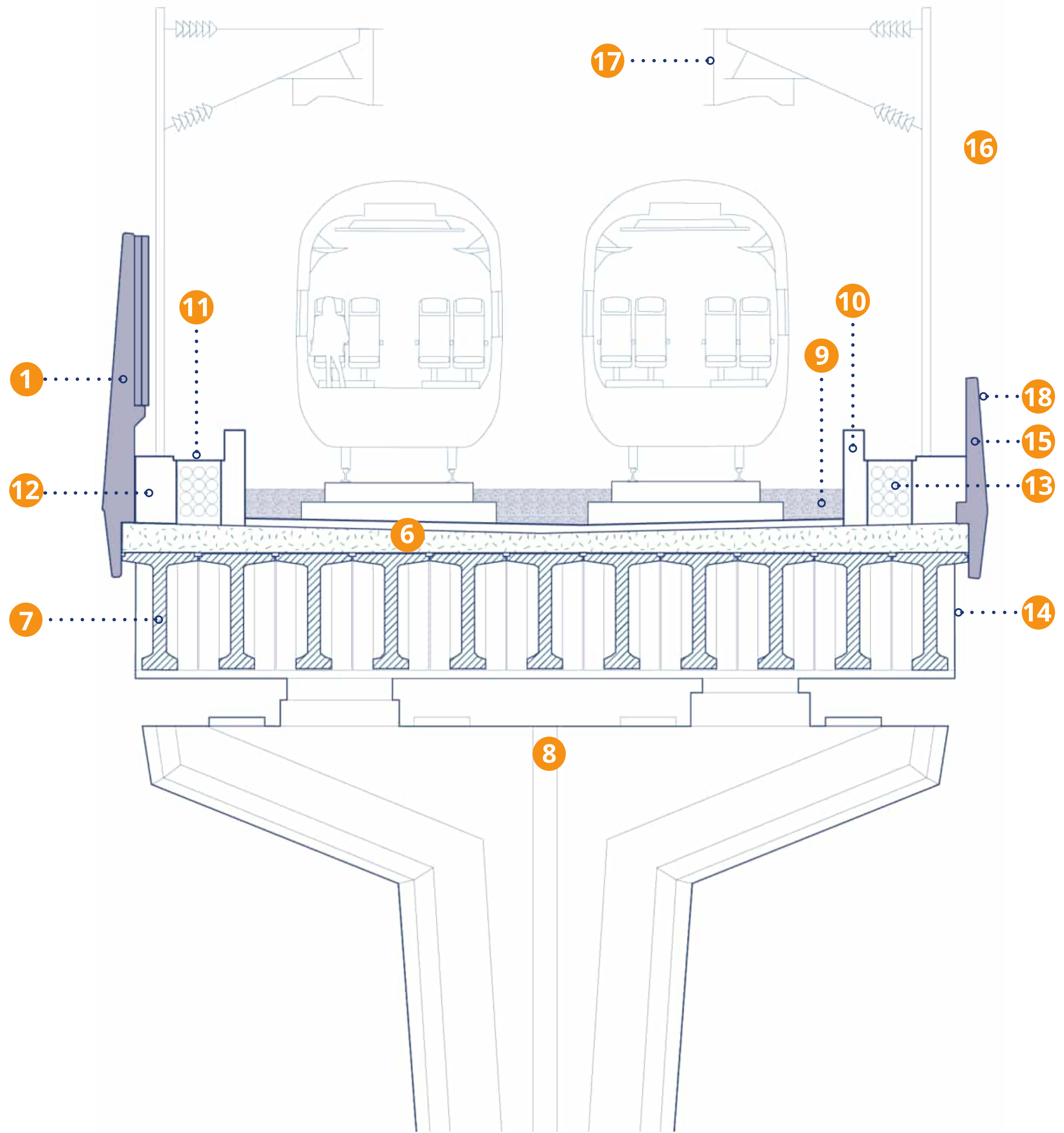
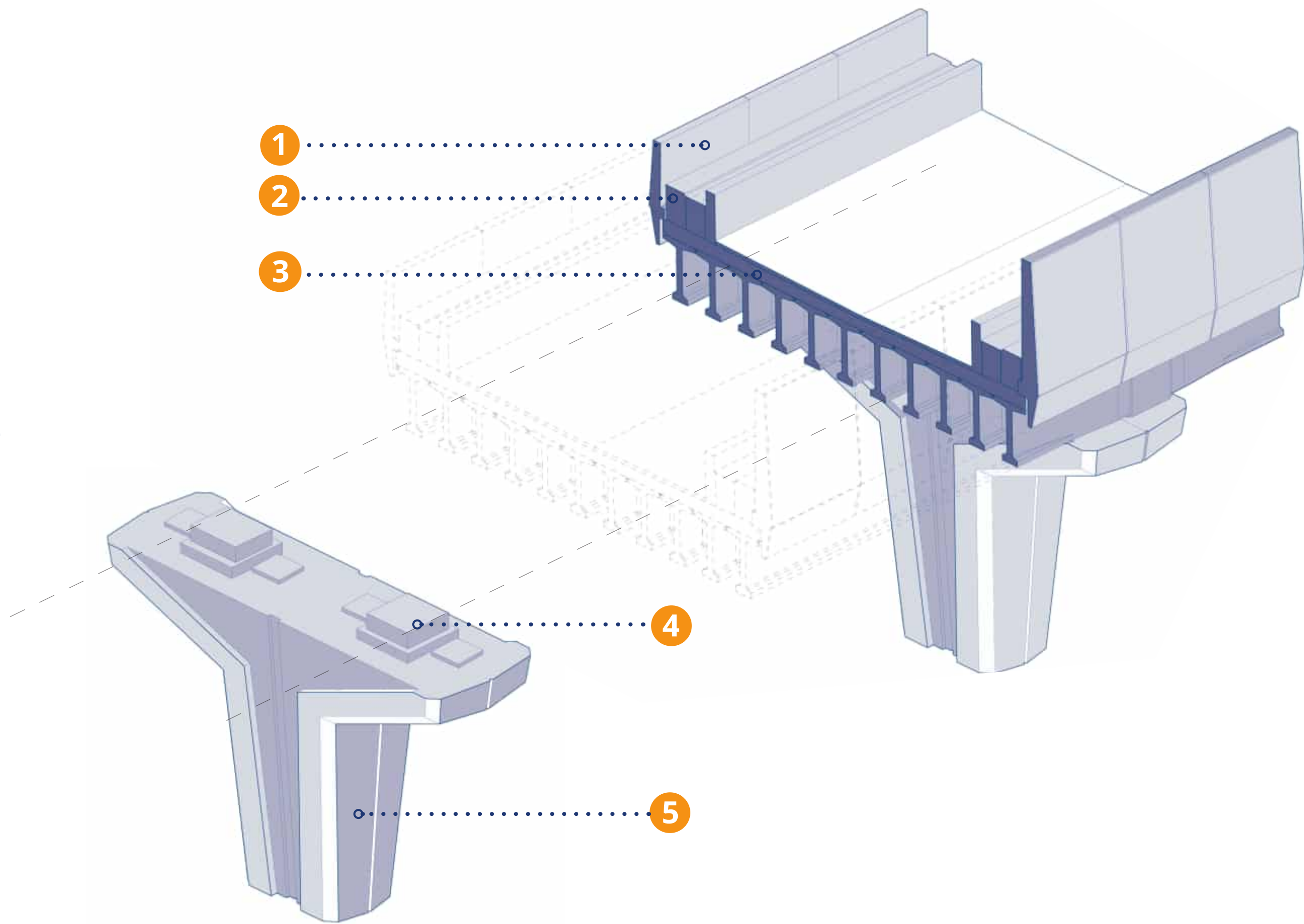
River Blythe Viaduct

12 viaduct elements

Design ethos and elements of the viaduct

The component parts including deck, piers and abutments are explained in detail as are the dual function parapets which also perform an acoustic role.

- 1 Acoustic parapet
- 2 Maintenance walkway
- 3 Viaduct deck
- 4 Structural bearings
- 5 Pier
- 6 Concrete deck
- 7 Concrete beams
- 8 Viaduct drainage (concealed within the deck void)
- 9 Ballast infill
- 10 Robust kerb with absorptive inner face
- 11 Maintenance access walkway
- 12 In-situ stitch
- 13 Cable trough (600mm W x 750mm H)
- 14 Diaphragm
- 15 Precast concrete parapet
- 16 Galvanised steel Overhead Catenary System (OCS) mast
- 17 OCS
- 18 Highly polished concrete

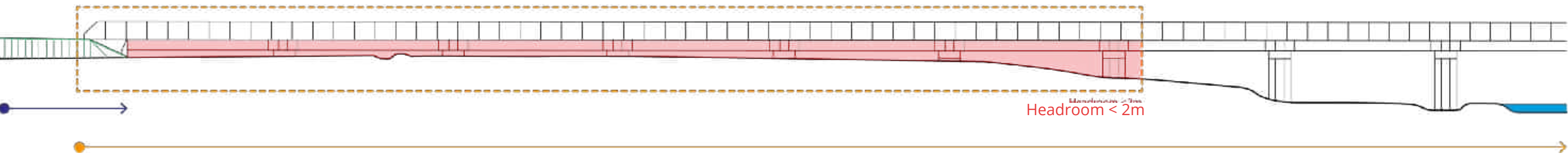


River Blythe Viaduct

13 Reducing our carbon footprint - comparison to the 2018 scheme

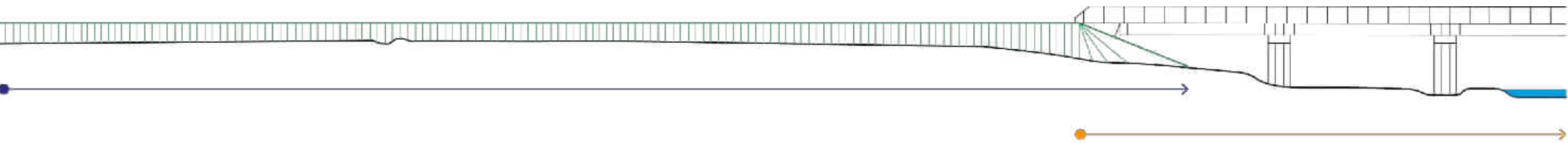
You asked how we are reducing the physical mass of the structure

The previous option was further refined to the current proposed design through the shortening of the viaduct and removal of 6 piers reducing the total length of the viaduct by 150m. By shortening the viaduct and reducing the amount of concrete used, savings equivalent to 798 tonnes of CO₂ emission are achieved. The viaduct development is a good example of how sustainability is a key consideration in design decisions which create a better outcome to better protect the natural environment whilst also improving the ability to manage land for landowners.



