

Design & Access Statement and Heritage Statement for Grade II Listed Redmire Bridge



Prepared By	Sarah Chadwick
Checked By	Philip Howarth
Approved By	Jemma Reay
Version	1

REDMIRE BRIDGE

Executive Summary.

Redmire Bridge is a Grade II listed masonry arch structure comprising three equal 8.5 m spans which carry the single track C199 minor road over the Tasset Burn. The C199 road is signed as “Unsuitable for HGV’s”. The bridge is located at Ordnance Survey Grid Reference 378789E, 585874N (see figure 1) within the boundaries of Northumberland National Park.

The bridge is formed from sandstone ashlar masonry featuring three broad segmental arch rings which support masonry spandrels and a parapet with a broad chamfered band at the base. The narrow parapet is chamfered towards the outside only and is noted to be low in height. The piers feature keeled cutwaters to up and downstream elevations.

A MEXE assessment undertaken by Northumberland County Council (NCC) found the bridge to be understrength, with the west and central arch having an Assessed Live Load (ALL) of 40/44 tonnes and the east span 12.5 tonnes. This resulted in an allowable capacity for the bridge as 7.5 tonnes according to the BD21 Standard “The Assessment of Highway Bridges and Structures”.

The scheme proposals are to undertake strengthening works to increase and maintain the capacity of the bridge to 40/44 tonnes.

This report provides additional information in support of the Listed Building Consent Application.

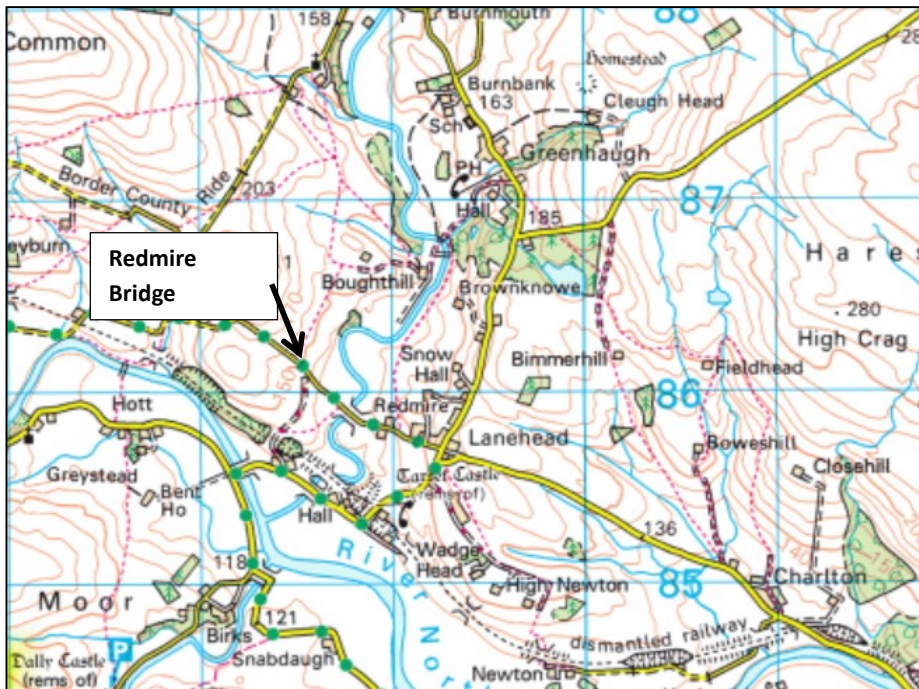


Figure 1 Redmire Bridge Location

Reproduced from the Ordnance Survey mapping with permission of the Controller of Her Majesties Stationary Office. © Crown Copyright. NORTHUMBERLAND COUNTY COUNCIL OS LICENSE NUMBER – 100021901 (2007)

REDMIRE BRIDGE

Introduction and Background Information.

Introduction

This Design and Access and Heritage Statement has been prepared in order to demonstrate the requirement for strengthening works to be carried out to Redmire Bridge, a three span Grade II listed masonry arch structure carrying the single track C199 minor road over the Tarsset Burn, and to accompany a Listed Building Consent Application deemed necessary for the works.

