

APPENDICES

(i) Consultation with Historic England



Mr Andy Thompson
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Direct Dial: 01904 601948

Our ref: PA 01152705

30 March 2021

Dear Mr Thompson

Pre-application Advice

ALDWARK BRIDGE, ALDWARK, NORTH YORKSHIRE

I am writing in response to your recent request for pre-application advice on the proposals for Aldwark Bridge. We offer the following comments:

Historic England Advice

Significance of the heritage assets

Aldwark Bridge is a particularly interesting example of a privately owned tollbridge still in operation. While elements of the bridge date to the mid-later 18th century, the iron-framed central section with timber deck forms a later 19th century addition. The resultant bridge structure makes for a very characterful arrangement which is both instantly recognisable and well regarded. The traditional construction methods used, materials palette and appearance all make an important contribution to the significance of this bridge.

Impact of the proposals on Significance

We are broadly supportive of works which look to safeguard the immediate and long-term future of this grade II listed bridge.

Two options have been proposed regarding works to the deck: Option 1- repair the timber deck; and, Option 2- replace the timber deck with a steel plate deck. We support the principle of repairing the timber deck on a like-for-like basis and consider that Option 1 could be an appropriate and sympathetic approach. We are not supportive in principle of Option 2 and the introduction of a steel plate deck.

Notwithstanding our position, we make the following additional comments in regard to each of the options, as well as other elements of the proposals:

Option 1: Repairing the timber deck

The drawings indicate the full replacement of all lower timber members and 50% of upper timber members which form the deck. It is our view that new proposals should start with a presumption in favour of the preservation of historic fabric and should maximise opportunities to better reveal the significance of the structure.



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We support the principle of repair to the timber deck. However, we note that while major signs of rot to the upper timber members of the deck have been noted in the Principal Inspection Report, this is classified as affecting less than 5% of the total area of the upper deck. A more targeted approach to replacing timber members may, therefore, be more proportionate.

It is also not clear from the information provided whether a physical inspection of the lower timber members has taken place to confirm their structural condition. Severe damp staining is to be expected given that water has been able to pass through the joints of the upper deck; however, this may not necessarily render the timber members unserviceable.

The physical inspection of each timber member alongside the adoption of a formal criteria to determine its suitability for retention would be very useful in refining the level of replacement required.

We would also welcome early incorporation of a deck drainage system in any repair/replacement work, given that this seems to have been the main cause of degradation to the timber members.

Option 2: Introduction of a steel plate deck

We do not consider that the introduction of a steel plate deck pays any regard to the special interest of this grade II building as is required by Section 66(1) of the Planning (Listed Buildings and Conservation Areas) Act 1990. It is our position that Option 2 would cause a high degree of harm to the heritage significance of this nationally important historic structure.

We do not see any justification for the harm that the introduction of a steel plate deck would cause to the special interest of the listed bridge. We do not consider any public benefits which might flow from this element of the proposal to outweigh this harm.

We consider that works to the deck can be achieved in a less harmful manner, as demonstrated by Option 1, while still realising the ambitions of the proposal. We strongly urge an approach which retains the bridge's historic character and fabric.

Repair of Masonry Arches

We appreciate that the masonry arches are suffering from defects related to water ingress through the barrels. This has led to mortar loss, and some movement and separation of the joints. We make no objection to the repair of these as proposed in Section 6, page 29 of the Principal Inspection Report.

Rivets

While small, rivets make an important contribution to the character of this historic bridge. Our preference in this proposal is for rivets, rather than bolts, as this would



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help to maintain its traditional construction and appearance. There is a dedicated number of companies within Yorkshire and the North East who make rivets and who have worked successfully on historic bridge structures.

Cleaning

Moderate corrosion and loss of protective coating has been recorded, suggesting that the corrosion is limited to the surface and is not of structural concern at the moment. Cleaning, localised repair and re-painting should be adequate in most locations.

We note that the recommendation is to sand-blast. Consideration should be given to gunning or soda-blasting.

Vehicle restraint system

Careful consideration should be given as to whether a vehicle restraint system is appropriate given the bridge's heritage significance, and the vehicle restrictions and speed limits already implemented on crossing the bridge.

Early engagement with the LPA

Our position is given without prejudice to the position of the LPA. We would recommend early engagement with this pre-application process and in regard to the scope of any future listing building consent applications.

Next Steps

Thank you for involving us at the pre-application stage. This letter concludes our free cycle of pre-application advice. Taking into consideration the points raised above, you are advised to discuss your proposal in detail with Hambleton District Council's heritage advisers.

Yours sincerely

Suzanne Lilley

Inspector of Historic Buildings and Areas
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List of information on which the above advice is based

Existing Sections and Detail- February 2021
Existing Aldwark Toll Bridge Plans- January 2021
Existing Elevations and Section- January 2021
Proposed Works to Aldwark Toll Bridge Option 1- January 2021
Proposed Works to Aldwark Toll Bridge Option 2- January 2021
Principal Inspection Report- January 2020



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<https://www.historicengland.org.uk/terms/privacy-cookies/>



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13 August 2021

Dear Mrs Waddington

Arrangements for Handling Heritage Applications Direction 2021

ALDWARD TOLL BRIDGE, ALDWARD, NORTH YORKSHIRE Application No. 21/01722/LBC

Thank you for your letter of 26 July 2021 regarding the above application for listed building consent. On the basis of this information, we offer the following advice to assist your authority in determining the application.

Summary

Historic England is supportive, in principle, of works which look to repair and safeguard the immediate and long-term future of this grade II listed bridge. Nonetheless, we have concerns regarding the current approach to fully replace all the timber members, replace rivets with bolts, and the use of sandblasting.

As per our pre-application advice, new proposals should start with a presumption in favour of the preservation of historic fabric. It was also our advice that we couldn't support proposals which lacked clear and convincing justification for the replacement of historic fabric. It is disappointing, therefore, that this application has been submitted without any information in support of the current approach.

We make the following additional comments on individual elements of the scheme, which we hope your authority will find useful.

Historic England Advice

Significance of the heritage assets

The grade II listed Aldward Bridge is a particularly interesting example of a privately-owned tollbridge still in operation. While elements of the bridge date to the mid-later



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18th century, the iron-framed central section with timber deck forms a later 19th century addition.

The resultant bridge structure makes for a very characterful arrangement which is both instantly recognisable and well regarded. The traditional construction methods used, materials palette and appearance all make an important contribution to the significance of this bridge.

Impact of the proposals

Historic England is supportive, in principle, of works which look to repair and safeguard the immediate and long-term future of this grade II listed bridge. Nonetheless, we have concerns regarding the current approach to fully replace all the timber members, replace rivets with bolts, and the use of sandblasting.

As per our pre-application advice, new proposals should start with a presumption in favour of the preservation of historic fabric. It was also our advice that we couldn't support proposals which lacked clear and convincing justification for the replacement of historic fabric. It is disappointing, therefore, that this application has been submitted without any information in support of the current approach.

We make the following additional comments on individual elements of the scheme.

a. Replacement of the timber deck

The drawings indicate the full replacement of all upper and lower timber members which form the deck. As part of pre-application discussions relating to the replacement of 50% of upper timber members, a recent Principal Inspection Report produced by the applicant classified major signs of rot to the upper timber members as affecting less than 5% of the total area of the upper deck. We therefore fail to see why the application is now for the full replacement of all upper and lower timber members.

It was our pre-application advice that a more targeted approach to replacing timber members was required. We considered that a physical inspection of all timber members to confirm their structural condition, alongside the adoption of a formal criteria to determine its suitability for retention, would be very useful in refining the level of replacement required. From the submitted information this does not appear to have been pursued in the development of this application.

b. Replacing rivets with bolts

We remain concerned by proposals to replace rivets with bolts. Our pre-application advice was that while only small, rivets make an important contribution to the character of this historic bridge. Our preference, therefore, remains for the like-for-like





replacement of the rivets, rather than the introduction of bolts, as this would help to maintain its traditional construction and appearance.

c. Sandblasting

From our pre-application discussions with the applicant, it is understood that moderate corrosion and loss of protective coating has been recorded. This may suggest that the corrosion is limited to the surface and is not of structural concern at the moment. Cleaning, localised repair and re-painting should be adequate in most locations. Our pre-application advice to the applicant was to consider alternatives to sandblasting, such as gunning or soda-blasting.

Historic England's position

We are supportive of the applicant's ambition to repair and safeguard this important grade II listed building. However, we remain concerned regarding the proposed replacement of the entire timber deck, introduction of bolts and use of sandblasting.

It is our position that the current application lacks clear and convincing justification for the level of intervention proposed and does not meet the requirements of the National Planning Policy Framework (NPPF) paragraphs 194, 199 and 200. While the harm arising from the application would be less than substantial, it would still be material.

An approach which starts with the presumption in favour of repair and retention of the existing structure and seeks to add sensitively and sympathetically where fabric is missing should be pursued.

Recommendation

Historic England has concerns regarding the application on heritage grounds.

We consider that the issues and safeguards outlined in our advice need to be addressed in order for the application to meet the requirements of paragraphs 194, 199, 200, 202 and 206 of the NPPF.

In determining this application, you should bear in mind the statutory duties of section 66(1) of the Planning (Listed Buildings and Conservation Areas) Act 1990. Section 66(1) requires you to have special regard to the desirability of preserving listed buildings or their setting or any features of special architectural or historic interest which they possess.

In addition, please bear in mind your statutory duties of section 38(6) of the Planning and Compulsory Purchase Act 2004. It requires you to determine planning applications





Historic England

in accordance with the development plan unless material considerations indicate otherwise.

Your authority should take these representations into account in determining the application. If you propose to determine the application in its current form, please inform us of the date of the committee and send us a copy of your report at the earliest opportunity.

Yours sincerely

Suzanne Lilley

Inspector of Historic Buildings and Areas

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3 March 2022

Dear Mrs Waddington

Arrangements for Handling Heritage Applications Direction 2021

ALDWARD TOLL BRIDGE, ALDWARD, NORTH YORKSHIRE Application No. 21/01722/LBC

As you are aware, we received an email from the applicant on 2nd March 2022 regarding further information on the above application for listed building consent. On the basis of this information, we offer the following advice to assist your authority in determining the application.

Historic England Advice

We have previously commented on the application on 13th August 2021 when we outlined the significance of the bridge and set out advice regarding the perceived impact of the development on its significance. Since then, we have been in correspondence about the development of the scheme and material alterations to the proposals. These comments should thus be read in conjunction with our previous correspondence on the matter.

We remain supportive, in principle, of works which look to repair and safeguard the long-term future of this Grade II listed bridge. We recognise the applicant's commitment to addressing our initial concerns.

We welcome the omission of the proposals to replace the existing rivets with bolts in favour of more sympathetic and appropriate like-for-like replacement of these features. We also appreciate that where rivets have been unsympathetically replaced in the past, the intention is to reinstate the original fixings.

We realize that the replacement of the entire timber deck, including both upper and lower board layers, is still proposed. However, it is our view that a clear and convincing justification has now been submitted to account for the works, including evidence of the recent date of the existing timbers. Consequently, we are of the view that the



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proposed new decking offers an acceptable solution on heritage grounds.

We also recognise the more nuanced approach to the proposed cleaning of the existing metalwork. We do strongly recommend that sandblasting is limited to selected areas where this method is considered absolutely necessary, otherwise substituted for the use of hand and less 'invasive' power cleaning tools. This is to prevent unnecessary disturbance to the dated historic fabric.

On balance, we are satisfied that the proposals have been amended with regard to our previous advice. More clear and convincing justification has been submitted to support the various aspects of the scheme considered to be of particular concern. Consequently, it is our position that the revised scheme does give greater weight to the conservation of the asset and its significance.

Recommendation

Historic England has no objection to the application on heritage grounds.

If minded to approve the application in its current form, your authority should consider whether the application meets the requirements of the NPPF, in particular paragraph numbers 199, 200, 202 and 206 of the NPPF.

In determining this application, you should also bear in mind the statutory duties of section 66(1) of the Planning (Listed Buildings and Conservation Areas) Act 1990. Section 66(1) requires you to have special regard to the desirability of preserving listed buildings or their setting or any features of special architectural or historic interest which they possess.

Your authority should take these representations into account in determining the application. If there are any material changes to the proposals, or you would like further advice, please contact us. Please advise us of the decision in due course.

