DUNHAM BRIDGE COMPANY

APPLICATION TO REVISE TOLL CHARGES

Application by

THE DUNHAM BRIDGE COMPANY

Dunham Bridge, Dunham Road, Newton on Trent, Lincoln LN1 2JR

Under the Transport Charges etc. (Miscellaneous Provisions) Act 1954

Section 6 Dunham Bridge Act 1830 and Dunham Bridge (Amendment) Act 1994

June 2022

CONTENTS

1. Executive summary

The Dunham Bridge Company ("the Company") is seeking permission to increase its tolls for all categories of vehicle from 1st August 2022 as laid out below. It is also seeking to reclassify agricultural vehicles as lorries in future, rather than as vans, as they are currently.

Vehicle Category	Proposed Toll *(Inc VAT)*	Current Toll *(Inc VAT)*
Cars	£0.50	£0.40
Vans	£1.00	£0.60
Lorries & Agricultural Vehicles	£2.00	£1.00

Table 1: Dunham Bridge - Current & proposed tolls

This will be the first financially driven toll application made by the Company since 2006. If granted, this will mean that the gross charge to the travelling public will have increased at approximately the same rate as the Retail Price Index ("RPI") (69% vs 66%) since that application.[1]

However, this increase also includes VAT, which the Company has been required to charge since 2012, owing to a change in EU regulations. Net of VAT, this change will represent a 42% increase in the Company's prices, since 2006 which is well below RPI over that period of 66%.

The Company did apply to increase its tolls in 2012, however that application was made to improve traffic flow. The imposition of VAT had made its tolls highly impractical to collect and was causing very significant delays to the travelling public. That application was used to rationalise toll amounts (cars moved from 36p to 40p, for example) and simplify the Company's charging structure and reduces delays.

The Company has obligations to its staff, the travelling public and its shareholders, in addition to the requirement to invest so that it can pay for the eventual rebuilding of the bridge. It will not be able to continue to meet all of these obligations without this increase.

The Company can demonstrate sound and effective management, both operationally and financially, in recent years and has substantially modernised and streamlined its operations to manage ever increasing costs.

However, despite this, a series of external cost increases and regulation changes, combined with post COVID-19 construction cost inflation and an ongoing and sustained reduction in traffic flows mean that these gains are no longer sufficient to meet the Company's needs and so the Company has decided to seek an increase in its tolls.

This increase will allow the Company to continue to meet its obligations to the travelling public, staff and its shareholders.

[1] *https://www.ons.gov.uk/economy/inflationandpriceindices/timeseries/czbh/mm23*

2. Background

2.1 The Dunham Bridge Company

The Dunham Bridge Company was constituted in 1830 under the Dunham Bridge Act, now amended by the Dunham Bridge (Amendment) Act 1994. The Company was given authority to construct, at its own cost, a bridge over the River Trent at Dunham on Trent. In return, the Act allows the Company to collect tolls for the operating costs, maintenance and eventual replacement of the bridge, and for the payment of dividends to shareholders.

The Transport Charges etc (Miscellaneous provisions Act 1954) as amended by the Dunham Bridge (Amendment) Act 1994 ("the 1994 Act") allows the Company to apply to the Secretary of State at any time to revise the toll charges to meet its obligations and commitments.

The bridge is a strategic piece of the transport infrastructure for Lincolnshire and Nottinghamshire. It is situated 11 miles West of Lincoln on the A57 and crosses the River Trent. The nearest alternative crossings of the Trent are approximately 10 miles North of the bridge at Gainsborough or 13 miles South of the bridge at Newark.

Figure 1: Dunham Bridge - Location Map

The original bridge was built in 1831 and 1832. The Company replaced the bridge's superstructure in 1978 when a new superstructure was constructed on the original foundations and piers.

It is a four-span bridge and is approximately 144 m long. It carries a single carriageway asphalt road and a footway on the South side of the bridge. The Company collects tolls at a toll plaza on the Eastern end of the bridge. The plaza contains three toll booths (two single booths and one double booth) which allow up to four toll collectors to work at any one time.

The bridge employs 33 people in addition to the directors and carries just under 70,000 vehicles per week currently. Its traffic is approximately 75% cars, 20% vans and 5% lorries. This is down from approximately 77,000 vehicles per week before the pandemic.

The Company's registered office is at the offices of its accountants Wright Vigar at 15 Newland, Lincoln LN1 1XG.

2.2 The company’s last toll application (2012)

The Company last applied to increase its tolls in 2012. That application was triggered by the Department for Transport’s (“DfT”) removal of the VAT reimbursement scheme that the bridge benefited from. The Company understands that this, in turn, was triggered by a change in EU regulations.

The removal of the VAT reimbursement scheme meant that Dunham Bridge was now required to charge VAT on its tolls. As the Company pays very little input tax, it became a substantial VAT payer. It was collecting approximately £300,000 per year of VAT before COVID-19.

Increasing tolls by 20% also meant that most of them became very time-consuming to collect. They required large amounts of change to be counted as part of each transaction.

The toll for cars that increased from 30p to 36p is the best example of the issues created. 30p is a simple amount to pay and give change for if the driver does not have the correct change. 36p is time-consuming to pay, count, and provide change for if the driver does not have the correct change.

This led to delays and significant frustration for the travelling public. There were frequently long queues of traffic waiting to pay even when all toll booths were fully staffed.

As a result, the Company applied for small changes to its tolls to make them more practical to collect. Cars, which make up most of Dunham Bridge’s traffic, moved from 36p to 40p. Vans tolls were unchanged at 60p, and lorries increased from 84p to £1.

As part of the same application, the Company applied to rationalise its charging structure from 7 tiers down to 3 tiers to speed up toll collection and traffic flow. Historically, the toll had depended on the number of axles on a vehicle.

These changes meant that motorcycles and tricars moved to be toll-free from being 10p, as bicycles and emergency vehicles already were, and that cars towing trailers, and vans towing trailers, enjoyed a reduction in their toll. This change also meant that the toll for the larger lorries did not increase.

A further measure to improve traffic flow, which was committed to in that application, was creating a frequent users card system to facilitate the passage of frequent users of the bridge and provide cars with a discount.

The discount of approximately 10% for cars using a Dunham Bridge card meant that there was also no toll increase for this category of vehicle in 2012. Users of this scheme have paid the same toll since 2006 when the bridge's previous toll increase was agreed.

Finally, as part of this application, the Company made commitments to make annual transfers into reserves for the repair of the bridge and the future rebuilding of the bridge.

The application for the increase in the tolls was accepted by users of the bridge, as evidenced by the fact that it did not generate a single formal complaint from a member of the public. As a result, there was no public enquiry to discuss this change.

The Company has honoured the commitments made in the 2012 toll application. It has transferred shareholder funds to the bridge repairs fund and the bridge replacement fund at or above the rate committed to in the previous toll application.

2.3 Improvements to bridge operations since the last toll application

Since its 2012 toll application, the Company has continued to invest to ensure that the bridge continues to offer the travelling public a safe, efficient crossing and staff a modern, well-run and safe environment in which to work.

Key improvements made since the last toll application include:

- The Company honoured the commitment made in the last toll application to set up a frequent users card system. This was established in 2013 and has made crossing the bridge more efficient and cheaper for cardholders.
- In 2015, in the interests of improving traffic flow, reducing delays and improving safety, a policy of not turning around lorries that claim to be unable to pay the toll was introduced.
- In 2015, the Company also introduced contactless card machines, allowing tolls to be paid by debit/credit card.
- Before 2016, the Company employed a full-time bridge manager, who was required to live on-site in the bridge house, and a deputy manager who did not live on site. This traditional way of working had served the Company well over a long period.

  On reviewing the Company's needs, the board decided that a more modern and flexible way of managing the bridge day-to-day would be more appropriate. The responsibilities of the bridge manager and deputy bridge manager were distributed between several newly appointed supervisors and the Directors. The new regime has proved successful while also providing the Company with a saving of approximately £10,000 per year.
- In 2019, the Company installed reactive and programmable electronic signs and CCTV. Reactive signs allow staff to better regulate the flow of traffic across the bridge and help to reduce the speed of vehicles, making the bridge safer and more efficient.
- CCTV has improved safety for pedestrians and cyclists. It has also provided valuable assistance to the police and has been instrumental in securing two criminal convictions.
- In collaboration with the adjacent Highway Authorities (Nottinghamshire and Lincolnshire County Councils), in 2019 the Company instituted a 40 mph speed limit on the bridge. This has improved traffic flow and safety by introducing a continuous 40 mph speed limit from the Lincolnshire boundary to the 30 mph limit at Dunham on Trent.
- In 2020 and 2021, the Company replaced two of its three toll booths. The third toll booth will be replaced in the second half of 2022. The new booths improve staff working conditions and give toll collectors better visibility of traffic.
- In 2021, the Company installed a new till system and faster traffic barriers, improving traffic flow through the toll plaza.

The Company is committed to further substantial investment in the bridge's infrastructure. It has planning permission to construct a modern, purpose-built toll office and associated new access road. The cost of this investment is currently estimated at £1.5m.

The new building will be extremely environmentally friendly, using solar panels and air-source heat pumps. It will improve staff working conditions and safety by allowing bridge supervisors far better visibility of the toll plaza.

The plans for this also include a cycle lane that will help separate cyclists from larger vehicles around the toll booths, where they are at the greatest risk.

The Company is investigating the possibility of providing a charging point for electric vehicles and other electronic payment methods, including the possibility of a Dunham Bridge app that would allow people to pay for a crossing on a mobile phone.

Given the success of the signs installed in 2019, the Company is also investigating the possibility of installing programmable signs to display the bridge tolls while offering the ability to communicate with vehicles crossing the bridge should that be required.

2.4 Engineering & maintenance since the last toll application

Dunham Bridge was set up to provide the travelling public with a safe crossing of the River Trent, and this continues to be the Directors' primary concern.

To ensure that the bridge's infrastructure continues to be well-maintained, the Board is assisted by professional consulting engineers who monitor and report on the bridge's condition.

Since the last toll application, key engineering and maintenance events include:

- In 2015, Norder Design Associates carried out a principal inspection of the bridge. They concluded that the bridge's condition continued to be good while recommending a number of remedial works, the most significant of which were dealt with in 2018 (see below)
- In 2015, survey markers were installed at each pier and abutment. These markers are checked annually and allow the bridge to be monitored for movement, which is important because it still sits on its original foundations and piers.
- In 2018, the Company carried out major maintenance works on the bridge's cathodic protection and paint system at the cost of approximately £400,000. The need to meet these types of very substantial repair bills is the reason that the repairs reserve was established. These repairs comprised the significant recommendations from the bridge's 2015 principal inspection.
- The 2018 improvement in the cathodic protection system allows for remote monitoring. The system's performance is reviewed quarterly. As with the survey markers, changes in readings on this system will help provide an early warning if there is a significant issue with the bridge's infrastructure.
- A principal inspection was carried out on the bridge in 2021 by specialist bridge engineers (Inertia Consulting) who commented on the 'previous timely repairs' that had been carried out and that the bridge was in good condition. This document can be found in **Appendix 1**.