Original Structure

Redmire Bridge comprises a three span masonry arch structure supported upon masonry piers and abutments. The arch spans are equal, measuring approximately 8.5m each. The structure dates from the early 19th Century and is Grade II Listed. It carries the C199, a minor single carriageway road over the Tarsset Burn, in the hamlet of Redmire, approximately 7 kilometres northwest of Bellingham. The bridge is formed from sandstone ashlar masonry, featuring three broad segmental arch rings which support masonry spandrels and a parapet with a broad chamfered band at the base. The narrow parapet is chamfered towards the outside only and is noted to be low in height. The piers feature keeled cutwaters to up and downstream elevations.

The bridge has an allowable capacity of 7.5 tonnes with the East Span being the governing factor.

Condition of Structure

The bridge is generally in fair condition, with arch barrel and spandrel wall joints well pointed. There are several cracks apparent to both elevations spanning between the top of the pier cutwaters up to the parapet stringcourse. The central span downstream elevation exhibits a vertical crack through the spandrel between quarter and mid span, a crack was also noted spanning across the depth of a single voussoir stone. Vertical cracks were also evident at the interface between pier face and cutwater stonework. Evidence of stone crushing can be seen along the length of the springing to the south abutment. Displaced arch barrel blocks were observed at the crown of both side spans, and possibly the centre span, however, there is some uncertainty since water levels precluded closer inspection. Cutwater masonry exhibits open joints and spalling, with evidence of recent damage to upstream masonry, perhaps as a result of debris collision during a flood event. Active seepage was noted in isolated areas of the northwest side span. Evidence of seepage was also noted to other spans, including pier and abutment faces.

The carriageway over the bridge appeared to be in fair to poor condition. Verges to both sides of the road were overgrown with vegetation.

See Appendix A for photographs.

REDMIRE BRIDGE

Site Constraints

Access across the bridge

The bridge carries the C199 which is a minor single carriageway road. The bridge represents an essential link in the local highway network. The Reivers Cycle Route, NCN 10 crosses over the bridge.

Diversion routes in the locality are available should the bridge require closure to facilitate repairs. A diversion plan is included at Appendix B.

Environmental and ecology

Redmire Bridge crosses Tarsset Burn. Total Ecology was commissioned by Northumberland County Council in January 2020 to undertake a desk based study and an extended Phase 1 update survey of Redmire Bridge. Surveys were completed for the bridge in 2016 and 2017 by Total Ecology Ltd and as it had been over two years since the last survey, an updated survey was instructed. The updated survey concluded that the works may impact or cause disruption to protected species or local wildlife, depending on the nature of works; and therefore care must be taken to avoid any disruption.

The updated survey states that the MAGIC search revealed one Site of Special Scientific Interest (SSSI) within 2km of the site known as Greenhaugh Meadow, approximately 1.1km to the north east. Additionally, this area is also designated as North Pennine Dales Meadows Special Area of Conservation (SAC).

No works are envisioned as being required under the structure or within the watercourse.

The updated survey is included with the Listed Building Consent application.

Proposed Works

Works are required to Redmire Bridge which has been assessed as under strength to increase the Highway Loading Capacity to 40/44 tonnes (current allowable capacity is only 7.5 tonnes).

Only the East Span is understrength so it is proposed CINTEC anchors will be installed from the carriageway level over the bridge at that location, removing the need to work within the watercourse.

Following the CINTEC anchors installation, the existing road level and fill will be removed to the East Span, nominally 200mm thick and replaced with a waterproofing slab with a downstand at the south abutment. Similarly, waterproofing slabs will be cast over the other spans with a downstand at the north abutment. Waterproofing slabs are required because the existing bridge is subject to water ingress which affects its condition and therefore its load carrying capacity.

The proposed works will arrest deterioration by stabilising the existing structure. This will be achieved following the principle of minimum intervention to ensure the external character of the bridge is not compromised.

Carriageway reconstruction will maintain the existing road width and include kerbs with hardened verges to prevent water ingress and to mitigate the risk of falling with the low parapet present.

REDMIRE BRIDGE

Impact of Development

Several options have been considered prior to the choice of proceeding with the proposed works:

Do nothing - The bridge has been identified as being under strength, as such it may be being overloaded which could lead to deterioration and eventual collapse. This poses an unacceptable risk to the bridge, a valuable heritage asset, and to the travelling public.

Road Closure – Closure of the bridge would be very disruptive to the local community, as this provides an essential link to the local highway network, the farming community in particular.

Weight restriction - There is currently a case for the introduction of restrictions given the structures allowable capacity of 7.5 tonnes. Imposing a weight restriction would reduce the load applied to the under strength elements and eliminate the risks presented. However, as the route is an essential link to the local highway network, this may prove extremely disruptive to some road users. Furthermore a weight limit cannot be enforced, so the risk of the structure being overloaded will continue. This poses an unacceptable risk to the bridge, a valuable heritage asset, and to the travelling public.