Yours sincerely

Paula Burbicka

Inspector of Historic Buildings and Areas

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(ii) Heritage Statement and Impact Assessment by PPIY Architects+ (with Appendices)



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ALDWARE TOLL BRIDGE
GREAT OUSEBOURNE
HARROGATE
NORTH YORKSHIRE



**HERITAGE STATEMENT AND
IMPACT ASSESSMENT**

3690/GRS/ EP
FEB 2022

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CONTENTS

INTRODUCTION.....	p. 2
HISTORICAL CONTEXT.....	p. 3
DESCRIPTION OF THE EXISTING STRUCTURE.....	p. 4
HERITAGE SIGNIFICANCE OF THE ASSET.....	p. 8
MONITORING OF THE STRUCTURE.....	p. 10
CONDITION AND PROPOSED REPAIRS	
- METAL ELEMENT DEFECTS.....	p. 11
- PROPOSED METAL ELEMENT REPAIRS.....	p. 13
- TIMBER ELEMENT DEFECTS.....	p. 14
- PROPOSED TIMBER ELEMENT REPAIRS.....	p. 17
IMPACT ASSESSMENT OF THE PROPOSED WORKS.....	p. 18
CONCLUSION.....	p. 19
APPENDIX	
1. List of toll bridges in the UK.....	p. 20
2. E-mail from previous Structural Engineer overseeing the 2000 refurbishment works...p.	21
3. 2005 proof of evidence by Richard Gibson.....	p. 22

INTRODUCTION

PPIY Architects+ were commissioned by Structural Engineers, Mason Clarke Associates, to provide specialist conservation consultancy input for proposed remedial works to the Grade II listed Aldwark Toll Bridge, on behalf of the client and current owner of the bridge Aldwark Toll Bridge LLP. The statement has been prepared by Evangelia Papakonstantinou, a RIBA chartered architect of PPIY Architects+ with a postgraduate MSc degree in Conservation and another MA degree in Cultural Heritage Management from the University of York.

Main elements of the structure of the bridge are currently in a poor condition and in a continuing state of deterioration. A substantial amount of work is required to safeguard the structure so that this can be enjoyed safely by its users in the years to come without compromising the appearance and significance of the heritage asset.

This Heritage Statement is made at the request of Hambleton District Council and Harrogate Borough Council, as the listed property lies between the two council area boundaries, and it should be read along with the rest of documentation submitted for Listed Building Consent for the proposed works (LBC application Ref 21/01722/LBC submitted to Hambleton District Council in July 2021). The statement considers the heritage significance of the designated asset within its setting and the impact of the proposed works taking into account the legislative framework of the National Planning Policy Framework (NPPF as last updated in July 2021), and in particular the relevant Section 16 for Protecting and enhancing the historic environment, the Planning Act 1990 for Listed Buildings and Conservation Areas and the Conservation Principles as set out by Historic England for the sustainable management of the historic environment published in 2008.

HISTORICAL CONTEXT

Aldwark bridge links the villages of Little Ouseburn on West and Aldwark on East with a crossing over the River Ure saving a detour of about 25 miles. Aldwark is a Saxon name from “ald weorc” meaning Old Fort, probably referring to a fort from Roman times¹. Drake's Eboracum refers to a Roman station on the banks of the river at Aldwark. The river and landing were used commercially from Roman times well into the present century, taking lead, minerals and farm produce downstream, lime and coal upstream. A warehouse, now gone, was built in the vicinity of the old fort at the bottom of Common Lane².

In 1772, John Thompson who was operating a ferry service crossing the river Ure at the current point of Aldwark Bridge, was given permission by an Act of Parliament to build a bridge at the same location, owing to the dangerous river conditions in the area. In the C19, the central span of the bridge was reported to have been washed away during floods and then rebuilt as the current standing structure³. Constructed of wrought iron beams supported by three sets of wrought iron shafts on trios of cast iron columns and with a double layer timber decking, assumingly out of hardwood, although the type of the original timber species is not known. The brick approach arches reinforced by piers and buttresses, as well as the abutment walls and piers at the banks, must date mainly from the original C18 structure.

Further C20 interventions include the laying of metalised finishes to both bridge approaches and the erection of concrete posts with timber rails to the parapets. The protection is of a very low standard in relation to current health and safety standards. Remedial works of extensive nature were undertaken in 2000, during which the timber decking was completely replaced along with the cross beams underneath.



Figure 1: The 18C brick flood arches of the West approach with the 20C concrete posts and timber rails to the upstands, built in a curved line.

¹ Information sourced from <https://www.aldwarkmanorhotel.co.uk/history-of-the-estate>

² Information sourced from <https://www.tollerton.net/history-of-aldwark>

³ Information sourced from

<https://historicbridges.org/bridges/browser/?bridgebrowser=unitedkingdom/boatlanebridge/>

DESCRIPTION OF THE EXISTING STRUCTURE

As already mentioned, the west and east bridge approaches are supported on brick flood arches which are enforced laterally by piers and buttresses (Fig.1, 2) generally as originally constructed in the C18. It is of particular interest that the west approach arcade is built in a curve to connect the skewed axis of Boat Lane, to the linear bridge spanning in the true direction of West to East. The start of the west approach is marked by the toll house on the North side and a big brick residential building (Bridge House) on the opposite South side.



Figure 2: Site plan of Aldwark bridge over the River Ure, where the curved west approach is evident.



Figure 3: The curvature to the West arcade to connect the main road to the river crossing.

The 19C rebuild to the central section, spans the river for approximately 55m and is approximately 4.5m wide. The section consists of two main wrought iron beams across the river which are connected by rivets to cross beams made of double angles, originally in wrought iron and covered with end plates. The structural loads are carried down via three pairs of circular wrought iron shafts, each supported on a trio of circular cast iron columns of smaller diameter fixed into the riverbed. All, or most of the cross beams, other than the principal beams which rest directly on the columns are understood to have been replaced with steel sections to match the existing profiles during the remedial works scheme in 2000 (refer to par. 2.12 of Appendix 3).



Figure 4: The two main horizontal beams spanning the river are interconnected with cross beams underneath, now replaced with new sections in steel.

The top decking consists of timber boards approximately 150mm wide and 100mm thick, which appear to span the bridge width in two sections halfway each, apart from the first four boards from East, which span the full width (see cover photograph). All the top boards are bolted down to a second layer of 260mm wide boards, which are fixed to the cross beams across the river (the top and bottom boards are placed perpendicular to each other). The centre of the bridge top decking is secured by a double row of bolts holding down the boards in the middle. In addition, a continuous steel strap acts as a strengthening element. It remains yet to be established whether these boards are one full width unit notched in the middle or two separate boards, although it is suspected that it could well be a combination of both cases. This will be made clear once the strap is removed to enable the proposed works. To the outer edges, the boards are again bolted down and further secured with short timber kerbs, with gaps between each kerb.

The lower decking consists of wider (260mm) timber boards 100mm thick spanning the cross beams across the river. There is another steel strap to the lower timber board layer running in the middle along the boards.

All the timber boards to both top and bottom layers are a recent replacement from the 2000 refurbishment (refer to e-mail from the structural engineer overseeing the 2000 works attached in Appendix 2).



Figure 5: The top decking is demarcated by a double row of bolts holding down the inner ends of the boards, the one row further aligned with a steel strap.

The parapets are constructed of wrought iron UC sections placed in a diagonal lattice, riveted together at each intersection and topped with a flat rail. The parapets are fixed along a bottom rail with rectangular wrought iron plates at the main connecting points to the principal cross beams providing a well bound iron frame.



Figure 6: The outer ends of the top decking are further secured with spaced out timber kerbs, while the parapets are made of wrought iron sections in a diagonal lattice with strengthening plates.



Figure 7: A bottom layer of timber boards is fixed across the crossbeam spans. A steel strap fixed along them is evident in the middle of the bridge width.

SIGNIFICANCE OF THE HERITAGE ASSET

Aldwark Toll Bridge is a Grade II Listed Building with a listing date from 1988. However, for some inexplicable reason and although the east part of the bridge lies within the Hambleton District Council, the bridge was only listed with Harrogate Borough Council until after 2000. The Listing reads as follows:

Description

The asset was previously listed twice also under List entry 1382008 (*apparently this was duplicated after Hambleton District Council also listed the bridge*). This entry was removed from the List on 25th February 2016.

SE 46 SE

4/9

12.12.88

GREAT OUSEBURN

BOAT LANE

Aldwark Bridge

II

Tollbridge. Mid C18, part replaced in late C19. Iron-framed bridge with timber decking, and one surviving brick arch on sandstone cutwater; flood arches red brick in loose English garden wall bond with sandstone dressings; sandstone and brick abutment walls and piers on Aldwark bank. Flat 4-span bridge on tall slender columns flanked by semi-circular brick arches between pilaster piers with round-arched recessed panels. Arch on Aldwark side is skewed and spans part of river. Arcades of semi-circular flood arches between pilaster piers and with flat, tooled coping, on each bank. Arcade on Aldwark bank terminates in splayed walls with flat coping, ramped up from piers with flat caps. Bridge statute approved in 1768; centre part washed away in flood of 1880.

Listing NGR: SE 46708 62177⁴

Although Aldwark bridge has been standing in this location since the C18, and the brick arches can certainly be dated from then, the central span iron structure and timber decking was rebuilt in the last part of the C19 as the original section had been washed away by a flood (or even an iceberg according to anecdotal sources). The ironwork is original to its majority, excluding the cross beams which were replaced in 2000 with steel sections to match the originals. The timberwork is a complete replacement from modern times, the most recent replacement again dated to the 2000 major repair works.

Consultation with Historic England at pre-application stage identified the heritage significance of Aldwark Bridge as follows:

“Aldwark Bridge is a particularly interesting example of a privately owned toll bridge still in operation. While elements of the bridge date to the mid-later 18th century, the iron-framed central section with timber deck forms a later C19 addition. The resultant bridge

⁴ Information sourced from <https://britishlistedbuildings.co.uk/101150281-aldwark-bridge-aldwark#.Yaon6Pn7SM8>

structure makes for a very characterful arrangement which is both instantly recognisable and well regarded. The traditional construction methods used, materials palette and appearance all make an important contribution to the significance of this bridge.”

Aldwark is one of eight privately owned toll bridges in the UK and one of less than twenty remaining toll bridges in the country. A list of these toll bridges can be found included in the Appendix. In this regard, the bridge is quite a unique structure on its own.

The differentiation in the building materials, as a result of the two main construction phases, is a very interesting aspect of this Grade II Listed Building. It is also one of few remaining timber deck vehicular bridges in Great Britain. Its design and layout are also of particular interest due to the extensive flood arches to both banks (22 in total) with the west bank side skewed to the linear axis of the actual river crossing. With its distinct appearance and structure, the bridge has a evidential value along with undeniably aesthetic value.

With regards to context and setting, the bridge is in the immediate vicinity of Aldwark Manor and Aldwark Conservation Area and is directly associated with the growth and development of the settlements of Aldwark, and Aldwark Manor. The crossing at this location, established since Roman times, has enabled the transport of goods and the movement of people bringing wealth to the local area. Historical value of an associative nature is therefore also part of the significance of this bridge.

