

An aerial, top-down view of a green-tinted map of London. A winding river, representing the Thames, flows through the center of the map. Scattered across the map are several small, realistic human figures in various poses and outfits, suggesting movement and activity. The overall aesthetic is clean and modern, with a strong emphasis on the color green.

London's river crossings: Bridging the Thames

Transport Committee

LONDONASSEMBLY

Transport Committee



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Foreword



Caroline Pidgeon MBE AM
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London is an inspiration for cities across the world. Londoners and this city prove to the world, on a daily basis, what is possible in the realm of urban innovation. To continue our global city status, we must ensure that we continue providing world-class services, and that we can move around our city easily.

London's reputation and status as a global city is at risk. The closure of historic river crossings in our city, such as Hammersmith Bridge, have travelled globally through the most prestigious media platforms, damaging our reputation internationally.

London's river crossings are some of the oldest, most valuable critical-infrastructure assets that we have in the city. Every day, they allow Londoners the opportunity to cross, circulate and reach new destinations, while ensuring business continuity, resilience and choice for the city. But what is clear is that we face a challenge. London's river crossings are governed, managed, maintained, funded and operated by a complex number of stakeholders and asset owners. Growing populations and commuting, climate change and extreme weather conditions, and the lack of proper planning around the full true life of these assets, are having a direct impact on the river crossings' ability to do what they were built for: connecting our communities.

This report intends to help solve this complex situation we now face, using international good practice. If we want to ensure that London's river crossings continue to inspire cities across the world, we must innovate in our governance and coordination, and raise the bar in terms of transparency and funding.

This is not only possible. It is imperative, and it is what Londoners deserve.

Together we can bridge the gap.

Executive summary

London's river crossings are a fundamental part of London's transport network. A number of these crossings were built a significant time ago, and some of them for different purposes than they are used for now. With assets ageing, extreme weather and, for example, Hammersmith Bridge closing to vehicles and then pedestrians and cyclists, causing serious congestion and other problems, there is a question about how to manage London's major transport assets most effectively. This is particularly pertinent to river crossings, given how crucial they are to the resilience of London's road network, and the impact it can have if one or more of them are closed for an extended period. There are national and international examples of successfully managing these types of assets, ensuring routine maintenance, investment and funding is available to support their smooth operation.

The closure of Hammersmith Bridge to pedestrians and vehicles last year, as well as closures to other river crossings in recent years, presented a timely opportunity for the Transport Committee to investigate London's river crossings.

The report highlights the state and maintenance of London's river crossings, and the lessons that can be learned from previous closures, and from international examples of river crossing management.

London's river crossings: at a glance

What do we mean by river crossings?

For the purposes of this report, we are looking at river crossings (including bridges, tunnels, the cable car, and boat services) that cross the River Thames.

What examples are there?

Some of the most recognisable river crossings in London are its many bridges over the Thames. Tower Bridge and London Bridge are iconic examples of London's history, which are tourist attractions as well as functional crossings. Other more recent examples of pedestrian crossings include the Emirates Airline Cable Car and the Millennium Bridge. These are just a few of the more recognisable examples, with London's transport network highly reliant on all the river crossings that cross the River Thames. The recent closure of Hammersmith Bridge to vehicles and pedestrians is a clear example of the disruption that can be caused to the city and its citizens because of lack of investment and coordination.

Who is responsible for maintenance?

The ownership and maintenance responsibilities for London's river crossings are complicated and are split between several interested parties, including the local boroughs – for example, London Bridge is owned and maintained by Bridge House Estates, the highway authority is Transport for London (TfL), and it crosses into the boroughs of City of London and Southwark across the Thames.

Who is responsible for overseeing and funding the maintenance of London's river crossings?

There is no single body with overall responsibility for the maintenance of London's river crossings to ensure that any planned maintenance minimises the impact on London's transport network.

Any major road closures affecting travel in London can be tracked through TfL's Journey Planner services.¹ TfL also lists major works and events by month, so that it is possible to plan ahead to avoid closures.² However, this only looks ahead a few months and different boroughs provide updates on their own separate road closures.

How is this maintenance funded?

The responsibility for managing funding and maintenance lies with the owner of the crossing. Therefore, TfL, Bridge House Estates, Network Rail and London boroughs are all responsible for funding the maintenance for their assets, drawing the finance from different sources.

What about other river crossings?

This report has concentrated on the river crossings across the River Thames, as these include some of the oldest and most important structures for London's transport network. These are also some of the biggest structures, with the most complicated maintenance requirements and the most significant funding required to keep them in a good condition. The Committee recognises that other river crossings in London are extremely important and that there is the potential for further work to be conducted on the state of these crossings, and the maintenance regime attached to them.

¹ TfL, [Plan a journey](#)

² TfL, [Major works and events](#)

Recommendations

Recommendation 1

The Committee recommends that the speed and volume of road traffic should form a part of the reporting on the maintenance needs and costs for existing crossings. Options should be laid out for how maintenance can be made more affordable by means of controlling speed or volume of traffic, particularly for heavy vehicles.

Recommendation 2

TfL, the Government and all impacted boroughs should consider formalising the Thames River Crossing Coordination Group overseeing the maintenance of river crossings in London. This formalised group would publish relevant documents and papers relating to its work, which would provide greater transparency and accountability on the management and maintenance of river crossings in London.

Recommendation 3

TfL, the Government and all impacted boroughs that wish to opt-in should consider having a collective fund for maintenance of the relevant river crossings in London, into which all the relevant asset owners would contribute. This would allow for a more planned and transparent maintenance and investment plan for London's river crossings.

Recommendation 4

The Government should devolve London's portion of VED, currently worth around £500 million, to TfL and make national roads funding schemes available to London boroughs, on the same basis as other English Local Authorities. This would allow a portion of the funding to be spent on the future maintenance of London's river crossings, as well as dealing with London's £241 million bridge maintenance backlog.

Recommendation 5

TfL and other asset owners in London should publish an annual report on the condition of river crossings in London, showing the need for maintenance, scheduled maintenance over the coming years and any capital projects that are planned.

Chapter one: Ownership and maintenance

Key findings

- Many of London's river crossings are very old and require significant funding to ensure they are properly maintained.
- The river crossings in London have varying degrees of usage. However, there is a significant impact when one is closed for any period. Many of these assets are not used for their original intended function, which has an impact on how often these crossings require maintaining, and how easy it is to choreograph that maintenance.
- The maintenance responsibilities for London's river crossings are complicated, with TfL, Bridge House Estates, Network Rail and a number of local authorities all having ownership and/or maintenance responsibilities.
- The cost of maintaining some of TfL's river crossings is significant, and in the case of TfL, particularly worrying given its financial situation.

Background

The river crossings in London have been built over a number of years, and many of them are very old. Richmond Bridge, built in 1777, is the oldest Thames bridge still in use.³

A significant number of London's bridges were built in the 19th century, including the current structures of Albert Bridge (1873), Barnes Bridge (1849), Battersea Bridge (1890), Blackfriars Bridge (1869), Hammersmith Bridge (1887), Putney Bridge (1886), Tower Bridge (1894) and Westminster Bridge, whose current structure opened in 1862 – making it the oldest bridge in use in Central London.⁴ The Rotherhithe Tunnel was opened in 1908, and is a rare example of a road tunnel where road traffic, pedestrians and cyclists were all intended to share the same tunnel bore. However, due to safety and environment concerns, it is rarely used by pedestrians or cyclists. Road traffic data from the Department for Transport (DfT) confirms the low numbers of cyclists.⁵

³ PLA, [Thames Bridges](#)

⁴ PLA, [Thames Bridges](#)

⁵ DfT, [Road traffic statistics](#)

The age of these crossings highlights the significant task of maintenance, especially where the structures were not necessarily built to withstand the wear and tear of current traffic demands. The use of weight limitations on some crossings, such as the weight limit of two tonnes introduced on Albert Bridge in 1973, further reinforces this point.

A number of river crossings have structures that have needed to be replaced since their initial design and opening. The current structures of Cannon Street Railway Bridge (1981), Chelsea Bridge (1935), Chiswick Bridge (1933), Grosvenor Railway Bridge (1963-67), Kew Bridge (1903), London Bridge (1973), Southwark Bridge (1921), Wandsworth Bridge (1940) and Waterloo Bridge (1945) have all been built more recently to replace previous structures that had become unsuitable or unsafe.

The history and age of London's crossings also raises questions about their suitability with changing demands on the road surface, with vehicles getting heavier.

Responsibility for managing London's road network

In London, responsibility for managing London's road network is shared between TfL, Highways England and the 32 London boroughs, plus the City of London:⁶

- TfL manages the TfL Road Network (London's 'red routes')
- Highways England manages the national motorway network, including the M25, M1, M4 and M11
- London boroughs are responsible for all the remaining roads within their boundaries.

Some bridges and crossings are red routes, but not all.⁷ Many of the bridges in central London are TfL's responsibility. Bridges spanning the River Thames – namely London Bridge, Tower Bridge, Blackfriars Bridge, Southwark Bridge and the Millennium Footbridge – are maintained by the Corporation of London (through the Bridge House Estates), while railway bridges and tunnels are maintained by Network Rail. The Rotherhithe and Blackwall Tunnels are maintained by TfL.⁸

The map of crossings in central London at **Figure 1**, provided by TfL, shows who owns and is responsible for each of the crossings.⁹ This graphic shows – through highlighting the asset owners, highway authorities and boroughs – that even with a few examples, the ownership and maintenance responsibilities for river crossings in London is complex.