The Board believes that, with the assistance of appropriate experts, it has a robust engineering and maintenance programme that will ensure that the bridge continues to be well-maintained and safe for the travelling public.

3. The need for a toll increase

3.1 Sustained cost increases

Since 2012, Dunham Bridge has experienced sustained cost pressure on a number of fronts. This has only intensified during 2022, with the increase in National Insurance and the planned increase in corporation tax.

It has mitigated historic cost pressures through careful management but has now reached the point where it cannot continue to mitigate cost pressures any longer.

The points below contain four illustrative examples.

Example 1: Before 2014, the bridge had been staffed by an individual toll collector overnight, given the low traffic levels. New regulations regarding lone working were introduced in 2014, meaning this was no longer appropriate. Consequently, the Company now has two toll collectors working overnight, with obvious cost implications for the business.

Example 2: Health and Safety ("H&S") and environmental legislation is ever more expensive to comply with. EU and other international environmentally driven changes to allowable paint compositions have reduced the life of suitable paint systems from the 20 years anticipated in previous toll applications to approximately 12 years today. Over the same period, changes to the regulations regarding working over rivers have made carrying out work on the bridge structure substantially more expensive than it was previously. In many cases, organising safe, environmentally sound access now exceeds the cost of the work itself.

Example 3: The majority of the wear and tear suffered by the bridge is caused by lorries and agricultural vehicles. Since 2006 the legal weight limit for lorries has been increased from 36t to 44t. As a result, wear and tear, and so repair costs, are above the level forecast previously. This is discussed in more detail in the '**3.5 (ii) Repairs Reserve**' section below.

Example 4: Pensions auto-enrolment now costs the Company approximately £6,000 per year. In addition, the Company has committed to paying all staff the national living wage at an approximate additional cost of £4,000 per year in 2022.

Despite these and other cost pressures, as discussed above, the Company has continued to invest in new infrastructure and repairs and maintenance to ensure that the bridge continues to be well-maintained and safe for users. It has also funded its repairs reserve and bridge replacement fund at or above the rate forecast in the 2012 toll application.

As a result, the bridge's toll operations have become increasingly unprofitable in recent years. This is discussed further in the section '**3.3 Recent Financial Performance**' below.

3.2 Coronavirus

The coronavirus pandemic has impacted the Company's finances materially.

- Between 25th March 2021 and 23rd May 2021, the Company allowed free passage to all traffic, as required by Public Health England.
- From 24th May 2021 until 9th October 2021 and again from 21st January 2021 to 21st April 2021 low traffic levels made collecting tolls at night uneconomic, so the Company only collected tolls during the day.

- The Company made appropriate use of the Government's furlough scheme throughout this period and 'topped up' all furloughed staff salaries to 100% for the first six weeks of furlough.
- During the period while the Company allowed free passage, all staff other than supervisors were furloughed. The supervisors ensured that the bridge continued to offer safe passage to motorists.

As a result, the Company's toll income dropped 23% in financial years ("FY") 2020 and 2021 when compared to FY 2019.

While the UK dropped all restrictions in Q1 2022, the level of traffic crossing the bridge is still over 10% below where it was in 2019. It has fallen back to approximately the levels of traffic crossing the bridge in 2013.

Despite this substantial decrease in income over the last two financial years the Company has continued to invest in its infrastructure using shareholder funds it reserved in previous years.

The Company is now collecting tolls 24 hours per day, as it was before the pandemic, but its weekly income is still below where it was in the equivalent week in 2019. Since all coronavirus restrictions were dropped (24th February 2022), income has been around 7% down on the equivalent week in 2019. This decrease does not correlate with traffic levels, as lorries now make up a higher proportion of traffic.

Assuming that there are no more issues with coronavirus or other adverse events, the Company anticipates that traffic will hold steady for the next two years before it starts growing again.

The Company does not currently anticipate its traffic returning to 2019 levels during the period of its forecasts, which run to 31 July 2026.

3.3 Recent financial performance

The table below shows the results of the bridge's tolling operations on their own, having removed the impact of the bridge's investment operations. As can be seen, the bridge benefited from steady increases in traffic levels through to March 2020.

As can also be seen, the last time that the bridge's operations generated a surplus sufficient to also cover the dividend paid to shareholders was FY 2017. Dividends are discussed in more detail in "**3.4 Dividends**" below.

Since 2017, the shortfall has been met from the Company's accumulated reserves which benefited from above forecast investment returns generated by a strong global stock markets.

However, as global stock market performance during 2022 so far shows, this can not be relied upon over the longer term and the trading profitability of the bridge needs to be restored. Current and future inflation only make this more pressing, as they will further impact the bridge's profitability.

FY Ending 31 July:	2021	2020	2019	2018	2017	2016	2015	2014
Turnover	**1,194,099**	**1,203,717**	**1,549,696**	**1,525,970**	**1,518,858**	**1,456,774**	**1,444,793**	**1,419,461**
- Running Costs	(715,214)	(723,971)	(723,092)	(1,018,205)	(638,165)	(616,546)	(584,982)	(676,449)
- Depreciation	(130,133)	(124,199)	(120,639)	(117,198)	(117,729)	(179,777)	(123,372)	(125,724)
- Corporation Tax	(80,170)	(80,301)	(149,368)	(84,647)	(154,360)	(139,044)	(156,031)	(139,102)
Post-Tax Profit	**41,778**	**(7,664)**	**286,778**	**305,920**	**608,604**	**521,407**	**580,408**	**478,186**
- Dividend	(566,800)	(566,800)	(555,900)	(512,300)	(468,700)	(442,540)	(407,660)	(337,900)
Transfer To/(From) Earmarked Reserves	**(525,022)**	**(574,464)**	**(269,122)**	**(206,380)**	**139,904**	**78,867**	**172,748**	**140,286**

Table 2: Dunham Bridge - Recent financial performance

Reductions in toll income brought about by coronavirus have only served to exacerbate this issue, especially when it is noted that these dividends were paid at ***below*** the rate recommended by the 2006 public enquiry.

Please note that all financial figures are exclusive of VAT unless noted otherwise.

3.4 Dividends

The 2006 toll enquiry noted that the

> ***'The Company needs to strike a balance between providing a reasonable rate of return to shareholders on their investments and the responsibilities of operating, maintaining and replacing the Bridge'.***

It also noted that

> ***'In other regulated industries in the UK, rates of returns between 6% and 8% are considered reasonable'.***

It approved a steady increase in the Company's dividends such that by 2012 shareholders would be receiving a dividend of £150 per share, which represented an anticipated 6% return on capital. It noted that the dividend had been £120 per share in 1996 and that this represented a below-inflation increase.

The impact of the financial crisis (2007-2008) and the subsequent recession impacted the Company's traffic. As a result, the Directors authorised a dividend of £135 per share in 2012. This was 10% below the amount agreed at the enquiry. The Directors felt they could not authorise the full dividend given the uncertainty around the Company's trading at that point.

Since 2013 the Company has continued to increase dividends steadily. As traffic and the equity markets recovered after the financial crisis, the Directors felt more confident that the Company was appropriately funded.

The table below shows the level of dividends that have been paid since the last toll application. While the Directors have increased dividends, they are still not paying shareholders a return on capital of 6%.

Given the reduction in toll income that the Company suffered during the pandemic, the Directors held the dividend steady for the FYs 2020 and 2021.

Financial Year	Dividend	Shareholder Return on Capital
2013	£150	4.1%
2014	£155	4.1%
2015	£187	4.7%
2016	£203	4.6%
2017	£215	4.5%
2018	£235	4.8%
2019	£255	4.9%
2020	£260	5.2%
2021	£260	4.7%

Table 3: Dunham Bridge - Historic dividends

The Company is proposing to pay a dividend representing 6% return on capital in future.

3.5 Current financial reserves

The Company operates two key financial reserves in order to manage the risks that it faces.

(i) Replacement Reserve

This reserve is designed to pay for the eventual rebuilding of the bridge. The bridge was rebuilt in 1978 with a 100-year life, and so this is anticipated in 2078.

The current estimate for the bridge's future replacement cost is £60m in 2078. This is unchanged from the last two toll applications submitted. The Company believes that the long term assumptions made previously continue to be appropriate, despite short-term fluctuations.

As was agreed at the last two toll applications, this application assumes that over the long run, the cost of replacing the bridge will inflate at 3% per annum and that the replacement reserve can earn a net return of 4.7% per annum.

The replacement reserve is financed with transfers of distributable profits into a ring-fenced replacement reserve. The Company has met its commitments to transfer funds into this reserve at or above the rate forecast in the last toll application.

The replacement reserve currently contains approximately £5m.

The Company will continue to transfer funds into this reserve to ensure that this reserve will meet the expected rebuild cost for the bridge in 2078.

Financial Year Ending 31 July:	2023	2024	2025	2026
Bridge Rebuild Cost Fund	5,136,678	5,378,102	5,630,873	5,895,524
Transfer Of Funds	230,586	241,424	252,711	264,651

Table 4: Dunham Bridge - Historic level of bridge replacement reserve

(ii) Repairs Reserve

In 2005 the Company commissioned a study by its Consulting Engineer to determine likely repair costs over the coming 10-year period. The Company's 2006 toll application included a commitment to establish a repairs fund to fund these anticipated repairs.

This was driven by the fact that repair costs do not fall evenly each year. In addition, the Company's Consulting Engineer was concerned that the damage caused by an increase in the weight limit for HGVs to 40t (subsequently increased to 44t) would accelerate these costs ahead of the forecast.

As feared, these estimates proved to be understated in some areas. In particular, for 'Waterproofing, Joints & Resurfacing'. The bridge's joints are currently being replaced every 5-6 years rather than every 10 years, as estimated in that application.

A material contributor to this has been the increase in heavy goods vehicles using the bridge. Lorries and other heavy vehicles cause the vast majority of the wear and tear that the bridge suffers, and lorry traffic has consistently grown faster than car and van traffic in recent years.

Currently, the repairs reserve contains approximately £600,000. The Company reviews this reserve annually and believes that it is appropriately funded currently.

It should be noted that this document does not anticipate any further increases to the HGV weight limit. Any future increases to this would further increase wear and tear, and so the Company's repair costs, and might require a further toll application to meet these costs.

3.6 Financial forecast assuming no toll increase

The figure below shows a financial forecast for Dunham Bridge, assuming that it does not increase its tolls. Again, this forecast excludes the Company's investment funds.