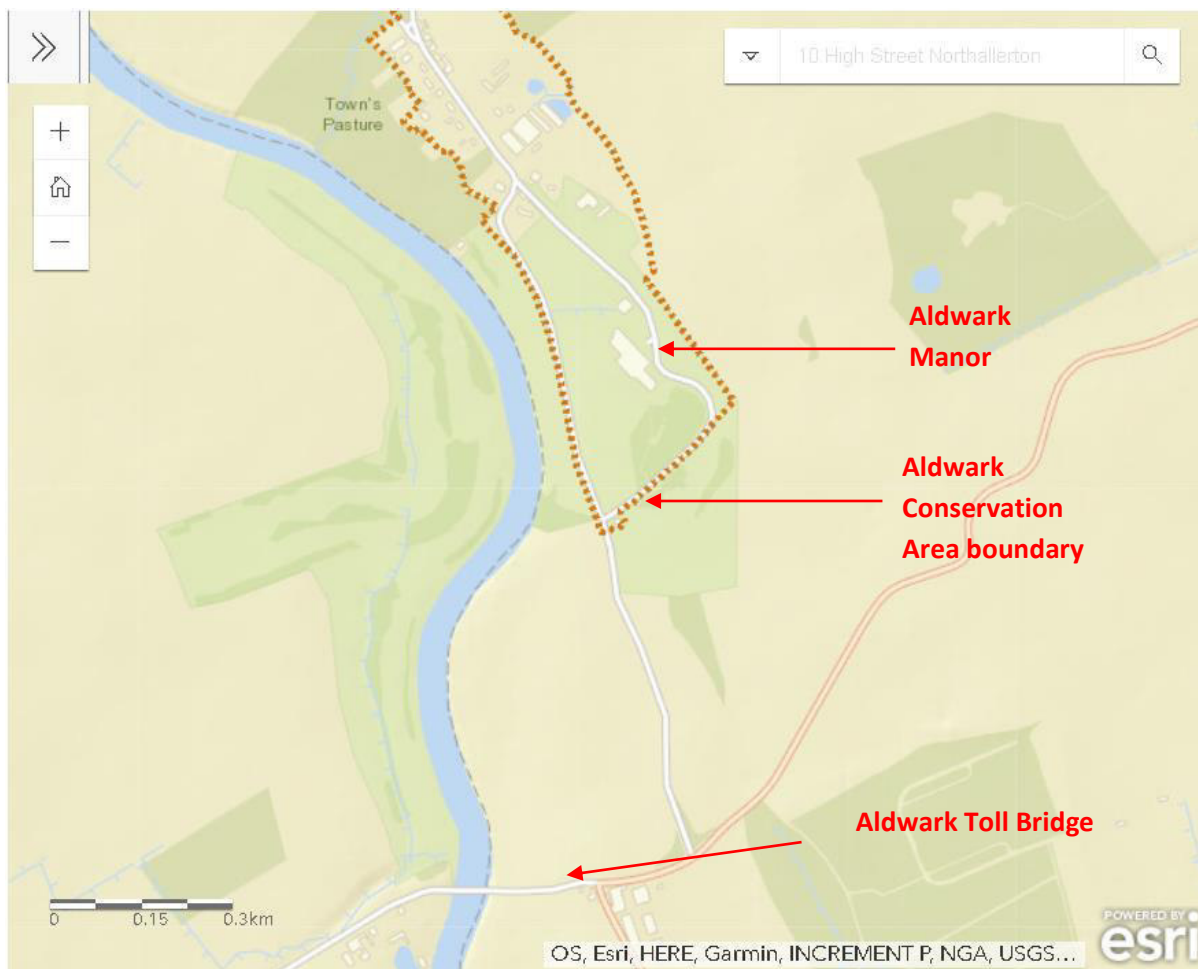


Figure 8: Aldwark Bridge in relation to Aldwark Manor and the Aldwark conservation area (Map of Conservation Area downloaded from Hambleton District Council webpage: <https://www.hambleton.gov.uk/planning/conservation-areas-listed-buildings?documentId=194&categoryId=20060>)

The bridge allows commanding views to the open fields around and is also highly visible from the west bank on the north side, where there is an opening for cars to park and a small jetty for small boat activity. This area is part of a wildlife area with picnic seating facilities along the north side of the west approach arcading. On the south side of the same approach, is based the Aldwark Scout Activity Centre, which makes regular use of the river facilities around the bridge. The bridge has become an intrinsic feature of the landscape of the river Ure at this location, since it was first built. Traffic using the bridge has increased over the years as well as boats using the river. The bridge with its distinctively recognisable appearance is highly valued among the local community, particularly as it offers a very practical connection between the two sides of the river, which saves a substantial detour. All the above show that there are undeniably social values attached to the bridge.

Despite this multifaceted significance, the bridge's condition has greatly deteriorated over the last few years. Unfortunately, as the bridge is privately owned, its condition depends largely on the good intentions and responsible maintenance management by its owners, with the last ones not having stood particularly efficiently to these, though not legally bound, responsibilities for a listed property. As a result, the listed bridge is now in need of remedial works in due course so that it can keep its functionality and sustain all its heritage values intact, in line with the Conservation Principles (Historic England 2008), the NPPF (2021) and as one of the main aims set with the Planning Act 1990 for decision makers on granting Listed Building Consent.

MONITORING OF THE STRUCTURE



Figure 9: North view of the West approach of the bridge with the toll house on right and the red brick house on left demarcating its beginning.

Following the purchase of the bridge by Aldwark Toll Bridge LLP, the structural engineers Mason Clark Associates were commissioned and undertook a thorough inspection in 2020 to record the condition of the various bridge elements. A more recent inspection was undertaken at the beginning of 2022, which is submitted as part of the documentation with the LBC application pack. The inspections revealed various areas that were in urgent need

of repair, both to the river span section and the masonry arches. The inspection identified continuing deterioration of all bridge elements.

Aldwark Toll Bridge LLP have only limited funds to repair the structure, the intention is therefore to focus only on the most urgent remedial works to secure the structure and safeguard it for the current and future users. It is clearly apparent on visiting the site, the general neglected state of maintenance and repair of the bridge. The main areas requiring urgent attention in line with the structural engineer's recommendations are identified as follows:

- Replacement of the entire timber deck, including both upper and lower board layers.
- Removal of existing failed coatings and rust to metalwork and redecoration.

The condition of both elements is further explained below along with the proposed repairs.

CONDITION ASSESSMENT AND PROPOSED REPAIRS

METAL ELEMENT DEFECTS

The protective coating of the ironwork has been damaged to a great extent and completely lost in some areas. Consequently, the iron surface has corroded where exposed. This condition is most severe at the top and bottom surfaces of the metal sections and at junctions where water can collect. Elsewhere the coatings are stained by dirt and rust etc. and there is substantial flaking of protective coatings and lichen growth. In addition, there is loss of fixings and evidence of localised replacement of original rivets with bolts. All these defects contribute to a far from satisfactory appearance, while also threaten the structural integrity of the bridge. *(A few indicative photographs are included here, but a comprehensive photographic record of the current condition can be found in the latest structural engineer's report).*



Figure 10: Protective coatings to metalwork are damaged and flaking leaving the metal surface vulnerable to corrosion. This is particularly evident at the top surfaces of the parapets.



Figure 11: Close up of the damaged coating at the top surface of the parapet with corrosion taking place underneath the protective coating and lichen growth being encouraged.



Figure 12: Corrosion has taken place to a significant degree to the cross beams below the timber decking.



Figure 13: Deterioration extends to more protected elements which are stained with dirt and lichen growth, which will eventually affect the coating which will deteriorate further.

PROPOSED METAL ELEMENT REPAIRS

A holistic approach is proposed for cleaning all metal surfaces as necessary and stripping the existing coating where this has failed, so that all loose material is removed and a sound surface is left for redecoration. A suitable protective paint system to closely match the existing finish will be applied. This approach will guarantee that all historic iron and modern steel elements will be brought to a similar condition, quality and finish standard, avoiding any disturbing differentiation between new and older interventions.

This approach will also avoid future disruption to the structure and usage if further works had to be undertaken on areas thought to be currently not urgent. The latter is particularly important as the bridge is the only river crossing for a substantial distance.

As listed in the English Heritage Practical Building Conservation series -Metal (p. 179), the effectiveness of a coating depends on the following parameters:

- the condition of the substrate
- the preparation of the surface
- the choice of coating system
- the thickness of the coating
- the environmental conditions
- the ongoing care and maintenance.

According to the Historic Scotland Inform Guide on the maintenance of iron gates and railings, *“if the iron surface has not been properly cleaned and prepared before painting, the paint is less likely to provide good protection”*.

While Keith Blackney states that “air abrasive blast cleaning is now the most widely used method of surface preparation for volume work. The method can be adjusted to produce a range of cleanliness levels and surface profiles, which are often specified by the coatings

manufacturers to achieve optimum performance of their products. For better control, heavy corrosion scales can be cleaned by hand before the application of sandblasting⁵.

Taking all the above into consideration it is proposed that the preparation of all the rusted areas and failing existing coatings will be mainly achieved with careful sandblasting to the wrought iron and steel elements. An appropriate grade, tailored to the requirements of the specific area being treated, will be selected to minimise a loss of historic fabric. The overarching principle will be to remove only loose material and none of the sound historic metalwork surfaces. Coatings are to be retained if sound and painted over.

To achieve this, sandblasting will be applied carefully starting with the finest grade and lowest pressure and adjusting the parameters progressively to achieve the absolute necessary cleaning of the surface and nothing beyond that point. Where the defects are of very localised character, the use of hand and power cleaning tools will be prioritised as the preferred method to begin with. It is envisaged that this combination methodology, tailored to each area's specific needs, will provide a gentle enough approach to the historic metalwork yet provide a clean surface sufficient to receive a new protective coating system without causing any unnecessary disturbance to the actual material itself.

TIMBER ELEMENTS DEFECTS



Figure 14: The top decking as viewed from the east approach. The uneven surface is evident with boards having sunk and others projecting.

Both layers of the existing timber deck were fully replaced in the 2000 refurbishment works, with Opepe C27 boards. The top decking has been replaced since then, where they had deteriorated to such a great degree that they were posing a safety hazard. The boards

⁵ Sourced online from <https://www.buildingconservation.com/articles/cleaningironwork/cleaningironwork.htm>

before the 2000 works were confirmed to be pitch pine but were replaced with hardwood Opepe C27 grade due to pitch pine being in short supply at that time. It is understood that no Listed Building Consent was acquired for the 2000 replacement of the decking, although discussions about the repair works were undertaken with the planning/ conservation officers from both local authorities. (All this information was acquired by e-mail exchange with the structural engineer heading the 2000 works and can also be found attached in Appendices 2 and 3.

Since the 2000 works were completed, only limited localised repairs have been undertaken. These include: the replacement of individual boards from the top layer; tightening of the fixings where loose; and replacement where fixings have been lost.

The condition of the present 2000 upper decking is now in a poor condition. Boards have rotten in places, many have splits or have broken (Fig. 14, 16) Some timber has been lost in some areas and the voids left are gathering debris. This is encouraging vegetation growth to take place. Boards have also sunk or moved, especially where fixings have been lost or become loose. Most have deformed with a dip where the car wheels make contact, generating a very uneven surface (Fig 13).

Fixings tend to be inconsistent, with some boards having lost their fixings, while others have had additional fixings added (Fig. 15-16), to secure the timbers down as they became loose, or at alternative locations, (e.g. relocated to sounder timber when the boards have decayed). Fixings also vary in type from dome to hexagon headed bolts. The central steel strap has also detached in places and is discontinuous (Fig. 16).

Boards are also very slippery when wet, as noted on the rainy day of the writer's site visit.



Figure 15: Timber boards with broken pieces and debris around, encouraaina veetation growth..

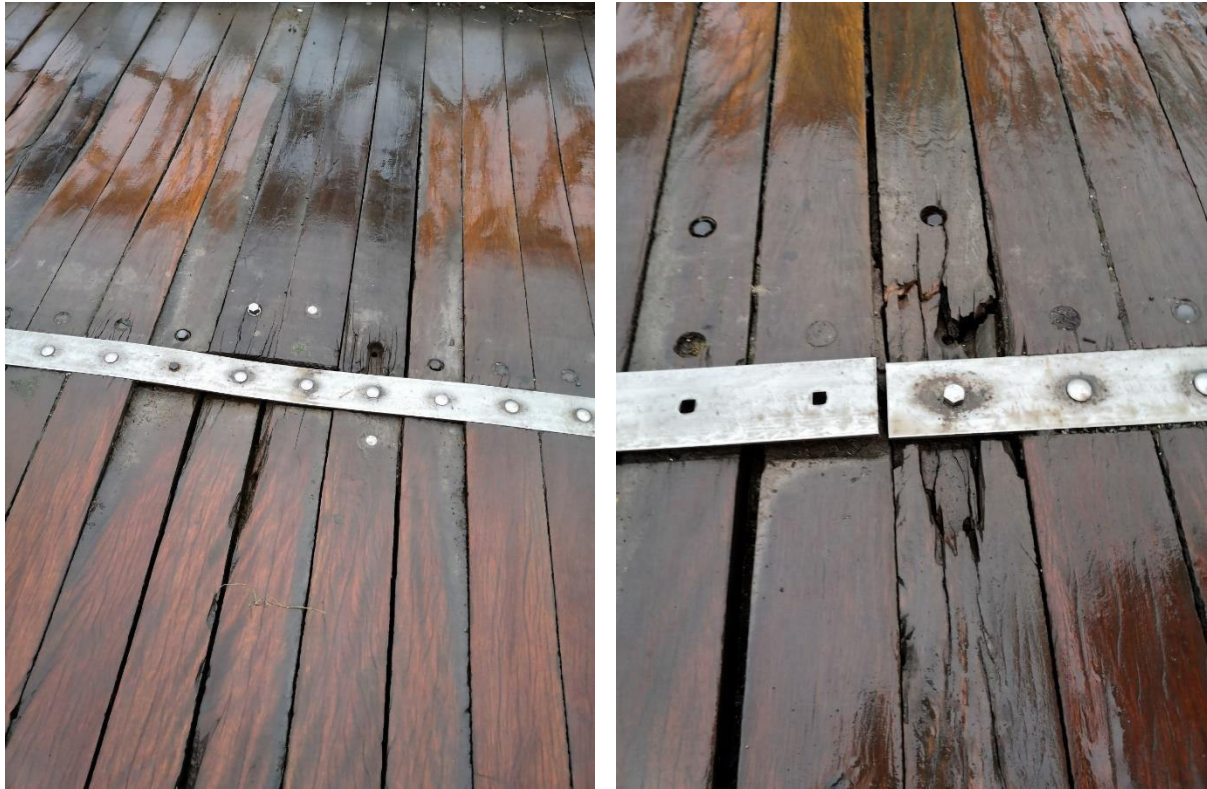


Figure 16, 17: Fixings of the boards are inconsistent in type and location. Others have become loose or lost. The galvanised steel strap has detached and boards have sunk, split and or/moved.