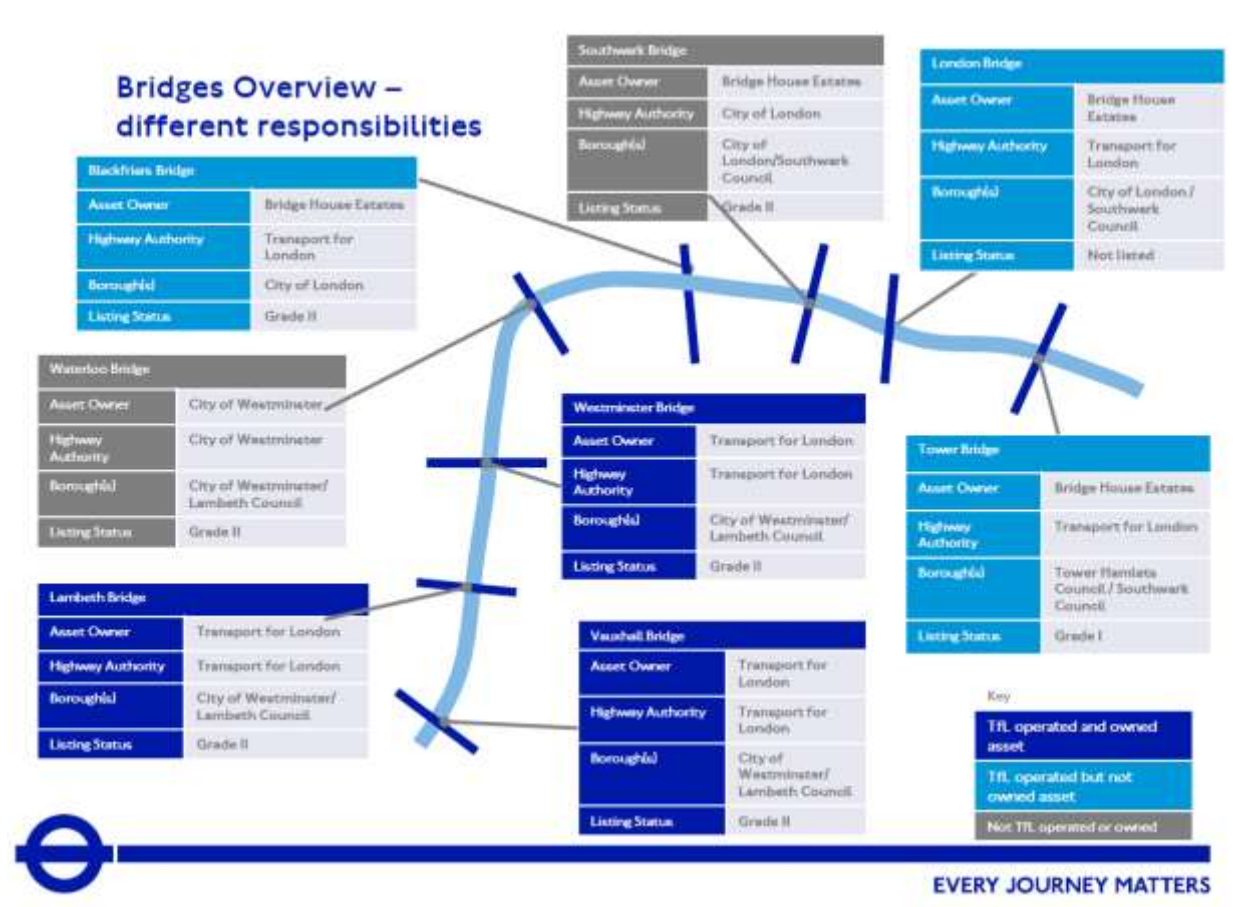
⁶ TfL, [What we do](#)

⁷ A full route of London's red routes is available [here](#)

⁸ Southwark Council, [Bridges, subways and walls](#)

⁹ TfL, [Bridges Overview – different responsibilities](#)

Figure 1: TfL, Bridges Overview – different responsibilities¹⁰



The overall picture for ownership across all of London’s river crossings is even more complex. The table at **Appendix 1** is based on information provided by TfL and shows the asset owners of the different river crossings in London.

At the Transport Committee meeting on 19 July 2021, the Committee heard from TfL and Bridge House Estates on the complexity of who is the owner and who is responsible for maintaining different river crossings, using Tower Bridge as an example.

“TfL is the highway authority and my colleague here [David Farnsworth] is responsible for the asset itself and its overall maintenance. The distinction is that the highway authority is responsible for the road itself, for the safety of the road, all the road safety aspects and so on. Clearly that road quite often is just sitting on the surface. But where it is on a structure then there might be a

¹⁰ TfL, [Bridges Overview – different responsibilities](#)

different asset owner who is responsible for the overall integrity of the asset. That is the distinction between the two.”¹¹

Gareth Powell,
Managing Director, Surface Transport, TfL

This quote shows the complexity in coordination, management, funding, and decision-making when different parties are responsible for different aspects of the same asset.

While the Committee heard that there wasn't confusion on the part of asset owners about the responsibility for different crossings, it is noted that this is not necessarily the case for the public, and that information is difficult to obtain. The Committee believes there is room for further clarity on who is responsible for the maintenance of different bridges, and that a new body overseeing the maintenance of river crossings would help to achieve this, as well as making the information more accessible.

Usage

Another significant issue for London's river crossings is the use of these structures. This has a significant impact on the wear and tear each river crossing is subjected to, and therefore an impact on the maintenance the crossing may require. This is particularly important given how varied this can be across the different crossings.

At the Transport Committee meeting on 19 July 2021 TfL spoke about the differences between the crossings. TfL noted that for the river crossings it is responsible for, the Blackwall Tunnel carries the most motor vehicles, while Vauxhall Bridge and Twickenham Bridge also carry a high number. In terms of pedestrian flows, Vauxhall Bridge is very high, as is Westminster Bridge. In terms of cycling, Vauxhall Bridge carries the largest flow of cyclists.

“Just to give you a sense of that Chair, Blackwall Tunnel will carry something in the order of 100,000 vehicles a day and Rotherhithe Tunnel 20,000 vehicles a day, so quite a difference in scale just on two adjacent crossings. Then you have something like Woolwich Ferry that is very constrained in terms of its capacity due to its nature.”¹²

David Rowe
Head of Surface Major Projects and Renewals Sponsorship, TfL

Accurate and comparable data on the usage of different river crossings is difficult to find and is not available from one source. Further information about the use of different river crossings was received from TfL as part of this investigation showing that Chiswick Bridge, Kingston Bridge, Putney Bridge, Twickenham Bridge, Wandsworth Bridge and Vauxhall Bridge all had an average daily flow of over 30,000 motor vehicles during 2020.

A full breakdown of the use of these assets is included at **Appendix 2**.

When the Congestion Charge was introduced in 2003, TfL was concerned about the impact of Tower Bridge, which would be an exempt road at the eastern edge of the zone. To reduce the impact from larger and heavier vehicles, the speed limit was reduced from 30mph to 20mph, and an 18-tonne weight limit was put in place that included the approaches.¹³ This was enforced using Automatic Number Plate Recognition, which saw crossings by vehicles over 18 tonnes reduce from six per hour to six per day.¹⁴ There is also evidence to suggest that higher vehicle speeds, particularly for heavy vehicles, are linked to increased strain on structures.¹⁵

There has been a steady and gradual reduction in speed limits on bridges throughout London. We heard that reducing the speed of traffic, as well as the volume, can reduce the maintenance requirements for a crossing. These parameters are a key part of planning for the future maintenance of an asset as well. Figure 2, below, shows a response to a Mayor's Question on the speed limits for road bridges across the River Thames. The response states that this information has been gathered from consultation with boroughs.

Figure 2: Speed limits for road crossings over the River Thames¹⁶

Bridge	Speed limits (mph)						
	2021	2020	2019	2018	2017	2016	2015
Tower Bridge	20	20	20	20	20	20	20
London Bridge	20	20	20	20	20	20	20/30
Southwark Bridge	20	20	20	20/30	20/30	20/30	20/30
Blackfriars Bridge	20	20	20	20	20	20	20/30
Waterloo Bridge	20	30	30	30	30	30	30
Westminster Bridge	20	20	20	20	30	30	30
Lambeth Bridge	20	20	30	30	30	30	30
Vauxhall Bridge	30	30	30	30	30	30	30
Chelsea Bridge	30	30	30	30	30	30	30
Albert Bridge (Road)	30	30	30	30	30	30	30

¹¹ London Assembly, [Transport Committee meeting, minutes](#), 19 July 2021

¹² London Assembly, [Transport Committee meeting, minutes](#), 19 July 2021

¹³ The Gazette, Road Traffic Acts, [The A100 GLA Road \(20 Mph Speed Limit\) Order 2003](#)

¹⁴ Bridge Protection Scheme, [Speed and weight limit enforcement, Tower Bridge](#)

¹⁵ Iowa State University, [Investigation of the Effect of Speed on the Dynamic Impact Factor for Bridges with Different Entrance Conditions](#), July 2016

¹⁶ London Assembly, [Mayor's Question Time: Speed Limits on Thames Crossings](#), 6 September 2021

Battersea Bridge (Road)	30	30	30	30	30	30	30
Wandsworth Bridge	30	30	30	30	30	30	30
Putney Bridge	30	30	30	30	30	30	30
Hammersmith Bridge	20	30	30	30	30	30	30
Chiswick Bridge	40	40	40	40	40	40	40
Kew Road	30	30	30	30	30	30	30
Twickenham Road	40	40	40	40	40	40	40
Richmond Bridge	20	30	30	30	30	30	30

Note: This response did not include information about Kingston Bridge and Hampton Court Bridge. It is also worth noting that information from the London Borough of Hammersmith and Fulham appears to show that Hammersmith Bridge had a 20mph limit in 2016.¹⁷

The Committee heard from TfL on the use of speed limits and weight restrictions as a possible way of extending the time before maintenance is required on an asset, at its meeting on 19 July 2021.