FY Ending 31 July:	2023	2024	2025	2026
Turnover	**1,413,960**	**1,412,934**	**1,415,437**	**1,417,944**
- Running Costs	(829,479)	(853,818)	(873,247)	(894,813)
- Depreciation	(147,224)	(202,914)	(193,735)	(188,228)
- Corporation Tax	(78,706)	(89,050)	(87,114)	(83,726)
Post-Tax Profit	**358,550**	**267,151**	**261,341**	**251,178**
- Dividend	(628,000)	(628,000)	(620,000)	(611,000)
Transfers To / (From) Ear-marked Reserves	**(269,450)**	**(360,849)**	**(358,659)**	**(359,822)**

Table 5: Dunham Bridge - Financial forecast assuming no increase in tolls

As can be seen, this is not a sustainable situation for the Company, with net assets and so dividends decreasing over time as the Company draws on historic profits to meet losses.

For a discussion of the assumptions used to generate these figures see "**6.1 Assumptions**" below.

4. Proposed new toll structure

As a result of the issues discussed, the Company is now applying to increase its tolls.

4.1 New standard toll structure

The Company is requesting an increase in its standard tolls as per the below table.

Vehicle Category	Proposed Toll	Proposed Toll	Current Toll
	(Ex VAT)	*(Inc VAT)*	*(Inc VAT)*
Cars	£0.42	£0.50	£0.40
Vans	£0.84	£1.00	£0.60
Lorries & Agricultural Vehicles	£1.68	£2.00	£1.00

Table 6: Dunham Bridge - Current & proposed tolls

Currently, agricultural vehicles crossing the bridge are charged as vans. In this application, we seek permission to categorise agricultural vehicles as lorries.

Large, modern tractors, often towing large trailers, cause a level of wear and tear to the bridge that is far closer to a lorry than a van. In particular, the protruding treads on their tyres cause disproportionate damage to the bridge's expansion joints.

This application does not seek to increase the Company's toll income (net of VAT) ahead of RPI, and the adoption of the Company's proposal in "**4.2 CPI-Linked Future Toll Increases**" below will support this intent. In the 15 years from March 2006 to March 2022 RPI inflation has been 66%.

The table below shows the increase in toll proposed in this application against the toll proposed in the March 2006 application to the Department of Transport.

Vehicle Category[2]	Proposed Increase Since 2006 *(Ex VAT)*
Cars	40%
Vans	39%
Lorries	68%
Agricultural Vehicles	280%
Average toll increase[3]	**42%**

Table 7: Dunham Bridge Tolls - % increase since 2006

[2] *In 2006 the Company charged vans and lorries depending on their number of wheels. For this comparison, a standard van (4 wheels) and lorry (18 wheels) has been used.*

[3] *Average is weighted by the traffic over the bridge during 2022.*

In suggesting these increases, the Company has taken the following factors into account:

1. The tolls must be very quick and simple to collect in cash. The majority of tolls will continue to be paid in cash for the foreseeable future.
2. Lorries and agricultural vehicles cause the vast majority of the wear and tear suffered by the bridge and benefit most from it, given the cost per mile of driving these vehicles.

The last toll increase for the heaviest lorries was proposed in a toll application dated April 2002. For lighter lorries, small increases were made in 2013 to allow the Company to simplify its toll structure.

4.2 CPI-linked future toll increases

The Company is also seeking the right to increase tolls in future without the need to refer to the DfT in a very limited number of scenarios.

This would save the DfT the time and cost of reviewing and managing a Dunham Bridge toll application and save the Company the cost of producing and managing a toll application.

The Company would propose that an automatic toll increase only be allowed if all the conditions below have been met.

1. The increase is limited to a maximum of the increase in the consumer price index (“CPI”) since the previously authorised toll increase.
2. The Company is not permitted to use this right if the tolls have been increased in the previous five years.
3. The new tolls continue to be quick and simple to collect to avoid traffic delays.

4.3 Bridge discount scheme

The Company created a discounted toll scheme for cars as part of its 2012 toll application, with pre-paid card users benefitting from a discount of just over 10% on each crossing.

The effect of this was to maintain tolls at their 2006 levels, meaning that users of the pre-paid card scheme have not suffered a toll increase for 16 years.

Users of the car pre-paid card scheme now make up almost 20% of all bridge crossings.

The scheme’s popularity means that it has become increasingly expensive for the Company.

Nevertheless, the Company plans to maintain a pre-paid card scheme offering a 10% discount to cars for at least the next three years and will keep the level of discount under review thereafter.

The Company plans to continue encouraging users to pay electronically, whether using a Dunham Bridge card or a bank card, to improve traffic flow.

5. Comparative tolls

The Company believes that its tolls will continue to represent very good value to the travelling public after this increase. It will continue to charge significantly less than comparable bridges elsewhere in the UK in almost all cases.

The UK has a number of similar privately-financed toll bridges. A full list of these bridges can be found at: https://www.gov.uk/uk-toll-roads.

Each toll bridge in the UK has its distinct geography and position in local highway infrastructure. However, the bridges most similar to Dunham Bridge in terms of size, complexity, and traffic composition are those on A-roads that carry HGV traffic as well as cars and vans. The other toll bridges in this category are Humber, Itchen, Mersey Gateway and Tamar bridges[4].

The chart below shows the cost of a standard car crossing for these comparable bridges. It should be noted that some comparative bridges only charge for crossing in one direction.

Even after this toll increase, Dunham Bridge's toll will still be the lowest of any comparable bridge. Tamar Bridge is currently in the process of applying for a toll increase, as can be seen.

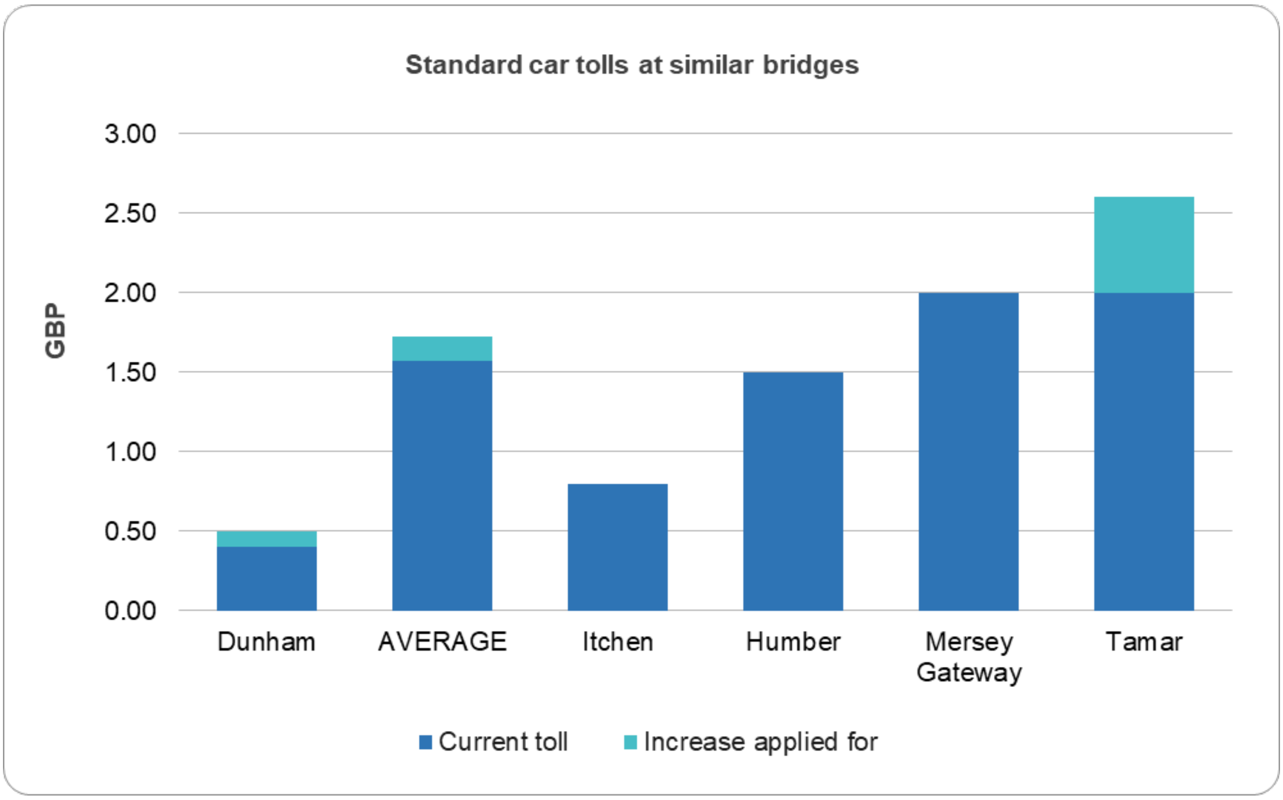

Figure 2: Dunham Bridge - Comparison with car tolls charged by similar bridges

[4] *Batheaston bridge has been excluded because we believe the DfT have included this in this listing in error. It has a weight limit of 4 tonnes.*

All of these bridges offer discounts for frequent or registered users. Even allowing for these discounts, Dunham Bridge's toll will continue to be modest by comparison.

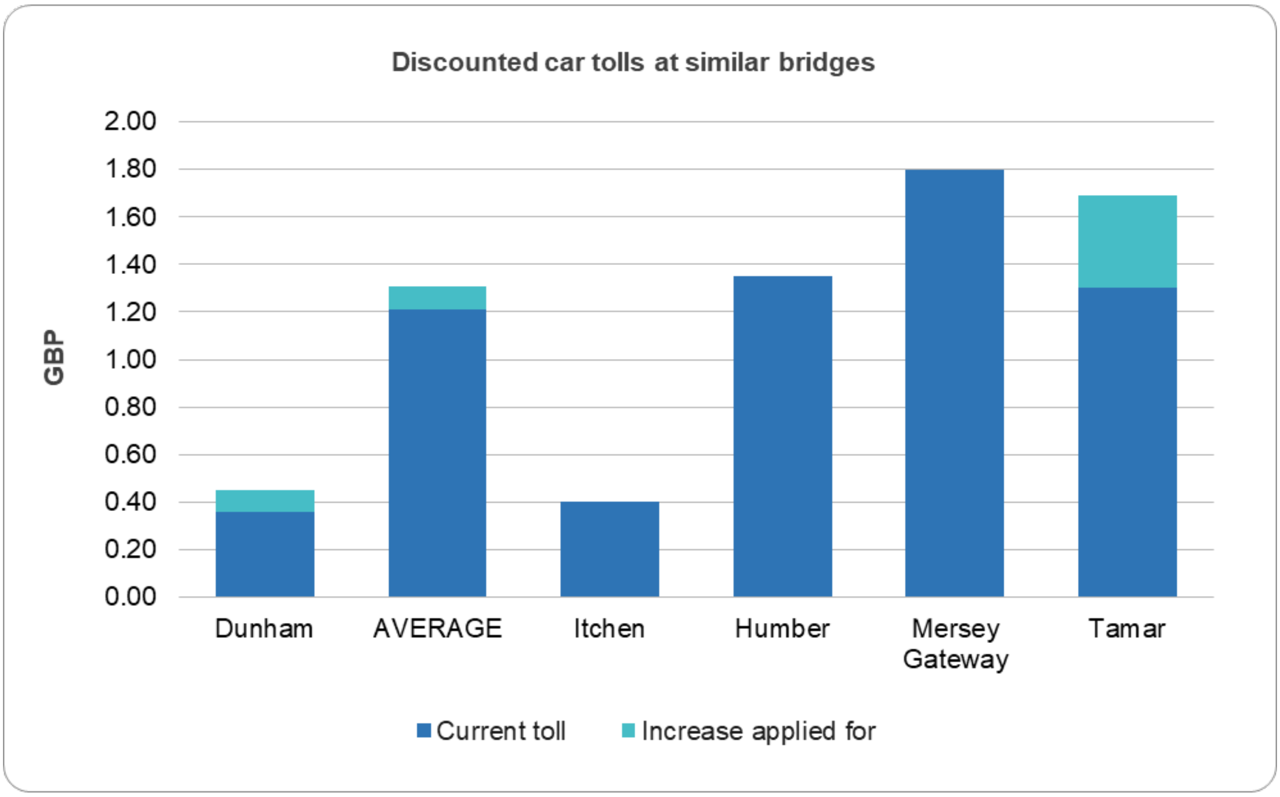

Figure 3: Dunham Bridge - Comparison with discounted car tolls charged by similar bridges

Similarly, the chart below shows the cost of a standard HGV crossing for these bridges. After this toll increase, Dunham Bridge's HGV toll will still be the lowest of any comparable bridge.