Maintenance and monitoring works – Whilst this option will ensure the bridge is regularly maintained and would address the visible cracking and mortar loss, it would not address the fundamental capacity issue. This poses an unacceptable risk to the bridge, a valuable heritage asset, and to the travelling public.

Strengthening –Strengthening of the bridge, provides the best option of eliminating the risk associated with an under strength structure. Strengthening will increase the capacity to 40/44 tonnes, and allow all road users to continue utilising the route following the works. In addition, strengthening works will maintain the structural integrity of the bridge, ensuring longevity of this valuable heritage asset.

Access to the Works

Access to the areas to undertake the proposed strengthening works will be from above the structure to negate the need to work within the watercourse. A road closure will be required to provide a safe working zone as per Chapter 8 regulations. Works areas will be securely guarded and appropriately fenced to prevent unauthorised or accidental access.

Any works affecting vehicle access will be undertaken at a time to minimise any resulting disruption.

REDMIRE BRIDGE

APPENDIX A – PHOTOGRAPHS



Photograph 1 – Poor surfacing and vegetation growth in verges looking southeast over bridge
(16.10.2016)



Photograph 2 – Dampness and staining to arch barrel masonry of north abutment

REDMIRE BRIDGE



Photograph 3 – Bulging spandrel wall above west pier upstream elevation

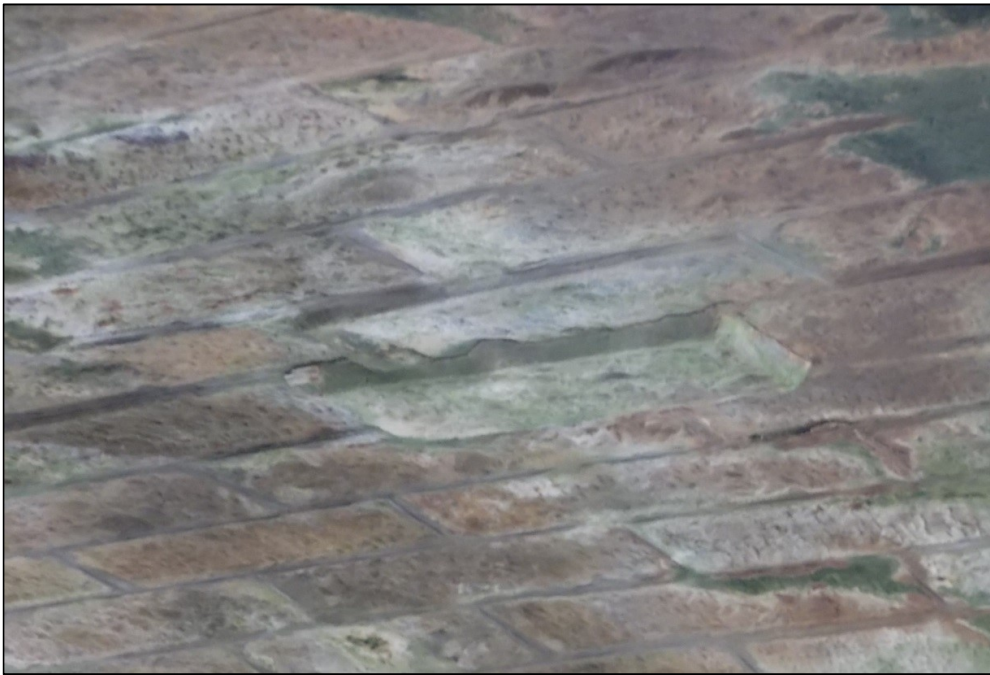


Photograph 4 – Crack above east pier to downstream elevation

REDMIRE BRIDGE



Photograph 5 – Crack in centre span spandrel to downstream elevation



Photograph 6 – Displaced masonry block to south span arch crown

REDMIRE BRIDGE



Photograph 7 – Masonry crushing at south abutment springing

REDMIRE BRIDGE



Photograph 8 – Crack and open joints to east pier downstream cutwater



Photograph 9 – Open joints in east pier upstream cutwater, note evidence of recent spalling