“There is a spectrum because in the middle of all of that if you have an asset that is starting to degrade and you know it is going to take you a period of time in order to be able to come up with the methodologies to fix it and so on, you may put a restriction in at that point in order that you do not have to close the asset.”¹⁸

Gareth Powell,
Managing Director, Surface Transport, TfL

The Committee therefore heard evidence to support further reporting on the maintenance needs and costs for existing crossings, and that this could be formalised.

● Recommendation 1

The Committee recommends that the speed and volume of road traffic should form a part of the reporting on the maintenance needs and costs for existing crossings. Options should be laid out for how maintenance can be made more affordable by means of controlling speed or volume of traffic, particularly for heavy vehicles.

¹⁷ London Borough of Hammersmith and Fulham, [Appendix 1 Speed limits](#)

¹⁸ London Assembly, [Transport Committee meeting, minutes](#), 19 July 2021

River traffic

The usage, maintenance and design of river crossings is not just defined by the speed and volume of road traffic, but also by river traffic. One of the reasons that Tower Bridge is so recognisable is because it opens and closes. It is required by law to open for any vessel that provides at least 24 hours' notice ahead of the time it wishes to pass through.¹⁹ Some boats based in St Katharine Docks now pass through Tower Bridge four times in one day – necessitating four lifts of Tower Bridge – just to enable a trip from London Bridge pier to further downstream on the Thames and back.

The requirement to consider both the ability of river traffic to pass through, up to the height catered for by Tower Bridge, and the possibility of being hit by river traffic was a factor in the cost escalation for the paused Rotherhithe to Canary Wharf walking and cycling bridge. The pausing of this project meant proposals for a ferry service, as a less expensive alternative, which the Committee wrote to TfL about in March 2020.²⁰

Evidence heard at the 19 July Transport Committee meeting indicated that consideration needs to be given to the balance between larger vessels such as cruise ships wanting to pass through the iconic Tower Bridge, and the need to enable more active travel over the Thames by new crossings, such as those at Rotherhithe to Canary Wharf or at the Thames Barrier.

“It is a balance, but it is around the height and that is the issue for those crossings. Large ships come all the way up to here and moor alongside [HMS] Belfast and it is a working river, but broadly east of Tower Bridge we are supportive of more crossings.”²¹

**John Stevenson,
Government Relations Lead, Port of London Authority (PLA)**

The PLA has indicated, in evidence submitted to the Committee, that it believes any shift in this balance from the present situation would need examination and debate of the relevant public interests.

The Committee believes that consideration should be given to the impact of existing usage of the Thames upon new crossings that will help achieve the Mayor's target for 80 per cent of journeys to be made by walking, cycling and public transport.

¹⁹ Tower Bridge, [Why does Tower Bridge open?](#)

²⁰ London.gov.uk, [Transport Committee – Rotherhithe to Canary Wharf letter](#), 3 March 2020

²¹ London Assembly, [Transport Committee meeting, minutes](#), 19 July 2021

Current state of London's crossings

Given the age of a number of London's river crossings, along with other factors such as their usage, it is understandable that they are at different states of disrepair. Coverage of this problem has increased recently, partly because of the closure of Hammersmith Bridge – which meant that in autumn 2020, there were three major bridges in London closed to vehicles.²² It has also been reported that the TfL-owned bridges in London are showing varying degrees of deterioration. This includes suggestions that four bridges – Twickenham, Kew, Battersea and Lambeth – may need extensive interventions within 10 years.²³ At the Transport Committee on 19 July 2021, TfL explained that it has a planned maintenance and inspection regime for all its assets.

“It is a well-proven methodology that we use to assess the condition of those assets. We undertake two types of maintenance: day-to-day maintenance, which is about making sure that the asset, the bridge or the tunnel, remains in operation, is serviceable, clearing up any issues that arise; and then interventions where we need to renew the asset in some way because, for example, if it needs painting on a regular cycle to stop further degradation of a bridge, or indeed ultimately to intervene and to structurally repair the bridge.”²⁴

Gareth Powell,
Managing Director, Surface Transport, TfL

In December 2020, the Mayor responded to a question on the condition of London's bridges and Bridge Condition Indicators with information on the state of the bridges maintained by TfL.²⁵ This information covers all bridges maintained by TfL, and doesn't identify the crossings across the River Thames.

The Committee also heard from Bridge House Estates at the same Committee meeting, who explained that Bridge House Estates was set up in the 11th century to raise a fee to maintain London Bridge. From then onwards, a charity endowment was set up and stewarded by the sole trustee, the City of London Corporation, with the main objects of the charity being to maintain and support Tower Bridge, London Bridge, Blackfriars Bridge, Southwark Bridge and Millennium Bridge.

²² *New York Times*, [“London's bridges really are falling down”](#), 7 September 2020

²³ BBC, [“London's bridges 'are the capital's embarrassment'”](#), 14 October 2020

²⁴ London Assembly, [Transport Committee meeting, minutes](#), 19 July 2021

²⁵ London Assembly, [Mayor's Question Time: Bridge Condition Indicators](#), 17 December 2020

Alongside this David Farnsworth, Director and Chief Grants Officer at Bridge House Estates, explained the life cycle through which they look at maintenance.

“Those bridges are maintained with in-house expertise at the trustee, the City of London Corporation, and outsourced expert contracts through Aecon. There is a 50-year forward trajectory in terms of maintenance and repair and a rigorous inspection regime. This endowment is the source of the funding to maintain and support those five bridges.”²⁶

**David Farnsworth,
Director and Chief Grants Officer, Bridge House Estates**

It was also revealed that TfL works to a similar 50-year time frame when looking at the state of an asset, such as a bridges or tunnels, to determine where these are in their life cycles – be they new, middle-aged or towards the end of their life or if in fact it would be necessary to renew that asset.

At present there is no single published document that shows the state of all river crossings in London. An overview of some river crossings in London is recorded in the *State of the City report: London's Highways 2020*, published by London Technical Advisory Group (LoTAG). This provides key information on asset numbers, condition and funding across London's highways.²⁷ Although it doesn't look at “river crossings” specifically, it gives an overview on the amount of maintenance that is needed across London's Road network, as well as an overview for bridges.

On the situation for bridges, the report states: *“As it stands, the outlook is bleak, and the pattern of declining State of Good Repair will continue... Bridges will continue to degrade and more will be closed. Active travel choices of walking and cycling will be unattractive because footways and roads will have potholes and defects.”*

This definition of “bridges” is different to the Committee's use of the term “river crossings”; however, it helps to highlight the wider problems with structures across London. It also gives an example of how reporting on the state of London's river crossings could be useful, and a potential example of how that might work.

²⁶ London Assembly, [Transport Committee meeting, minutes](#), 19 July 2021

²⁷ LoTAG, [State of the City report: London's Highways 2020](#)

Coordination

The Committee also heard about the coordination that takes place to ensure that any maintenance to bridges doesn't have a knock-on effect on other parts of London's transport network. Bridge House Estates explained how it works in conjunction with other stakeholders, both formally and informally on a day-to-day basis, to ensure that disruption is minimised. The Committee heard that TfL runs and leads the Trans-River Partnership, and that TfL takes an overview of the whole network as part of their work.²⁸

TfL also stated that it used a shared database tool with London boroughs called Bridge Station with relation to all elevated structures, as a way of recording information on the condition of assets, with London boroughs also doing the same.

TfL also strategically coordinates works through:

“The strategic coordination of works is managed through the Thames River Crossing Coordination Group which comprises representatives from TfL, London boroughs, bridge owners, Port of London Authority, Tideway and Network Rail. This Group meets on a quarterly basis and hold a comprehensive overview of forthcoming and potential works on all river crossings.”²⁹

David Rowe,
Head of Surface Major Projects and Renewals Sponsorship, TfL

Information on the work of the Thames River Crossing Coordination Group does not appear to be readily available to the public, and also does not appear to be formalised. For example, the papers of the group do not appear to be published or made available for public record. While it is reassuring that this work is taking place, it is not clear how the outputs from the group feed into what information is made available to the public.

In follow-up information provided to the Committee, Bridge House Estates also expanded on its role when coordinating with other stakeholders. This noted that Bridge House Estates and the City Corporation work particularly closely with TfL and the City of Westminster (as associated Thames' crossing owners) and TfL, Westminster, Southwark and Lambeth (as highway authorities) to plan advance work, publicity and impact-mitigation measures across

²⁸ London Assembly, [Transport Committee meeting, minutes](#), 19 July 2021

²⁹ London Assembly, Written evidence from TfL, 6 August 2021

a range of activities. That work includes avoiding clashes between crossing closures as well as minimising other work on the road network in general when these closures take place.³⁰

In recent years this has included both full and partial closures of London, Tower and Southwark bridges to enable various works by TfL, the City Corporation and third parties, as well as smaller works operated under temporary traffic controls.

The Committee also received written evidence from Network Rail on the coordination with other stakeholders for bridge closures.³¹ This noted that the PLA is the main external stakeholder they must consult and agree with when one of their Thames River crossings is closed for examination or engineering works. Network Rail would work with them to coordinate works, wherever possible, with other nearby projects, to minimise disruption to Londoners.

The Committee also heard from the PLA at the Transport Committee meeting on 19 July 2021 on this issue, which clarified its involvement in coordination.