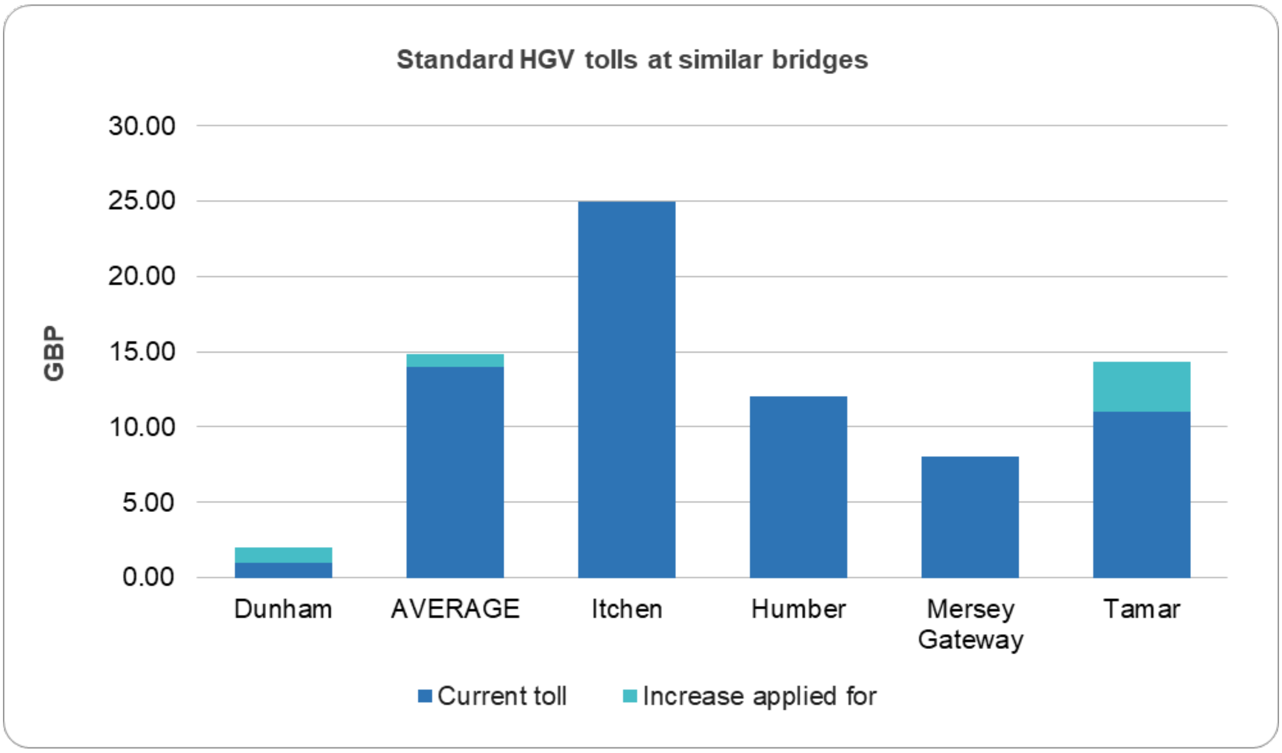

Figure 4: Dunham Bridge - Comparison with HGV tolls charged by similar bridges

Again, all of these bridges offer frequent user discounts and even after taking these into account, a standard HGV crossing of Dunham Bridge will still be the same price or less than the discounted price of all of these bridges.

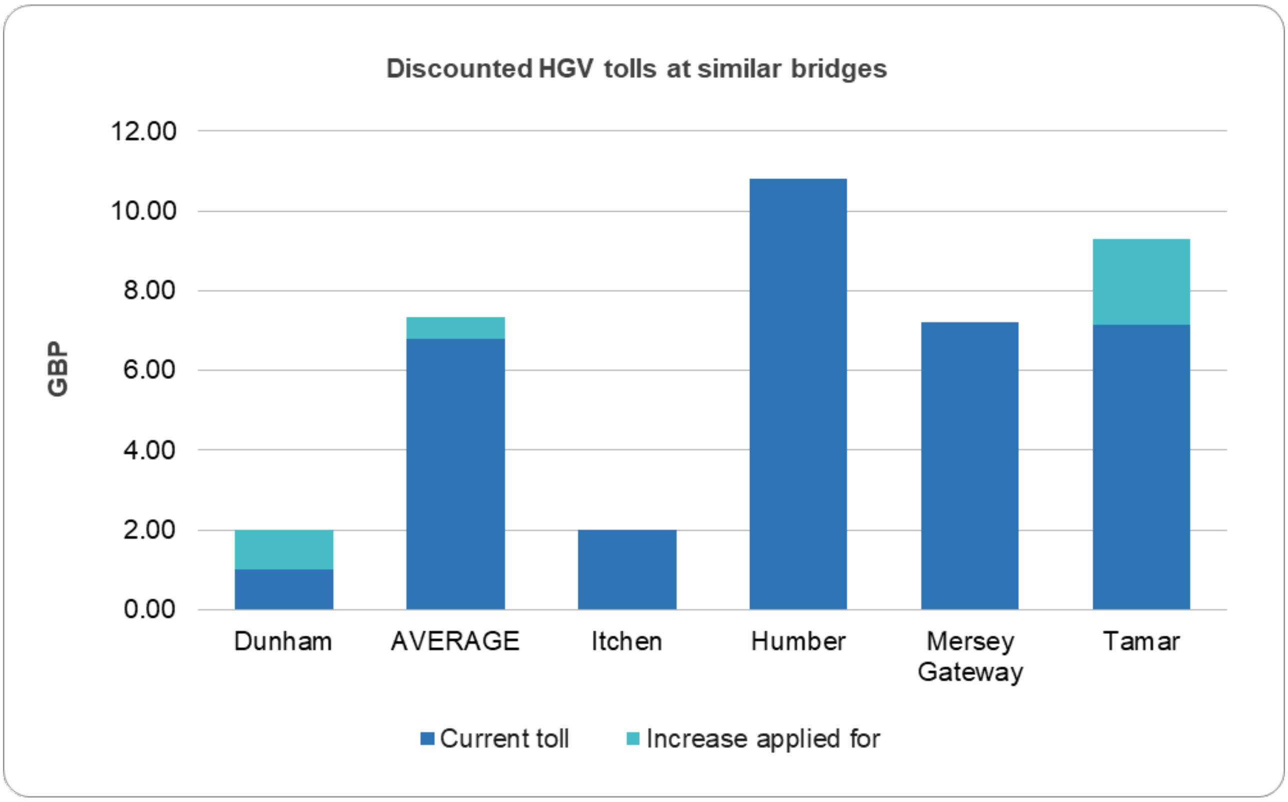

Figure 5: Dunham Bridge - Comparison with discounted HGV tolls charged by similar bridges

6. Future financial forecasts including a toll increase

The Company has created financial forecasts in order to assess the appropriate level of future tolls. Please note, all forecast figures exclude VAT.

6.1 Assumptions

The financial forecasts in this submission contain a number of material assumptions, which are laid out in more detail below.

(i) Bridge Rebuild Cost & Bridge Rebuild Investment Reserve

The public enquiry held in 2006 confirmed that the Company has a legal obligation to provide for the bridge's future replacement.

This submission retains three key assumptions which were agreed upon in both of the previous two toll applications.

1. The cost to rebuild the bridge was approximately £7m in 2005. This figure is from a survey carried out by the engineering firm PCC Consultants.
2. The cost to rebuild the bridge will increase by 3% per year over the long term.
3. The bridge replacement fund can be invested and grow at 4.7% per year over the long term.

However, the directors are aware that small changes to these assumptions make very substantial changes to the outcome.

If cost inflation averages 4% per annum rather than the forecast 3% per annum, the cost of replacing the bridge doubles to over £120m in 2078, leaving a c£60m shortfall.

Similarly, if the replacement reserve earns a return of 1% less than forecast, then the replacement reserve will only meet 48% of the bridge's projected replacement cost.

While the above demonstrates how little margin for error there is in the estimates regarding the Company's statutory obligation to replace the bridge, the Company is not proposing to change either of these assumptions.

It believes that they will continue to be appropriate over the anticipated lifespan of the bridge.

Recent cost inflation in the building and engineering sector has been substantially above 4% per year, with increases in input prices of materials like concrete and steel of up to 75% year-on-year[5].

The RICS forecasts that inflation will continue to run at above 4% per year until 2026, which is as far as they are currently forecasting[6].

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[5] *https://www.architectsjournal.co.uk/news/material-costs-surge-23-in-a-year-government-data-shows*

[6] *https://www.rics.org/uk/products/data-products/insights/bcis-five-year-forecast---oct-21/*

However, in the main, this has been driven by short term concerns, including the construction of HS2, Brexit, the war in Ukraine and the Coronavirus pandemic, so this cost inflation should fall back in the long run.

Similarly, in recent years, the returns on the Company's investment portfolio have been above 4.7% per year. Equity markets have performed strongly during that period, and the Company is currently able to benefit from its long-term investment horizon and invest for growth.

As with the recent cost inflation, the Company does not believe that these investment returns will be sustained over the long run. This is particularly true in later years as the bridge's rebuilding becomes less distant and so a more conservative investment policy is required.

(ii) Future Traffic Growth

The Company has forecasted that its traffic will return to 2013 levels during 2022. It has then assumed that there will be no traffic growth during FYs 2023 and 2024 before growth in traffic number returns in FYs 2025 and 2026 at 0.25% p.a. across all categories of vehicle.

The Directors believe that these figures are sensible, however, there is the possibility that they may prove to be optimistic given the current high and increasing price of petrol and diesel.

It is also worth noting that the average age at which people are passing their driving test continues to increase, and many commentators believe that the country may have already reached 'peak car'. This would mean that the number of cars on the road would steadily decrease in coming years.