Figure 18: The bottom layer of the decking is extensively stained due to the general wet conditions and the inadequate drainage.

The wider boards on the lower layer are in a poor condition with extensive staining from damp and rot. They tend to retain a lot of moisture due to insufficient drainage through the boards and the damp environment lying in close proximity to the river surface (Fig. 18).

More photographs showing the condition of both upper and lower boards are available in the structural engineer's latest condition report and the general conclusion is that these timbers have reached the end of their serviceable life. The previous structural engineer who had specified the new timber decking in 2000 was expecting it to require full replacement in 2025 (Refer Appendix 3- Estimate of Year 2025, paragraph 6.0).

The general appearance of the top decking is that of a very uneven surface not ideal and certainly unnerving when crossed by wheeled vehicle. The rattling noise is indicative of the significant movement most of the boards undergo every time a vehicle passes over.

Constant traffic with its associated vibrations, put the boards under particular stress adding to the deteriorations caused by environmental impacts.

PROPOSED TIMBER ELEMENT REPAIRS

Timber is a susceptible material especially in adverse conditions in this case, so it is expected that it will have to be renewed periodically. The Grade I Listed Union Chain Bridge is a case in point. It is recorded that the decking has been replaced in 1871, 1902, 1933, (1953) and 1973 since it was built in 1820⁶. The decking is again being replaced under a current refurbishment scheme.

The project structural engineer has recommended that all timbers (including the edge kerbs) are now fully replaced with new hardwood grade D50 (as opposed to the current grade C27) planks in sizes to match the existing and following the existing layout, but with the top boards supplied in full length pieces and without the need for a middle steel strap. This will improve the aesthetic appearance of the bridge as there will be just a central line of fixings and no other intermediate elements obscuring the top decking surface. This is made possible because of the stronger timber grade proposed, which will offer a general improvement to the structure of the bridge. The stronger timber grade will allow the bridge to cope with all the traffic stresses and adverse wet conditions in a much better way compared to the existing timber, and the new boards are therefore anticipated to have a longer life expectancy.

The boards will be spaced out with an 8mm gap between them to both layers to allow for the efficient drainage of the bridge decking through the boards into the river. A carefully chosen timber species in agreement with the architect and the conservation officers and Historic England will be specified to deliver a good aesthetic result.

⁶ Information sourced online from: <http://unionchainbridge.org/bridge-story/the-bridge-today/>

IMPACT ASSESSMENT OF THE PROPOSED WORKS

- Replacement of all the grade C27 Opepe timberwork from the 2000 refurbishment and later with new hardwood grade D50 to match existing sizes.

Assessed impact: There will be no harm to the historic fabric of the bridge by this alteration. The existing timber will be a full replacement of the timber installed during the 2000 refurbishment works.

The existing timber is in a very poor condition and has in most cases reached the end of its life.

The new timber as proposed will be of greater strength and will suit better the structural requirements of the bridge and will enhance its appearance. This will add to the aesthetic value of the Listed Structure and hence to its significance.

This proposed work should be considered under Historic England’s conservation policy for periodic renewal, which is desirable when no harm is caused to the heritage values of the designated asset, as is in this case.

- Cleaning and recoating of all metal surfaces with a new protective paint system.

Assessed impact: There may be minor impact on the original metalwork (wrought iron elements) due to the cleaning process, however this is to be minimal as every care will be taken to apply the gentlest cleaning method possible according to the degree and extent of defect of the surface to be treated. Where sandblasting is to be used, this will be limited to areas where it is absolutely necessary. The grade and pressure will be adjusted accordingly to remove all the build-up of rust and dirt sufficient to provide a sound surface to enable the new coating to adhere successfully.

The new applied paint system will match the existing finish of the painted surfaces (which is believed to have matched the finishes used previously). The new coating will in turn provide a much-needed protection to all the historic and later metal work. This will provide an enhanced appearance which will compliment the significance of this listed asset.

This proposed work comes under Historic England’s conservation policies of maintenance and repair, which is desirable provided that repair proposals are designed to avoid or minimise harm.

- Impact on the setting

The setting consists of the natural river landscape and the heritage context of the Aldwark conservation area including Aldwark Manor. The impact of the proposed works on the setting, will only be positive. Enhanced views of this listed structure will be provided from both banks, the bridge approaches and from a distance.

The bridge will no longer read as a neglected part of infrastructure but as a valued historic heritage asset that is being looked after and adorns its setting.

CONCLUSION

Aldwark Toll Bridge is a Grade II listed structure of mixed construction with two main distinct historic building phases: the brick arches of both approaches dating from the original C18 bridge building and the middle part spanning the river being a reconstruction from 19C, while there are also some 20C and more recent interventions. Apart from historic and evidential values combined with some aesthetics along with a characteristic appearance within its setting, the bridge is highly valued in the community for its heritage and its connecting function as a very useful river crossing. However, the structure has been neglected by its last owners and is now in need of major maintenance and repair works.

Due to the limited funds, the works are to be concentrated on the most urgent parts of the structure spanning the river, namely the metal and timberwork elements of the bridge.

The proposed works are necessary to safeguard the secure use of the bridge and enhance its appearance sustaining and reinforcing its significance as a Listed Building within its environmental and historic context for the years to come.

The works are largely of remedial character and do not include the loss of any historic fabric, rather they intend to preserve and maintain the historic structure. The impact on the heritage asset can only be considered of positive contribution to both its inherent significance and to its setting.

APPENDIX

1. List of toll bridges in the UK

Source: https://en.wikipedia.org/wiki/List_of_toll_bridges#United_Kingdom

England

- Aldwark Bridge, North Yorkshire
- Bathampton Toll Bridge
- Cartford Bridge
- Clifton Suspension Bridge, Bristol
- Dartford Crossing (Dartford Tunnel northbound, and the Queen Elizabeth II Bridge southbound)
- Dunham Bridge, Nottinghamshire/Lincolnshire
- Eling Bridge, Eling Tide Mill, Hampshire
- Humber Bridge, near Hull
- Itchen Bridge, Hampshire
- Kingsland Bridge, Shrewsbury
- Middlesbrough Transporter Bridge
- Mersey Gateway Bridge, Cheshire
- Swinford Bridge, Oxfordshire
- Tamar Bridge, Plymouth
- Warburton Toll Bridge
- Whitchurch Bridge
- Whitney-on-Wye toll bridge

Wales

- Newport Transporter Bridge
- Penmaenpool Bridge

2. E-mail from previous Structural Engineer overseeing the 2000 refurbishment works

From: Richard Gibson <gibsondesign1@btconnect.com>

Sent: 18 January 2022 14:40

To: Andy Thompson <Andy.Thompson@masonclark.co.uk>

Cc: Jim Taylor <jim.taylor@dossormca.co.uk>; John Mitchell <john.mitchell@masonclark.co.uk>

Subject: RE: 18967 - Aldwark Bridge

Andy

Please find attached a selection of documents that you may find of use in the current application to raise tolls.

I have attached my proof of evidence for the 2005 enquiry. In total the document I produced was around 120 pages long, most of it copies of the contract documents for the year 2000 refurbishment, details of variation orders together with invoices and contract correspondence which will be irrelevant to your claim. The total contract cost is set out in my proof of evidence and was accepted by the inspector at the time. The replacement timber used was Opepe and I can confirm that the full timber deck was replaced.

I had discussions with Listed Building officers from Harrogate Borough Council and Hambleton District Council at the time of the refurbishment. The boundary between the two runs down the centre of the River Ure. At that time only the half of the bridge in HBC was listed but I believe Hambleton subsequently applied for listing over their half of the river. I put forward suggestions for alternative deck materials but both Councils were adamant that the bridge should retain its timber deck. An application was made to replace the timber rails on the approaches to the river crossing with Armco barriers; this was also rejected by both councils. Reasons given were similar to those you express. Prior to the year 2000 refurbishment the deck was pitch pine. At the time of the refurbishment pitch pine was in short supply. The timber deck was in such poor condition that the owners decided to look for alternative timbers. After some research I recommended Opepe, one of the lighter hardwoods. The full timber deck was replaced. Weight was critical. Analysis of the bridge using the DMRB Manual had suggested that the bridge would not sustain the loads recommended for 7.5 ton vehicles. It was successfully argued that the loads in the Manual were not relevant to Aldwark Bridge as it is a single lane bridge with relatively few 7.5 ton vehicles passing over it and usually singly and at low speed. My involvement in the bridge ceased when the owners at the time of the refurbishment and enquiry sold the bridge. Some of the individual timbers have been replaced over the years but that was to be expected of a natural material subject to harsh conditions of service.

You will note that the tender appraisal included for a temporary pedestrian access strapped to the side of the bridge, something NYCC requested for any pedestrians who wanted to cross the bridge. The toll collectors reported that pedestrian crossings of the bridge were extremely rare and so it was agreed that if any pedestrians did approach the bridge they would be taken round to the other side in a contractors vehicle, I don't think this ever happened. The post for bridge farm immediately on the Aldwark side of the bridge is delivered by the Ouseburn postman. An arrangement was made that the post would be dropped in at the toll house and one of the contractors would take it to the farm.

Regards,

Richard

Richard N Gibson

B Eng, MSc, C Eng, MICE, FStructE, FCI Arb

Gibson Design Consultancy Ltd.

PO Box 80

Leeds LS26 0YR

0113 288 9054



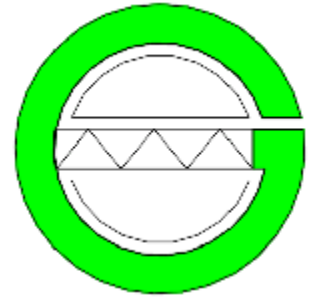
3. 2005 proof of evidence written by Richard Gibson

**GIBSON DESIGN
CONSULTANCY**

P.O. Box 80

Leeds

LS26 0BX



The Transport Charges etc (Miscellaneous Provisions) Act 1954
Section 6

**APPLICATION FOR AN ORDER TO
REVISE THE TOLL CHARGES AT
ALDWARD BRIDGE**

**ALDWARD BRIDGE LIMITED
PROOF OF EVIDENCE OF RICHARD N. GIBSON**

February 2005

Ref: 1041

CONTENTS

	Page
1.0 INTRODUCTION	3
2.0 THE YEAR 2000 REFURBISHMENT	7
3.0 FUTURE WORKS	12
4.0 SUMMARY	20
5.0 APPENDIX	
APPENDIX GDC-01 GENERAL	
APPENDIX GDC-02 REFURBISHMENT CONTRACT	

1.0 INTRODUCTION

Professional qualifications

1.1 My name is Richard Gibson. B.Eng., C.Eng., M.C.I.Arb. M.I.C.E., M.I.Struct.E. I am currently the principal of Gibson Design Consultancy. I hold the following professional qualifications:

Honours Degree in Civil Engineering (1973)

Chartered Engineer (1979)

Member of the Institution of Civil Engineers (1979)

Member of the Institution of Structural Engineers (1981)

Member of the Chartered Institute of Arbitrators

Currently studying for an MSc in Construction Law and Arbitration at Leeds Metropolitan University.

Professional experience

1.2 I have over thirty years of general experience in civil and structural engineering on a variety of structures and materials working for engineering consultancies together with seven years as an employee of British Coal responsible for structural engineering in the South Yorkshire Area.

1.3 I have experience of working on listed buildings of many forms including structures incorporating cast and wrought iron. I had experience at British Coal of inspecting their private bridges at colliery sites. Many were old and in poor condition and designed to standards long since superseded.

Scope of evidence and professional involvement with Aldwark Toll Bridge

1.4 The scope of my proof of evidence is to explain the need for and the extent of the works that were carried out in the autumn of year 2000 to refurbish Aldwark Toll Bridge and makes comment on works that are anticipated in the future.