2018 Scheme

- Significant length of viaduct with very low headroom on built-up embankment
- 650m total length
- 26 x 25m pier spacing



Proposed design

- Earthworks and embankment extended to edge of the flood plain
- 500m total length
- 6 piers removed, leaving 20 x 25m pier spacing
- 5.7m head high clearance maintained over Meriden Road

Options	tCO ₂ e per option	tCO ₂ e per m of viaduct
2018 Scheme - 650m viaduct	6496.92	10.15
Current Scheme - 500m viaduct plus 150m of Diddington Lane embankment	5699.3	8.91
Difference	797.62	1.24

Shortening the viaduct is a good example of how sustainability and design decisions working in tandem to create a better outcome in terms of:

- Minimising resources
- Reduced carbon
- Better protection of the natural environment
- Enhanced ability to manage land for landowners

HS2 Sustainability Policy themes



View towards Diddington Lane abutment with the River Blythe in the foreground and Mouldings Green Farm LWS in the background (Vegetation at Year 10)

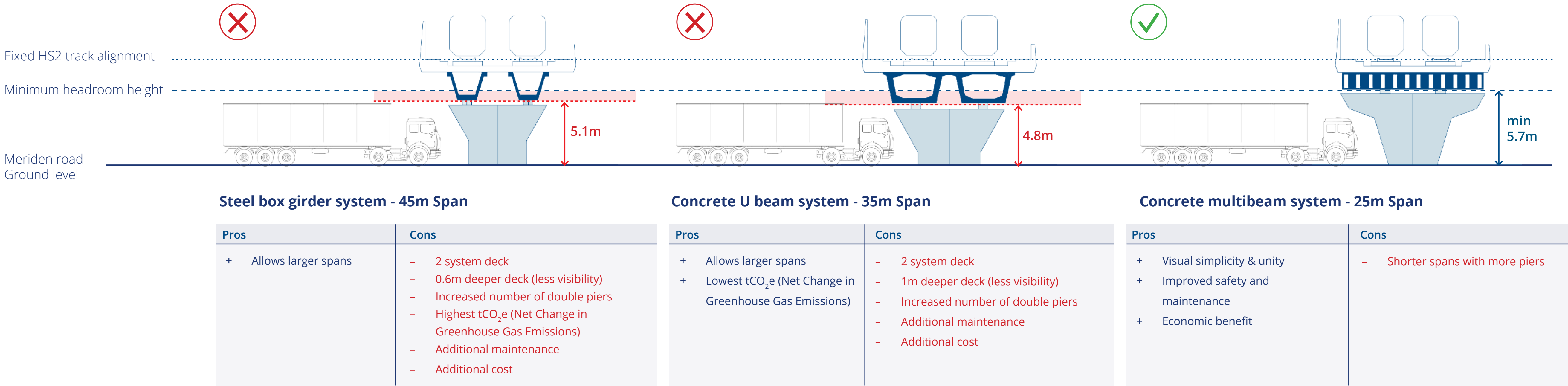
River Blythe Viaduct

14 Structural options comparison - Span length appraisal

You asked if we have considered other structural approaches

The chosen 25m span unifies the viaduct with a single structural approach which elegantly addresses all the constraints and requirements the viaduct must meet. This design thinking of “doing more with less” has been carried through to the refinement of all the elements including the piers themselves as well as the parapets and abutments at each end of the structure.

Pier spacing - Rationale for 25m span



Material selection



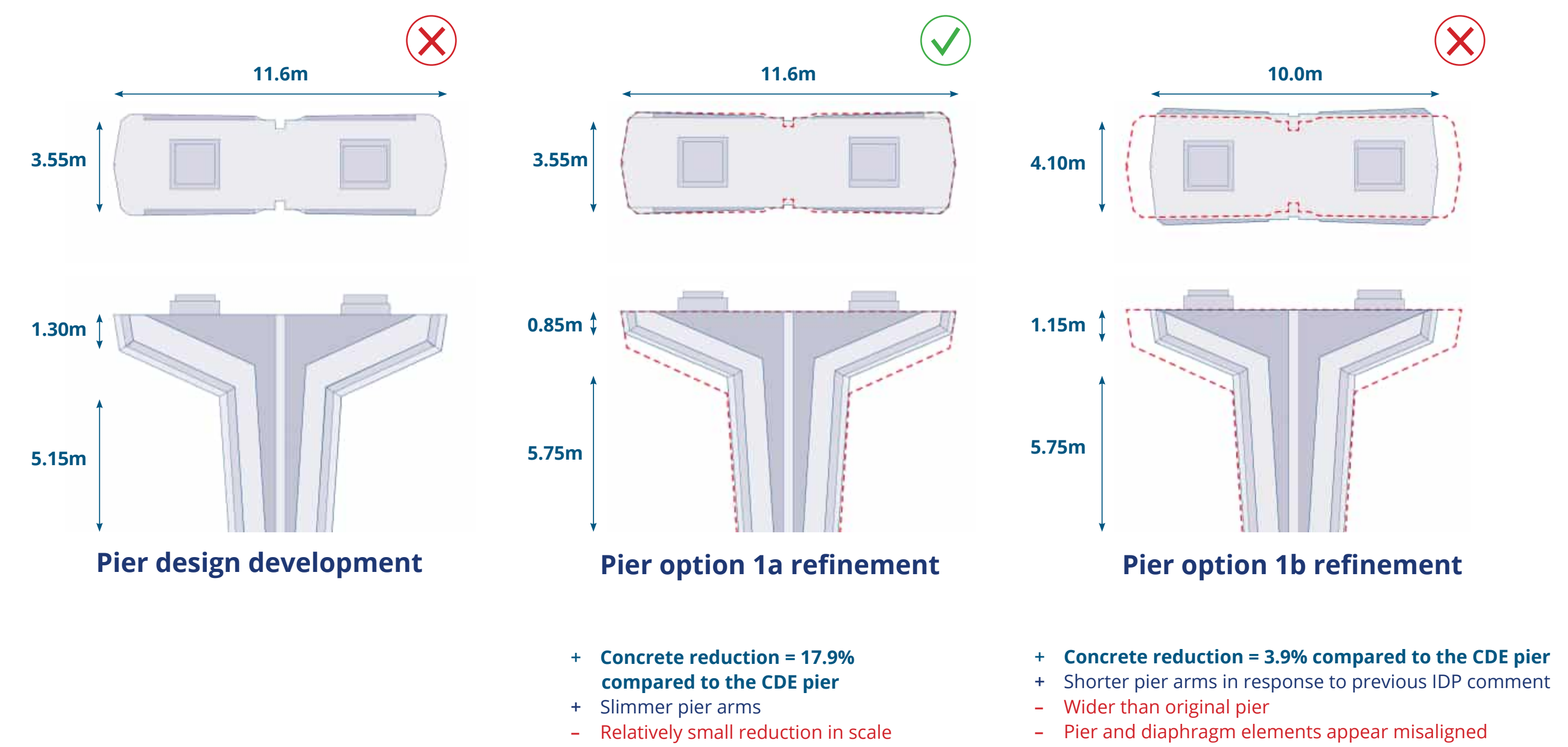
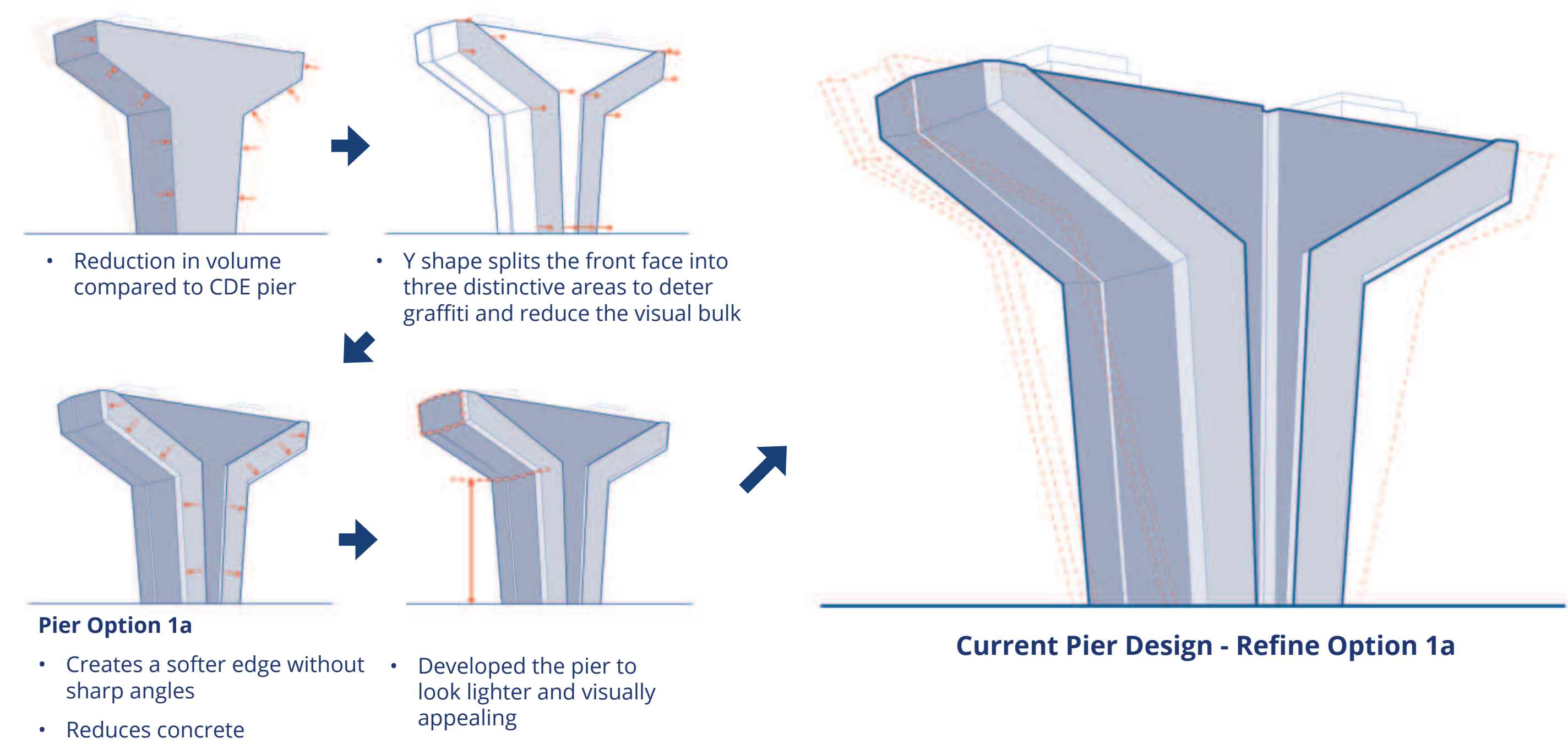
River Blythe Viaduct

15 Pier refinement

You asked how we are reducing the visual mass of the viaduct

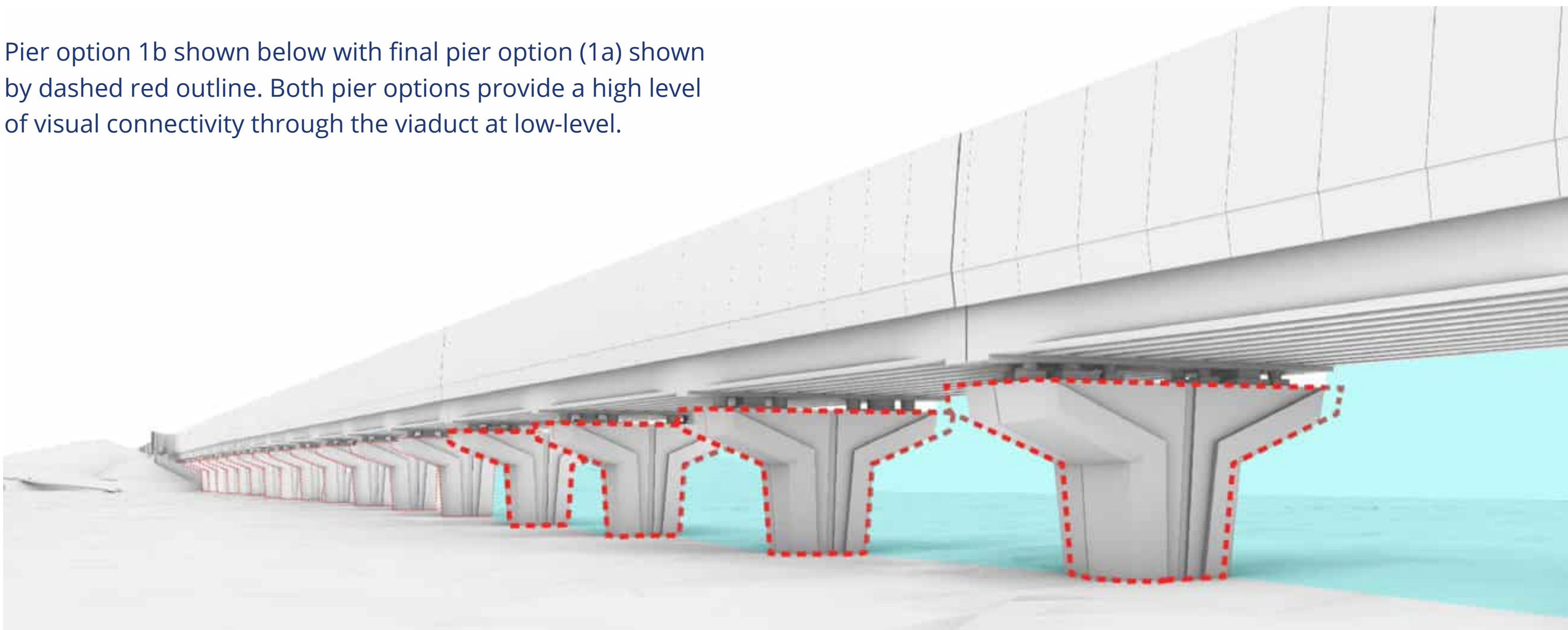
The design development for the pier shape focuses on human scale and reduced mass. The piers have been engineered to minimise the use of material whilst responding to the context with a 'Y-shaped' form partly inspired by the mature oaks growing nearby that allow a permeable view through them.