“Our role is to work with either the asset owner or the contractor to make sure that any maintenance that will involve the river is done in a safe way. That is a rolling programme and broadly that can lead to things like arch closures. But that is done in a constructive way and carries on without much incident day-to-day.”³²

**John Stevenson,
Government Relations Lead, PLA**

The Committee is assured that there is relevant coordination between stakeholders when river crossings are to be closed for planned maintenance. However, there remain concerns about the transparency of this work and how easy it is for Londoners to find out what bridges are being closed and when. The group does not appear to be formalised and doesn't publish papers of its work for public scrutiny. This raises concerns about how closures of river crossings are communicated to Londoners and whether this could be better coordinated. It also has a knock-on effect for what happens when an asset must close at short notice, and how effectively this is communicated to users. The Committee therefore recommends that TfL and the Government should consider formalising the Thames River Crossing Coordination Group overseeing the maintenance of river crossings in London, which would provide greater transparency and accountability on the management and maintenance of crossings in London.

³⁰ London Assembly, Written evidence from Bridge House Estates

³¹ London Assembly, Written evidence from Network Rail, 30 July 2021

³² London Assembly, [Transport Committee meeting, minutes](#), 19 July 2021

For example, in Milan problems (including a lack of alignment of agendas and calendars for maintenance, and a lack of communication between relevant stakeholders in the management and maintenance of assets) were addressed by the creation of a joint commission. The City of Milan and the Italian Railway Network (RFI) created a joint commission in 2018 to oversee, manage, maintain and fund all bridges and underpasses in the city. This has helped all asset owners better align themselves, share data, and align efforts into providing a more robust and quality service in the city.

• Recommendation 2

TfL, the Government and all impacted boroughs should consider formalising the Thames River Crossing Coordination Group overseeing the maintenance of river crossings in London. This formalised group would publish relevant documents and papers relating to its work, which would provide greater transparency and accountability on the management and maintenance of river crossings in London.

Chapter two: Examples of crossing closures

Key findings

- The example of Hammersmith Bridge closing shows how important understanding who is responsible for the maintenance of different major assets is.
- The example of the closures of the Greenwich and Woolwich foot tunnels again highlights the significant impact on Londoners when a river crossing closes.
- The materials river crossings are built from can have a significant impact on their life span. Technology can be used to measure the use of the bridge and a better understanding of what maintenance it requires and when.
- There have been several plans for new rivers crossings over the last few years, many of which have been paused or stopped due to difficulties with the projects.

Example 1 – Hammersmith Bridge

The most current example of one of London's crossings closing for an extended period is that of Hammersmith Bridge. The ownership of Hammersmith Bridge was transferred to the London Borough of Hammersmith and Fulham (LBHF) in 1985. The LBHF has a legal duty under Section 41(1) of the Highways Act 1980 to maintain the highway. Therefore, the responsibility for maintaining the bridge, and making decisions on its repair, lies with the borough.³³

³³ Gov.uk, [Hammersmith Bridge updates](#)

On 19 July 2018, the Mayor of London told the London Assembly at Mayor's Question Time that TfL was supporting the council with assessment and repair of the bridge:³⁴

"Hammersmith & Fulham (H&F) Council is the highway authority for Hammersmith Bridge and is responsible for its maintenance and repair. Transport for London (TfL) is supporting the council with the assessment and repair of the bridge."

Sadiq Khan, Mayor of London

In a response to an FOI request published in October 2020, TfL detailed that it had been supporting the LBHF for several years in developing refurbishment plans for the bridge and, in total, had spent £16.7 million on assessments, feasibility, inspections and surveys, designs and other matters.³⁵ Based on TfL's reported spend of £43 million on bridge maintenance since 2010, the spend on Hammersmith Bridge makes up more than a third of this spend.

At the 19 July 2021 Transport Committee meeting, TfL spoke about its involvement in working with Hammersmith and Fulham Council, while reiterating that it remained the responsibility of Hammersmith and Fulham Council.

"...the processes that have been used over the last couple of years to inspect the asset, to come up with methodologies to repair it and so on, TfL has been supporting the London Borough of Hammersmith and Fulham in that activity. We have been letting a number of the contracts for specialist engineers that have been able to go and do that on their behalf and advising them from whatever expertise we have in terms of our own in-house engineering and other planning individuals. We have been doing what we can to advise them. Ultimately, the decision-making is for the asset owner, as it should be, and they are responsible for its safety and its long-term planning. That sits with Hammersmith and Fulham."³⁶

Gareth Powell **Managing Director, Surface Transport, TfL**

³⁴ London Assembly, [Mayor's Question Time: Hammersmith Bridge](#), 19 July 2018

³⁵ TfL, [FOI Request Detail: Hammersmith Bridge](#), 27 October 2020

³⁶ London Assembly, [Transport Committee meeting, minutes](#), 19 July 2021

Hammersmith Bridge closure and Taskforce

In 2014, a report from Hayder Consultancy raised concerns about the bridge's resilience prompting the commissioning of the first Comprehensive Structural Integrity Review into the bridge.³⁷ Cabinet Member papers from December 2014 show the LBHF seeking authority for strengthening and refurbishing Hammersmith Bridge. The papers also state that, at that point, the last repainting had taken place in 1994, and in 2000 the bridge was strengthened to its load capacity at that time. In 2015 the council imposed new, strict restrictions on the weight and size of permitted vehicles on the bridge. Before the limit was put in place, the bridge was used by 22,000 motor vehicles including 1,800 buses every day. On 10 April 2019, Hammersmith Bridge was closed to motor traffic, leaving it accessible only to pedestrians and cyclists. Then, on 13 August 2020, the 133-year-old Hammersmith Bridge had to be closed to pedestrians, cyclists and river traffic for safety reasons, without any indication of how long it would be closed.³⁸ As river traffic could not pass under the bridge, the Oxford vs Cambridge boat race was moved away from the River Thames for only the second time in its 165-year history due to safety fears over Hammersmith Bridge.³⁹

A government-led taskforce, chaired by Baroness Vere, was set up by the DfT in September 2020 to work towards the safe reopening of the bridge.⁴⁰ The taskforce brings together key stakeholders: the LBHF, the London Borough of Richmond upon Thames, TfL, the Greater London Authority and the PLA.

The government states that the core function of the group is to consider proposals for both long-term repair and short-term temporary measures, and to resolve challenges that stand in the way of reopening the bridge at the earliest possible opportunity.⁴¹ The taskforce is supported by engineers from the DfT and Network Rail, plus AECOM as external engineering consultants, while Dana Skelley OBE has been appointed as Project Director to coordinate efforts to get the bridge reopened.

New proposals

In November 2020 Hammersmith and Fulham Council, Sir John Ritblat from Delancey, and architects and engineers Foster and Partners, put forward a plan to build a temporary double-decker crossing within the existing structure of Hammersmith Bridge.⁴² Under the

³⁷ Hammersmith and Fulham, [Hammersmith Bridge timeline](#)

³⁸ Hammersmith and Fulham, [133-year-old Hammersmith Bridge closed due to urgent safety concerns](#), 13 August 2020

³⁹ *Daily Mail*, [“Hammersmith Bridge debacle means The Boat Race will be held in Cambridge for the first time since WWII over fears for safety of athletes”](#), 26 November 2020

⁴⁰ Gov.uk, [Hammersmith Bridge updates](#)

⁴¹ Gov.uk, [Hammersmith Bridge updates](#)

⁴² Hammersmith and Fulham, [H&F, Sir John Ritblat and Foster + Partners unveil radical new plans for Hammersmith Bridge](#), 26 November 2020

proposal, pedestrians, cyclists and, potentially, motor vehicles could use the bridge, with river traffic passing underneath. A six-week study by Foster and Partners suggested this would allow pedestrians to use the bridge within a year of a contractor being appointed.⁴³ The timeline for the bridge to be fully fixed remains unclear.

After some initial works, the Hammersmith Bridge has reopened for cyclists and pedestrians at the time of this report.

Public Accounts Committee

On 15 October 2020, the Public Accounts Committee called officials from the DfT to give updates on major projects, including Hammersmith Bridge.⁴⁴ At the meeting, Bernadette Kelly, Permanent Secretary at the DfT, confirmed that the DfT would be providing “some funding” towards the repair of Hammersmith Bridge. She later confirmed in writing to the Committee that this was in fact not the case.⁴⁵

At the Public Accounts Committee, she also spoke about the problems associated with the state of Hammersmith Bridge, and the need for the DfT to help. She said:

“It has been a long-running concern. A lot of the problem is that the bridge seems to have fallen into something of a no man’s land, in terms of who is responsible for its maintenance and repair. It is officially a borough responsibility, but clearly it is a very significant bridge and thoroughfare.”

Bernadette Kelly, Permanent Secretary Department for Transport

In a follow-up letter to the Public Accounts Committee on 28 October, Bernadette Kelly added on this matter:

“There is no single body which has ownership, responsibility or oversight of bridges in London. Individual boroughs hold responsibility for some (such as LBHF for Hammersmith), TfL for others (including Westminster and Vauxhall bridges), Network Rail for rail bridges and the Bridge House Estates for bridges into the City of London. Hammersmith Bridge is our immediate priority. We will use our learning from this project to inform further consideration of whether longer-term changes are appropriate.”⁴⁶

⁴³ Hammersmith and Fulham, [Study of double-decker proposal concludes Hammersmith Bridge could re-open to pedestrians next summer](#), 19 March 2021

⁴⁴ Public Accounts Committee, [Oral evidence: Department for Transport Recall, HC 850](#), 15 October 2020

⁴⁵ Public Accounts Committee, [Update on Hammersmith Bridge following the Public Account’s Committee hearing on 15 October 2020](#), 28 October 2020

⁴⁶ Public Accounts Committee, [Update on Hammersmith Bridge following the Public Account’s Committee hearing on 15 October 2020](#), 28 October 2020

Example 2: Greenwich and Woolwich Foot Tunnels

Another recent example of a crossing closure that caused severe disruption to Londoners is the closure of the Greenwich and Woolwich foot tunnels. Like the problems with Hammersmith Bridge, the problems escalated over a number of years, with several warning signs.

The Greenwich Tunnel was opened in 1902 and the Woolwich Tunnel was opened in 1912. The purpose of the tunnels was to provide reliable all-weather access by residents to the London shipyards and docks on the north side of the Thames.⁴⁷ While the Greenwich Foot Tunnel replaced an unreliable ferry service, the Woolwich Foot Tunnel was created to operate alongside the Woolwich Ferry.⁴⁸

Both foot tunnels were built by the former London County Council and the Royal Borough of Greenwich manages the tunnels on behalf of its respective partners, The London Borough of Tower Hamlets, and the London Borough of Newham.⁴⁹ The tunnels at Greenwich and Woolwich are used by 1.5 million people a year (around 1.2 million in Greenwich and 300,000 in Woolwich). Both foot tunnels are open 24 hours daily and have stairs and lifts at each entrance.⁵⁰

Work on renovating the tunnels began in 2009, with the aim to finish the work by 2011, in time for the 2012 Olympics.⁵¹ Funding for the project was provided by a fixed grant from Ministry of Housing, Communities and Local Government (now the Department for Levelling Up, Housing and Communities), awarded in 2009. The grant was allocated for fixed amounts over a three-year financial period with no provision for slippage between the years. During 2010 and early 2011 the Greenwich tunnel was subject to sudden closures as the lifts broke, while the Woolwich tunnel was closed altogether due to problems with the stairs.

The tunnels reopened in December 2011; however, the completed work hadn't been sufficient, and further work was needed. It was reported that Greenwich Council would launch an independent inquiry into the project, and take legal action against three contractors, after it was forced to step in and run the scheme itself.⁵²

The Inquiry reported in October 2013 and concluded that the work in phases 3 and 4 of the project had not been finished. It also concluded that the delays to the completion of the tunnel work were down to *"a mixture of time pressures, the difficult sites, the delay by Hyder in resolving design issues ... Greenwich staff, albeit with good intentions trying to*

⁴⁷ Royal Borough of Greenwich, [Foot tunnels history](#)

⁴⁸ South London Club, [A brief history of the Greenwich and Woolwich Foot Tunnels](#)

⁴⁹ Royal Borough of Greenwich, [Foot tunnels history](#)

⁵⁰ Royal Borough of Greenwich, [Foot tunnels](#)

⁵¹ South London Club, [A brief history of the Greenwich and Woolwich Foot Tunnels](#)

⁵² 853 London, [Foot Tunnels Fiasco: Greenwich Council Launches Inquiry](#), 12 October 2012

resolve such issues, but without, in a timely manner, standing back to view the bigger picture and reporting it to higher management.”

The significant delays to the project and the impact it had on commuters also led to the establishment of the Friends of Greenwich and Woolwich Foot Tunnels in 2013. However, in March this year the group announced they would disband, due to frustration with ongoing issues, including cycling and ongoing lift problems.⁵³ It has been reported that further works are needed for the lifts, and closures are expected.

The difficulties experienced with this project once again highlight the challenges of maintaining London's river crossings for local authorities, but also the severe disruption that closures can have to Londoners who rely on these crossings for their daily commutes.

Lessons learned

The Transport Committee meeting on 19 July 2021 sought to understand what lessons could be learned from the situations surrounding Hammersmith Bridge and Greenwich Foot Tunnels. While TfL was unable to comment on whether it might have done anything differently, Tom Osborne from Knight Associates raised the range of issues that could contribute to the situation.

“There is no one thing. I would say we are over-reliant on too few bridges and perhaps also over-reliant on too few modes of transport. Hearing about the challenges of maintaining these assets makes clear that one of the things the city needs is options. A way to achieve options is with diversifying the number of crossings of the river and also the way we use those crossings. Otherwise, planned or unplanned maintenance will essentially result in an increase in disruption.”⁵⁴

**Tom Osborne, Director
Knight Associates**

The potential for further crossings was explored further with the PLA as an area in which lessons could be learned from previous structures. This covered not just the issue of funding them and the lifetime cycle funding, but also on how the height of the bridge might prove a problem.

“The PLA is supportive of more crossings east of Tower Bridge and, broadly, we

⁵³ 853 London, [Greenwich and Woolwich foot tunnel users' group to disband in frustration](#), 23 March 2021

⁵⁴ London Assembly, [1 December 2020 Transport Committee](#), 1 December 2020

are location and mode-neutral and will, as you would expect, judge each application on its merits. We would have strong views on some locations. Certainly, height, as you have highlighted and as others have mentioned, is mainly around air draught for vessels.”⁵⁵

John Stevenson, Government Relations Lead PLA

Funding

The Committee has also noted that the development of new crossings has potentially had an impact on the funding available to maintain the crossings that already exist. In March 2021, it was widely reported that TfL had spent almost half as much on the proposed Garden Bridge development (£24 million) as it had on the maintenance of London's river crossings (£43 million) since 2010.⁵⁶

Further information on the breakdown of that spend was released in a response to a Mayor's Question on 21 January 2021.⁵⁷ This breakdown shows that the largest spends on maintenance have occurred in the financial years 2019-20 and 2021-22. This could potentially be the beginning of trending need to spend more money on maintenance in the future, which will need to be monitored. A full breakdown of the spend is included at **Appendix 3**. In March 2021 it was reported that the cost of potential repairs to Westminster, Lambeth and Vauxhall bridges could reach up to £130 million.⁵⁸

Given TfL's current uncertain financial situation, this poses questions as to how this investment will be funded, and what the implications are if funding is not secured. This was addressed by TfL in the 19 July Transport Committee meeting, when asked which of TfL's assets were most in need of repair and what the estimates to carry out these repairs are.

⁵⁵ London Assembly, [1 December 2020 Transport Committee](#), 1 December 2020

⁵⁶ *New Civil Engineer*, [Revealed: More money went on failed Garden Bridge than TfL has spent maintaining Thames' crossings in last decade](#), 3 March 2021

⁵⁷ London Assembly, [Mayor's Question Time: London Bridges repair costs since 2010](#), 22 January 2021

⁵⁸ London SE1, [Westminster, Lambeth & Vauxhall bridges could need £130m repairs](#), 9 March 2021

“...for the Rotherhithe Tunnel we need to do a lot of work and it is going to be very difficult to do that work. The estimates are somewhere around £120 million worth of work is required to the Rotherhithe Tunnel. These estimates do change, as you will know, as engineers come up with methodologies and as those costs are refined and ultimately as we go out into the market to get competitive quotes back to then go and deliver them. But something like the Rotherhithe Tunnel is in that order of magnitude. Something like Vauxhall Bridge, talking maybe £30 million to £50 million worth of intervention to that asset.”⁵⁹

Gareth Powell,
Managing Director, Surface Transport, TfL

The Committee therefore remains concerned that the cost of maintaining London's river crossings remains extremely high, especially given TfL's current financial situation. TfL spoke at the meeting about the need for a long-term funding agreement in order to be able to plan for the future and to ensure that this maintenance could be planned and carried out.

When pressed on what would happen if the funding couldn't be secured, and maintenance couldn't be carried out at the appropriate time, TfL stated that it could ultimately lead to the asset being closed.

“Ultimately, we do not want to do this, but ultimately if the asset is not safe then we will need to close it. That is the ultimate restriction. That is inconvenient for everybody who uses that asset. It causes disruption, it causes congestion, it means that businesses cannot function and so on, particularly when you look at the strategic nature of river crossings. There are not that many of them and therefore keeping them all open is really important.”⁶⁰

Gareth Powell,
Managing Director, Surface Transport, TfL

⁵⁹ London Assembly, [Transport Committee meeting, minutes](#), 19 July 2021

⁶⁰ London Assembly, [Transport Committee meeting, minutes](#), 19 July 2021

The Committee considers this to be an unacceptable risk that could be mitigated with a different approach to the funding of maintenance of river crossings. The Committee is therefore recommending that TfL and the Government should consider having one fund for maintenance of the river crossings in London, into which all asset owners contribute a set amount each year to ensure a consistent level of funding is available for maintenance. This would allow for a more a flexible approach to scheduling maintenance as one funding pot should mean that maintenance would not need to be delayed if required, and there was available funding. In particular it could potentially avoid another situation where local authorities don't have the funding for urgent repairs to a major asset, but the funding pot could allow for maintenance to happen.

The New York City example (detailed later in the report) showcases best practice where the city manages to centralise funding from different agencies, and fund their maintenance in a more coordinated manner. It also publishes a yearly report on the state of all bridges in New York City.

How could this be funded?

One of the themes of the Committee's investigation was how the maintenance of London's river crossings could be funded in the future. At present, with responsibility split between the different asset owners and responsible highway authorities, the streams of funding differ. The Committee believes there is potential for this funding to be streamlined and for a central pot between interested parties, which is reflected in its recommendations.

Potential options for funding include:

- tolls – the Committee received evidence from both New York and Milan, which identified the use of tolls as a way of raising revenue for maintenance of river crossings
- central fund – the Committee is recommending that maintenance be coordinated through the use of a central fund. In order for this to exist, it would require the owners, maintenance authorities and local authorities responsible for river crossings to contribute to the joint fund. Funds could then be withdrawn to maintain assets as was necessary.