- 1.5** Costs that appear in this report have been estimated by myself. The costs have been based on historical evidence of spending on the bridge and contractor's estimates for work.
- 1.6** Gibson Design Consultancy Ltd. was founded in July 1997 and the practice was appointed to carry out its first inspection of the Bridge on 20th October 1997. This was a visual inspection for signs of distress. Richard Gibson had some previous experience of the bridge under a previous employer who was appointed to inspect the bridge in 1994.
- 1.7** In September 1998 the bridge owners received a letter from North Yorkshire County Council in respect of the weight limit of 8 tons which was in place at that time. The council were assessing all the bridges in their area prior to the introduction of a European Directive that permitted gross vehicle weights on roads in the United Kingdom to increase to 40 tons. The Council requested a copy of the bridge's assessment to BD21/97, the Highway's Agency standard for bridge assessment, which sets out the requirements for inspecting road bridges. This document is intended to apply to Local Authority and Highways Agency bridges but is a useful tool to form the basis of private bridge assessment, particularly one carrying a public highway. No such assessment had ever been carried out on the bridge. Although the bridge was plainly incapable of carrying 40 ton vehicles the owners appointed Gibson Design Consultancy to carry out an inspection of the bridge and report on its capacity under the guidelines of BD21/97. The inspection and investigation that followed was followed by the extensive works to the bridge that commenced on site in September 2000.
- 1.8** The bridge is a grade II listed structure. The boundary between Harrogate Borough Council and Hambleton District Council lie at the centre of the river. This listing imposed limitations on the extent and type of works that could be carried out. In the year 2000 Harrogate had listed the bridge but Hambleton had not. All the works to refurbish the bridge were agreed with planning officers of both councils, despite the lack of listing in Hambleton. Hambleton were surprised to learn of the bridge's listing and reported that they would seek to list their half of the bridge.

1.9 An application was made on 14th December 2000 to reduce the weight limit on the bridge from 8 tons to 7.5 tons. The purpose of this was twofold.

- To make it easier for toll keepers to identify overweight vehicles, 7.5 tons is a recognised plated vehicle weight.
- To bring the signage into line with Highways legislation on weight limit for public roads that came into force in January 2005. (Traffic Sign Regulations and General Directions Act 1994).

The application was granted.

Description of Aldwark Toll Bridge

1.10 The current bridge was reputedly built in 1873 to replace an earlier timber structure that was demolished by ice floes on the river. The bridge is constructed in two distinct parts.

- The approaches to the river, at each side of the river, comprise a series of brick arches across the flood plain for a length of around 75 metres each side of the bridge. These arches are in reasonable condition requiring only occasional works to make good pointing, clear off vegetation and clear drainage. The parapets to these approaches are in the form of timber rails supported on concrete bollards. The approaches were resurfaced in the year 2000 as part of the refurbishment works. Where the arches are constructed in the river bed they are known to be sat on a mat of timber piles. The date of construction of these arches is not known but is likely to be at least the mid 19th century if not earlier.
- The river crossing is in the form of a wrought and cast iron bridge structure. The structure is supported on a series of cast iron piles driven into the river bed. The main bridge beams are upstand lattice trusses. Cross beams span between the bottoms of the trusses. The cross beams support a timber deck.

1.11 The river crossing was enabled by an Act of Parliament passed in 1772 which gave certain rights and responsibilities to the owners in respect of constructing and maintaining the crossing.

2.0 THE YEAR 2000 REFURBISHMENT.

- 2.1** As part of the “BD/21” assessment a detailed survey was carried out of the bridge to establish its structure and condition at that time. The soffit of the bridge was inspected from end to end using a suspended cradle.
- 2.2** The river section of the bridge is made up of wrought iron. This has similar properties in respect of corrosion to those of steel. The piers are presumed to be made of cast iron which is resistant to corrosion once a skin of oxidised material has formed. The piers are in an acceptable condition.
- 2.3** The main trusses spanning the river were found to be in reasonable condition. They are fully exposed, which allows them to air, and are not subjected to salt to the same extent as the deck members. At the time of the inspection the paint system to the trusses was found to be in reasonable condition with only minor surface corrosion and pitting.
- 2.4** The cross beams spanning between trusses, under the timber deck, were found to be severely corroded. The cross beams were ‘I’ shaped made up of wrought iron angles riveted to a plate web. The edges of the wrought iron angles had corroded to a ‘knife edge’ in many places. Although the bridge had been repainted over the years it was not possible to paint the top flanges of the beams as the timber deck sat directly upon them. As a result severe corrosion had occurred to the top flanges of the cross beams.
- 2.5** These beams were deflecting severely under heavier vehicles, relying on the timber deck to distribute wheel loads to adjacent members.
- 2.6** The timber deck was similarly in a poor condition. The timber deck was bolted and strapped to the cross beams. The deflection of the cross beams had caused the fixing bolts to pull through the timber deck and the plates restraining the timber deck were breaking. In some places the main timber bearers showed signs of severe rot and holes could be seen right through the deck. The timber deck was believed to be pitch pine.
- 2.7** At the time the recurrence of maintenance tasks on the bridge deck was increasing. Because access was not available to the soffit of the bridge it was difficult to carry out satisfactory repairs and repairs were of a temporary nature.

- 2.8** Some of the timber beams showed signs of crushing at their bearing on the cross beams.
- 2.9** On 18 February 2000¹ I wrote to the bridge owners outlining alternatives for refurbishing the bridge.
- 2.10** Consideration was given at that time to using different materials and uprating the capacity of the bridge.
- 2.11** The weakest part of the bridge were the main trusses. To uprate these would have required a fundamental redesign of these trusses. The expense would have been considerable and would have required the trusses to be fully replaced. Problems were foreseen obtaining listed buildings consent. NYCC confirmed their policy of uprating bridges only when this was economically viable when other benefits were taken into account, diverting traffic away from congested areas for example. Aldwark Bridge would not have been considered viable to uprate.
- 2.12** The cross beams were replaced with steel sections chosen to mirror the profile of the original wrought iron. Steel sections were chosen which complied with the requirements of BD/21 for 7.5 ton vehicles.
- 2.13** Other material such as concrete or steel would have provided a more durable running deck to the bridge. A concrete deck would have been considerably heavier than timber to obtain the same load bearing capacity and provide a durable deck with adequate protection to steel reinforcement within the concrete. This would have imposed additional weight on the main trusses and a corresponding reduction in the allowable weight they would carry. A steel deck would have required listed buildings approval and would have similarly been as heavy as or heavier than timber. There was concern that obtaining the necessary consents would delay the works. The owners were keen to maintain the appearance of the bridge as described in its listing and so timber was selected as the deck material, this met the listing requirements, and so did not require

¹ Appendix GDC-01 page 1-3

an application to Harrogate Borough Council to amend the appearance of a Listed Building.²

- 2.14** A specification for the works was prepared and tenders sought in the June of 2000 from four contractors. My tender report is attached at pages 5-7 of Appendix GDC-01.
- 2.15** W.A. Hare were appointed to carry out the works; their Contract Sum amounted to £155889 plus VAT.
- 2.16** Appendix GDC-02 contains the documents that formed the contract between Aldwark Bridge and the Contractor, W. A. Hare and includes the specification and drawings indicating the scope of the works.

Variations

- 2.17** During the course of the contract seven variation orders³ were issued as a result of defects that came to light when the timber deck was removed and when corrosion was removed from the bridge to allow painting. The owners also took the opportunity to resurface the approach roads when the bridge was closed. Previous repairs had necessarily been patches as traffic flow could not be disrupted.
- 2.18** These variations amounted to £18550.15 plus VAT.
- 2.19** Various payments were made to the contractor during the contract period and my certificates for these are attached at Appendix GDC-01 pages 1-20 to 1-21.
- 2.20** At practical completion, 16th December 2000, the total value of the contract value was £177.395.15, although all the work had not been completed at that time due to inclement weather. Hare submitted a final account claim for £177373.15⁴. The final figure was

² Appendix GDC-01, page 4.

³ Appendix GDC-01, pages 1-8 to 1-19

⁴ Appendix GDC-01 pages 1-22 to 1-23

summarised to Hare in my letter dated 24th January 2001⁵ and in my certificate to Trustee Management dated 29th January 2001⁶.

- 2.21** Towards the end of the works the River Ure had flooded to unprecedented levels. The contract with Hare required that they accepted all risks associated with unusually inclement weather to encourage them to take steps to overcome any resulting problems. The bridge had been closed for 14 weeks and the closure notice expired at the end of that period. At the end of the contract period water levels were still too high to complete certain works, mainly painting of the supporting piers. It was agreed that Hare would remove all scaffold and return in the summer of 2001 to complete, which they did.
- 2.22** On completion of the works Hare suggested that they would be submitting a claim for additional costs associated with the return visit. After discussions and correspondence⁷ they submitted a formal claim for these additional costs, dated 23rd October 2001 for the sum of £2871 plus VAT. At the time of completion Hare could have elected to keep the bridge closed until such time as they could complete, accepting any damages that might result, and then submit any claims for additional costs that they believed reasonable. Winter was on us and it was not clear when the waters would recede or the weather improve to permit painting to resume. That would have caused unnecessary disruption to the local community and so it was agreed that it was in the best interests of all that they should leave site and that the bridge would reopen. I assessed the claim and recommended to the owners that there was some substance in the claim. By opening the bridge early the owners had taken possession and toll income had resumed and the outstanding works were completed without a bridge closure. After discussions with the owners and on my recommendations they elected to offer W.A. Hare the sum of £1800 plus VAT to settle the dispute which Hare eventually accepted.
- 2.23** The total costs of the bridge repairs amounted to £179195.15.

⁵ Appendix GDC-01 page 1-24

⁶ Appendix GDC-01 pages 1-25 to 1-26

⁷ Appendix GDC-01 pages 1-27 to 1-29

3.0 FUTURE WORKS

- 3.1** The application lists areas of work that are anticipated as being required in future years leading up to a repeat of the major refurbishment in around twenty five years. It has been difficult to arrive at a repeat date for the refurbishment of the timber deck. There is no data available for the performance of timber bridges such as this and its future performance is entirely reliant on traffic volumes and environmental conditions. I understand that the last refurbishment took place in the 1960's but this is hearsay. In practice the bridge was in a poorer state than I would have liked when the works did commence, traffic flows have increased and so on that basis twenty five years seems a reasonable return period.
- 3.2** The owners have a duty under the enabling act to maintain the bridge in a safe condition. I would suggest that the owners also have a duty imposed on them in parallel with that of the Local Authorities and the Highways Agency under a general requirement in the Highways Act that requires local authorities to maintain bridges in a safe condition and to ensure that they are safe to use
- 3.3** In addition to any duties under the enabling act or vicariously through the Highways Act the bridge owners have a duty under health and safety legislation to maintain the bridge in a safe condition.
- 3.4** Underwater inspections have been carried out in November 1997 and May 2003. The cost of the latter being £892 for the diver's costs. My own fees amounting to an estimated £336 plus VAT. The diver's costs in 1997 amounted to £850. Predicted costs for the toll application were based on the 1997 costs, hence the higher cost levels shown in the original application for a toll increase.
- 3.5** The first inspection revealed scour which was made good and protection added in the form of a concrete mat. The second inspection revealed that a small amount of additional scour had taken place around the edge of the new mat. This was made good at no cost by the contractor who carried out the original work. A five year return period for these inspections is reasonable given that the bridge appears susceptible to scour.

- 3.6** The paint system selected for the bridge claims a return period for maintenance of 8 years to first maintenance, minor maintenance from wear and tear between 8 and 15 years with a full recoating required at 15 years in accordance with appendix 50/1, Specification for highway works, form HA/P1⁸. The paint system to the exposed trusses has been damaged in use, suffering minor scrapes from vehicles. Having inspected the bridge in February 2005 I would normally suggest that the paint system is maintained in 2006 however for other reasons detailed below I recommend that this work is carried out in 2005.
- 3.7** It was anticipated that the bridge deck would need tightening up within one to two years of completion as the timber seasoned and as a result suffered shrinkage and dimensional changes. The timber has performed better than expected in this regard and in view of the lack of finance available to carry out the tightening exercise it has been deferred. The bridge deck is now in need of attention in 2005.
- 3.8** I recommend that both painting and deck maintenance operations take place simultaneously in 2005, saving scaffold, British Waterways licensing and signage costs. I estimate that the costs of these works at year 2000 figures amounts to £17,000 plus VAT⁹.
- 3.9** I predict that the return period for initial maintenance of the paintwork will be 6 years rather than the 8 claimed as the bridge does seem to suffer from scuffs and impact damage. In addition the timbers hold moisture against the cross beams so the effects of any breakdown in the coating can be worse than would normally expected from a properly drained bridge; as a result I anticipate that the bridge will require repainting in 2011.
- 3.10** The bridge owners have expressed a desire to make the bridge safe for road users to comply with the duties described above at 3.2 to 3.3. Two areas of the bridge do not meet the requirements of current Highways Agency standards.

⁸ Appendix GDC-01, page 1-30 to 1-32

⁹ Appendix GDC-01, pages 1-33 to 1-34.