The pier shape incorporates areas utilised for temporary support of the deck beams, eliminating the need for additional structures during construction, with associated safety, efficiency and sustainability benefits.



View from north side of Patrick Farm looking south – private view

Pier option 1b shown below with final pier option (1a) shown by dashed red outline. Both pier options provide a high level of visual connectivity through the viaduct at low-level.



River Blythe Viaduct

16 Emphasising the horizontality of a low-lying structure

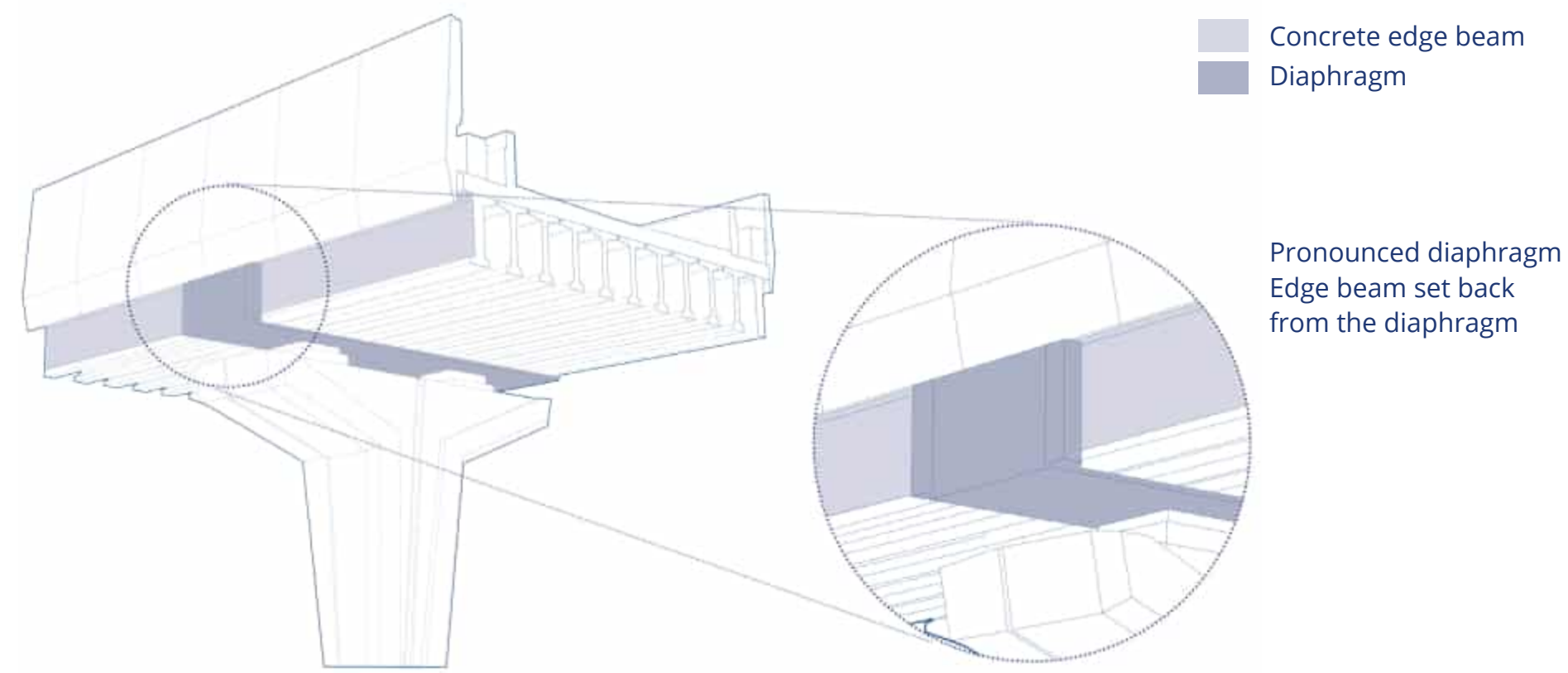
You asked how we are maximising views through the viaduct

Piers, edge beams and diaphragms are all elements which have been continuously refined to emphasise the simple horizontality of the viaduct expressing the seamless and coherent character of and structure.



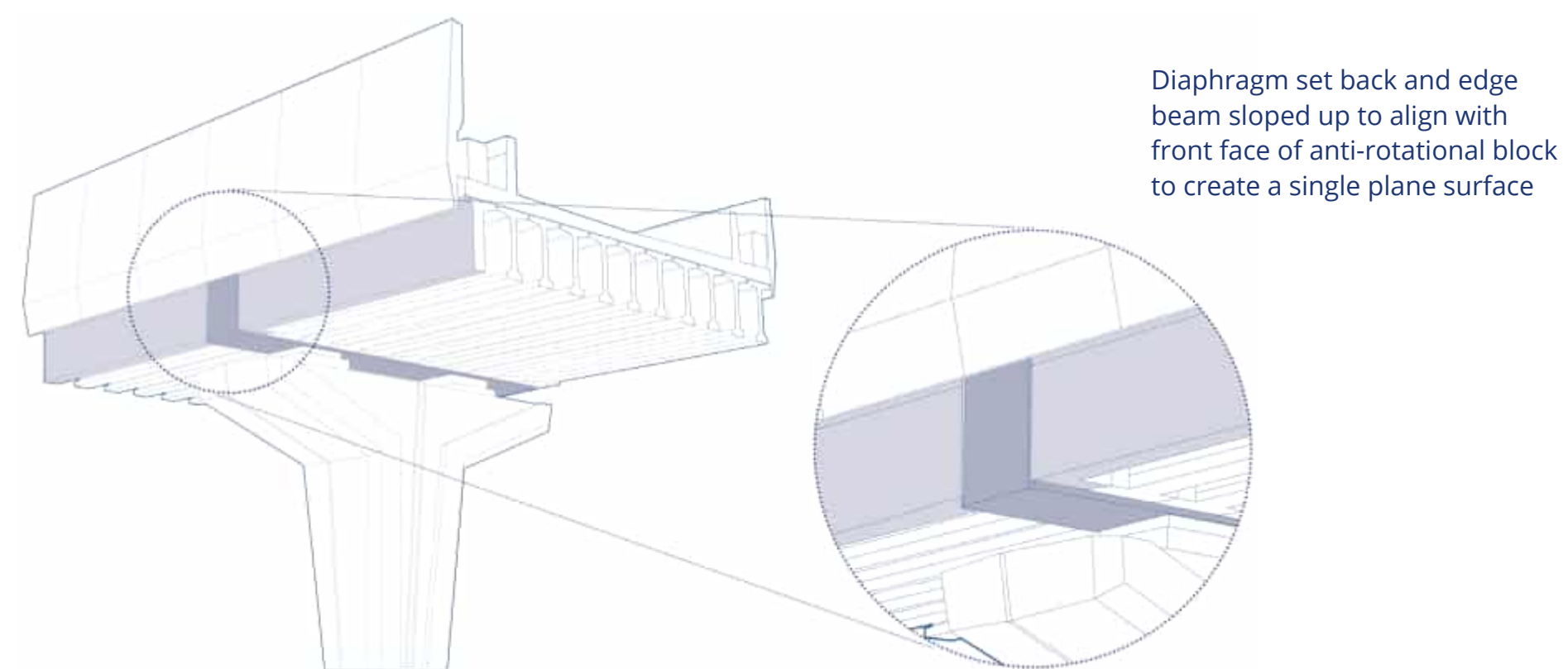
Previous design

- Width of pier arm obstructs views
- Highly prominent diaphragm increases visual clutter
- Lack of differentiation in materiality



Current design

- + Slimmer pier arms with a reduction of 16.6% in concrete
- + Improved leading edge to reduce visual clutter
- + Coherent design to achieve the 120 years lifespan; Polished top surface to reflect the changing environment; Textured bottom surface to add contrast and divide the elevation



View of the viaduct set within its agricultural context – view from Patrick Farm Field looking south west (private view)

River Blythe Viaduct

17 Acoustic parapet

You asked how we are minimising sound from the trains

As part of the wider design, noise attenuation is required both on and off the viaduct. Noise barriers and acoustic parapets have been designed to reduce adverse impacts on health and quality of life due to noise from operation of the railway. Local noise receptors include people at home, at community facilities or at workplaces, with barrier heights designed according to degree of impact. With a greater number of noise receptors to the south-

west of the viaduct in Hampton-in-Arden, the 3.1m acoustic parapet will include an integrated acoustically absorptive panel on the rear, to help mitigate noise impact on the neighbouring village. Since there are fewer noise receptors to the north-east, the 1.2m parapet will be used as a routewide common design element.

