



**Haweswater Aqueduct Resilience Programme - Proposed Marl Hill
Section**

Volume 6

Proposed Ribble Crossing

Chapter 3: Design Evolution and Development Description

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3. Design Evolution & Development Description

- 1) This chapter sets out the need for the Proposed Ribble Crossing and the evolution of the design solution. It describes the alternative proposals that were considered, and the optioneering process used to arrive at the proposed design.
- 2) A description of the Proposed Ribble Crossing is provided in Section 3.5, including information on the design, and the envisaged construction methods and approach. The description in Section 3.5 has informed the basis of assessment for the EIA as presented in Chapters 6-19.

3.1 Needs Case

- 3) The construction of the Proposed Marl Hill Section would require access from the A59 for a wide variety of construction vehicles, some of them exceptional loads, to the Bonstone and Braddup compounds. Volume 2 of the Environmental Statement explains that construction vehicles approaching the Bonstone and Braddup compounds would use the existing public highway network from the Junction 31 of the M6 *via* the A59. Volume 2 goes on to describe two routes in the Clitheroe area along which construction vehicles could pass *en route* to the Bonstone and Braddup compounds:
 - Route 1: For vehicles up to 3.5 m in height, the preferred route to Bonstone and Braddup compounds from the A59 at Clitheroe would be via Pimlico Link Road, Chatburn Road and north on Waddington Road below the limited headroom railway bridge towards and through the village of Waddington
 - Route 2: Vehicles over 3.5 m in height would have to avoid the limited headroom railway bridge and would be directed via Pimlico Link Road, through Chatburn and Grindleton, and along West Bradford Road towards Waddington.¹
- 4) Through consultation with the Highway Authority, a Construction Traffic Management Plan has been produced and offsite highways works (e.g. temporary access roads, passing places, etc.) have been proposed to minimise potential conflicts with other road users and to enable the safe and timely movement of HGVs and other construction vehicles along local roads. Construction vehicles could use Routes 1 and 2 safely, however, the proposals would unavoidably involve large volumes of construction traffic on Route 1, while off-site highways works would be required on Route 2 where there are existing 'pinch points' on narrow road sections or at junctions. Route 2 passes through the villages of Chatburn, Grindleton and West Bradford. While the traffic volumes would be considerably lower than for Route 1 (approximately 70 two-way movements per day during the busiest periods in the construction programme), and acceptable highway safety parameters could be met, residual concerns about the potential impacts of construction vehicle movements through these villages were voiced by members of the local community during consultation undertaken in the latter part of 2020. As a responsible developer, United Utilities offered to explore options that may reduce the need for construction vehicles to pass through the villages.
- 5) A temporary road to link West Bradford Road to the north and West Bradford Road near the Ribblesdale cement works to the south was identified as an option that could avoid vehicle movements through Clitheroe, Chatburn, Grindleton and West Bradford and much of Waddington. This route would, however, still require the movement of vehicles through Waddington at the junction between West Bradford Road and Slaidburn Road.

3.2 Consideration of Alternatives

- 6) Options to avoid communities in Clitheroe and the villages of Waddington, Chatburn, Grindleton and West Bradford are limited. There are few if any options available on the existing road network which avoid the potential community impacts that gave rise to the concerns expressed over Route 1 and

¹ Route 1 and Route 2 were derived from a haulage route optioneering study for the Proposed Marl Hill Section, and were referred to as Route Option 1 and Route Option 5, respectively, during public consultation carried out in 2020. Please refer to Volume 2 Appendix 3.1 for a more detailed account of the route optioneering process.

Route 2. United Utilities concluded that a dedicated, newly built temporary haul route, running across open land to avoid a number of residential areas altogether, may provide the only other viable solution.

7) A feasibility study considered a temporary haul road passing through open countryside between West Bradford Road to the south (south of the existing West Bradford Road Bridge over the River Ribble) and West Bradford Road to the north (in between Waddington and West Bradford). Four broad route corridors were considered, all of which involved a temporary crossing of the River Ribble and temporary vehicular access off West Bradford Road between the Ribblesdale Cement Works and existing West Bradford Road Bridge. In addition, it was assumed that all of the routes would be used by all construction traffic. The temporary haul route options that were considered are shown in Illustration 1 and summarised below.

- West Bradford Route 1 – leaving the West Bradford Road and crossing the River Ribble approximately 100 m downstream of the existing West Bradford Bridge, the route would head west and then north to re-join West Bradford Road between Waddington and Waddington and West Bradford Primary School
- West Bradford Route 1a – leaving West Bradford Road in the south at a similar point as Route 1, this route differed from Route 1 by crossing the River Ribble at a point much further downstream (approximately 575 m downstream of the existing West Bradford Bridge), before connecting into the Route 1 alignment
- West Bradford Route 2 – involved crossing the River Ribble at the same point as Route 1, before heading in a general northerly and westerly direction to connect into the West Bradford Road in between the primary school and West Bradford village
- West Bradford 3 – extending from West Bradford Route 1, and crossing the River Ribble at its furthest point downstream from the existing West Bradford Bridge, this option crossed agricultural land to join into the Clitheroe-Waddington Road south of Waddington and north of Clitheroe
- Waddington Routes 1, 1a and 2 – comprised northerly extensions of West Bradford Route 1, continuing in a general westerly direction to 'bypass' Waddington to joining Slaidburn Road to the north of the village

Illustration 1: Ribble Crossing Route Options



- 8) In consultation with affected landowners, tenants, members of the community and technical specialists, a number of possible alignments and access points off the existing public highway were considered within the broad corridors described above.
- 9) Taking into account environmental, community, constructability and safety considerations, West Bradford Route 1 was considered to be the most feasible and advantageous alignment. It was preferred to West Bradford Route 2 as that option would involve all construction traffic travelling past Waddington and West Bradford Primary School. In addition, Waddington Routes 1, 1a and 2, whilst having the benefit of joining Slaidburn Road north of Waddington, would have resulted in substantial tree removal either within, or adjacent to, an area designated as ancient woodland. It was also considered likely to involve significant temporary works with associated environmental impacts. Waddington Route 3 was discounted on the basis that it would require all construction traffic to travel through Waddington village, reducing the potential community benefits associated with the construction of a temporary haul route.
- 10) For these reasons West Bradford Route 1 was considered feasible and as such was taken forward for assessment.