- 3.11** The brick arch approaches to the bridge are around 3 metres above the surrounding ground level. At present vehicles are prevented from leaving the road by a timber barrier supported on concrete pedestals. This system does not comply with the requirements of BS 6399:1996 or Highways Agency document reference BD52/93, titled “The Design Of Highway Bridge Parapets”, for the restraint of vehicles. The two timber rails clearly not having the strength to restrain a moving vehicle. In practice the system works well, occasionally vehicles strike the bollards and rails, demolishing them, but to my knowledge a car has not left the bridge in its recent history. The narrow road width means that vehicles usually strike the barriers at an oblique angle. On 6th January 2005 a car lost control near the toll house and allegedly spun striking both the house opposite the toll cottage and the toll cottage. As a result the porch where the toll collectors shelter had to be demolished. The structure reportedly fell into the road as soon as demolition commenced. This highlighted the fact that the risk of an out of control vehicle striking the barrier over the arches and leaving the road is a reality.
- 3.12** The barrier height does not comply with the requirements of Highways Agency document reference BD52/93, titled “The Design Of Highway Bridge Parapets”, which, at paragraph 2.19, requires that a rail should be provided at 1000mm above road level, to prevent a person toppling over the barrier. Under Paragraph 7.6 of BD52/93 any gap in the barrier should not permit passage of a ball 100mm in diameter, this prevents a child climbing/falling through the barriers.
- 3.13** In the case of building structures it is not generally necessary to up-date them to comply with current building regulations unless risk assessments indicate that such action is required, even in these cases it is the buildings owner’s choice to update to comply with current requirements rather than a duty under the Building Regulations. There are certain aspects of the Building Regulations that must be complied with retrospectively, safety glazing in and adjacent to doors in commercial premises for example.
- 3.14** In October 1992 the Highways Agency produced a document entitled “Priority Ranking of Existing Bridge Parapets”, reference BA 37/92. At paragraph 1.1 this document states that

“As part of the Overseeing Departments programme for the rehabilitation of trunk road structures it is intended that the parapets on existing structures should, where necessary, be brought up to standard on a priority basis with the highest risk sites being tackled first”

At the time of the bridge repairs this presented the bridge owners with a dilemma as they only have one bridge whereas most local authorities at whom the circular was addressed have several.

- 3.15** 37/92 presents a simple risk assessment that results in a risk value, measured as a points total, which can then be compared with other bridges. The higher the points total the higher the risk and the higher the priority for upgrading. A risk assessment was carried out for Aldwark Bridge. The bridge is in a category that indicates low risk as speeds are slow, especially between passing vehicles, heavy goods vehicle use is low, pedestrians rarely use the bridge and as far as the approaches are concerned if a vehicle should leave the road the risk of injury occurring to persons or damage occurring to property in the land below the arches is extremely low. A discussion with North Yorkshire County Council’s bridge engineer confirmed that the bridge parapets would be at the lower end of their priority ranking.
- 3.16** At the time of the bridge refurbishment a decision was made to delay the renewal of the rails on the approaches by five years in anticipation of a toll increase that would allow a fund to be established to allow such works to proceed.
- 3.17** The Highways Agency does suggest that parapet renewal should be carried out at a time to minimise disruption to bridge users. Works have been carried out to repair damaged sections of the parapet without closing the bridge and so there was no need to renew the parapet when the bridge was closed.
- 3.18** In order to install protection to the brick arches it will be necessary to remove the existing barriers and replace them with a vehicle restraint barrier extend combined with

a hand rail. The cost of this is estimated at today's prices at £78,500 plus VAT. Any system provided must receive local authority Planning Consent as the bridge is listed.

3.19 The protection of the iron bridge structure is a different matter where it crosses the river. There is insufficient mass and stiffness to the bridge structure to provide restraint to vehicles and providing a restraint structure to this part of the bridge will be extremely difficult. However the route over the bridge is straight and narrow and as a result vehicles travel slowly. It is difficult to imagine how a vehicle could strike the bridge except at an oblique angle. There is no history of serious collision damage. The timber kerbs provide some guidance for wheels.

3.20 Containment structures require room to deflect under impact. As the iron bridge is narrow such room is limited. At paragraph 7.5 BA37/92 allows

“where the cost and inconvenience of strengthening the supporting structure are excessive (e.g long viaduct), it may be economic to accept local damage to the supporting structure”

On this basis I have recommended that, for the time being, no provision is made to update containment of that part of the iron bridge which passes over the river although this will remain open for review.

3.21 The River Ure is a navigable waterway, pleasure craft and some commercial craft use this stretch of the river passing between Ripon, Boroughbridge and York. The navigation rights are managed by British Waterways.

3.22 Brief consideration has been given in the past to the need to replace or up-date the system of timber piles upstream of the bridge that protect it from boats using the river, known as groynes. Consultations with NYCC revealed that they had two bridges at similar risk to Aldwark, at Selby and Caywood. At that time NYCC engineers had prepared schemes for capital expenditure to uprate the groynes and these have since been approved. The expense was justified under the Authority's general requirement under the Highways Act to maintain the safety of bridge users. The river Ouse at these

two locations is a busier river than the Ure at Aldwark and is used by large commercial boats. This sets a precedent that requires Aldwark Bridge Ltd. to carry out an investigation into the need for works to the groynes. A risk assessment is required to establish the craft that use the river and with what regulatory.

- 3.23** The existing groynes are still in place but debris trapped in the groynes prevented diver inspection last year. The groynes regularly catch large trees which weigh in excess of most pleasure boats and so for such river traffic would appear to be adequate. However British Waterway dredgers and work boats are known to operate on the river, they occasionally clear debris from the bridge when they pass. Other commercial craft may use the river.
- 3.24** The groynes are unlikely to deteriorate under water. The divers have reported that the timber supports to the wooden bridge constructed before 1870 are still visible under water. The timbers at water level will deteriorate through exposure to changing environments and collision damage from debris. They have not been maintained to anyone's knowledge. As the tops break down at water level they will become a hazard to boats if they are not visible above the water line.
- 3.25** I have had discussions with the bridge engineer at NYCC in respect of standards that apply to the design of groynes. The loads that groynes are required to resist are dependant on the size of craft using the river and the extent to which the groynes can be considered sacrificial if for instance large craft use the river rarely. I am told that NYCC produced two designs for the groynes they proposed at Caywood and Selby, one based on the requirements to stop boats in a head on collision, the other based on requirements to deflect boats possibly with some damage. I understand from my discussions that the new groynes were designed to this latter standard, based on the previous performance of existing groynes at the site.
- 3.26** Discussions with a marine contractor as a guide to preparing an estimate for groynes in year 2001 suggested that the costs of groynes could vary between £35000 and £180,000 depending on the standard specified.

- 3.27** It is clear that a risk assessment is required to establish the standards required of the groynes and it is likely that works of some form or another will be required within the next ten years. It has yet to be established if the Environment Agency will impose conditions on the works to conserve the ecology of the river. The Environmental Agency had the powers to and made impositions on the way the Year 2000 refurbishment was carried out. Without such information it is difficult for me to predict the cost of a scheme to replace the groynes. Establishing the criteria to design a system of new groynes is a major civil engineering project. At present funds are not available to proceed with such a scheme.
- 3.28** It is possible that a change in the current usage of the river or bridge legislation may require the groynes to be updated. The groynes may deteriorate rapidly with changes in environmental conditions which result in more trees passing down the river or more frequent flooding. New groynes may be required sooner rather than later. There are three sets of groynes and early lack of serviceability may dictate that the groynes are repaired individually rather than under one continuous contract, which would prove more expensive than a single contract to refurbish all the groynes.
- 3.29** I recommend that the bridge owners start to build up a sinking fund to prepare and instigate a scheme to replace or reinforce the existing timber groynes. At this stage it is difficult to estimate the cost of installing new groynes. Marine contractors have suggested the cost range indicated at 3.26 of £35,000 to £180,000. I recommended that the owners should build a fund in the sum of £100,000, at year 2000 prices, being the average cost in the range discussed with contractors, for expenditure in year 2011. This is the date I originally suggested in 2000/2001 being 5 years after the major expenditure on barriers. These dates being recommended in an attempt to prioritise repairs in line with a growing fund after an increase in tolls. However as the temporary works associated with painting the bridge would conflict with works to the groynes I now recommend that provision is made for expenditure on the groynes in 2012.
- 3.30** Hearsay has it that the bridge was subject to a major refurbishment in 1964, in 2000 the bridge was refurbished again, 36 years later. It has been shown in Brian Hall's report, submitted as part of this enquiry, that traffic volumes are going to continue to increase.

It is difficult to assess how changing environmental conditions will affect the performance of the bridge. I recommend that the bridge owners make provision for assembling a sinking fund to carry out a major refurbishment in 2025, 25 years after the previous refurbishment and that they should allow for the same sum spent in 2000, £179,000, appropriately adjusted for inflation.

4.0 SUMMARY

4.1 Aldwark Toll Bridge was refurbished in the year 2000 for a sum just under £180,000 plus VAT. Aldwark Bridge Limited should make provision for a similar sum, adjusted for inflation to be spent in the year 2025.

4.2 Estimates of the costs to be allowed in future years appear at page 1-36 and 1-37 of appendix GDC-01.

4.3 The major items of expenditure and the dates they will occur are as follows:

- Tighten bridge deck and make good paintwork £17,000 at year 2000 prices, to be expended in 2005
- Install parapet rails and barriers to the brick arch approaches, £78,500 plus VAT at year 2005 prices, to be expended in 2006
- Underwater survey of the bridge, at year 2003 prices, £1250 plus VAT. To be expended in 2008
- Repaint the bridge, at year 2000 prices, £31,000 plus VAT. To be expended in 2011
- Refurbish the protective groynes to the bridge, £100,000 at year 2000 prices to be expended in 2012

This report has been prepared by Richard N Gibson B.Eng., C.Eng., M.C.I.Arb. M.I.C.E., M.I.Struct.E.

I understand that my duty in preparing this written report is to assist the tribunal in determining the matter before it. This duty overrides any obligation to the party who has engaged me and who is liable to pay me.

I have pointed out all matters that might adversely affect my opinion.

Where there is a range of reasonable opinion I have indicated the extent of that range in the report

All opinions expressed in this report are my own independent and complete professional opinion.

Signed

Richard N. Gibson B. Eng., C. Eng., M.I.C.E., M.I.Struct.E., M.C.I.Arb.

REFURBISHMENT OF ALDWARKE TOLL BRIDGE

For

TRUSTEE MANAGEMENT Ltd.

Gibson Design Consultancy
P.O. Box 80
Rothwell
LEEDS
LS26 0YR

INDEX

- 1.0 PRELIMINARIES**
- 2.0 CONTRACT PARTICULARS**
- 3.0 GENERAL REQUIREMENTS**
- 4.0 PARTICULAR REQUIREMENTS**
- 5.0 SPECIFICATION AND SCHEDULE OF WORKS**

APPENDIX A - FORM OF TENDER

**APPENDIX TO THE CONDITIONS OF
CONTRACT**

DAYWORKS SCHEDULE

AGREEMENT

CONTRACT SCHEDULE

**APPENDIX B – SIGNAGE REQUIREMENTS FOR BRITISH
WATERWAYS.**

1.0 PRELIMINARIES

1.1 Project Name:

Aldwark Toll Bridge

1.2 Project Location:

Aldwark, North Yorkshire

1.3 The Works Comprise

1.3.1 Remove and dispose of existing timber deck

1.3.2 Carry out repairs to corroded structure.

1.3.3 Repaint Structure

1.3.4 Provide and install new timber deck

1.4 Name of Employer

Trustee Management Ltd.
19 Cookridge Street
LEEDS
LS2 3AG

1.5 Name of Engineer

Gibson Design Consultancy
P.O. Box 80
Rothwell
LEEDS
LS26 OYR

1.6 Applications for payment are to be sent to the Engineer

1.7 Arrangements for visiting the site

Tenderers may visit site without prior notice

2.0 CONTRACT PARTICULARS

2.1 Form of Contract

The Form of Contract will be the I.C.E. Conditions of Contract for Minor Works, Second Edition 1995 incorporating the amendments reference ICE/MW2/HGCR//March 1998 and ICE/MW2/Cor/September 1998.

2.2 Tender Validity

Tenders must remain open for acceptance for a period of 112 days after the tender date.

2.3 Site Possession

2.3.1 The Contractor's site possession will be limited to the area of the permanent work and the approach roads at each side of the bridge.

2.3.2 The site boundary will be at the gate across the road at the toll house on the West side of the bridge.

2.3.3 The site boundary will be where the arched approach meets the public highway on the East approach.

2.3.4 The Contractor does not have to take possession of the full site area but the Contractor's site boundary must be clearly fenced for avoidance of doubt.

2.3.5 The employers has rights of access across land adjacent to the bridge for maintenance but has asked that the Contractor plans work in such a way as to minimise the passage of men or materials across neighbouring property.