(iii) Business Cost Inflation

It has been assumed that the business will experience cost inflation of 5.5% during FY 2023 and 2.5% during FY 2024 before inflation returns to the Bank of England's long term target of 2% p.a. for the rest of the period.

This is in line with current Bank of England forecasts.

The only exception to the above relates to engineering and maintenance costs.

The Company spends significant amounts on the monitoring, maintenance and repairs of the bridge and associated infrastructure each year.

Current price inflation for engineering and maintenance works is substantial. As discussed above, this is due to a number of one-off factors and is forecast to fall in the coming years.

The Company is forecasting that this cost will increase at an average rate of 4.4% per year across the period, in line with recent RICS forecasts.

(iv) Depreciation

The forecast depreciation figure is mainly made up of depreciation on the value of the bridge and the new bridge office. These are depreciated at 2.5% of cost p.a. in line with the Company's accounting policies.

(v) Dividends

The forecasts assume that shareholders are paid a dividend representing a 6% return on capital.

(vi) Tax

Other than the corporation tax increase in Q2 2023 to 25% the Company is not anticipating any further tax or national insurance increases in these financial forecasts.

6.2 Future financial position

The table below shows the financial forecast for the Company if its tolls are changed from 1st August 2022.

FY Ending 31 July:	2023	2024	2025	2026
Turnover	**2,000,879**	**1,999,583**	**2,003,283**	**2,006,989**
- Running Costs	(829,479)	(853,818)	(873,247)	(894,813)
- Depreciation	(147,224)	(202,914)	(193,735)	(188,228)
- Corporation Tax	(202,275)	(235,713)	(234,075)	(230,987)
Post-Tax Profit	**821,901**	**707,138**	**702,225**	**692,961**
- Dividend	(628,000)	(663,000)	(680,000)	(695,000)
Transfers To / (From) Ear-marked Reserves	**193,901**	**44,138**	**22,225**	**(2,039)**

Table 6: Dunham Bridge - Financial forecast assuming a toll increase is granted

As can be seen, the toll increase allows the Company to meet all of its obligations, but only with a relatively narrow margin for error.

In 2023 and 2024 turnover reduces as it has been assumed that the number of users of the car discount scheme will continue to grow, as discussed above. It grows in 2025 and 2026 when it has been assumed that traffic growth will return.

This increase will allow it to continue to invest in modernising its infrastructure to improve traffic flows, transfer funds into its ‘Replacement Reserve’ at the agreed rate and pay shareholders an appropriate dividend.

The forecasts show a very modest loss in 2026. There is considerable uncertainty in some variables in the financial forecast, not least the future traffic numbers and future cost inflation.

The Company is not seeking to ‘future-proof’ its finances by seeking a larger toll increase today to ensure it does not run a loss in 2026. If the company believes that it will face an ongoing financial loss from 2026, it would then seek an appropriate further toll increase.

7. Summary

The Company submits this application to demonstrate that:

- The bridge is a piece of strategic infrastructure to the Counties of Nottinghamshire and Lincolnshire and that the Company has, and will continue to, operate it in a safe and sustainable manner.
- The Company has continued to demonstrate sound financial management and make appropriate provisions for all future liabilities prior to and throughout the recent COVID-19 pandemic. By doing so, the Company is ensuring that there is no potential liability for the public sector nor need for public sector finance.
- In recent years, the Company has invested substantial sums in maintaining and upgrading the bridge's infrastructure and has plans to continue to do so in future.
- The Company plans to offer shareholders an appropriate dividend in future. It has demonstrated caution during both the financial crisis and the COVID-19 pandemic by not continuing to increase dividends so that appropriate provision for the bridge's future repairs and replacement can continue to be made.
- The Company's financial position is such that it will not be able to continue operating and meeting its legal commitments over the medium term without a toll increase.
- The Company is seeking a toll increase that will increase its toll income by below the rate of RPI inflation since its toll application in 2006.

The Company is seeking the increase in tolls from 1st August 2022.

The Company is happy to provide further information and explanations as required.

Appendix A:

2021 Principal Inspection Report from Inertia Consulting

Principal Bridge Inspection

Dunham Bridge Company

Dunham Bridge

Report Reference: P20-0088/RPT/001
Report Date: 29/06/2021
Report Revision: 1
Report Status: Final

Contents

Document Control Sheet

Report Title	P20-0088/RPT/001 – Dunham Bridge Principal Inspection
Revision	1
Status	Final Issue
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Record of Issue

Rev	Date	Originator	Checker	Authorised	Amendments	Purpose of Issue
-	21/05/21	C Bruce	T Crawford	-		Internal Draft
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Distribution

Organisation	Contact	Copies
Dunham Bridge Company	Ben Richardson	1E

Note: Unless otherwise noted herein, the conclusions and recommendations contained in this document are based on the information supplied by the Client and visual inspection and testing (if any) described within. Inertia Consulting can accept no liability in respect of differences between the actual structure and the information supplied except (i) where these are readily apparent by visual inspection or (ii) where physical investigation has been undertaken by, or under the control of Inertia Consulting, and then only to the extent of such physical investigation.

1. Introduction

Inertia Consulting Ltd were appointed by Dunham Bridge Company to carry out a Principal Inspection of the Dunham Bridge.

The bridge carries the A57 Dunham Road over the River Trent to the West of Lincoln. The bridge is located at Ordnance Survey Grid Reference SK 81907 74469.

The purpose of the inspection was to undertake a ‘within touching distance’ inspection of all accessible structural components to determine the current condition of the structure and to identify remedial works that may be required to ensure the long-term durability of the structure.

2. Bridge Description

Dunham Bridge carries the A57 Dunham Road over the River Trent to the West of Lincoln.

The structure is a four-span composite deck spanning West to East for the sake of the report with the River Trent flowing South to North at the structure. The two Eastern spans are above the River Trent with the two Western spans over a flood plain. Each span is approximately 36m in length by 10m width. Each span comprises 3No steel I-beams with a reinforced concrete deck supported on a type of trestle rocker bearing on stone abutments and piers. The West span is tied back to the West abutment with threaded bars embedded in the abutment.

There was a stone retaining wall either side of the East abutment with a timber walkway spanning between the retaining walls. The East abutment, retaining walls and piers in the river were all protected from scour with the use of large stone riprap with an average size of between 300-500mm.

The foundations are believed to be timber piles, but these were not inspected during this inspection.

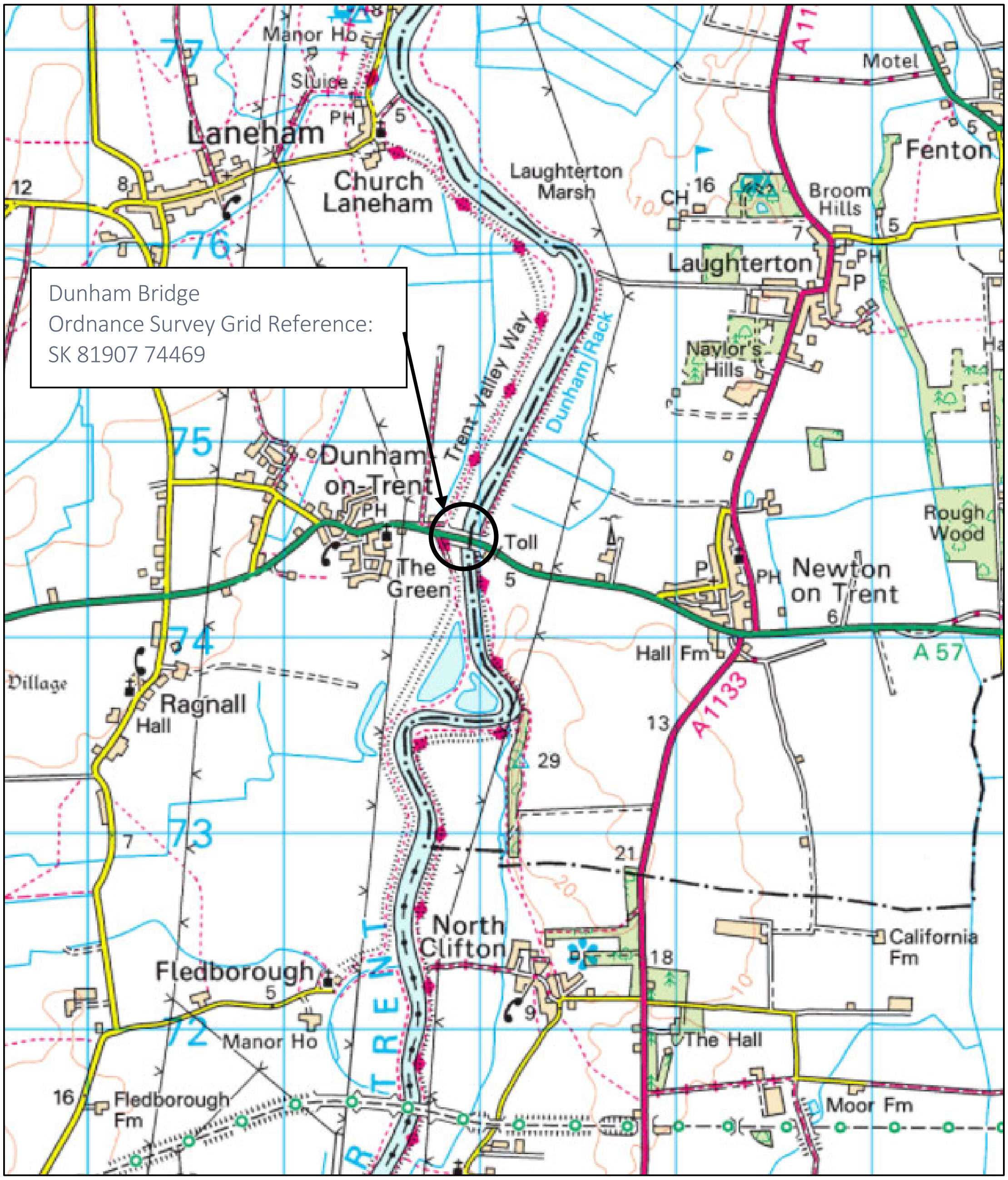
The structure carries an asphalt single carriageway with an asphalt footway along the South side and a narrow brick verge along the North side. There were expansion joints between each section of deck and the abutments.

The structure had 1.2m high painted steel parapets on either side of the carriageway. Single open box beam barriers connected to the parapets at the South-West and North-East ends. The barrier to the North-West transitioned from a corrugated barrier to an open box beam barrier which was connected to the parapet. There was no impact barrier at the East end of the South parapet, where barriers are connected at the other ends of the parapet, in this corner there was a staircase accessing a footpath along the river below and to the East of that above a grass embankment was a timber post and beam fence.

Toll kiosks were on the East approach to the structure.

General photos of the structure can be found in Appendix A, plates 1-36.

3. Location Plan



4. Inspection

The inspection was carried out to Principal Inspection standards in accordance with Highways Agency Design Manual for Roads and Bridges document CS450.