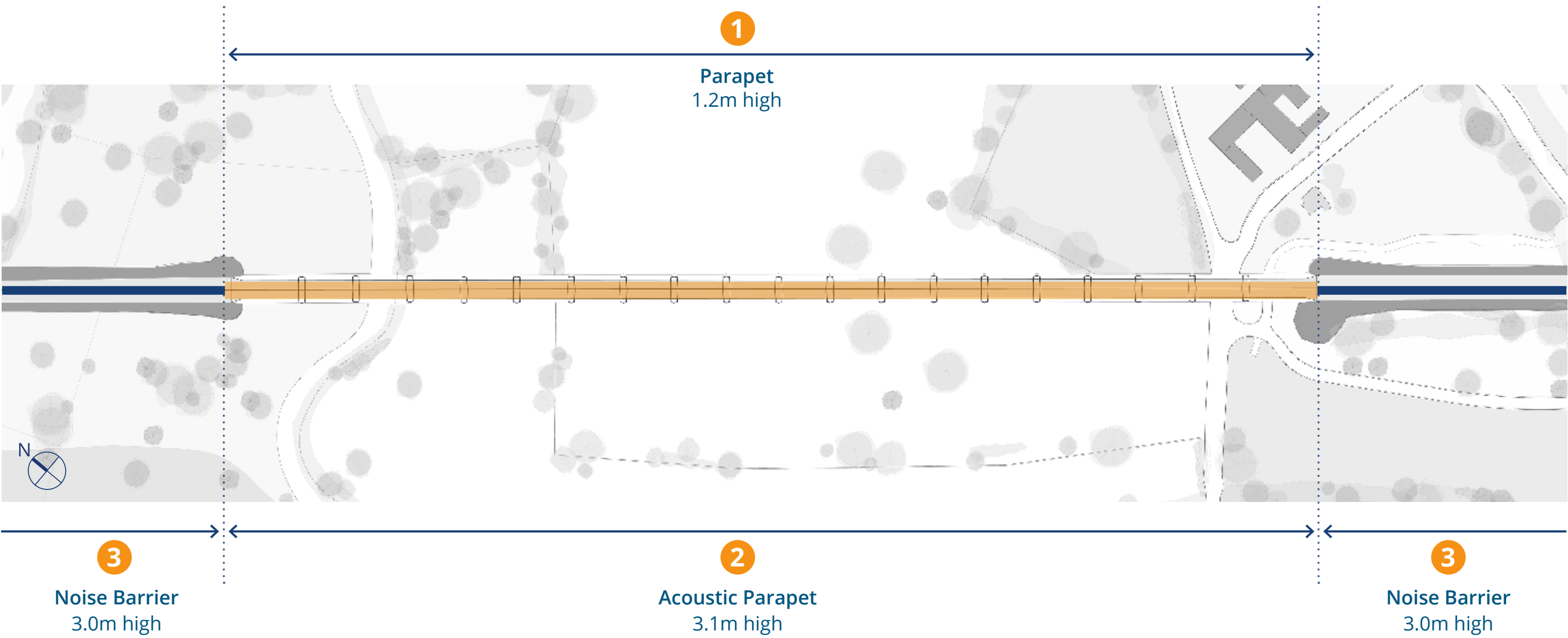


Extract from Noise Demonstration Report with receptor reference numbers

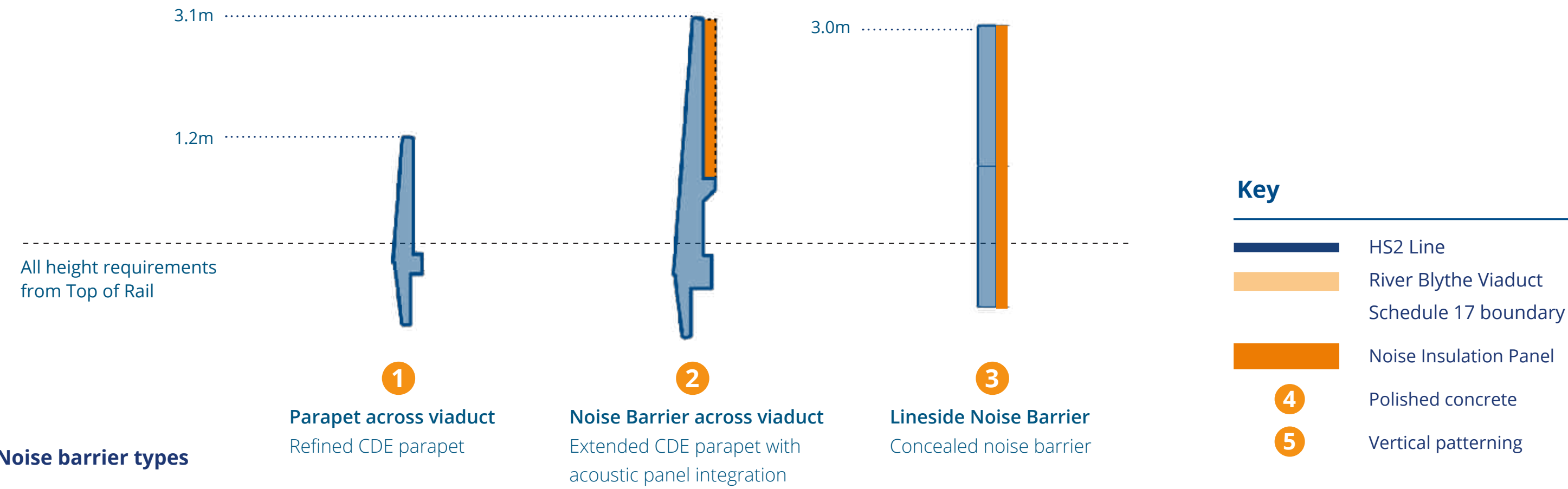


View from Meriden Road looking north

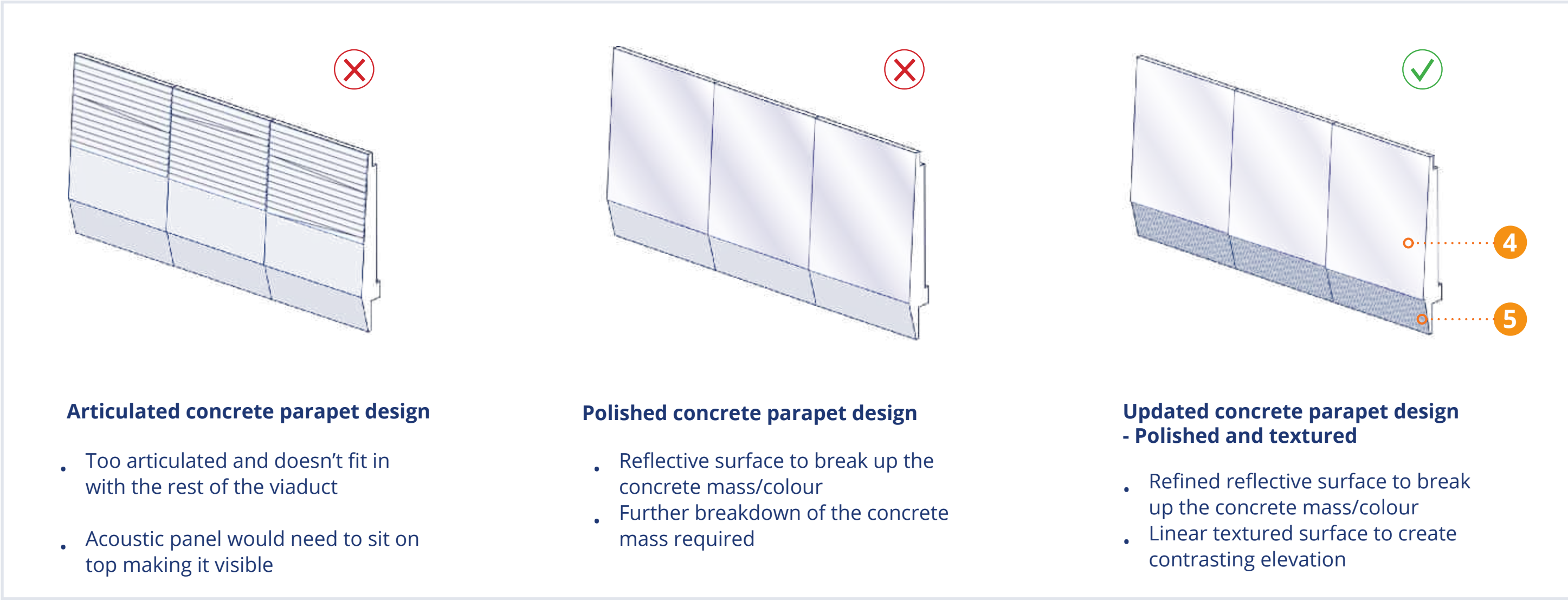
River Blythe Viaduct



Noise protection requirements map



Noise barrier types

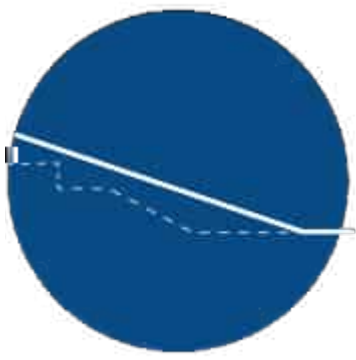


18 Abutments and planting

You said the viaduct should be well integrated into the landscape

The abutments at either end of the viaduct, Diddington Lane at the north-western end and Patrick at the south-eastern, will both incorporate access stairs for maintenance. In the case of the Patrick abutment, this will be in a highly visible location next to Meriden Road and close to the Public Rights of Way bridleway diversion linking to Marsh Lane. The design of the abutments aims to minimise the clutter associated with the necessary maintenance

access stairs, fencing, handrails and associated inspection platforms for the bearings. This has been achieved by sinking the access stairs and inspection platforms 1.2m into the abutment slope, to allow handrails to be fixed directly to the retaining walls hidden from view. The design of the retaining wall for the stairs and bearing platform minimises the use of concrete in favour of space for planting.



Step 1
De-cluttering

Stairs and maintenance platforms are sunk into the earthworks to increase landscape integration



Step 2
Security fencing

Changing the location of the security fencing from the bottom to the top of the embankments, forming a coherent relation on both sides



Step 3
Earthwork gradient

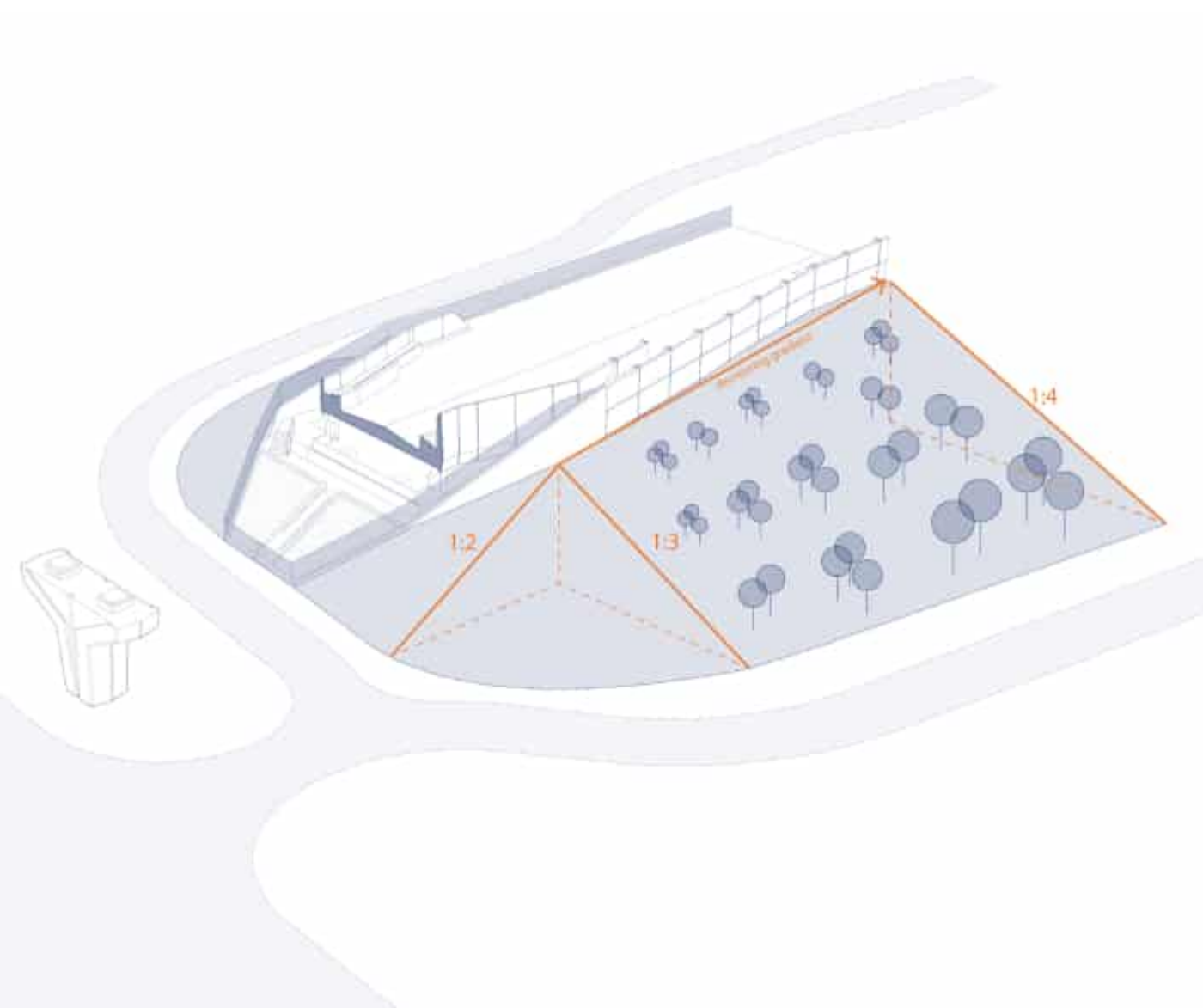
The slope of the embankments changes from a 1:2 to a 1:3 slope, creating more space for planting and a more natural form



Step 4
Embankment planting

Various planting heights and styles contribute to sustainability and reduce visual impact

Earthworks gradient



Embankment planting



1 - View towards Diddington Lane abutment with the River Blythe in the foreground and Mouldings Green Farm LWS in the background (Vegetation at Year 10)



2 - View from side of Meriden Road looking towards Patrick abutment (Vegetation at Year 10)

River Blythe Viaduct

19 Graffiti strategy and concrete finish

You asked how we are dealing with vandalism

Vandalism, graffiti, security and a sense of ownership are all inter-related. We propose to adopt a ‘no tolerance’ approach to graffiti which has worked well on HS1; any graffiti is promptly removed or painted over (using a paint colour that matches the concrete) and graffiti ‘artists’ are thereby progressively discouraged.