2.3.6 Access will be permitted to the soffit of the bridge at the west, ouseburn bank of the River for erecting scaffold. It is anticipated that materials will be taken to their final places over the top of the bridge.

2.3.7 All site cabins and establishment must be situated on the approach roads to the bridge, to either River bank.

2.4 Construction (Design and Management) Regulations 1994

2.4.1 The Client will be Trustee Management Ltd.

2.4.2 The Planning Supervisor will be Gibson Design Consultancy Ltd.

2.4.3 The successful tenderer will be appointed as Principal Contractor.

2.5 Master Programme of Works Within seven days of the award of the Contract, the Contractor shall prepare and submit to the Engineer two

copies of a master programme clearly showing the order and timing of the works by elements, and the latest dates by which instructions, drawings and other information are required from the Engineer. The programme will be produced as a bar chart, two copies of which shall be given to the Engineer and one copy kept permanently on site. Actual progress achieved shall be regularly marked upon it for inspection by the Engineer. It shall be regularly updated as proved necessary.

2.6 Health and Safety File

In accordance with the CDM Regulations the Contractor will be required to submit a detailed Health and Safety File for the works containing risk assessments and method statements not less than 14 days before commencing work on site. The File must address the hazards and risks to users of the River.

2.7 The Contractor must appoint a full time site manager to supervise the works.

3.0 GENERAL REQUIREMENTS

3.1 Temporary Name Boards and Advertising Rights

The Contractor may erect an approved sign-written board that must include the names and addresses of the Consultants, the Contractor and any Nominated Sub-Contractors.

3.2 Maintenance of Existing Live Mains or Services on/over the Site

Some live services are attached to the bridge, these are clearly visible and will remain live during the course of the works.

The environment agency have an ultrasonic river level gauge attached to the bridge as part of the early flood warning system for York. Consultations are being made with the agency for a temporary relocation of the gauge onto the Contractor's temporary works to maintain this facility. Repositioning the gauge will be carried out by others. The Principal Contractor must make access available to others to carry out their work. The Contractor should be aware that the gauge might remain in place requiring protection.

3.3 Co-ordination of Sub-Contractors, Employer's Direct Labour and Suppliers etc.

The Contractor is to be responsible for supervision and administration of all sub-contracts of sale etc. and is to arrange and monitor a programme for each Sub-Contractor, Supplier, Employer's Direct Labour, Local Authority or Statutory Undertaker and obtain and supply information as necessary for the co-ordination and timely completion of the works. The Contractor is promptly to obtain and submit to the Engineer duplicate drawings of Sub-Contractor's and Suppliers works, including builder's work details.

3.4 Overtime

No extra will be paid for overtime unless worked at the specific written request of the Engineer. In the event of such permission being given, the Contractor will be reimbursed the net extra cost incurred in accordance with the rules.

3.5 Pricing

The Contractor is to allow for all costs in respect of the following:-

- a) Plant, tools and vehicles.
- b) Scaffolding, trestles, platforms and the like.
- c) Site administration and security.

- d) Transport and workpeople.
- e) Safety, health and welfare of workpeople.
- f) Disbursements arising from the employment of workpeople.
- g) Removing rubbish, protective casings and coverings and cleaning the works on completion.
- h) Temporary fencing, hoarding, screens, fans, planked footways, guardrails, gantries and similar items.
- i) Toilets and welfare accommodation for all staff and visitors to site.
- j) Office and meeting accommodation.
- k) Control of noise, pollution and all other statutory obligations.
- l) Telephones for use of contractors and visitors
- m) Maintenance of public roads
- n) Lighting and power for the works including temporary distribution, lamps etc. and electric company charges.
- o) Protecting the works from inclement weather

3.6 Maintaining and Cleaning the Site

The Contractor is regularly to remove from site all unrequired materials, debris and rubbish and is to keep the works and the site clean and tidy at all times. The Contractor is, on completion, to clean the works.

3.7 Remedial Work

No remedial work shall be carried out without the prior approval of the Engineer.

3.8 Protective Clothing

Eye shields, hearing protection, gloves and other protective wear must be worn where required. Safety helmets and protective footwear must be worn at all times by all Contractors' staff.

3.9 Access

The Contractor must allow for providing all necessary scaffold to carry out the works.

3.10 Environmental Protection Act

The Contractor shall make all necessary arrangements for the disposal of waste materials leaving site in accordance with current legislation. Copies of all waste transfer notes must be maintained in a record on site which will form part of the Health and Safety File which the Principal Contractor will hand to the Planning Supervisor on completion.

3.11 Text of Specification and Schedules of Quantities

No amendment or insertion shall be made to, or recognised in, the text of specification and or Schedule of Rates except with prior written authorisation of the Engineer.

3.12 Dimensions

The Contractor is to work to figured dimensions only and wherever possible dimensions are to be checked at the site. The Contractor is to give immediately written notice of any discrepancies to the Engineer.

3.13 Fire Precautions

The attention of the Contractor is drawn to the current HMSO publication 'Standard Fire Precautions P5'; and he must observe the recommendations where relevant to the works.

3.14 Road Closure

The Employer is separately applying for a road closure in order to allow the works to be completed. It is important that the programme set out in these works is strictly adhered to, in order to keep the disruption to the public at a minimum. If tenderers discover any matters which will have implications on the dates given for site possession in these contract documents they should bring these to the attention of the Engineer as soon as possible. Others will provide temporary signage away from the site for road closures and diversions. The Contractor will be required to provide all necessary signage and barriers at the bridge to ensure vehicles do not progress onto the bridge. Barriers can be erected at the existing gate at the toll house and at the commencement of the brick arches on the East approaches. Access must be maintained for the owner of Bridge House to maintain their property.

3.15 Progress Meetings

Formal progress and safety meetings will be held on site at three-week intervals in accommodation provided by the Contractor.

3.16 British Standards

All materials must comply with relevant British Standards.

3.17 Accuracy and Setting Out

All tolerances must comply with BS 5606. The Contractor must arrange the setting out, erection, juxtaposition of components and applications of finishes to ensure that there is a satisfactory fit at junctions and that the work has a well aligned and true and regular appearance. Instruments and assistance must be provided to assist the Engineer in checking the works.

3.18 Schedule of Conditions

A Schedule of Conditions supported by photographs or a video must be prepared by the Contractor and agreed with the Engineer in respect of the site and adjoining area for which the Contractor is responsible which may be subject to damage by the Contractor.

3.19 Contractor's operatives must remain on the construction site and must not wander onto adjacent property without the Employers express permission.

3.20 Health and Safety

3.20.1 A copy of the Health and Safety Plan for the works is included with these tender documents. Tenderers must include in their Tender Sum for all necessary works to comply with both the particular requirements identified in the Health and Safety Plan and any other requirements imposed by current health and safety legislation.

The Principal Contractor will be required to develop the Health and Safety Plan to cover the construction phase.

4.0 PARTICULAR REQUIREMENTS

- 4.1** Navigation rights on the River are managed by British Waterways. British Waterways have a statutory duty to ensure that the rights of those using the River are protected.
- 4.2** Any costs that might arise out of the approval and supervision of the works by British Waterways will be met directly by the Employer. The Contractor will meet all other costs for working to the requirements of British Waterways.
- 4.3** One bridge span of the River must be maintained clear for use at all times. In order to meet this requirement no part of the works, permanent or temporary, will be allowed to hang below a level equal to 75mm below the bottom flange of the main girder. The plan profile of the River dictates that the single span that remains open must be either the East most span or the span immediately adjacent to it.
- 4.4** The Contractor must allow in his costs for providing the signage detailed in appendix B of this document. Some of these signs are available in the basement of the toll house for use by the Contractor. The Contractor must satisfy himself of the suitability and the durability of these signs. The costs of supplying, erecting and maintaining these signs in position must be included within the Contractor's tender. The Engineer will seek permission for the erection of the signs from landowners. However on previous contracts problems were experienced with cattle knocking signs down and persons unknown throwing them in the River. The Contractor may wish to consider erecting these signs in the River although they should not be more than 2 metres from the bank.
- 4.5** British Waterways may inspect the Works during execution to ensure that the interests of the River are being safeguarded.
- 4.6** British Waterways should be advised of any Reportable Accidents and Dangerous Occurrences and supplied with copies of forms F2508 or F2508A.
- 4.7** British Waterways will require the name and address and telephone number of the Site Manager or other such competent persons responsible for the supervision of the Works including a twenty four hour telephone number for emergency contact.
- 4.8** No stoppage of the navigation will be permitted.
- 4.9** Construction debris, materials or arisings of any sort, which shall include but not be limited to bricks, timber, containers of any kind, reinforcing bars, polythene or plastic sheeting must be prevented from entering any River.

- 4.10** Contamination of the River with any toxic, or other polluting matter or liquid of any sort which shall include but not be limited to grout, concrete, or silane must be prevented.
- 4.11** The users of the River must be must be protected from any hazard which shall include but not be limited to oxy-acetylene burning, welding, grit blasting, water jetting or cleansing, spraying or pointing. Alternatively all such Works shall cease until craft or persons are past and clear.
- 4.12** Any vessel or craft on the River shall be licensed by British Waterways and used and moored in accordance with the British Waterways Bylaws.
- 4.13** If any plant, vessel or craft falls or sinks or is cast adrift in the River the Contractor shall immediately inform the British Waterways Representative and the Engineer and take immediate steps to make the hazard known to users of the River. The Contractor shall immediately arrange the salvage/re-securing of the plant, vessel or craft from the River and until such salvage/re-securing has been completed the Contractor shall provide buoys and/or markers and erect warning notices indicating the navigation hazard to River users to the satisfaction of British Waterways.
- 4.14** **EMERGENCY ACTION**
- The following actions shall be taken by the Contractor in the event of any damage to the River its containment and/or supporting structure or banking:-
- a) IMMEDIATELY inform British Waterways, the Engineer and (if required) the Emergency services.
 - b) Secure the area from the approach of traffic and/or the general public.
 - c) Render every assistance to the Emergency Services and/or British Waterways as shall be requested for the purposes of mitigating water loss and/or damage arising from the incident and/or for the purpose of securing public safety and the stability of other property.
- 4.15** An application has been made to the Environment Agency to carry out the works. A Permanent licence will be issued before the works commence. In River works are not included in the licence application, as it is not foreseen that they will be necessary. In terms of risk to the River environment they should be avoided.
- 4.16** No temporary works must be placed in the River.
- 4.17** No materials arising from the works must be permitted to enter the River. A horizontal protective membrane will be required for the full width of the underside of the bridge extending out 1 metre beyond the parapet to prevent the spillage of any liquids, such as paint, and any debris such as

wood shavings or materials arising from surface preparation for paintwork from entering the watercourse.

- 4.18** A vertical fine debris net will be required parallel to each main beam. When painting or shot blasting is taking place this fine mesh must be supplemented by an impervious membrane. An impervious membrane should not be fixed to the full length of any span at one time.
- 4.19** Trade or sewage effluent, or arisings, surface water of any kind in any way must not be discharged into the River.
- 4.20** Water must not be drawn from the River.
- 4.21** Contractors must not store fuel or oil, re-fuel service vehicles or plant on or in proximity to the River where there is a risk of pollutants entering the River.
- 4.22** The land surrounding the bridge and the approaches is at lower levels. The general public and local farmers have access to this property. The edge protection to the arches is insufficient for what will be a construction site. The Contractor must provide suitable protection along the approach arches to prevent harm from falling materials and to safeguard those working on site and the land below.
- 4.23** Parking will be available on site within the area as detailed in the contractors site establishment. Parking must not be permitted on the approach roads in close proximity to the bridge. Contractors may wish to make their own arrangements to park on the land behind the toll house that is owned by Aldwark Manor Hotel.
- 4.24** The bridge will be closed for the duration of the contract. The congested nature of the site means that the bridge will not be reopened for use until a certificate of practical completion has been issued which in effect means that all works must be complete and the site cleared.
- 4.25** Materials must be available at point of use to absorb spillage of paint or similar fluids.

5.0 SPECIFICATION AND SCHEDULE OF WORKS

5.1 Remove existing timber deck and dispose off site.

5.2 Replace/repair corroded cross beams

Cross beams must be removed or worked on progressively. Work can commence at each end of a particular main beam span with no more than one cross beam being out of position at each end at any one time.

When removing rivets techniques must be used that will avoid overheating the surrounding structural wrought and cast iron.

When replacing rivets with bolt and it is evident that the hole tolerance is greater than 2mm the existing holes must be drilled out to next whole bolt size.

Paint to be provided by Kemira coatings. Tenderers may submit alternative equivalent specifications with their tenders. Alternative specifications should indicate projected life of system. The colour scheme must match the existing colours of the bridge.