REDMIRE BRIDGE



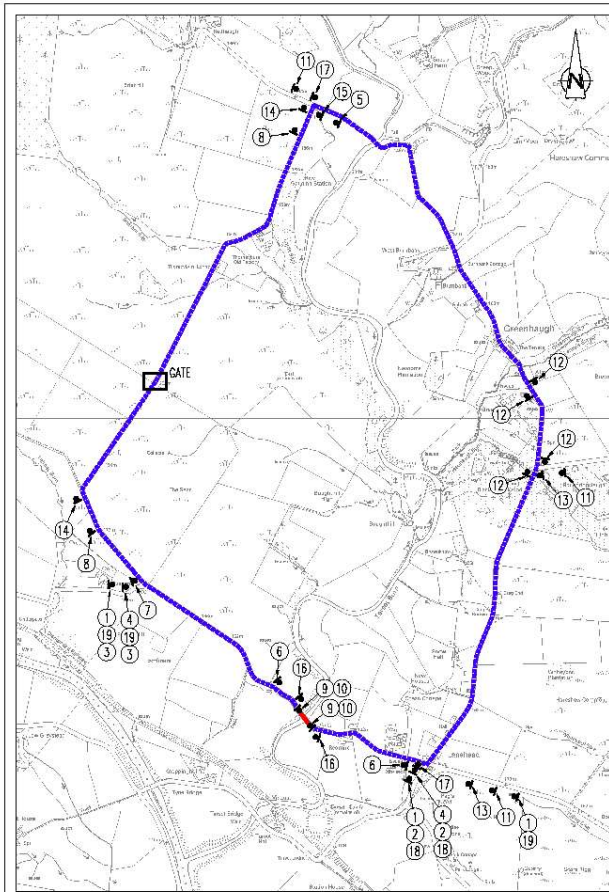
Photograph 10 – Downstream verge BT duct (05/12/2016).



Photograph 11 – Abandoned water main cover to the Upstream verge (05/12/2016).

REDMIRE BRIDGE

APPENDIX B – DIVERSION ROUTE



SCHEDULE OF SIGNS					
SIGN REF. No.	TSPRD2 2002 DMC No.	LEGEND	No. OFF.	SURFACE	REMARKS
1	7001		3	CLASS R2	BLACK ON WHITE
2	572		2	CLASS R2	BLACK ON WHITE
3	573 VARIANT		2	CLASS R2	BLACK ON WHITE
4	7010.1(3)		2	CLASS R2	WHITE ON RED
5	2703 VARIANT		1	CLASS R2	BLACK ON YELLOW
6	2702 VARIANT		2	CLASS R2	BLACK ON YELLOW
7	2702 VARIANT		1	CLASS R2	BLACK ON YELLOW
8	2703 VARIANT		2	CLASS R2	BLACK ON YELLOW
9	7010.1(4)		2	CLASS R2	WHITE ON RED
10	7010.1		2	CLASS R2	WHITE ON RED
11	-		3	CLASS R2	BLACK ON YELLOW
12	2703 VARIANT		4	CLASS R2	BLACK ON YELLOW
13	2702 VARIANT		1	CLASS R2	BLACK ON YELLOW
14	2704		2	CLASS R2	BLACK ON YELLOW
15	2704 VARIANT		1	CLASS R2	BLACK ON YELLOW
16	-		2	CLASS R2	BLACK ON YELLOW
17	2702 VARIANT		2	CLASS R2	BLACK ON YELLOW
18	573 VARIANT		2	CLASS R2	BLACK ON WHITE
19	572		3	CLASS R2	BLACK ON WHITE

CONTRACT DRAWING No.	DATE: 15/08/2019
Northumberland Northumberland County Council	
<small>All rights reserved. In use of this document or its contents without the written permission of the author is prohibited. The author shall not be held liable for any loss or damage arising from the use of this document. The author shall not be held liable for any loss or damage arising from the use of this document.</small>	
LEGEND DIVERSION ROUTE ROAD CLOSURE	
 NORTH	
Drawing Status: CONSTRUCTION Issue: NORTHUMBERLAND COUNTY COUNCIL, COUNTY HALL, NORTHERN, NORTHUMBERLAND, NE18 2BT Job Title: C199 REDMIRE BRIDGE MASONRY ARCH REFURBISHMENT Drawing Title: DIVERSION PLAN Scale: 1:10000	
Northumberland Northumberland County Council TECHNICAL SERVICES	
Date: OCT 16 Drawing Number: NAK 51707/19/C199/14/03 Job Number/Title: NAK	Checked: [] Approved: [] Date: