



Date: 17 October 2013

Item 13: Hammersmith Flyover Strengthening Phase 2

This paper will be considered in public

1 Summary

- 1.1 The purpose of this paper is to request that the Committee approve an increase in project authority of £72.879m to a total project authority of £76.779m to undertake the design and construction phase of the Hammersmith Flyover strengthening.
- 1.2 At its meeting on 3 October 2013, the Projects and Planning Panel noted the proposals in this paper and supported the recommendations to the Committee.

2 Recommendation

- 2.1 **The Committee is asked to approve an increase in Project Authority of £72.879m, to a total project authority of £76.779m, to undertake the design and construction phase of the Hammersmith Flyover strengthening.**

3 Background

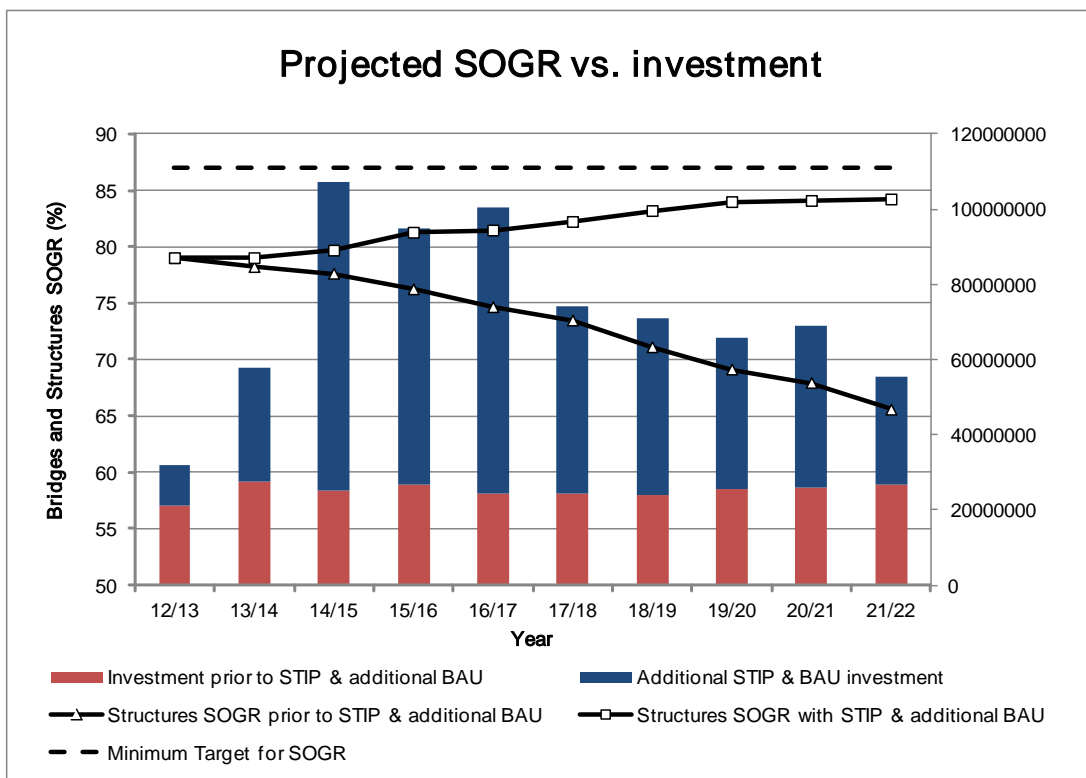
Background – Transport for London Road Network Structures and Tunnels Investment

- 3.1 There are over 1,800 structures on the Transport for London Road Network (TLRN), including 475 bridges and footbridges, 676 retaining walls and 281 subways. There are also 12 major road tunnels, including Blackwall, Rotherhithe and Limehouse. The current and target State of Good Repair (SOGR) for these key assets are:
 - (a) Bridges and Structures SOGR is 79 per cent¹, against a target range of 87 to 91 per cent that optimises safety, whole life cost and performance; and
 - (b) Tunnels SOGR is 86 per cent¹ against a target range of 92 to 96 per cent.
- 3.2 The poor state of these assets is a direct result of historical under-investment by the Highways Agency and TfL's focus on Public Transport Investment in its early years of existence. Since 2010, steps have been taken to advance TfL's asset management practices for TLRN assets. This asset management work has:
 - (a) identified the above SOGR targets by taking account of risks to safety and network performance (reliability) and whole life cost considerations;

¹ these SOGR measures are currently under review to determine if the generic national weightings for different structure types suitably reflect the characteristics of TLRN tunnels and structures