5.2.1.1 Alternative one

5.2.1.2 Remove corroded cross beams and dispose off site.

5.2.1.3 Provide new 203x203x60UC cross beams with 6mm end plates, full profile 6 fillet weld.

5.2.1.4 New UC to be delivered to site galvanised, T washed and painted to the required specification. Paint to be touched up on completion. Use nylon or similar slings to prevent risk of damage to paint surfaces

5.2.1.5 Paint specification for new cross beams.

1 coat Temabond STV W/G 2 pack surface tolerant Epoxy Undercoat -
125 microns dft. (brush)

1 coat Temathene PLV series 2 pack Acrylic/polyurethane - 50 microns
dft. (brush)

5.2.1.6 New cross beams fixed with 8 No. grade 8.8 bolts at each end through original rivet holes, bolt size to suit rivet holes.

5.2.2.1 Alternative Two

5.2.2.2 Remove corroded cross beam.

5.2.2.3 Remove top two wrought iron angles and dispose off site.

5.2.2.4 Fit new steel angles 80x80x10, bolted through every rivet hole.

5.2.2.5 Tenderers may wish to offer to refix the new angles with rivets and should provide an alternative cost for this together with details of the system they can offer.

5.2.2.6 Refix cross beam.

5.2.2.7 Repaired cross beams to be painted to general specification detailed in section 7.3.

5.3 General repairs

5.3.1 Drill out rivets or remove existing bolts to general bridge superstructure and replace with grade 8.8 bolts. Allow for 6 Number.

5.3.2 Tighten up bridge diagonal ties. This will probably require their removal to ease bolts and possibly cut new threads. Temporary ties must be inserted. Consideration may be given to replacing the original ties with new galvanised painted high yield steel ties. Paint specification as for new cross beams detailed at **5.2.1.5**.

5.4 PREPARE AND PAINT BRIDGE STRUCTURE

5.4.1 In order to reduce the risk to the environment induced by grit blasting the specification for preparation has been limited to hand methods except where the paint system has completely broken down and corrosion has resulted in which case the structure should be locally blasted to remove corrosion.

5.4.2 Blasting must be carried out using in a contained, tented, environment to prevent grit and the waste products of blasting from polluting the environment.

5.4.3 General preparation shall consist of

- Chipping, scraping and steel wire brushing with mechanical tools where possible to remove degraded paint. Mechanical tools must incorporate dust extraction.
- Remove dirt and contamination with detergent wash.
- Ensure surfaces are dry before painting.

5.4.4 The programme for the works must be maintained to a minimum to reduce disruption to the general public. As a result the Contractor will be expected to provide protection to the structure to allow the painting operation to be carried out in inclement weather to avoid delay.

5.4.5 The works to the bridge supports must be carried out at times of dry weather and low water to get coverage as low down as possible. The Contractor must accept that to achieve this painting works may be required out of sequence with other painting works.

Paint system

5.4.6 Patch prime exposed bare metal with 1 coat Temabond ST250 2 Pack surface tolerant epoxy aluminium primer, 125 microns dft overlapped onto sound paint by 50mm.(brush).

5.4.7 Apply overall 1 coat Temabond STV W/G 2 pack surface tolerant Epoxy Undercoat - 125 microns dft. (brush)

5.4.8 Apply overall 1 coat Temathene PLV series 2 pack Acrylic/polyurethane - 50 microns dft.(brush)

5.5 REPLACE TIMBER DECK

5.5.1 Lay reinforced polymer (Monarflex or similar) DPC 300 wide over top flanges of cross beams.

5.5.2 Replace timber deck in two layers in sizes to match existing.

5.5.3 Fixings and details to be as detailed on drawing no. 104-D1

5.5.4 Timber to be Pitch Pine stress graded to grade C27 in accordance with the latest version of BS 5268.

5.5.5 Timber must be well seasoned to avoid warping and must be free from wane at bearing areas.

5.5.6 The timber should be treated with a pressure applied CAA (copper chrome arsenic) preservative applied to give protection to hazard group 4 for a period of thirty years in accordance with European Codes of Practice. The preservative should be certified to meet with Environment Agency approval. The timber must be treated off site. Excess preservative must be washed off and the timber allowed to superficially dry before it is brought to site.

- 5.5.7** Alternative timbers will be considered to meet the following parameters.
- The timber must be stress grade to C27. Other species that are known to achieve this grade include British Grown Larch, British Pine and European redwood and whitewood.
 - The timber density must not exceed 700 kg/m³
- 5.5.8** Contractor should submit an alternative price for the use of the hardwood keruing together with the affect of the use of this timber on the programme, the maximum density should not exceed 735 kg./m³
- 5.5.9** All bolts to be galvanised. Bolts to be countersunk for the depth of the bolt head in lower beam fixing. The countersunk holes to be filled with flexible resin sealant. Resin to be easily removable.
- 5.5.10** The Contractor must allow for making good the flexible pavement where it is disturbed at the junction between timber deck and road construction.

APPENDIX A

All Permanent and Temporary Works in connection with **The Refurbishment of Aldwark Toll Bridge**

FORM OF TENDER

(NOTE: The Appendix forms part of the Tender)

Having examined the Conditions of Contract and requirements Associated with the above named works, we offer to carry out the said works in conformity with the preliminaries, Conditions of Contract and specification for the sums detailed in the Contract Sum Analysis.

.....
.....
....

Or such other sum as may be ascertained in accordance with the said Conditions.

We undertake to complete and deliver the whole of the works comprised in the Contract.

Unless and until a formal Agreement is prepared and executed this Tender, together with your written acceptance thereof, shall constitute a binding Contract between us.

We understand that you are not bound to accept the lowest or any tender you may receive.

Yours faithfully

Signature

Address

.....

.....

Date

APPENDIX TO THE CONDITIONS OF CONTRACT

1. Short description of the work to be carried out under the Contract

Refurbishment of Aldwark Toll Bridge.

2. The payment to be made under Article 2 of the Agreement in accordance with Clause 7 will be ascertained on the following basis:

Lump Sum.

- | | | |
|-----|---|--|
| 3. | Name of the Engineer
(Clause 2.1) | Richard N. Gibson |
| 4. | Starting Date
(Clause 4.1) | Place order July 2000
Start on site August 2000 |
| 5. | Period for Completion
(Clause 4.2) | twelve weeks from start on site |
| 6. | Liquidated damages
(Clause 4.6) | £1000 per week |
| 7. | Limit of liquidated damages
(Clause 4.6) | No Limit |
| 8. | Defects Correction Period
(Clause 5.1) | 1 year |
| 9. | Rate of Retention
(Clause 7.3) | 5% |
| 10. | Limit of Retention
(Clause 7.3) | 5% |
| 11. | Minimum Amount of Interim Certificate
(Clause 7.3) | £5000 |
| 12. | Bank Whose Base Lending Rate is to be Used
(Clause 7.8) | BANK OF ENGLAND |
| 13. | Insurance of the Works
(Clause 10.1) | Required. |
| 14. | Minimum Amount of Third Party Insurance (persons and property)
(Clause 10.6) | £5,000,000.00 |

Any one accident/number of accidents unlimited

13. Name of Planning Supervisor
(Clause 13(1)(b))

Gibson Design Consultancy Ltd.

14. Name of Principal Contractor
(Clause 13(1)(b))

The Contractor

CONTRACT SUM ANALYSIS

£

- 1.0** PRELIMINARIES
- 2.0** PROVIDE ACCESS TO THE WORKS
- 3.0** REMOVE DECK
- 4.0** STRUCTURAL REPAIRS Alternative 2
- 5.0** MINOR STRUCTURAL REPAIRS (SECTION 5.3)
- 6.0** PREPARATION AND PAINTING
- 7.0** REPLACE DECK

The Contractor may enter any method or time related charges he wishes to make.

TOTAL

The cost of carrying out structural repairs to Alternative 1 is

The Contractor may wish to comment on the affect on programme of Alternative A

DAYWORK SCHEDULE

A. DAYWORK PRIOR TO DATE OF PRACTICAL COMPLETION

The percentages of labour, materials and mechanical plant and haulage are to include for the supply, use, repair and sharpening of tools and for fuel, hire of non-mechanical plant, use and waste of protective clothing, staging tarpaulins and other similar items that may be generally in use, all supervision and maintenance.

1. Nett Local Rates of Wages for Labour

General Tradesmen	per hour
Labourer	per hour
*	per hour
*	per

hour.

ADD% to the foregoing rates for labour in Daywork, for National insurance Acts, Pension contributions, all other insurances, all bonus, Joint Board Supplement and incentive payments or the like; including guaranteed minimum bonus, guaranteed time, workmen's fares, lodging allowances, holidays and public holidays with pay, sick pay scheme, Industrial Training Act, transport and payment of men from whatever district labour is obtained, requirements of safety, Health and Welfare Regulations and any other provisions or payments to be made in accordance with the relevant working rule agreements, supervision, overhead and establishment charges and including head office charges and profit.

2. Materials

The value of materials used in Daywork will be the actual cost to the Contractor and all discounts obtained other than cash discounts not exceeding 2.5% will be deducted.

The cost of any timber used in Daywork for formwork or showing will be taken at **% of the value of the new timber.

ADD% of the cost of materials in Daywork for storage, double handling, insurance, overheads and established charges and profit.

3. Mechanical Plant and Haulage

Mechanical plant and haulage used in Daywork will be valued at the rates contained in the schedule below; to be completed by the Contractor. Rates to be inclusive of driver when applicable.

ADD % to the cost of mechanical plant and haulage used in Daywork for cost of repairs and replacement, fuel, power and consumable stores, insurances, licences, overhead and establishment charges and profit, delivery to and from site.

The Institution of Civil Engineers
Conditions of Contract for Minor Works

AGREEMENT

THIS AGREEMENT is made the day of 19.....

between

of (or whose registered office is at)

.....

(hereinafter called 'The Employer') of the one part

and

of (or whose registered office is at)

.....

(hereinafter called the 'Contractor' of the other part

WHEREAS the Employer wishes to have carried out the following

.....

and has accepted a Tender by the Contractor for the same

NOW IT IS HEREBY AGREED AS FOLLOWS:

Article 1 The Contractor will, subject to the Conditions of Contract, perform and complete the works

Article 2 The Employer will pay the Contractor such sum or sums as shall become payable under the Contract and in accordance with the Conditions of the Contract

Article 3 The documents listed in the Contract Schedule form part of this Agreement

AS WITNESS the hands of the parties hereto:

Signed for and on behalf of the Employer

in the presence of

(WITNESS)

Signed for and on behalf of the Contractor

in the presence of

The Institution of Civil Engineers
Conditions of Contract for Minor Works

THE CONTRACT SCHEDULE
(List of documents forming part of the Contract)

The Agreement (if any)

The Contractor's tender (excluding any general or printed terms contained or referred to therein, unless expressly agreed in writing, to be incorporated in the Contract).

The Conditions of Contract

The Appendix to the Conditions of Contract

The Drawings. Reference Numbers

The Specifications and Contract Requirements

The Daywork Schedules*

The following letters*

From:	To:	Dated:
From:	To:	Dated:
From:	To:	Dated:
From:	To:	Dated:
From:	To:	Dated:
From:	To:	Dated:
From:	To:	Dated:

* Delete if not applicable

ADDENDUM PROOF OF EVIDENCE OF RICHARD N. GIBSON

Estimate of Year 2025 refurbishment

- 1.0** Please refer to the tender appraisal attached to this document and which also appears at page GDC-01-7 of my full proof of evidence.
- 2.0** Taking Hares lowest tender as the basis of the estimate for 2025 costs, this is a conservative approach.
- 3.0** The tender was broken down into 9 main sections each discussed below.
- 4.0** Preliminaries – Preliminaries which can include the costs of office overheads, profit, site set-up, supervision and contract management will be included in the 2025 refurbishment.
- 5.0** Access to the bridge, which includes scaffold costs, will be required.
- 6.0** The timber deck will require replacement so the existing deck will have to be stripped.
- 7.0** There will be some minor works
- 8.0** Painting costs will be accrued through a separate allowance currently made for repainting in 2005 and 2011, a proportion of the tolls will continue to be collected for future painting events.
- 9.0** Providing a new timber deck, this will be required as timber is not as durable as steel or concrete.
- 10.0** Several of the variation costs will be required at a major refurbishment, the costs of these are set out at page GDC-01-22 of my proof of evidence.
 - 10.1** The timbers must be stress graded, this was an additional sum ordered before the contract was placed.
 - 10.2** Variations one and two will apply
 - 10.3** An allowance should be made for replacing rivets, variation 3, 5 and part 7
 - 10.4** It is likely that the approach roads will require some treatment as for the next 25 years they will only be subject to patch repairs. Variations 4 and 5 at page show this cost.