A combination of these approaches may be necessary to secure the funding of maintenance for river crossings in the UK. The example heard in evidence that Bridge House Estates was set up in the 11th century to raise a fee to maintain London Bridge. From then onwards, a charity endowment was set up and stewarded by the sole trustee, the City of London Corporation, with the main objects of the charity to maintain and support. This allows the fund to be used responsibly over a long period of time.

A strong theme from TfL's evidence to the Committee was the need for a long-term funding agreement, in order to plan and finance the maintenance required for the river crossings in London. This is one of the ways in which London is in a different financial situation to the rest of the country, which has an impact on the way in which maintenance for river crossings can be funded and planned for the future. As the Committee has heard at previous meetings, including the 30 June 2021 meeting, this is not only the case for having available funds to plan maintenance for river crossings but is a wider problem in terms of planning for TfL's current financial situation overall.⁶¹ While this report has concentrated on river crossings across the Thames, the Committee recognises that maintenance of other river crossings in London, as well as infrastructure on the road network in general are extremely important. It also notes that funding for maintenance of other areas remains a problem for London, and that there is the potential for further work to be conducted in these areas.

Another example of the difference in funding is through how VED is distributed. The Committee has previously stated its position that London does not receive its fair share of road maintenance funding, with the approximate £500 million of VED revenue raised in the capital funding road maintenance outside of the city.⁶² The Committee therefore believes that London's share of VED should form a part of the funding pot for the maintenance of London's river crossings, as part of the funding for London's road network overall.

It should be noted that the Cable Car has a sponsor, currently the Emirates airline, that committed a reported £36 million of funding over a 10-year deal to cover the costs of this crossing.⁶³ Sponsorship of other river crossings is potentially an option but no evidence was received supporting this in our investigation.

Recommendation 3

TfL, the Government and all impacted boroughs that wish to opt-in should consider having a collective fund for maintenance of the relevant river crossings in London, into which all the relevant asset owners would contribute. This would allow for a more planned and transparent maintenance and investment plan for London's river crossings.

⁶¹ London Assembly [Transport Committee meeting, Appendix 1 – minutes](#), 30 June 2021

⁶² London Assembly, [Plenary agenda item](#), 10 September 2020

⁶³ Reuters, [Emirates to sponsor UK's first cable car](#), 7 October 2011

Chapter three: International comparisons

Key findings

- International examples of the management of river crossings show some areas of best practice from which London may be able to learn.
- New York City's network of river crossings are managed by a number of different agencies, and information on which organisations manage which bridges is far simpler to access than for London's crossings.
- The Municipality of Milan and the RFI launched an agreement in June 2018 for the redevelopment of all the bridges and underpasses of the railways by creating a joint coordination committee to oversee the work.

The Committee has considered examples of river crossings in cities other than London as part of this investigation. By looking in more detail at the case studies of New York City and Milan, it has gathered two very different examples of how river crossings and major assets are managed.

These examples have been illustrated below in order to highlight areas of best practice, which can be used as part of the management of London's river crossings. There are some elements that are fundamentally different, such as funding, which means they may not be transferable to London's transport network. However, there is merit in considering the possibilities of using these examples of best practice.

Example 1: New York City

New York City's network of river crossings is managed by a number of different agencies, including the New York City Department of Transportation (NYC DOT), the Metropolitan Transportation Authority, the Port Authority of New York and New Jersey, the New York

State Department of Transportation, and Amtrak. Information on which organisations manage which bridges is far simpler to access than for London's crossings.

For example, NYC DOT lists the crossings that it manages, as well as those managed by other organisations.⁶⁴ NYC DOT owns, operates and maintains 789 bridges and tunnels throughout New York, including the Brooklyn Bridge, the Ed Koch Queensboro Bridge, the Manhattan Bridge and the Williamsburg Bridge, plus 24 movable bridges and four tunnels. It does not operate any toll bridges. NYC DOT's staff manage an annual operating budget of \$1.1 billion and a ten-year \$19.7 billion capital programme.

In January 2021, the New York State Department of Transportation announced the availability of \$200 million in Bridge NY funding, to assist local agencies in refurbishing and replacing bridges and culverts.⁶⁵ This funding was on top of \$500 million that had been awarded to 143 local government agencies since 2016, assisting with the refurbishment and replacement of 298 bridges and culverts.

At the 19 July 2021 Transport Committee meeting, the Committee heard from Dr Michael Horodniceanu, the former Traffic Commissioner of New York City, on the best ways to finance and maintain river crossings. As part of his evidence to the Committee he discussed the ways in which New York finances the operation and maintenance of its crossings.

“New York is not much different than other places. New York City today operates around 790 bridges that need to be maintained continuously and that is a very important aspect of what is the New York City Department of Transportation. In addition to that, there are bridges that are tolled. If they cross the Hudson River, it is crossing from one state to another, from the state of New Jersey to the state of New York. These are maintained by the Port Authority, and it has the responsibility to ensure the viability and long-term operation of bridges and tunnels across the Hudson River. Then we have a number of tunnels and bridges that connect the city of New York and the various boroughs to the centre, so to speak, which is Manhattan. They have their own operation and funding that is generated solely by tolls because part of the tolls is subsidising public transit.”⁶⁶

Dr Michael Horodniceanu
Professor, New York University

⁶⁴ NYC DOT, [Bridges](#)

⁶⁵ Transport Topic, [Bridge NY Funding Key for Repairs and Resiliency, Experts Say](#), 1 February 2021

⁶⁶ London Assembly, [Transport Committee meeting, minutes](#), 19 July 2021

An important element of this example is the difference between levels of tolling used to maintain bridges, in comparison to London. The Committee has discussed the prospect of expanding road charging at a number of Committee meetings, and the example from New York City lends further evidence to the argument that an extension of this may become more likely in the future. Dr Horodniceanu also noted that tolling was done based on the vehicle miles of travel. This means that the contribution of the overall vehicular traffic in a city can then be used to support the generic maintenance by collecting from everyone. He highlighted that if you simply add tolls on one bridge that people will then find a way to travel that avoids this toll.

Dr Michael Horodniceanu also stated that the crossings maintained by the City of New York are funded as part of the budget that the city sets aside for the Department of Transportation to operate. This is done through having a capital budget and an operation budget – the capital budget is responsible for building or rebuilding, while the operational budget covers continuous maintenance as part of the operational element.

Alongside this, MTA Bridges and Tunnels operates roadway bridges and tunnels including the Bronx-Whitestone Bridge, the Brooklyn-Battery Tunnel, the Henry Hudson Bridge, the High Bridge and the Queens-Midtown Tunnel. In 2019 they had an operating budget of \$528.1 million, and have tolls in place at all of their crossings.⁶⁷

The Port Authority operates road bridges and tunnels between New York and New Jersey including the Bayonne Bridge, the George Washington Bridge, the Goethals Bridge, the Holland Tunnel and the Lincoln Tunnel. They charge tolls on all bridges going into New York, but not New Jersey.

Annual reports

Another important point of the evidence was a yearly report detailing the work being done, at what level and how, issued by the City of New York.⁶⁸ In fact, NYC DOT publishes Annual Bridge and Tunnel Condition Reports that describe the recent and planned maintenance and capital projects on DOT bridges.⁶⁹

This small example shows a significant difference in ease of access to information, and the apparent transparency of different organisations. It is also an example of best practice that could be adopted in London's transport system and for Thames river crossings. Therefore, the Committee recommends that TfL and other asset owners in London should publish an annual report on the condition of Thames river crossings in London, showing the need for maintenance, scheduled maintenance over the coming years and any capital projects that are planned.

⁶⁷ MTA, [MTA Bridges and Tunnels](#)

⁶⁸ London Assembly, [Transport Committee meeting, minutes](#), 19 July 2021

⁶⁹ NYC DOT, [Annual Bridge and Tunnel Condition Reports](#)

Example 2: Milan

Another example of a different approach to the management of river crossings is in Milan. The Municipality of Milan and the Italian Railway Network (RFI) launched an agreement in June 2018 for the redevelopment of all the bridges and underpasses by creating a joint coordination committee to oversee the work.⁷⁰ The stated intention was to guarantee the safety of the infrastructure, and to ensure vehicular and pedestrian transit on bridges and railway operation. This coordination body today includes the city's main water company, MM (which ensures the maintenance piece when it comes to soil, underground waters and maintenance of underground tunnels) and Milan's Transport Agency (equivalent to TfL), which is responsible for Milan's metro system, and the maintenance and governance of many of the crossings. The RFI is also responsible for the highways and road maintenance.

While the city of Milan receives funding from regional and national governments for the maintenance of its crossings, it also relies on tolling and ticketing systems to raise public funds to maintain the crossings and their infrastructure.

In the Municipality of Milan, there are 495 bridges, 90 of which are the exclusive responsibility of the RFI. All the structures are subject to monitoring by specialised personnel aimed at drawing up a progressive plan of ordinary and extraordinary maintenance.

Since the collapse of the Morandi Bridge in Genoa, the national government and the EU have provided a series of emergency funds to which cities can apply in order to repair and maintain their infrastructure, including their crossings.

As there are many bridges, checking all of them and prioritising which ones to intervene first remains a challenge.

Being a start-up and technology hub in Italy, Milan is building an urban intelligence platform, using artificial intelligence (AI) and blockchain technology to manage data and better understand the state of its crossings and their climate impact; and to have a better understanding of the status of the assets and its infrastructure.

Having a digital technology platform helps the city measure the flow of the people and vehicles per bridge, and helps understand which bridges need priority intervention.

⁷⁰ Commune de Milano, [Maintenance and monitoring of railway overpasses](#)

For the management of any unforeseen situations, both the Municipal Administration and the Railway Company are equipped with operational tools to ensure prompt intervention 24 hours a day.