Opportunities for other vandalism will be minimised by Crime Prevention Through Environmental Design (CPTED), which aims to facilitate crime prevention through the design of a building or structure, minimising conditions which support anti-social behaviour.

Utilising the routewide strategy of HS2’s reporting system for graffiti, any which is identified will quickly be painted over, coloured-matched to the concrete finish. The faceted pier design dividing the large surfaces will further discourage graffiti on the more accessible elements of the viaduct.



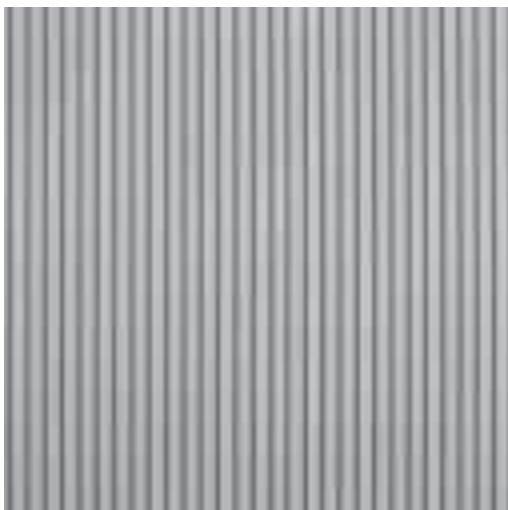
Precedents from HS1 - Before (left)



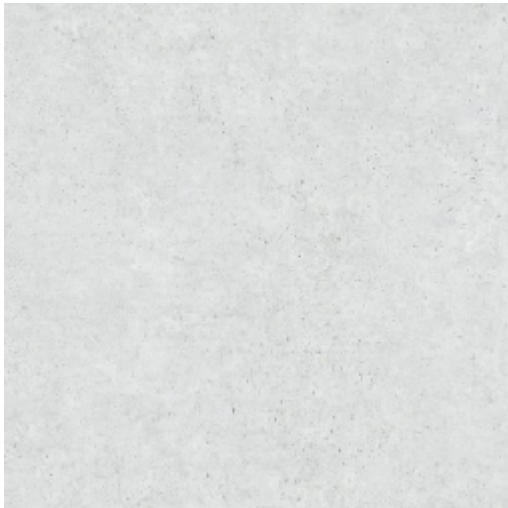
After graffiti is treated (right)



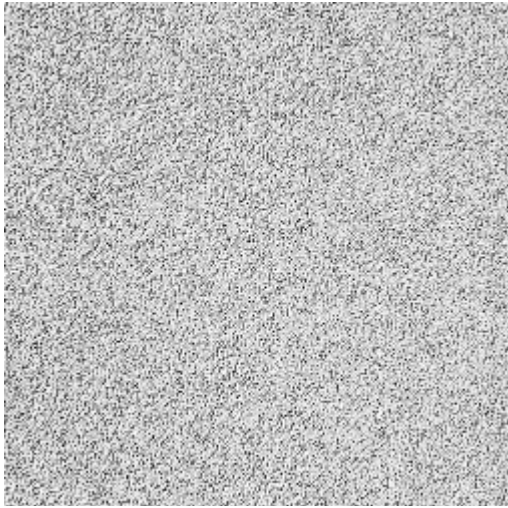
1 Illustration of polished concrete



2 Vertical grooved pattern (Tigris)



3 Smooth concrete with no pattern



4 Roughcast pattern (only on piers either side of Meriden road)

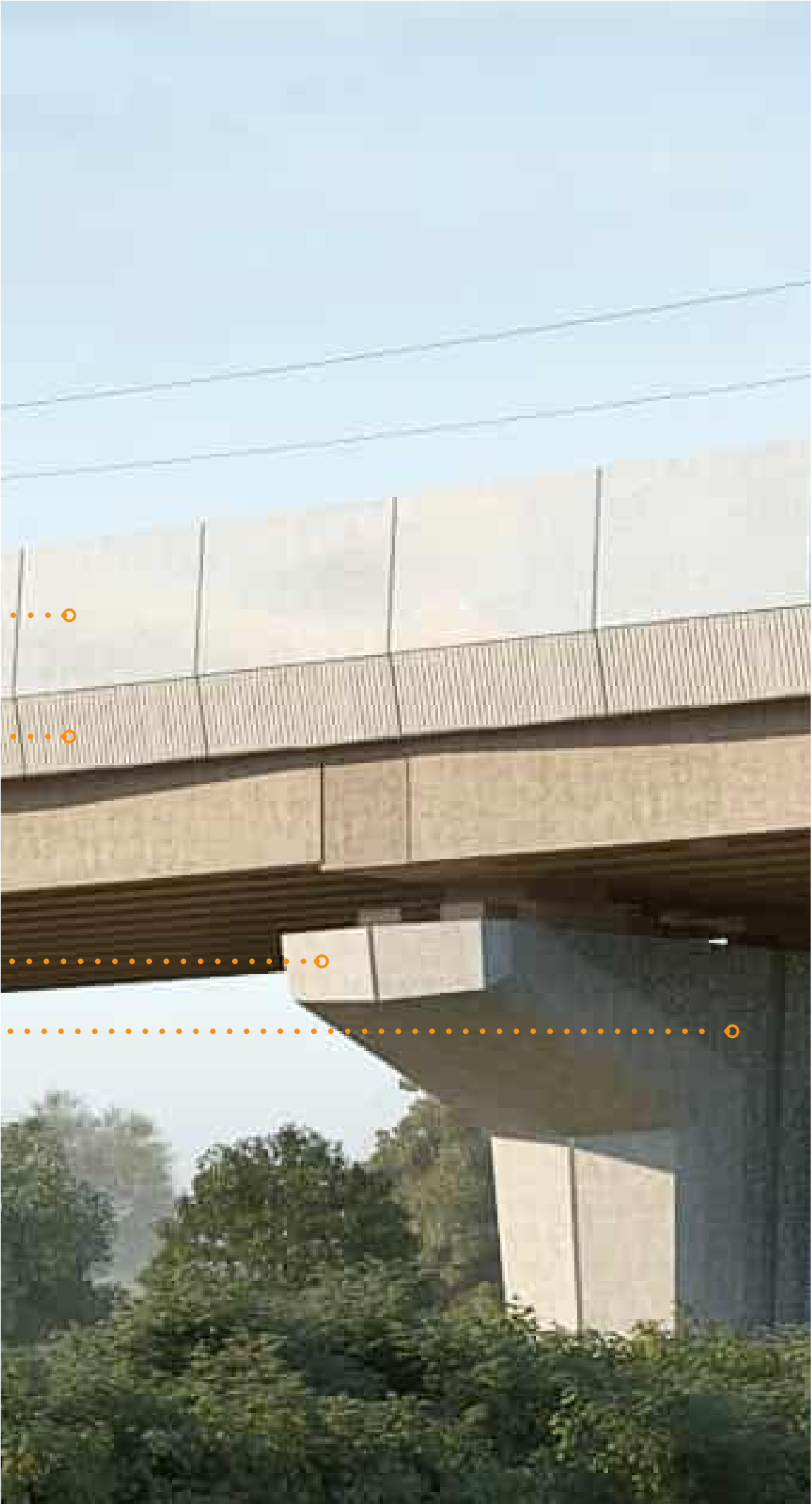


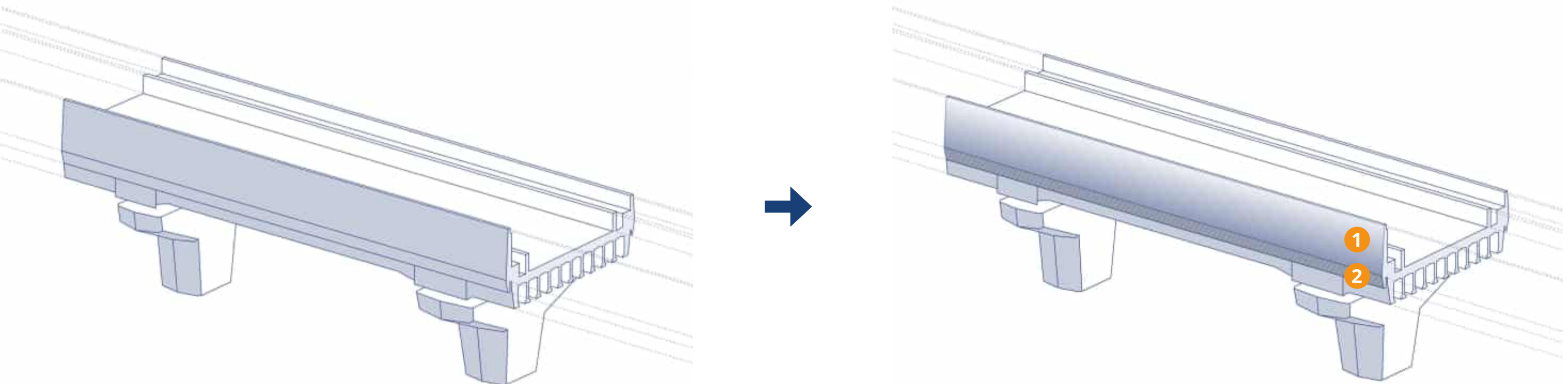
Illustration of concrete textures on viaduct

River Blythe Viaduct

20 Concrete finishes

You asked how we are reducing the visual bulk of the viaduct

The external appearance of all parapet barriers will be split into two parts: the upper part has a reflective surface achieved by polished concrete. This will allow for the parapet to gently reflect its surroundings and optimise its integration within the landscape. The lower part of the parapet will have a roughcast texture to minimise weathering and maintain a consistent texture across the viaduct. The only variable between the parapet types is the length of the upper polished part.