- (b) identified the structures and tunnels that posed the highest risk to network safety and reliability – these high risk structures form the majority of works in the early years of the Structures and Tunnels Investment Programme (STIP); and
 - (c) identified works that, through timely intervention, will deliver considerable whole life cost savings – these form business as usual (BAU) works and structures identified for major works later in STIP.
- 3.3 STIP addresses a range of high risk structures and tunnels that require high cost and complexity interventions, for example, bridge replacements and major mechanical and electrical refurbishments in tunnels. High risk/lower cost component renewals are delivered via the BAU capital renewals programme. A detailed assessment of risk and whole life costs was undertaken to verify and prioritise STIP.
- 3.4 The TfL Business Plan (2013/14 to 2021/22) has identified around £650m for tunnel and structures capital works – this includes BAU capital works and STIP. Graph 1 shows how SOGR would have declined under previous investment levels; this would have exposed road users to inappropriate levels of risk, thereby requiring an increasing number of TLRN restrictions (e.g. weight limits) and closures to mitigate the risk. The previous budget would have necessitated a focus on high risk works – this would have exacerbated the situation because preventative works, that slow down deterioration and reduce whole life costs, would not have been undertaken.
- 3.5 As shown in Graph 1, the STIP investment, plus additional BAU investment, will arrest the decline in SOGR and deliver a gradual improvement. This will greatly reduce the risk of restrictions/closures due to poor condition and reduce whole life costs because more preventative works will be undertaken.

Graph 1



Background – Hammersmith Flyover

- 3.6 In December 2011, TfL's structural investigations revealed that the post tensioned cables in five of the sixteen spans of the Hammersmith Flyover had deteriorated significantly, leading to the closure of the flyover just before Christmas. Urgent work was undertaken on these five spans, allowing the flyover to fully reopen to traffic in time for the Games in 2012.
- 3.7 The second phase of works is planned to commence on 28 October 2013 and complete in summer 2015. During this time, TfL will introduce additional post tensioning to the remaining eleven spans, replace the bridge bearings, replace the drainage system, and waterproof and resurface the deck of the flyover.
- 3.8 The Hammersmith Flyover Strengthening Phase 2 project forms part of the Structures and Tunnels Investment Portfolio, to which the Board approved the award of a Framework Agreement for Early Contractor Involvement (ECI) and Construction with four suppliers for refurbishment or replacement of bridges, tunnels and other structures (the Framework Agreement), on 27 March 2013.
- 3.9 Since this time, TfL and the integrated design and construction teams have been developing the design sufficiently to allow the construction costs to be agreed.

4 Description

- 4.1 Delivery of the project will ensure the structure remains operational for decades and without the need for significant maintenance in the next 20 years.
- 4.2 During the ECI phase the approach has focused on providing optimal design solutions, minimising construction risk and ensuring minimal network disruption.
- 4.3 The design is led by an expert team from Ramboll Parsons Brinkerhoff (RPB) who retain overall design responsibility. An integrated team has been in place and specialist design support has been provided by subcontractors around proprietary systems and integrated by RPB. Design assurance has been provided via an independent expert engineering checker (an industry 'Category 3' check).
- 4.4 In accordance with the Framework Agreement, the selected Contractor demonstrating best value will be awarded the design and build contract. The RPB contract will be novated to the Contractor to ensure that interfaces for temporary works and any temporary jacking or bridge movement during installation are fully integrated into the permanent design model by RPB.
- 4.5 The construction works have been planned to commence as early as practical and minimise the time required for the design. The start of the construction works is planned for 28 October 2013, with a planned completion in summer 2015.
- 4.6 The contract will be the NEC Option C, Target Cost contract, with a pain/gain mechanism of a 50/50 share if the outturn is within the range of 85 per cent – 115 per cent of the target cost. Where this is greater than 115 per cent, the Contractor would receive 100 per cent of the pain and where it is below 85 per cent, 25 per cent of the gain.

- 4.7 The target cost is now established at £55.8m. The target is subject to change control for design development changes prior to approval for contract award at the date of approval.
- 4.8 The Project Authority sought is £76.8m and is detailed in Table 1. An explanation of the variance in cost from the approved Business Case (April 2012) is included in Appendix 1.

Table 1

	Business Case £m	Current £m
Replacement PT incl Structure Refurbishment	38.000	46.730
Monitoring	1.530	2.100
Cantilever Strengthening	8.000	0.000
Bearing Replacement	4.000	6.970
Construction Target Cost Subtotal	51.530	55.800
Lane Rental	0.000	0.420
Insurances (OCIP)	0.000	0.250
Sub-Total	51.530	56.470
TfL Staff Costs	2.505	3.500
RPB Design Cost pre Novation	1.467	2.250
ECl - Costain and Survey Costs	0.000	3.000
CAT3 Checker	0.000	0.750
Sub-Total	55.502	65.970
TfL Risk	22.201	10.809
Total EFC	77.703	76.779
Current EFC	77.703	77.703
Delta	0.000	-0.924

5 Mayor's Transport Strategy and TfL Business Plan

- 5.1 As outlined in the Mayor's Transport Strategy, bringing and maintaining all assets to a state of good repair is integral to supporting economic development and population growth. The Hammersmith Flyover Phase 2 Strengthening is a key project in Surface Transport's portfolio of strategic asset renewals. Furthermore it supports Surface Transport's business plan goals as follows:

Table 2

Principal Surface Outcomes	How the outcome is supported by the scheme
Ensuring reliable operation of London's road network for all users, while reducing congestion	This work will address major safety concerns and restore Hammersmith Flyover to a good state of repair. If the condition/defects are not addressed then the risk the bridge poses to safety will increase over time and necessitate restrictions or closure, dramatically affecting network reliability.