The inspection comprised a visual inspection of all visible parts of Park Road Railway Bridge.

4.1. Inspection Team

The inspection of the structure was completed over three days on the 10th, 12th and 19th of May 2021 by Craig Bruce BSc(Open), Eur Ing Tom Krok CEng and Eur Ing David Roome CEng with an inspection support team.

4.2. Inspection Methodology and Access Arrangement

The river spans were inspected on 10th May 2021 utilising a pontoon with scaffold attached to gain access to the deck and high-level elements. The carriageway inspection was also carried out this day.

The Western spans over the flood plain were inspected on 12th May 2021 utilising a truck mounted MEWP to gain access to all high-level elements.

4.3. Weather Conditions

The weather was changeable during all visits. There was bright sunshine and heavy thunderstorms with temperatures between 14 & 18°C on each of the days on site.

4.4. Parts of Structure Not Inspected

All above ground elements were inspected.

The foundations and waterproofing were not inspected with portions of the piers beneath the water level also not being inspected.

4.5. Inspection Findings

The inspection findings are summarised below. General photos of the structure are in Appendix A, plates 1-36.

4.5.1. Foundations

The foundations were not visible. There were no signs of settlement indicative of foundation failure.

4.5.2. Abutments

The abutments were in fair to good condition with several minor defects noted.

There was minimal water staining noted to the back wall of both abutments.

Fine cracking was visible on the vertical face of the reinforced concrete caps on both abutments. Two notable horizontal cracks in the West abutment cap and one in the East abutment cap had associated rust staining implying corrosion to the reinforcement. The cracks on the West abutment cap were 1050mm and 350mm long respectively with the

East abutment crack being much shorter. Rust staining was noted on the stone beneath the cracking in the West abutment cap. There was no hollow sounding concrete around the cracks when struck with an inspection hammer at the time of the inspection. Other vertical cracks were also noted but were much finer and likely to be shrinkage cracking. Plates 37 – 40.

On the front face of the East abutment reinforced concrete cap there were two full height areas of repair measuring 1690mm and 1900mm, respectively. The repairs were sound when struck with an inspection hammer, but cracking was common, most likely shrinkage cracking. There was cracking with associated rust staining at the base of the North repair. Plates 41 – 43.

Anchorage bars embedded at the top of the back wall on the West abutment appeared to have been previously coated in a bitumen wrap. There was a residue on the anchor bolts which had been partially painted locally, with minor corrosion visible. Plates 44 – 46.

Debris was found trapped between the West abutment and the drainage deflector of the joint above. The debris extent was not clear. As it was a possible bird's nest this was left undisturbed. Plate 47.

A small number of stone masonry units on both abutments had minor spalling. There were historic corroding fixings in the East abutment. One abutment spall may have been due to the expansion of the historic fixings. Plates 48 – 50.

Several cracks were also found in the stone masonry units of each abutment. The cracks appeared to non-continuous and limited to individual stones. Plates 51 – 53.

The mortar on the West abutment was more noticeably friable than to the East abutment, but mortar loss was minor, and the stone masonry units were secure. Plate 54.

Felt material had been adhered to the joint between the back wall of the abutments and the reinforced concrete caps, presumably to prevent water ingress behind the cap. The felt at the East abutment was particularly worn. Plates 55 – 57.

A heavily corroded cathodic protection cabinet was noted on the West abutment. The cabinet was open. It was assumed that this cabinet was an old one and now redundant with the presence of newer cabinets and cabling adjacent to it. Plate 58.

Two areas of graffiti were found on the West abutment, one large area of painted non-offensive graffiti and a smaller non-offensive piece written using a type of mastic sealant. Plate 59 – 60.

There was evidence of a fire being lit in front of the West abutment, but there was no soot staining or associated defects to the abutment adjacent to the location of the fire. Plate 61.

4.5.3. Wing Walls

The wing walls were in fair to good condition with only minor defects noted.

An area of rust staining was visible at the base of the concrete slab above the South-East wing wall. Plate 62.

Minor mortar loss was noted across the wing walls, but all stone masonry units were secure, and loss was minimal. Plate 63.

There was evidence of old cable routing with corroding fixings left behind. Plates 64 -66.

4.5.4. Piers

The piers were found to be in fair to good condition. The East and centre piers were protected by riprap which appeared to be in good condition, intact and well distributed around the piers.

As with the reinforced concrete caps on the abutments, the caps on the piers also had visible cracking associated with reinforcement corrosion, including an area that was delaminated on the centre pier adjacent to a crack, and shrinkage cracking. An area of repair was also visible on the centre pier with rust staining beneath it, likely from prior to the repair. Plates 67 – 73.

A small number of the stone masonry units across the three piers appeared to have been struck at some point. The damage ranges from scrapes in the stones to notable spalls. Plates 74 – 78.

Water was dripping from the deck drainage on to the piers beneath resulting in staining but also calcite deposits. A historical attempt had been made to reduce the erosion effect of water dripping onto the pier caps by fixing acrylic sheets directly under the drainage, but these were ineffective as they are dependent on drips dropping vertically. Plates 79 – 82.

Cracks were found through stone masonry units in the piers, cracking appeared isolated to individual units and was not extending through adjacent stones. Plates 83 & 84.

There were areas of minor mortar loss noted across the piers, but these were not significant, and stone masonry units were secure. Plates 85 & 86.

There was evidence of fires being lit at the base of the West pier. There was no soot staining or associated damage found on the piers. Plates 87 & 88.

4.5.5. Bearings

The bearings were in fair to good condition. There were no signs of distress that would indicate that the bearings were not functioning as designed. It was mentioned in the previous report that the bearings were greased, there was no indication of this during our inspection.

The protective paint system had failed in several small, isolated areas. Rust staining was common in small amounts in areas adjacent to the bearing plates, but little to no exposed corrosion was found. There was very little corrosion noted across the bearing frames/trestles although a few cracks were found in the paintwork. Plates 89 – 94.

Grout surrounding the base of the bearings had spalled in several places, this was historic as none of the spalled pieces remained on the structure. Plate 95 & 96.

4.5.6. Deck Beams

The deck beams were in fair to good condition with common re-occurring minor defects.

The protective paint system had failed in several localised locations, typically on top of the bottom flange and at the bottom of the web. The paint was blistered/flaking and when broken away exposed early stages of corrosion to the beams. A small amount of ponding was noted on the bottom flanges after a heavy rain shower. Plates 97 – 103.

Small chips in the paintwork were relatively common along the edges of the bottom flanges. Plates 104 – 108.

Towards the beam ends including transverse beams, minor corrosion staining was noted that is likely due to the proximity to the expansion joints above. Plate 109 – 111.

A very small amount of bird droppings was found across the deck beams, unlikely to be having any significant effect of the structure. Plate 112.

4.5.7. Deck Slab

The slab was fair to good condition with several minor defects.

Concrete around drainage outlets and adjacent to deck joints had notable water staining which appeared to have led to further defects including some minor spalling, Delaminated concrete, rust staining and ultimately has led to repairs in these areas. Most repairs were in sound condition. The largest areas of delaminated concrete with associated spall noted were 290x150mm and 23x210mm. Plates 113 – 122.

Two small areas of exposed reinforced were found in the deck soffit. This was located away from joints and drainage locations and was likely due to low cover. Plates 123 & 124.

A small number of poor construction joints were visible that appeared to have low cover with rust staining and corroded ferrous debris. Plates 125 to 127.

Leachate filled transverse cracking was found to the cantilever soffits and parapet beam face along the length of the structure. Plates 128 – 130.

There was a recurring narrow repair along the cantilever soffit towards the outside edges that would regularly break off if tapped with an inspection hammer. The repair appeared to cover a construction joint between the cantilever soffit and the parapet edge beam and was very shallow. Plates 131 – 132.

There was no joint sealant found on the edge beams on either side of the deck at the centre joint above the centre pier. The centre joint was considerably wider than the others, measuring 68mm wide at the parapet edge beams compared to a typical measurement of around 30mm at the other joints except for the West abutment joint which is assumed to be fixed and had a measurement of 70mm. It is not clear whether the centre joint was originally sealed in the parapet beams or if it had failed historically. The joints in the edge beams with sealant all had varying levels of debonding between the sealant and adjacent concrete. Plates 133 – 135.

Repaired holes were noted along the vertical outside face of the edge beams. It was not clear what the purpose of these holes were but may have been sample locations for non-destructive testing. The repairs were in good condition. Plate 136.

A small void was found in the deck slab in the inner West span, it was assumed that this was a construction defect and has been present since construction. Plate 137.

A small amount of corroded ferrous debris was found in the deck soffit this was more prevalent in the cantilever soffits and adjacent to construction joints. Plate 138.

Transverse shrinkage cracking was visible in the deck slab soffit. Cracking was typically hairline and not considered detrimental to the structure. Plate 139.

4.5.8. Drainage

The carriageway drainage was largely clear of blockages and appeared to function well during a heavy downpour which occurred during the inspection. The concrete adjacent to the carriageway drainage outlets was deteriorating.

Joint drainage was largely in good condition although the detail discharges onto the piers beneath. A section of the centre pier joint drainage had failed and collapsed at the North end. Plates 140 & 141.

4.5.9. Waterproofing

The waterproofing was not inspected but there was no staining to the deck soffit suggesting failure.

4.5.10. Carriageway Surfacing

The carriageway surfacing was found to be in fair to poor condition.

There were settlement cracks at either end of the structure on the approaches to each abutment. Plates 142 – 143.

There were several cracks across the structure and on the approaches that were open, sealed or where a repair had failed. Plates 144 – 151.

The surfacing had notable wear/weathering across the carriageway with minor polishing and tracking but still serviceable. Plates 152 - 154.

4.5.11. Expansion Joints

The expansion joints were in fair to poor condition with notable recurring defects across the five joints.

The joints leak, but the drainage channel installed beneath prevents most water leaking onto elements beneath. There was some ponding across the seals at the time of the inspection before the heavy downpour occurred.

There was some debonding between the joint nosing material and the carriageway wearing course, adjacent to the East abutment joint. Cracking had occurred in the adjacent surfacing. Plates 155 – 157.

The steel nosing carrier rail in the West abutment and West pier joints was not continuous and was poorly installed. Movement here may have caused the cracking in the adjacent nosing mortar in the West pier joint. Plates 158 & 159.

The steel nosings were commonly corroded, particularly in the verges where not polished by tyre wear. Plates 160 – 161.

The joint seals were deformed in places across all five joints with areas visibly appearing to be detached. This was not confirmed due to live traffic. Plates 162 – 163.

Dirt and debris were trapped in the seal between the joint nosings which affected the performance of the joints. Plate 164.

4.5.12. Footway/Verge Surfacing

The footway surfacing was in fair condition.

There were surfacing and crack repairs at both ends of the structure in the South footpath where historic settlement had occurred, this does not appear to have significantly worsened since repairs were made. Some distortion of the bricks in the North verge was noted at either end of the structure. Plates 165 – 167.