Previous concrete parapet design

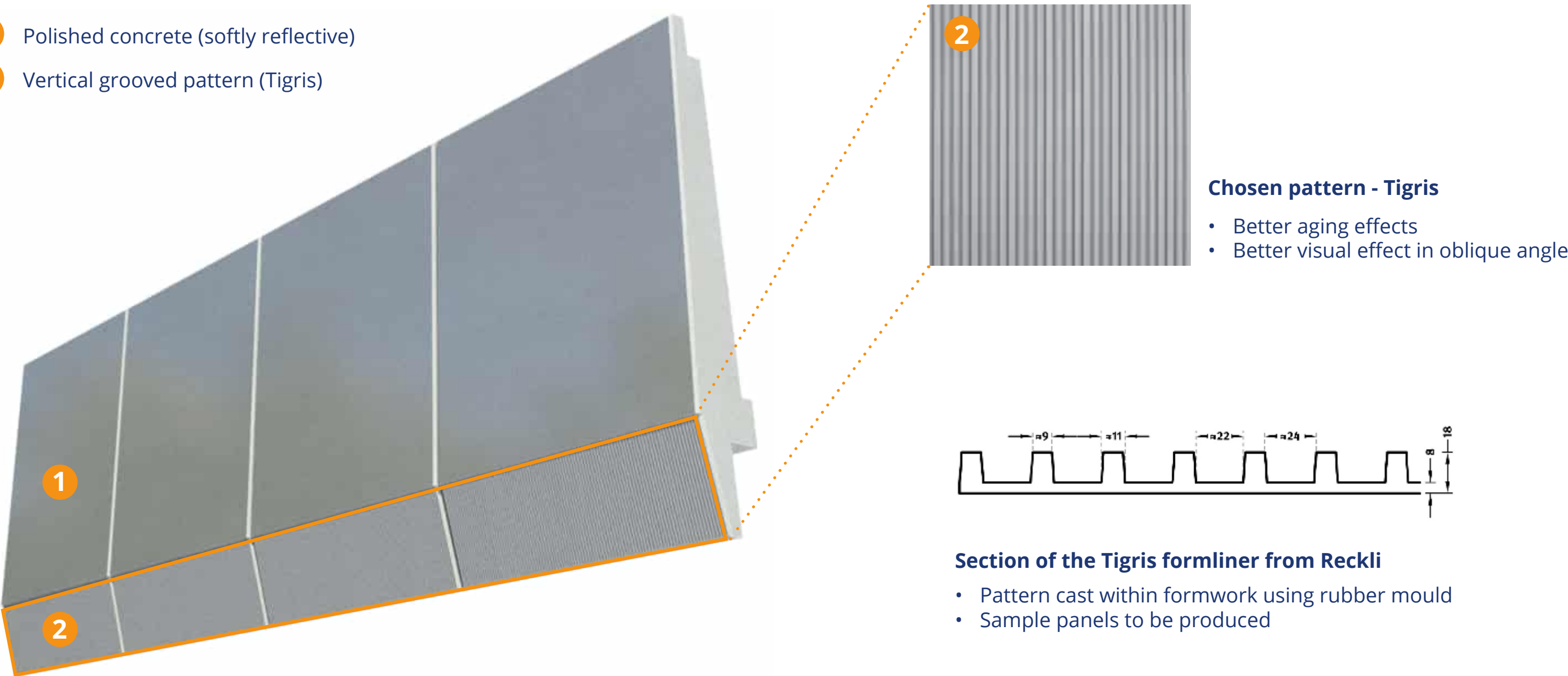
- + Coherent design to achieve the 120 years lifespan
- Lack of differentiation in materiality

Updated concrete parapet design
- Polished and textured

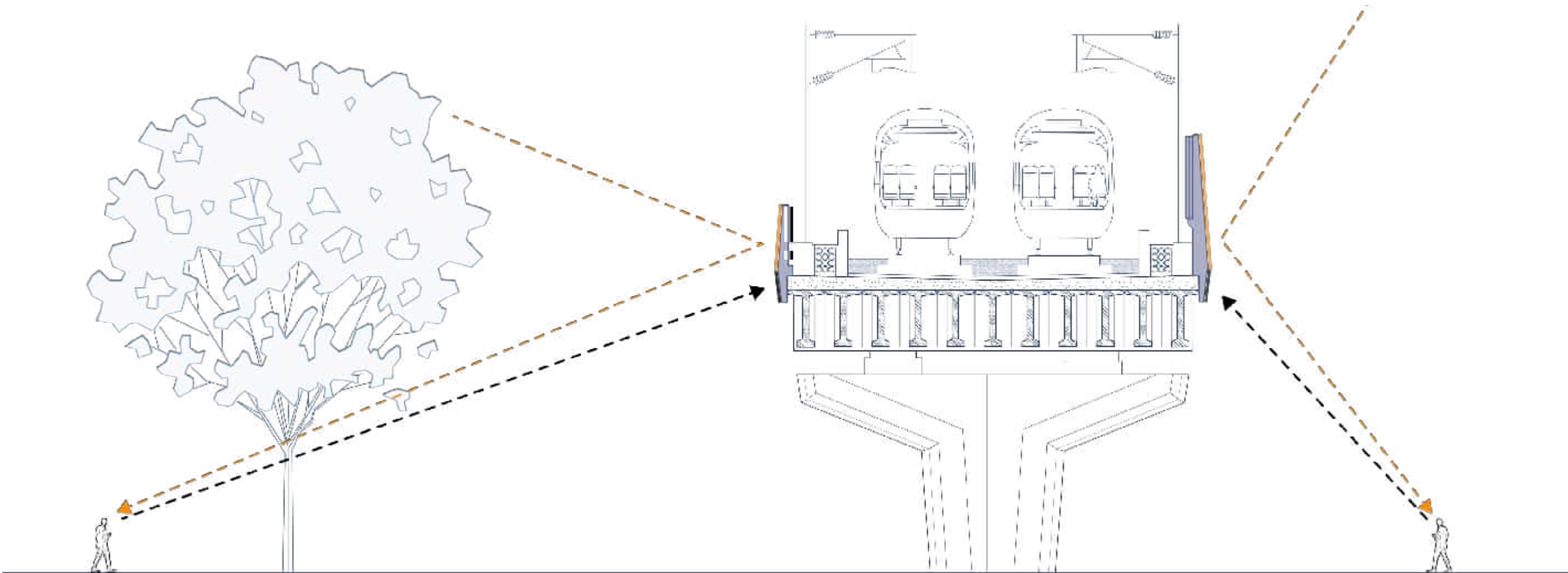
- + Coherent design to achieve the 120 years lifespan;
- + Polished top surface to reflect the changing environment;
- + Textured bottom surface to add contrast and divide the elevation

Key

- 1 Polished concrete (softly reflective)
- 2 Vertical grooved pattern (Tigris)



View of the viaduct looking towards Patrick Farm along Meriden Road



Section highlighting the parapet finishes

River Blythe Viaduct

21 Construction sequence

You asked how the construction work will be carried out

Construction methodology

1 Working platform construction and temporary bridge over the River Blythe

Installation of a working platform and a temporary bridge over the river will allow the construction of the viaduct and support the different types of heavy equipment. Topsoil will be protected from construction activities by being temporarily stockpiled nearby. Topsoil will be reinstated at the end of the work like for like.

2 Bored piles and cofferdams installed before pile cap constructed

In order to safely construct the pile cap (or foundation) at a level where there is no risk of scouring by the River Blythe or by flood water, a cofferdam will be installed around the piles. The cofferdam will also reduce the dewatering requirement that could affect the natural environment locally. Due to the poor ground conditions, concrete piles up to 30m deep are required to support the viaduct. Pile caps will be constructed inside the cofferdam and fully buried at the end of construction.

A temporary cylindrical casing will be installed and soil drilled & removed to the design depth using an auger, eliminating any spoils. This piling method is used as it can penetrate through difficult ground construction. Once drilled, pre-fabricated reinforcing steel cages are lowered into the hole using a crane and then filled with concrete.

Each pile is expected to take a day to complete. Pile caps will be constructed inside the cofferdam and fully buried at the end of construction.

3 Pier construction & Cofferdam removal

Piers will be erected on top of the pile cap and the cofferdam removed. The wide arms of the piers help to improve health and safety on site by providing a robust temporary platform for the subsequent beam installation.

4 Beam installation

Beams will be precast at an external yard to reduce the amount of work done within the River Blythe Viaduct construction area. They will then be transported to site and installed directly on top of the piers.

5 Deck and diaphragm construction

The diaphragms will be poured in-situ to connect the beams structurally and will be integrated to the deck (concrete slab) as one as the final piece of permanent formwork, tying the various structural elements together.

6 Parapet installation

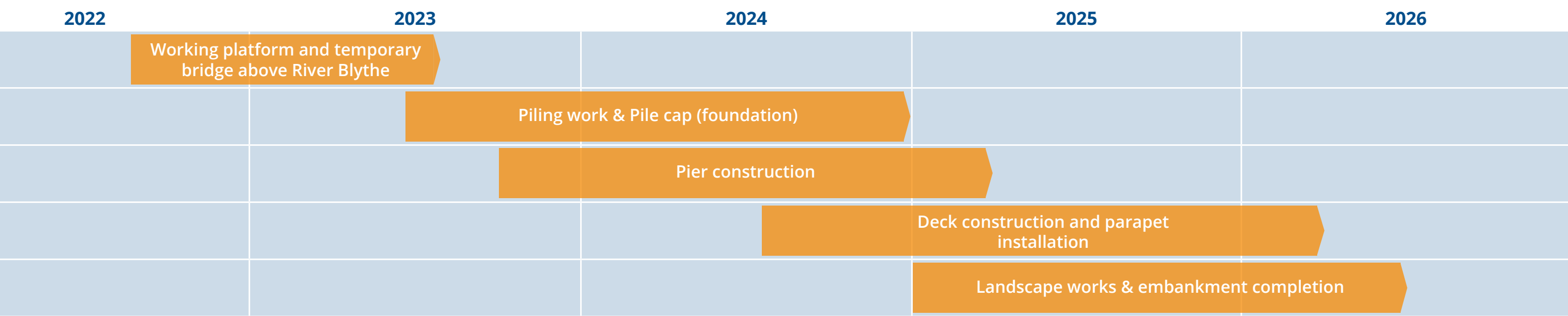
Different heights of parapets and acoustic parapets will be installed depending on the noise control measures required along the different parts of the viaduct. Parapet and acoustic parapets will be precast and transported to site for installation.

7 Reinstatement

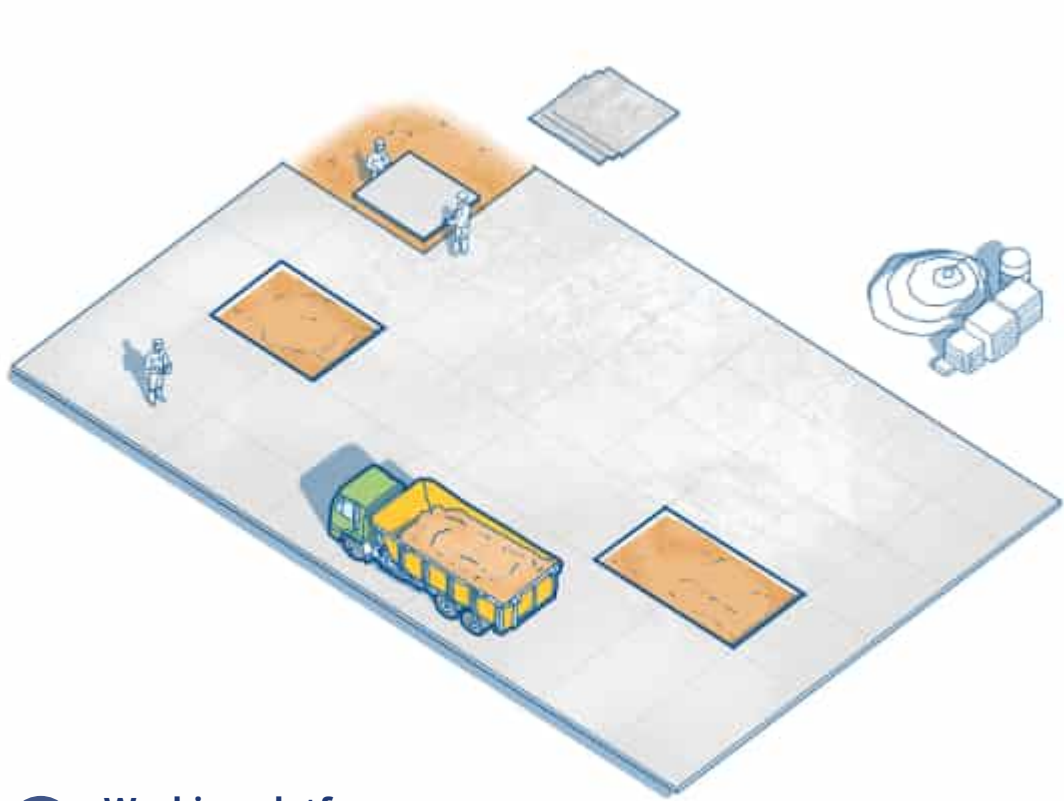
At the end of the construction period, the working platform will be removed and ground reinstated including, where appropriate, topsoil spreading, planting and seeding.