3.3 General Approach to Design

- 11) United Utilities started the initial design in 2018 for the Proposed Programme of Works and commenced environmental surveys in 2019. The various planning applications for the Programme of Works, of which the Proposed Marl Hill Section forms a part will be submitted in 2021. Pending the timing and outcome of the planning decision construction could start in 2023 with completion of the Proposed Programme of Works anticipated in 2029.
- 12) There are various technical requirements that have influenced United Utilities' overarching design approach for the Proposed Ribble Crossing , including:
 - The need to provide sufficient highway capacity for vehicles to serve the construction sites. The anticipated total vehicles movements through Waddington for the construction period is approximately 120,000. The approximate split of these movements is anticipated to be 60 % heavy goods vehicles and 40 % light vehicles.

- The position of the tunnelling sites which are fixed to connect to the existing aqueduct
- A need for the Proposed Programme of Works to be designed, built and operated safely.

13) Throughout the development of the design for the Proposed Ribble Crossing, a general approach has been to meet the objective of reducing community impacts while balancing the need to avoid or minimise any potential adverse effects on landowners and tenants, their farming businesses, and the environment. Additionally, the River Ribble poses a significant design constraint, both from the perspective of its environmental sensitivity, and the flood risk it poses to the proposed haul route and downstream properties. Finally, the approach to design and construction has reflected the fact that although anticipated to be in operation throughout the construction phase (up to around 2029), the Proposed Ribble Crossing must be removed and the land fully reinstated to its previous agricultural use.

3.4 Design Evolution

14) Once West Bradford Route 1 had been selected to be taken forward as the preferred solution, United Utilities undertook a feasibility assessment to: firstly, identify a suitable development envelope within which the proposed haul route (including a crossing over the River Ribble) could be delivered taking account of broad environmental constraints; and secondly, validate the indicative alignment of the route within the development envelope in order to provide a basis of assessment for the EIA. Desktop and field surveys were undertaken to define and validate the development envelope (which in turn became the planning application boundary) and the indicative alignment of the haul route (refer to Volume 6 Figure 3.1). Negotiations with landowners commenced at that point to identify mitigation measures to reduce the impact of the temporary haul route.

3.5 Development Description

- 15) The Proposed Ribble Crossing would be a two lane carriageway some 7.7 m wide and approximately 1,450 m in length. The road and bridge would be temporary structures in place for the duration of the construction of Proposed Marl Hill Section. The road would be fully removed, and the land reinstated, once the tunnel construction works have been completed. During the works the road would be reserved for the use of all construction traffic. Public access to the road would be prohibited through the provision of vehicle barriers at either end of the road and, possibly, a security presence.
- 16) The road would be suitable for heavy goods vehicle use, including exceptional loads, and would be surfaced with a tarmac material based on a stone aggregate foundation.
- 17) A temporary bridge crossing of the River Ribble is incorporated into the proposals. The structure would be a Bailey bridge type clear span construction, of approximately 70 m length, supported on columns either side of the river. The bridge would extend over the adjacent flood plain with additional bridge sections either side of the river crossing. Overall, the bridge would be approximately 175 m in length. Earthwork abutments would be required either side of the bridge.
- 18) With the exception of the bridge, the road would be constructed to suit the existing topography. Cuttings and embankments would be kept to a minimum and would only be made to create a suitable profile for the road.
- 19) Drainage would be provided to keep the road surface and foundations free from water. A drainage system would be put in place; this would attenuate and treat the water prior to discharge into the River Ribble at a rate not exceeding greenfield run off. Four new outfalls would be linked to the highway drainage system: three new outfalls and three new headwalls serving drainage into the Ribble, and one new outfall and one new headwall serving Coplow Brook.
- 20) The route of the road has been selected to keep to the periphery of field boundaries where possible. Gated crossing points would be provided for landowners and tenants to enable access to land that the road crosses.
- 21) The haul route would cross a number of public rights of way (PROWs) including the Ribble Way. The temporary bridge would cross over the Ribble way with sufficient clearance to avoid any disruption to access apart from during the bridge construction which may require a temporary diversion. Gated

crossing points would be provided to ensure continuity of access for any other affected public rights of way.

- 22) Temporary laydown areas would be established for the construction and removal of the route, but these would not be present when the road is in use.
- 23) The construction of the road would require removal of topsoil and sub-surface material where required. These materials would be stockpiled adjacent to the haul route at intervals and would be re-used to reinstate the land once the haul route is removed.

3.5.1 Phases of Construction Works

- 24) Table 3.1 lists the construction-related activities which are expected at each of the phases of the proposed construction works.

Table 3.1: Construction activities associated with each phase of work

Works Phase	Activities
Enabling Works	1 Site clearance. 2 Earthworks and levels.
Construction Works	3 Construction of bridge and road.
Operation	4 Haulage route in use for vehicles serving the Bonstone and Braddup compounds.
Decommissioning	5 Removal of infrastructure including the bridge. 6 Reinstatement to pre-enabling works condition.

3.6 Construction Code of Practice

- 25) The Construction Code of Practice introduced and explained in Volume 2 Appendix 3.2 would be equally applied where appropriate to construction of the Proposed Ribble Crossing.