A longitudinal crack extended much of the length of the structure and was offset from the parapet edge beam by around 250mm. This gap extended at the West end where the footpath widens. Transverse cracks were found at drainage hole positions and raised bricks were also noted at drainage hole locations in the North verge. Plates 168 – 172.

4.5.13. Parapets

The parapets were in fair to good condition. Rust staining was common where the paintwork had failed. These areas were most common to the base plates of the parapet posts. A small number of fixings were corroded, and paint loss was noted at parapet expansion joints. Plates 173 – 176.

An area over 1m long was noted on the top rail of the North parapet where paint loss had occurred but had not led to any corrosion. Plate 177.

Lichen growth was common over much of the length of the parapet rails. Plate 178.

Cracking was found in several parapet post base plate plinths. Plate 179.

At the West end of the North parapet, particularly the bottom rail, the rails did not appear level. They were however secure when checked. Plate 180.

4.5.14. Approach Barriers

The structure had safety barriers on three of the four approaches with a timber post and rail fence on the South-East approach, due to the presence of a pedestrian staircase in this location. As the toll booths are located at this end of the structure, vehicles travel at a reduced speed.

All the barriers and fences were in good condition and secure. Bolt assemblies were not fully tightened at the connection between the North parapet and the North-East barrier. Plate 181.

4.5.15. Embankments

The embankments surrounding the structure were in fair to good condition.

Two separate pieces of large protruding reinforcement bars were found on the West riverbank to the South of the centre pier. These could present a risk to craft using the watercourse. Whilst most craft using the navigation would be unaffected, inspection craft are at risk when inspecting close to banks. Plate 182.

Animal burrows were regularly found on the banks adjacent to the wing walls of the structure, particularly adjacent to the North-East and South-West wing walls. Plates 183 – 185.

4.5.16. East Retaining Walls

The retaining wall to the East of the structure was in fair to good condition.

A vertical crack was visible in the North face of the South section. It was partially obscured by vegetation and difficult to access due to the position of riprap at the base of the wall. Plate 186.

There was vegetation growth at the foot of the walls and growing from mortar joints. Plates 187 – 189.

4.5.17. East Abutment Walkway

The East abutment walkway was in fair condition.

The steel support structure was in fair to good condition although surface corrosion was common across the frame and fixings where the protective paint system had failed, but no section loss was noted. Plates 190 & 191.

The walkway planks were rotting towards their ends creating a small gap at either end of the walkway. Plate 192.

The parapet paint system had failed, and surface corrosion was common. A split in the top rail was also noted. Plate 193 – 195.

Flood debris was common over the walkway. Plate 196.

4.6. Level 1 Scour Survey

A Level 1 scour survey was carried out on 19th May 2021 due to high water levels and fast flows preventing safe survey at original inspection dates. The scour survey was undertaken in a RIB with outboard motor.

From the scour survey conducted, the piers were well protected by an even, well distributed amount of riprap. The absence of any obvious movement of the structure would indicate that the foundations are still in a good condition and currently not of concern.

Several depth readings were taken across the width of the watercourse 5m upstream of the South main beam, under the South main beam, under the North main beam and 5m downstream of the North main beam. These were compared against the previous reports measurements by superimposing their profiles on a drawing using our measurements.

The survey showed that the riverbed profile was very similar to that of past inspections indicating that there is no active scour at the site.

The scour risk rating to level 1 was Scour Risk Rating 5 (no further action required at time of survey).

See Appendix B for detailed scour survey results.

5. Discussion and Recommendations

The structure was visibly in fair to good condition, although several minor defects were noted across the structure.

The structure appears to have benefitted from the previous timely repairs however further proactive repairs are required to ensure the structure is maintained in a good to fair condition.

A maintenance painting scheme should be carried out to locally repair the failing protective coating system to metallic structural elements and prevent early corrosion accelerating. These repairs should be carried out with a compatible system following local preparation of the substrate to St3 standard.

The deck slab was in good condition with defects concentrated towards joints and adjacent to carriageway drainage outlets. Repairs were common in these areas and were typically in good condition. Some minor Delaminated concrete was noted in a small number of areas on or adjacent to repairs. Minor rust staining was also noted on or adjacent to repairs. Localised concrete repairs are recommended to the deck concrete to maintain long term durability.

A section of the joint drainage beneath the Centre joint had collapsed. This requires maintenance work to repair and reattach the drainage as soon as possible to maintain structural durability.

The recent painting of the structure made it difficult to determine how much if any movement has occurred across the bearings, however, there were no indications that there were any stresses on the bearings that were adversely affecting their performance.

The carriageway surfacing was still serviceable but was showing signs of weathering/wear and was reaching the end of its serviceable lift. Cracking was common in the surfacing across all four spans, including the South footpath. Some cracks have previously been repaired, of these some of the repairs had failed exposing an open crack.

The expansion joints appeared to be functioning but were reaching the end of their serviceable life. They should be replaced at the same time as the carriageway surfacing. Re-waterproofing should be considered at the same time to avoid repeat replacement should waterproofing fail in the interim period between joint and carriageway surfacing replacement intervals.

The parapets and safety barriers do not meet current standards. A site-specific risk assessment should be carried out to assess whether the current road restraint systems should be upgraded in next major maintenance scheme.

Cracking to masonry and concrete should be monitored at future inspections.

The full schedule of recommended repairs in included overleaf.

Remedial Actions

Suggested Remedial Work	Priority (1)	Estimated Cost (2)
Re-attach drainage channel beneath the centre joint	H	£1,800
Remove 2No. protruding reinforcement bars from the West riverbank.	M	£750
Tighten loose bolt assemblies connecting the North-East barrier to the North parapet	M	£250
Replace expansion joints	L	£45,000
Clean areas of failed paintwork across the main beams and re-paint	L	£10,000
Clean areas of failed paintwork across the parapets and re-paint	L	£4,000
Concrete repairs to deck soffit	L	£5,000
Concrete repairs to abutment and pier caps	L	£4,000
Resurface and re-waterproof carriageway and footpath surfacing	L	£100,000
Consider improving the drainage system	L	£5,000
Remove redundant cathodic protection box from West abutment	L	£450
Re-apply felt at junction between abutment caps and the back walls	L	£1,200
Clear debris sat on drainage diverter below the West abutment joint	L	£750
Clean & re-paint the East abutment walkway framework & parapet	L	£3,000
Replace East abutment walkway planks	L	£1,200
Clear vegetation and tree growth from East retaining walls and beneath the East abutment walkway	L	£1,200
Clear debris from walkway regularly after episodes of flooding	L	£600
Undertake Road Restraint System Replacement Study	L	£2,500
Re-wrap abutment anchors with protective wrap system	L	£1,000

1) Priority ratings envisage remedial work being completed within 6 months (H); 12 months (M) and 24 months (L)
It should be noted that cost estimates are indicative only and should not be relied on as outturn costs. All estimates are for the work activity and exclude access, project management and site setup costs

Appendix A
Photographs

Plate 1. North Elevation

Plate 2. South Elevation

Plate 3. West Abutment

Plate 4. East Abutment

Plate 5. North-West Wing Wall

Plate 6. North-East Wing Wall

Plate 7. South-West Wing Wall

Plate 8. South-East Wing Wall

Plate 9. West Pier

Plate 10. Centre Pier

Plate 11. East Pier

Plate 12. Typical Lower Bearing, East Abutment

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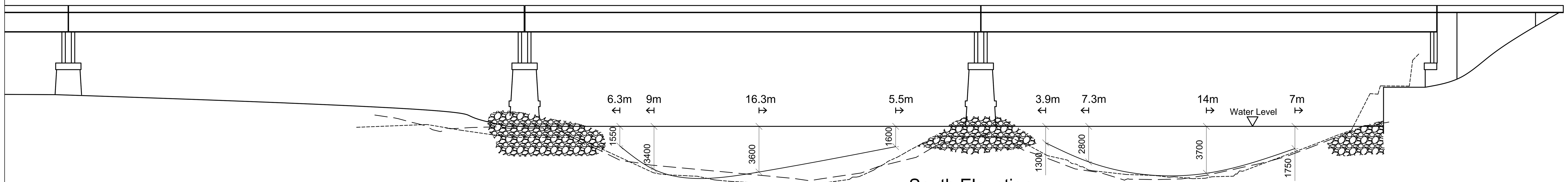
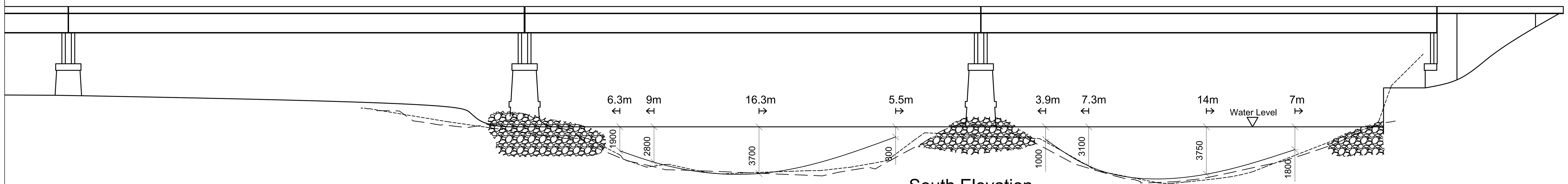
Appendix B
Level 1 Scour Survey & Drawing



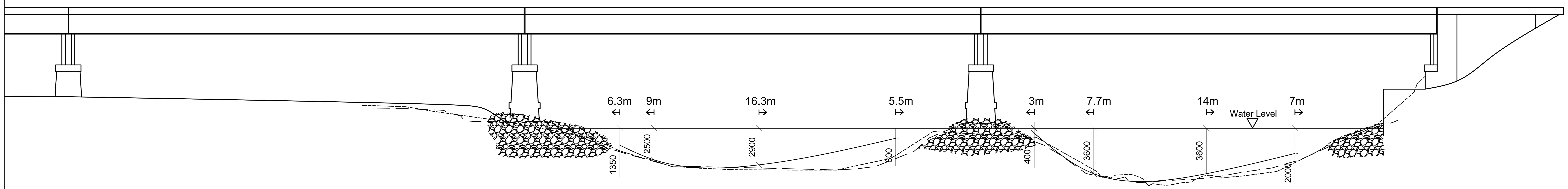
South Elevation

5m North of North Main Beam



South Elevation

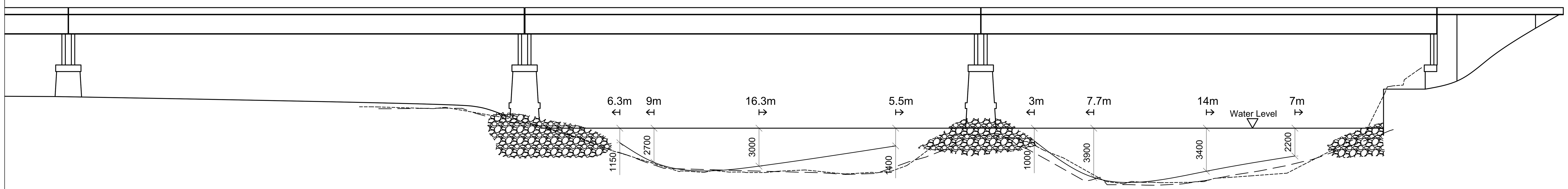
Below North Main Beam



South Elevation

Below South Main Beam

2021 Inertia Estimated Profile
2016 Survey
2010 Survey



South Elevation

5m South of South Main Beam

NOTES

1. ALL DIMENSIONS ARE IN MILLIMETRES UNLESS OTHERWISE STATED.
2. ALL LEVELS ARE APPROXIMATE IN METRES ABOVE AN ARBITARY SITEDATUM UNLESS OTHERWISE STATED.
3. DO NOT SCALE FROM THIS DRAWING.