In 2019 alone, many interventions were carried out to safeguard and improve the **railway heritage**:

- viale Monza railway bridge
- Villapizzone underpass flooring
- consolidation of the Viale Fulvio Testi railway bridge
- consolidation of the Viale Sarca railway bridge.

In the same year, interventions were carried out to safeguard and improve the **municipal heritage**:

- Walkway via Mosca
- Campanella underpass
- Porta Nuova underpass
- Footbridge via Imperia
- Replacement of expansion joints on all structures
- Via Agordat footbridge
- Via Licata vehicular bridge
- Via Marotta vehicle bridge
- Vehicle bridge via Feltre
- Walkway via De Marchi
- Monte Ceneri-Serra Bridge
- Prospero Finzi Bridge
- Replacement of brick cladding for railway bridges of Ferrovie Nord of the quadrupling of Cadorna Bovisa

Aside from this, the Municipality of Milan has a designated department working on its bridges and crossings – overseeing their infrastructure, urban planning, mobility and resilience aspects, working closely with the RFI. In its work through the Global Resilience Cities Network (of which London is also a member), Milan developed an urban resilience strategy where bridges and crossings are a key piece of its overall resilience goals.

Depending on the type of bridge, overpass or underground road, different state-owned companies or relevant national Ministries might be involved. But overall, since the joint coordination body between the Municipality and the RFI was set up in Milan in 2018, things have improved.

According to Piero Pelizzaro, Chief Resilient Officer of the City of Milan, before this coordination body existed, problems included:

- lack of alignment of agendas and calendars for maintenance
- lack of communication between relevant stakeholders in the management and maintenance of assets

- lack of coordination for common funding requests to other parts of central government and the EU
- competition for the same resources to be spent on different assets..

All of this resulted in badly maintained infrastructure, affecting the transport network and the lives of citizens. This is not a problem unique to Milan, but is seen across Italy (as with the collapse of the Genoa bridge in 2019).⁷¹

The lack of clarity around who is responsible for management, maintenance and repair of the different assets was one of the key problems to be addressed with this new coordination body. Now that one central body coordinates all the relevant partners, they can align and have a common approach to the crossings in Milan, including prioritising funding from regional and central government and the EU, and improved collaborative working.

Having seen an improvement since the joint coordination bodies, the City of Milan still identifies the following as some of its most critical challenges when it comes to its crossings:

- Climate change impacts, including extreme weather events, rain, floods, heat waves, heavy snow (concrete and asphalt are not designed for these weather events).
- Lack of maintenance over the last 20 years. This remains a key challenge across assets all over Europe. Cities have been more focused on increasing infrastructure (given growing populations) and not so much on maintaining the current ones. Milan and other European cities are still working on the lack of understanding around passenger flow, the real-time life of assets, and how to process all this data through AI and tech . Understanding the long-term investment around the life of an asset, and including that thinking in the initial proposal when building new assets, is key. For example, cities such as Los Angeles, through their “Los Angeles River – A Plan for the next 100 Years”,⁷² have started including a 100-year maintenance plan for all of its critical infrastructure, which allows planning ahead and ensuring the adequate level of resources.
- While the new generation of joint coordination bodies has meant an improvement, the different agendas, priorities, and ways of planning and measuring indicators of each of the stakeholders still creates complexity. Ensuring harmonisation across stakeholders is vital.

⁷¹ *The Guardian*, [“What caused the Genoa bridge collapse – and the end of an Italian national myth?”](#), 26 February 2019

⁷² Los Angeles River – A plan for the next 100 Years, City of Los Angeles

“There is so much innovation happening in cities across the world when it comes to managing, governing, and maintaining critical infrastructure. More coordination, innovative funding mechanisms and more transparency are a must. We must also build in a bottom-up approach to management of bridges, involving citizens by using AI, and using digital technology to help cities better understand their challenges, but also to allow citizens to feed into the process around asset management and infrastructure. This is the future of cities.”

Piero Pelizzaro
Chief Resilience Officer, City of Milan

Recommendation 4

The Government should devolve London's portion of VED, currently worth around £500 million, to TfL and make national roads funding schemes available to London boroughs, on the same basis as other English Local Authorities. This would allow a portion of the funding to be spent on the future maintenance of London's river crossings, as well as dealing with London's £241 million bridge maintenance backlog.

Recommendation 5

TfL and other asset owners in London should publish an annual report on the condition of river crossings in London, showing the need for maintenance, scheduled maintenance over the coming years and any capital projects that are planned.

Appendices

Appendix 1: Asset owners of the different river crossings in London

Asset owners	Number of assets	Significant assets
City of London Corporation (+ City Bridge Trust/+ Bridge House Estates)	5	Blackfriars Bridge, London Bridge, Millennium Bridge, Southwark Bridge, Tower Bridge
Hammersmith and Fulham Borough Council	1	Hammersmith Bridge
London Borough of Richmond	4	Hampton Court Bridge, Teddington Lockcut Footbridge, Richmond Bridge, Teddington Suspension Footbridge,
Network Rail (+Network Rail Infrastructure Ltd)	9	Barnes Railway Bridge and Footbridge, Battersea Railway Bridge, Blackfriars Railway Bridge, Cannon Street Rail Bridge, Grosvenor Bridge, Hungerford Bridge, Kew Railway Bridge, Kingston Rail Bridge, Richmond Railway Bridge
Royal Borough of Greenwich	2	Greenwich and Woolwich Foot Tunnels
Royal Borough of Kensington and Chelsea	2	Albert Bridge, Chelsea Bridge
Royal Borough of Kingston Upon Thames	2	Kingston Bridge, Kingston Rail Bridge
TfL (+ Docklands Light Railway Ltd)	15	Bakerloo Line Tunnels, Battersea Bridge, Blackwall Tunnel, Chiswick Bridge, Emirates Air Line Cable Car, Jubilee Line Tunnels, Lambeth Bridge, Kew Bridge, Northern Line Tunnels, Rotherhithe Tunnel, Twickenham Bridge, Vauxhall Bridge, Victoria Line Tunnels, Westminster Bridge, Woolwich Ferry
Wandsworth Borough Council	2	Putney Bridge, Wandsworth Bridge
Westminster City Council	3	Waterloo Bridge, Golden Jubilee Bridges

Appendix 2: Maintenance of River Crossings in London

River Crossings over the Thames

The below table is a summary of river crossings across the Thames in London, and maintenance that is scheduled imminently; maintenance that is planned; and any significant maintenance that has recently taken place.

It should be noted that due to the wide range of organisations responsible for the maintenance of these river crossings, this information is not available in one place, and so has been drawn from various sources.

Crossing name	Upcoming scheduled and planned maintenance	Previous maintenance	Maintained by
Albert Bridge	None currently identified.	Due to structural issues, the bridge was closed for renovation work between February 2010 and December 2011.	Kensington and Chelsea London Borough Council
Bakerloo Line tunnels	None currently identified.	N/A	TfL
Barnes Railway Bridge and Footbridge	Planned installation of new footbridge underneath railway bridge. Start date TBC.	N/A	Network Rail
Battersea Bridge	In summer 2021 TfL intends to build a brand-new signalised pedestrian crossing on the north side of Battersea Bridge to improve safety for people walking at this busy junction. Aim to complete the first phase of work in autumn 2021. TfL is proposing adding two more pedestrian crossings on Cheyne Walk and Beaufort Street. TfL will hold a full public consultation on them later in 2021.	N/A	TfL

	TfL proposals include a reported £15 million-£25 million of renovations scheduled for 2027-30.		
Battersea Rail Bridge	None currently identified.	Restoration work took place in 2013.	Network Rail
Blackfriars Bridge	Repaint and refurbishment planned from August 2021 until 2024. No expected significant interruptions to pedestrian and vehicular traffic. ⁷³	N/A	Bridge House Estates
Blackfriars Railway Bridge	None currently identified.	From 2009 until 2012 the platforms of the railway station were extended onto the bridge; all arches and abutments were repainted; and all steel work was rebuilt. The bridge was widened in order to allow more train tracks on the bridge.	Network Rail
Blackwall Tunnel	Feasibility works have begun on the Blackwall Tunnel systems.	In 2010, the southbound tunnel was affected by planned closures for maintenance. The tunnel was closed for six full weekends. Three-night southbound closure from 21 July to 23 July 2021 for enabling works. This was followed by a southbound closure from Sunday 25 July to Monday 26 July 2021 to	TfL

⁷³ *The Construction Index*, [“FM Conway and Taziker to refurbish Blackfriars Bridge”](#), 23 June 2021

		undertake the main works. ⁷⁴	
Canary Wharf–Rotherhithe ferry service	None currently identified.	In March 2020 the service was suspended due to the COVID-related closure of the Doubletree by Hilton hotel in Rotherhithe. The service reopened in September 2020.	London River Services (TfL)
Cannon Street Railway Bridge	None currently identified.	In 2019, as part of a £45 million artwork project, Cannon Street Bridge was lit up using new LED lights, replacing the ineffective and outdated lighting on the bridge.	Network Rail
Chelsea Bridge	None currently identified.	N/A	Kensington and Chelsea London Borough Council
Chiswick Bridge	None currently identified.	Major refurbishment of Chiswick Bridge was completed in July 2015. This included the installation of new, safer cycling and walking lanes.	TfL
Docklands Light Railway Tunnel	TfL announced in December 2020 that it had commenced further feasibility work on extending the DLR into Thamesmead to support new homes and growth. Start date for works TBC.	N/A	TfL
Emirates Air Line Cable Car	None currently identified.	On 21 March 2020, TfL suspended the service cable car due to the COVID-19 pandemic and reopened in May 2020.	TfL