Indicative construction timeline for the viaduct

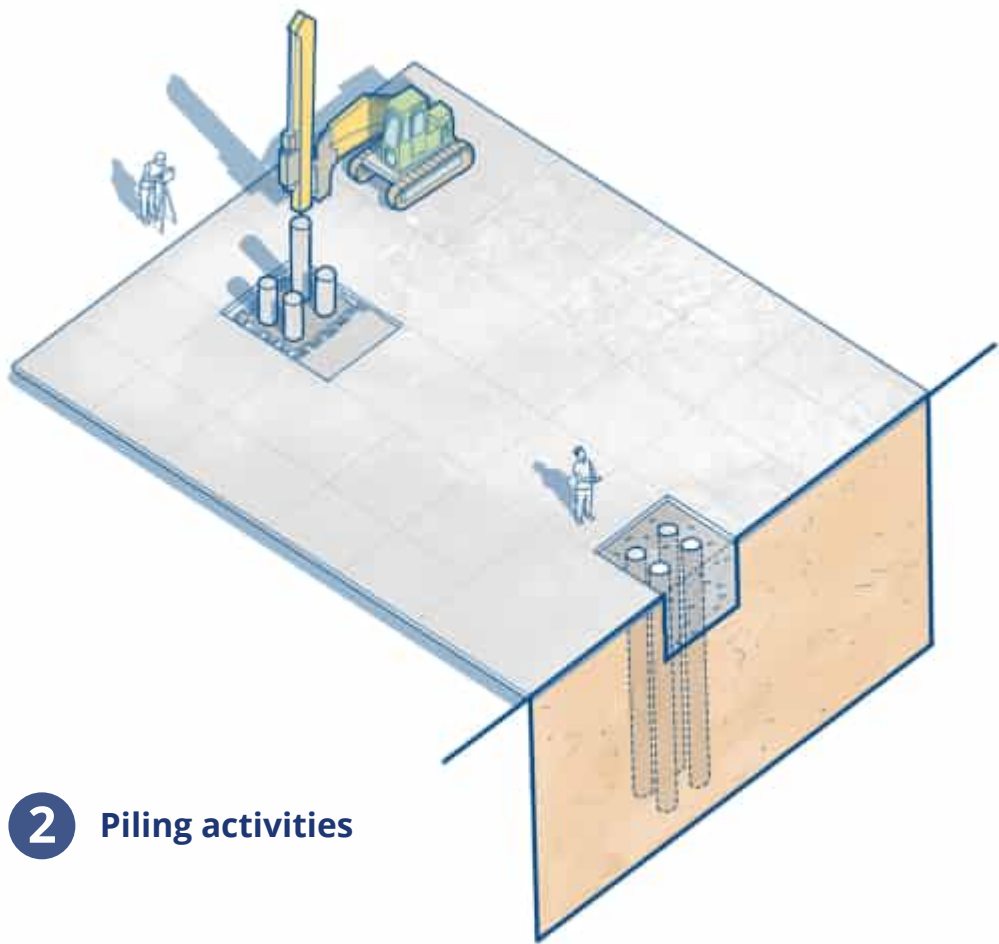
(Anticipated timeline - this could be subject to change)