Rev	Revision details	Chkd	Appd	Date

Drawn:	C Bruce	For comment	✓
Design:	---	For tender	
Chkd:	---	For construction	
Appd:	---	As constructed	
Date:	05/05/2021	Other	
File ref:	----		

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Client

Dunham Bridge Company

Project Name

Dunham Bridge

Drawing Title

Level 1 Scour Survey
Riverbed Survey GA

Original Drawing Size : A1
Scale : 1:200 Dimensions : Millimetres

Drawing No P20-0088-001 Rev A

Scour Inspection

Structure name and number: Dunham Bridge | OS Grid Ref: SK 81907 74469

Details of Inspection

Inspected by:	David Roome	Inspection Date:	19/05/2021
Weather:	Dry & bright with later heavy downpour	Flow Conditions:	Average Flow

Details of Structure

Record details of the following, identifying any estimated values.

Construction Type:	Composite Deck	Road over structure:	A57
Foundation Type:	Timber Piles	Waterway under structure:	River Trent
Construction Date:	1970s		

Items to be included with this inspection (minimum)

• Photographs of the structure and the channel from upstream and downstream of the structure	See PI Report
• Completed inspection form	YES
• Plan and section drawings of structure	NO
• OS plan of bridge and site	See PI Report

Notes

Scour Inspection

Structure name and number: Dunham Bridge

Inspection Date: 19/05/2021

General

Answers must be accompanied by further details in the notes section

Is there a bend in the river immediately upstream or under the structure?	NO
Does the river geometry agree with the OS plan of the site?	YES
Are there any confluences within 1km of the structure?	NO
Are there any islands or bars within the channel?	NO
Are there any control structures in the vicinity of the structure, e.g. weirs, sluice gates?	Controlled Outfall to the SW of structure
Are there scour countermeasures in place (note form and condition)?	Riprap Good Condition
Is there evidence of ongoing scour at the bridge site (note approximate depths and locations of any scour holes)?	NO
Is there evidence of general bed degradation or aggradation?	NO
Is there evidence of movement or settlement of the bridge structure?	NO
Is the structure fouled by debris or likely to become fouled in flood conditions? Action to remove fouling should be made an urgent recommendation.	NO
Are there signs of long-term bank stability?	YES, mature trees on adjacent banks
Is there erosion at the outside of river bends, e.g. undermining of the river bank?	NO
Are there adjacent flood relief structures?	YES
Is there evidence of previous flood levels?	YES

Scour Inspection Form

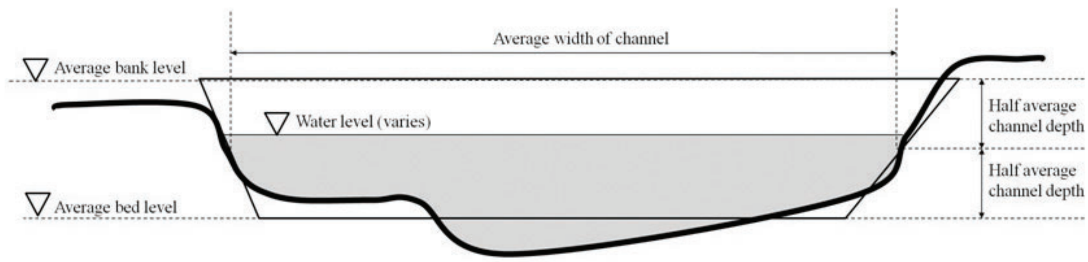
Structure name and number:	Inspection Date:

Notes:

Scour Inspection Form

Structure name and number: Dunham Bridge

Inspection Date: 19/05/2021



Geometry at the structure

Bank to bank width of channel	Approx. 65m
Height of soffit (or arch crown) above average bed level	Approx. 12.8m
Average depth of channel (to average bank level)	Approx 5.7m
Average width of channel	Approx. 58m
Average bank height above water level during inspection	Approx. 2.5m
Average depth of water during inspection	Approx. 3.2m
Max depth of water during inspection	3.75m
Sketch of structure including location of piers and abutments and approximate channel geometry.	See River Survey GA

Pier width (if piers are not uniform, provide details for all)	1.85m at top & widening below
Pier length	9.7m
Pier nose shape	Round
Protrusion of abutments into channel (from bank)	None
Angle of flow relative to piers	Parallel
Average bed material size	Not Measured

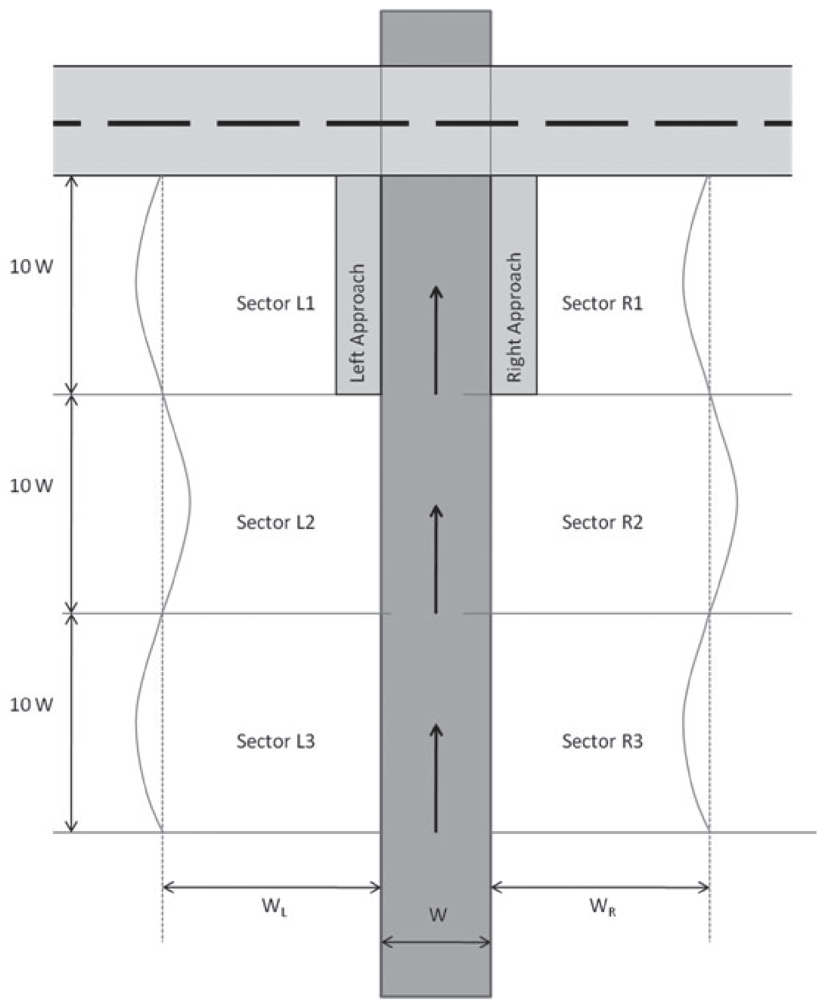
Scour Inspection Form

Structure name and number: Dunham Bridge | Inspection Date: 19/05/2021

Geometry upstream of the structure

Average width of channel	Approx. 65m
Average bank height above water level during inspection	Approx. 2.5m
Width of left flood plain	
Width of right flood plain	

Sketch of flood plain characteristics
(indicate for each sector and approaches whether very obstructed, partially obstructed or open)



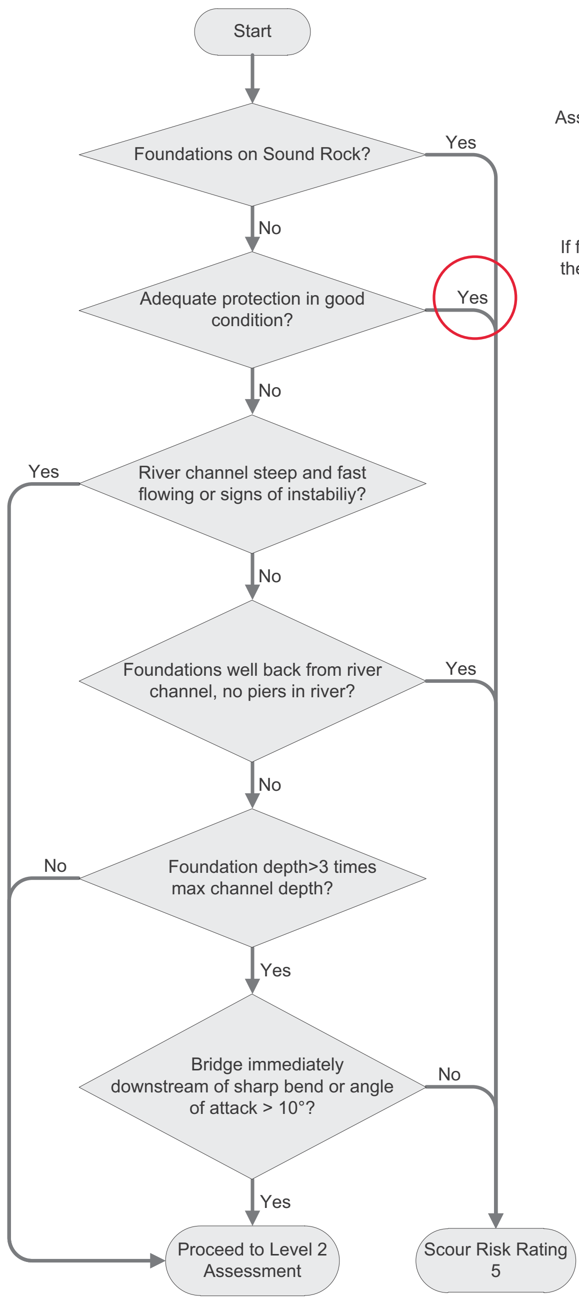
Notes

Level 1 Assessment Summary

Structure name and number: Dunham Bridge

Assessment Date: 19/05/2021

Notes



Assumed YES

If foundations are not on sound rock,
the provided Riprap was found in good condition.

Level 1 Assessment outcome

Proceed to Level 2		Scour Risk Rating 5	X

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