⁷⁴ TfL, [Press Release – Safety-critical repairs to the southbound Blackwall Tunnel in July](#), 30 June 2021

Golden Jubilee Bridges	None currently identified.	N/A	City of Westminster
Greenwich Foot Tunnel	None currently identified.	An £11 million project to refurbish the Greenwich and Woolwich foot tunnels left both tunnels uncompleted and in a poor condition.	Greenwich Council
Grosvenor Bridge	None currently identified.	N/A	Network Rail
Hammersmith Bridge	<p>On 10 April 2019, Hammersmith Bridge was closed to motor traffic.</p> <p>On 13 August 2020, the bridge closed to pedestrians, cyclists and river traffic.</p> <p>Hammersmith Bridge Taskforce is considering next steps. On 1 June 2021, the Government announced that (as part of its latest funding and financing package for TfL) the DfT and the LBHF hope to develop a Memorandum of Understanding in relation to the funding of the project. A tender has also recently been put out for a new ferry service.</p>	N/A	Hammersmith and Fulham Council
Hampton Court Bridge	None currently identified.	N/A	Surrey County Council
Hungerford Bridge	None currently identified.	Cast-iron pier repairs were carried out in 2015, closing the bridge for eight weeks.	Network Rail
Jubilee Line tunnels	None currently identified.	N/A	TfL
Kew Bridge	TfL proposals include £15 million-£30 million of renovations scheduled for 2024-26.	There were overnight works on Kew Bridge from 23-27 March 2021.	TfL

Kew Railway Bridge	None currently identified.	N/A	Network Rail
Kingston Bridge	None currently identified.	N/A	Kingston Upon Thames Borough Council
Kingston Railway Bridge	None currently identified.	N/A	Network Rail
Lambeth Bridge	<p>Proposals to convert the roundabouts on either side of Lambeth Bridge to signalised junctions, and to provide a cycle track across the bridge and permanent protective security measures, are currently on hold.⁷⁵</p> <p>Further TfL proposals include a reported £20 million-£35 million of renovations scheduled for 2023-28.</p>	N/A	TfL
London Bridge	London Bridge is now open to general traffic on a restricted schedule.	London Bridge was closed to cars from March to October 2020, with significantly reduced pedestrian access.	Bridge House Estates
Millennium Bridge	None currently identified.	The bridge opened on 10 June 2000. Two days later, on 12 June 2000, it was closed again due to swaying. It reopened on 27 February 2002.	Bridge House Estates
Northern Line Tunnels	None currently identified.	N/A	TfL
Putney Bridge	None currently identified.	On 14 July 2014, the bridge closed for three months, except to pedestrians and dismounted cyclists, to undergo essential repairs. The bridge	Wandsworth London Borough Council

⁷⁵ TfL, [Have your say on proposed changes to Lambeth Bridge north and south](#), 14 October 2020

		reopened on 26 September 2014. The bridge closed for 24 hours in February 2020.	
Richmond Bridge	None currently identified.	N/A	Richmond upon Thames London Borough Council
Richmond Lock and Footbridge	None currently identified.	The lock and weir underwent a £500,000 repaint that was completed in February 2020.	Richmond upon Thames London Borough Council
Richmond Railway Bridge	None currently identified.	N/A	Network Rail
Rotherhithe to Canary Wharf Pedestrian and Cycle Crossing	Currently paused. A pedestrian and cycle crossing between Rotherhithe and Canary Wharf, was originally proposed as a bridge, but TfL is now exploring establishing a ferry service instead.	N/A	TfL
Rotherhithe Tunnel	The tunnel is closed every Monday night to carry out regular maintenance operations. TfL has previously warned that the tunnel faces being closed without investment for major repairs.	The tunnel was closed for five days and nights from 11-16 January to repair the fire safety system. Further work to repair the fire main, install additional CCTV, and correct faults to the tunnel equipment controller, to ensure the continued safe operation of the tunnel in advance of the major renewal, was due to be completed in June.	TfL
Silvertown Tunnel	Under construction.	N/A	TfL
Southwark Bridge	None currently identified.	N/A	Bridge House Estates
Teddington Lock Footbridges	None currently identified.	The footbridge was closed by police in May 2020 because it was	Richmond upon Thames London Borough Council

		structurally unsound. It was also scheduled for closure in spring 2021. The footbridge was closed from 4-28 March 2013.	
Tower Bridge	None currently identified.	Tower Bridge is subject to regular maintenance including an essential maintenance and waterproofing programme from March to September 2020.	Bridge House Estates
Twickenham Bridge	TfL proposals include a reported £20 million-£30 million of renovations scheduled for 2027-29.	N/A	TfL
Vauxhall Bridge	TfL proposals include a reported £40 million-£60 million of renovations scheduled for 2023-25.	The bridge was closed from August to November 2020.	TfL
Victoria Line Tunnels	None currently identified.	N/A	TfL
Wandsworth Bridge	Current work including concrete and steel structural repairs, corrosion protection and repainting is expected to last until Oct 2021 with minimal disruption to traffic.	Work to reduce the bridge from four lanes to two closed the bridge from July to November 2020.	Wandsworth London Borough Council
Waterloo Bridge	None currently identified.	One lane of the bridge was closed during autumn 2020.	City of Westminster
Westminster Bridge	TfL proposals include a reported £25-35m of renovations scheduled for 2029-31. The detailed design for protective security measures at Westminster Bridge is progressing well and works are scheduled	N/A	TfL

	to begin on site in late 2021		
Woolwich Ferry	The ferry runs a two boat service Mon-Friday and a one boat service on weekends.	<p>In October 2018, the ferry was suspended for four months in order to undertake major repair work for the piers, and the existing vessels were taken out of service. The ferry service resumed on 1 February 2019.</p> <p>Strikes took place from July – September 2021, reducing the numbers of days of services run.</p>	London River Services (TfL)
Woolwich Foot Tunnel	None currently identified.	On 24 September 2010 the tunnel closed to all users, due to structural weaknesses discovered in the stairways and tunnel itself. It reopened to the public in December 2011. The £11 million project to refurbish the Greenwich and Woolwich foot tunnels left both tunnels uncompleted and in a poor condition.	Greenwich Council

Appendix 3: Capital expenditure by TfL on Thames bridges between 2010 and 2020

Total capital expenditure by TfL on Thames bridges

Financial Year	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	TOTAL
Total	£3,181,474	£4,578,336	£1,634,792	£1,045,224	£2,389,481	£2,958,720	£5,103,651	£2,350,612	£2,131,102	£6,460,584	£11,078,851	£42,912,825

Funding provided by TfL to London Boroughs via the Local Implementation Plan (LIP) Borough Bridges Programme

Financial Year	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	TOTAL
Chelsea Bridge	£0	£0	£0	£30,082	£35,000	£0	£20,000	£60,000	£0	£0	£0	£145,082
Albert Bridge	£2,430,728	£3,152,000	£578,165	£525,609	£0	£0	£0	£0	£0	£0	£0	£6,686,502
Wandsworth Bridge	£0	£0	£0	£0	£0	£0	£50,000	£0	£0	£0	£0	£50,000
Putney Bridge	£0	£0	£75,000	£0	£425,000	£0	£50,000	£0	£0	£0	£0	£550,000
Hammersmith Bridge	£0	£335,000	£0	£0	£200,000	£550,000	£790,000	£1,020,000	£2,080,000	£5,800,000	£5,900,000	£16,675,000
Total	£2,430,728	£3,487,000	£653,165	£555,691	£660,000	£550,000	£910,000	£1,080,000	£2,080,000	£5,800,000	£5,900,000	£24,106,584

Capital expenditure on TfL owned bridges

Financial Year	2010/11	2011/12	2012/13	2013/14	2014/15	2015/16	2016/17	2017/18	2018/19	2019/20	2020/21	TOTAL
Battersea Bridge	£531,359	£327,381	£4,237	-£6,381	£45,829	£117,370	£97,115	£1,711			£29,519	£1,148,139
Blackfriars Bridge	-£7,912	£66,937	£214,768	£18,748	£18,537	£89,126	£142,053	£60,499	£5,455		£27,362	£635,574
Chiswick Bridge	-£49,386	£0				£354,445					£96,132	£401,191
Kew Bridge	£234,182	£29,517	£199,455	-£24,848	£89,429	£224,200	£935,728	£439,177	-£39,011	-£22,170	£222,263	£2,287,921
Lambeth Bridge	£22,023	£311,491	£4,041	£3	£499,085	£213,362	£1,617,972	£240,011	£8,030	£4,280	£30,986	£2,951,284
London Bridge	-£7,717	£868	£162,230		£290,825	£130,082		£50,904			£41,466	£668,657
Thames Bridges				£56,614	£89,062	£65,207	£115,315	£130,462	£71,940	£105,152	£156,437	£790,189
Tower Bridge		£371	-£371	£0	£465,746	£757,401	£81,761	£1,526	-£404		£16,231	£1,322,261
Twickenham Bridge	-£38,726	£144		£0	£91,126	£335,115	-£8,719	£118,127	-£47,887	£20,049	£189,101	£658,330
Vauxhall Bridge	£66,922	£88,493	£186,353	£287	£61,826	£137,783	£1,212,975	£176,763	£51,871	£530,349	£4,247,175	£6,760,799
Westminster Bridge	£0	£266,134	£210,913	£445,109	£78,016	-£15,372	-£550	£51,433	£1,107	£22,925	£122,179	£1,181,894
Total	£750,746	£1,091,336	£981,627	£489,532	£1,729,481	£2,408,720	£4,193,651	£1,270,612	£51,102	£660,584	£5,178,851	£18,806,241

Note: Negative figures reflect financial adjustments between years based on value of work done and accrual amendments

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