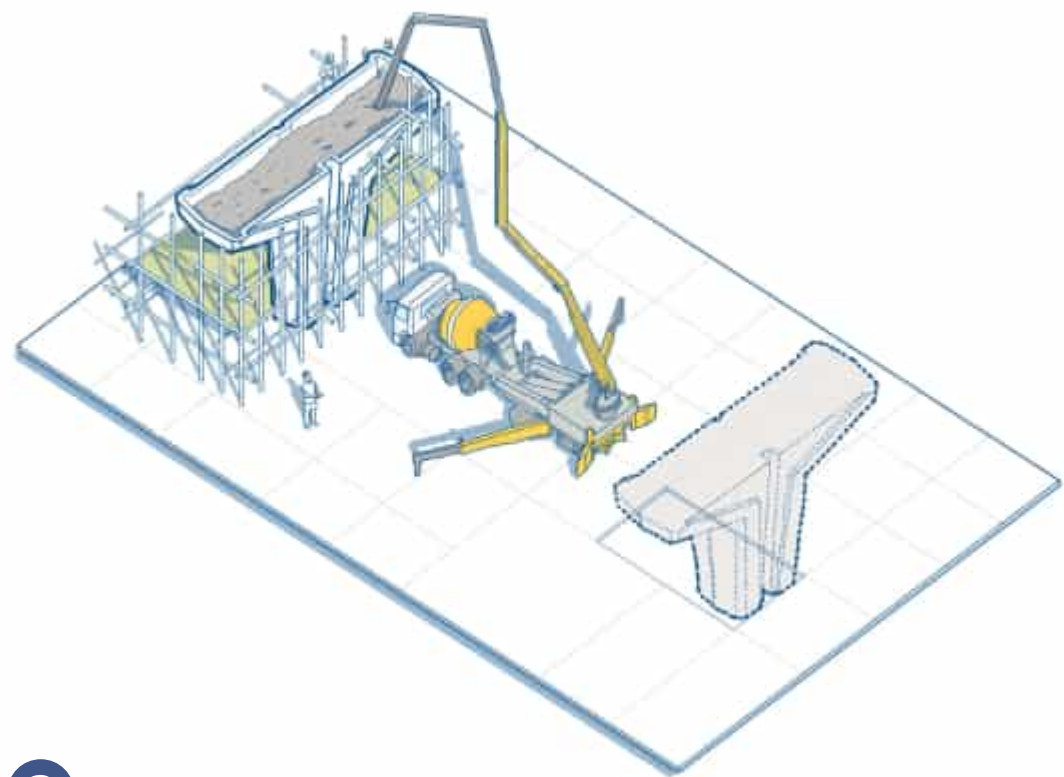
River Blythe Viaduct



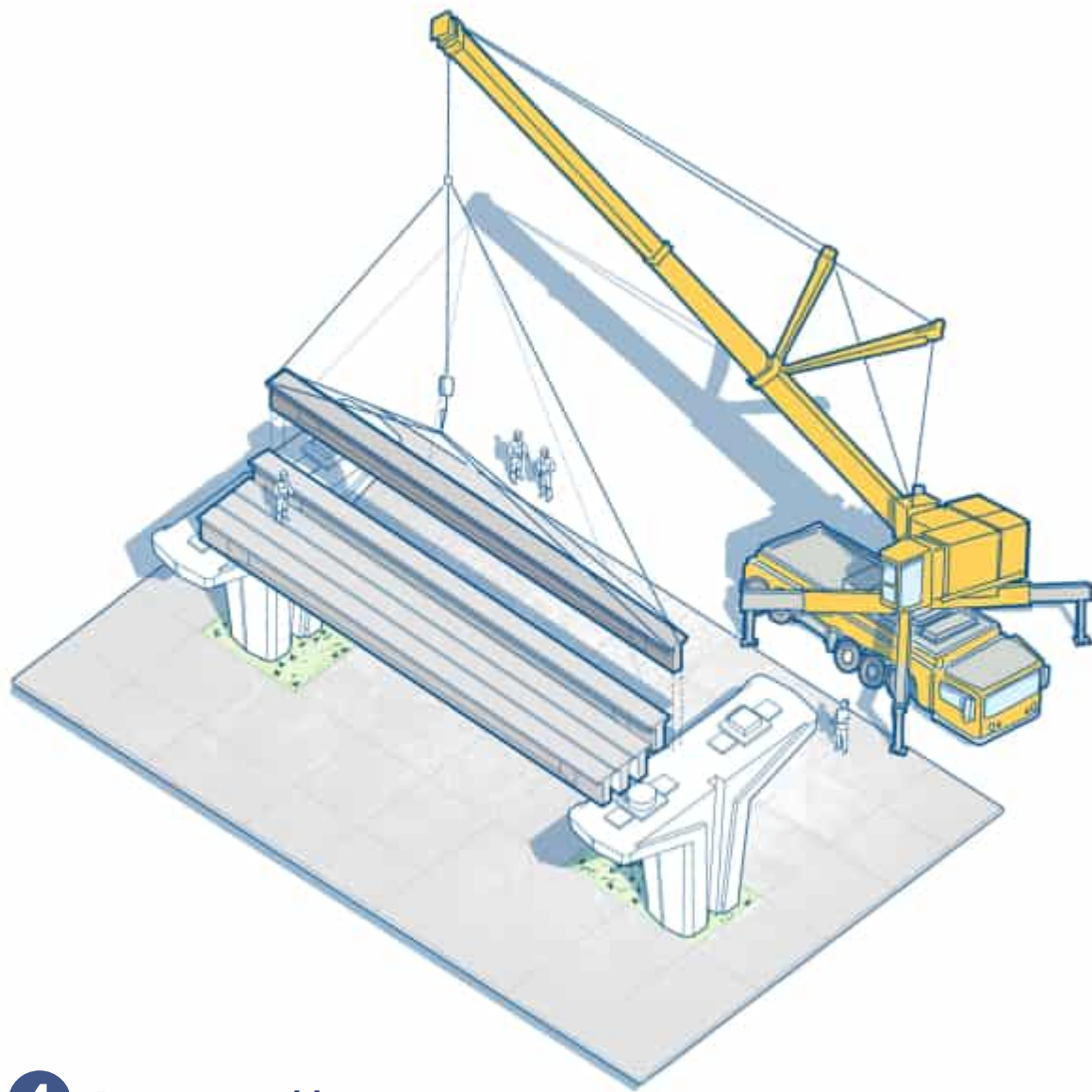
1 Working platform setting out



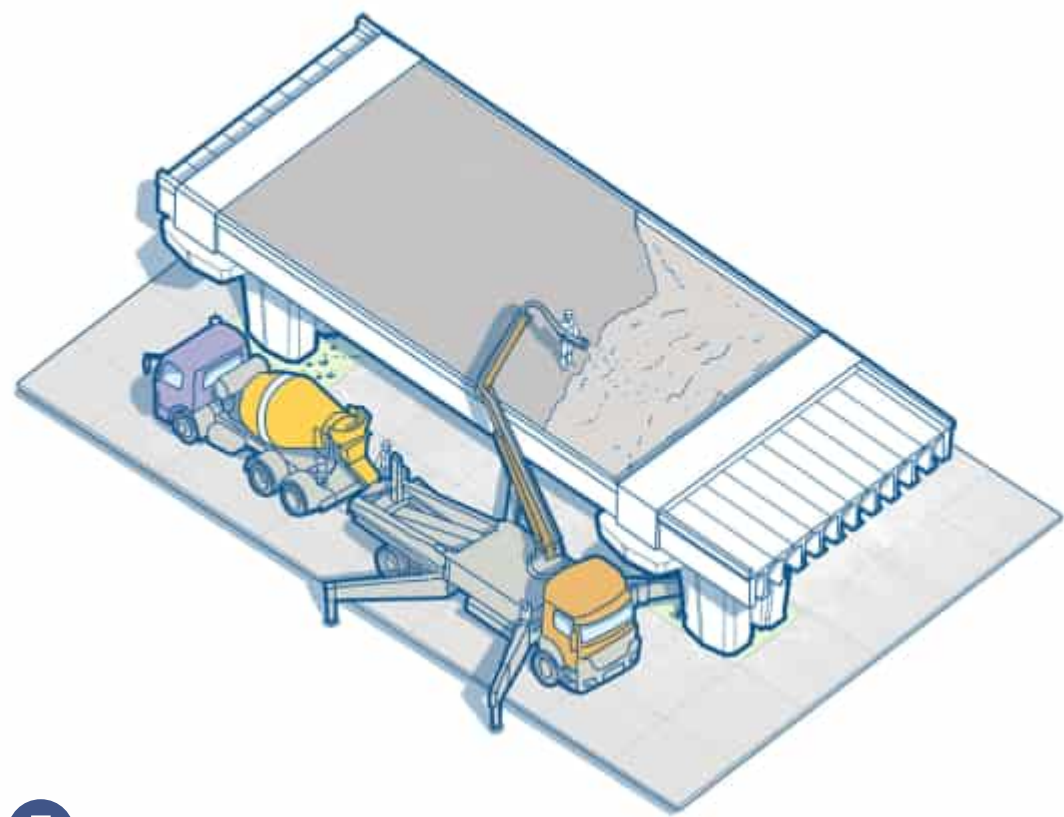
2 Piling activities



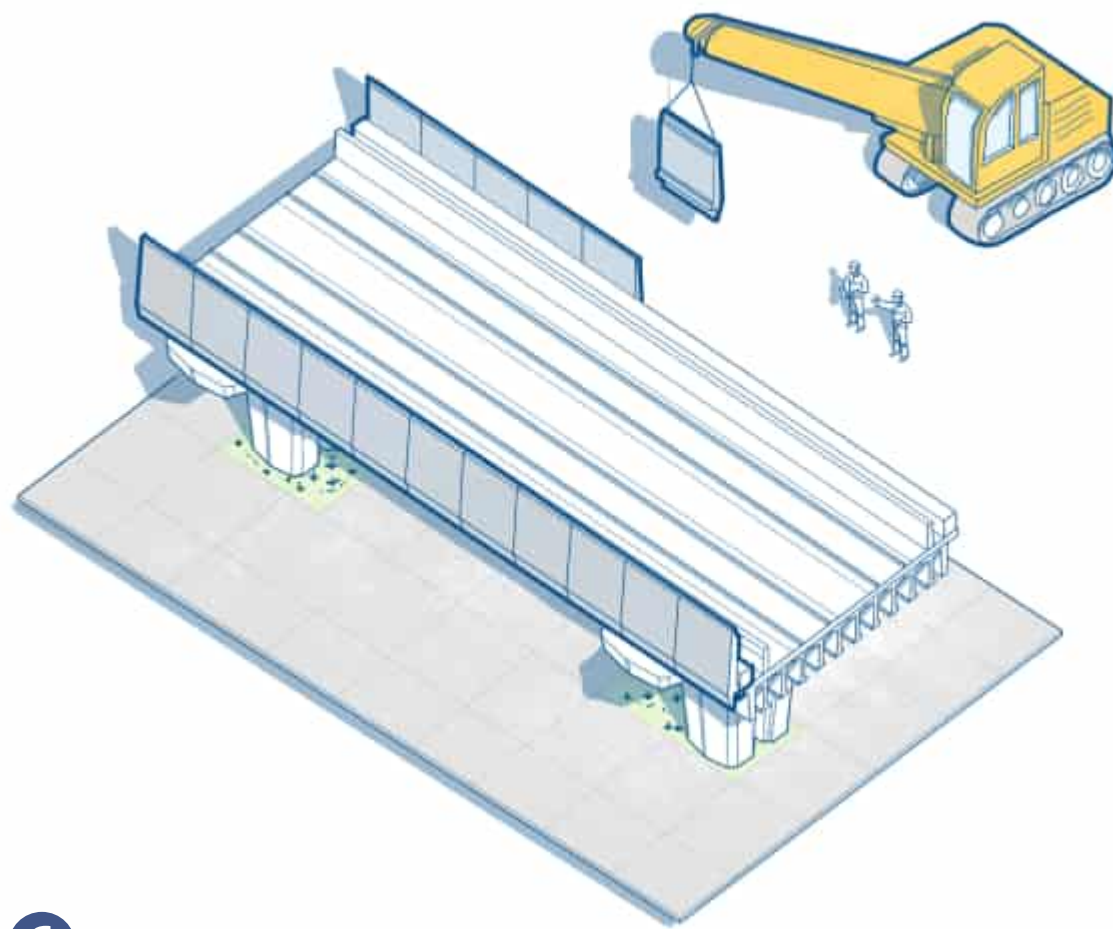
3 Pier construction



4 Beam assembly



5 Deck construction



6 Parapet assembly

22 Traffic management

You asked how construction work would affect the area

Traffic management

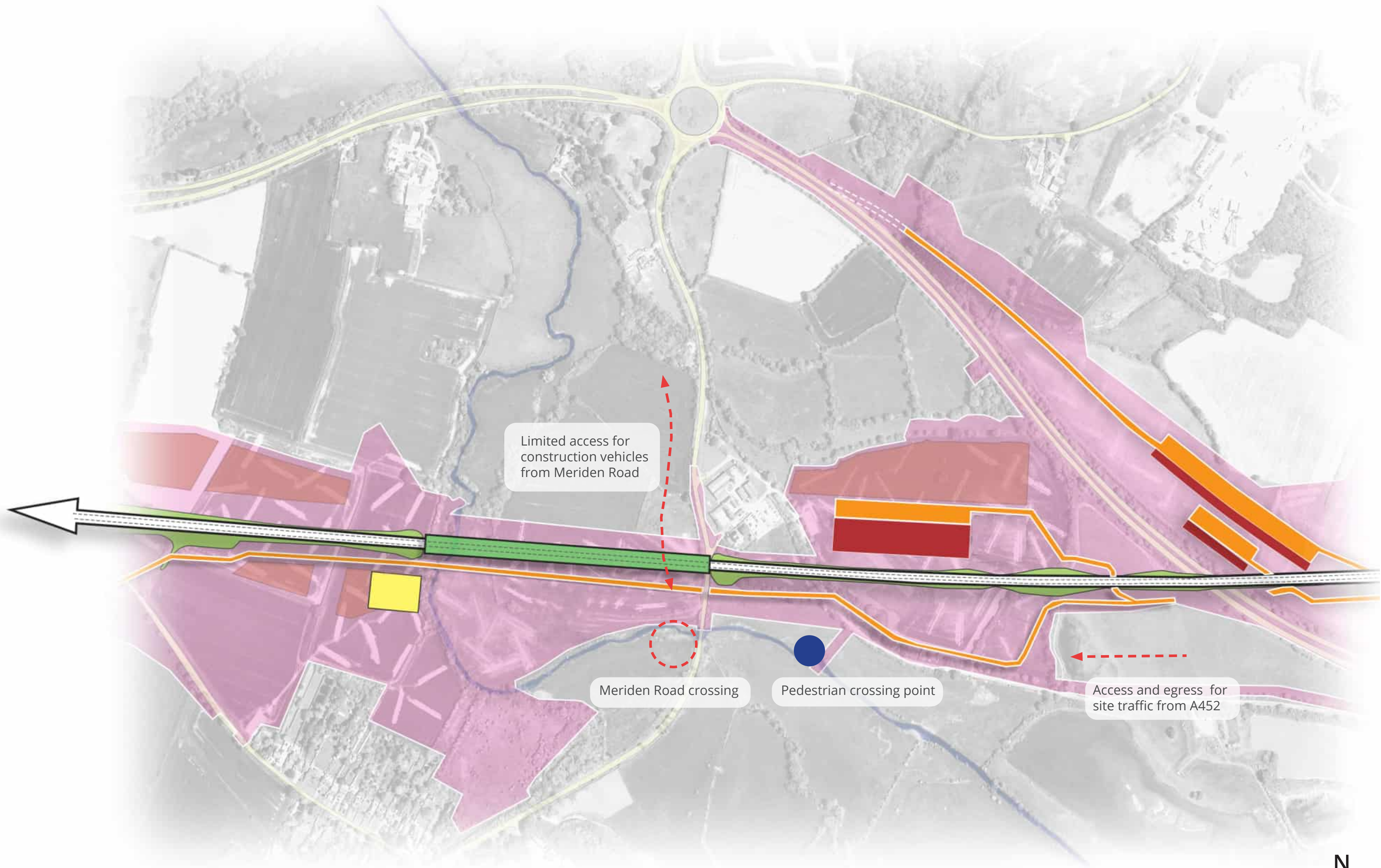
In order to minimise the impact on the local road network and nearby residents, an alternative access route will be constructed to access the River Blythe Viaduct directly from the A452, by-passing Meriden Road as indicated on the plan below.

It will be facilitated with traffic lights and a plant crossing on Meriden Road, as well as a temporary bridge above the River Blythe.

Closures on Meriden Road will be sporadically required for specific activities such as road improvements at the plant crossing and viaduct construction near or above the road.

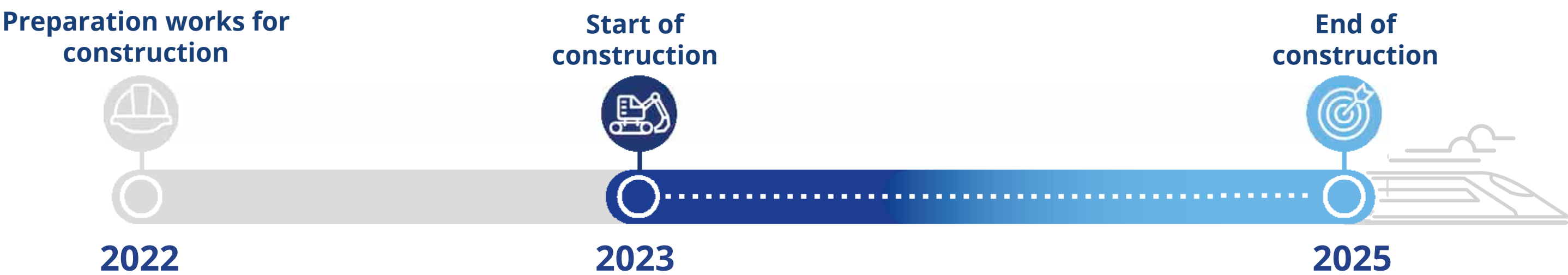


Photographs showing typical viaduct construction processes



Programme of work for the viaduct

(Anticipated timeline - this could be subject to change)



Key			
	Satellite compounds		Haul routes and road alterations
	Topsoil stockpile		Earthworks stockpile
	River Blythe Viaduct		Limit of Land to be Acquired and Used (LLAU)

River Blythe Viaduct

23 Visuals



View from Meriden Road looking east



View from Meriden Road looking north



Close-up view from Meriden Road looking east



View from side of Meriden Road looking towards Patrick abutment



Aerial view overlooking Meriden Road and Patrick Abutment

River Blythe Viaduct

24 visuals



View from Meriden Road looking south-west



View from North side of Patrick Farm looking south



View from the River Blythe looking east



View towards Diddington Lane abutment with the River Blythe in the foreground and Mouldings Green Farm LWS in the background



View from Patrick Farm Field looking south-west – private view

River Blythe Viaduct



Existing aerial photograph showing proposed viaduct location and the HS2 line

River Blythe Viaduct