Principal Surface Outcomes	How the outcome is supported by the scheme
Supporting more sustainable patterns of freight delivery and servicing	This work will make the bridge compliant with current load carrying standards and mitigate the potential for additional load restrictions or closures in future.
Maintaining and enhancing a reliable, accessible and high quality bus network and ensuring efficient coach service in London	This work will ensure the roads passing beneath the Flyover are not restricted (other than where necessary to facilitate the works), which would directly and drastically impact bus services in the local area.

6 Financial Implications

6.1 Table 3 summarises the funding and project authority inclusive of risk.

Table 3

£m	Prior Years	2013-2014	2014-2015	2015-2016	Project Authority
Construction Target Cost	-	15.530	35.650	4.620	55.800
Lane Rental	-	0.245	0.175	0.000	0.420
Insurances (OCIP)	-	0.250	0.000	0.000	0.250
TfL Staff	0.197	1.251	1.746	0.306	3.500
RPB Design Cost pre Novation	0.765	1.485	0.000	0.000	2.250
ECI Costain and Survey Costs	-	3.000	0.000	0.000	3.000
CAT3 Check	-	0.500	0.250	0.000	0.750
Risk	-	2.300	7.615	0.894	10.809
Total	0.962	24.561	45.436	5.820	76.779
Previously Approved PA					3.900
Increase PA Requested					72.879

Risk and Management Contingency

6.2 Key risks have been identified and transferred to the party most suitable to manage. The risks transferred to the Contractor have been included within their construction cost and quantified to P50 at £2.96m. The risks retained by TfL have also been quantified to P50 using Active Risk Manager (ARM). Financial risk provision of £10.8m equivalent to P50 has been included in the Estimated Final Cost. Any risk that materialised beyond this level would be addressed through the centrally held management contingency.

6.3 Four key risks have been identified that under TfL's standard contract amendments would be transferred to the Contractor; access, weather (exceptional events), statutory undertakers and unforeseen physical conditions. These have been assessed by the Contractor (pre monte-carlo) and are shown in Table 4:

Table 4

Access	£2.3m	Closures of the structure will be controlled by TfL through the London Streets Traffic Control Centre (LSTCC). TfL is therefore best placed to manage this risk.
Weather	£2.0m	The majority of the works are carried out inside or beneath the structure and are, therefore, less susceptible to weather events. The weather dependant works to the top of the structure are planned to be carried out during spring/summer. The probability of this risk occurring is low but the consequence is high and a high cost would therefore be included by the Contractor within the target. TfL is therefore best placed to own this risk.
Statutory Undertakers	£0.7m	There is no statutory undertaker's apparatus on or within the flyover. This will only affect a limited amount of work beneath the structure. TfL is therefore best placed to own this risk.
Unforeseen Physical Conditions	£2.1m	Investigations/surveys have been undertaken and the condition of the structure is known. Where this is unknown, assumptions have been agreed on this basis. Shared risk between TfL and the Contractor.

7 Commercial and Resources

Commercial

- 7.1 TfL's Commercial Team has supported and assured the contractor's procurement of subcontracts during the ECI phase. This has provided TfL with the opportunity to fully engage with the Contractor's Supply Chain, and has resulted in full visibility of subcontractor costs. Value for money has been demonstrated through effective competition and subsequent negotiations with subcontractors.
- 7.2 As with all construction contracts there is a significant element of Preliminaries which are programme dependant and cover site office, storage compounds, staffing and attendant labour. A full detailed review of these costs has been undertaken and the levels considered appropriate to the nature of the project.
- 7.3 The post tensioning package was a specialist area where there was a limited market for potential subcontractors. The package was tendered to three companies of which two responded with technical and financial submissions. While one of these companies was later excluded from the process due to incomplete information, there was sufficient data for a technical and financial comparison showing the selected Contractor as the best price with full visibility of pricing and productivity rates.

7.4 Further commercial assurance has been undertaken by Turner and Townsend (T&T) with industry benchmarking. The benchmarking indicated that while the overall target represents a robust estimate of the out-turn costs, the staffing levels within the Preliminaries seemed high. To ensure the Contractor cannot be incentivised for over-estimation, the staffing levels have been ring fenced with profit share only available on the first 10 per cent of the estimated levels. Staff savings greater than 10 per cent will be wholly attributed to TfL.

Resources

7.5 Existing internal TfL resources will be deployed to carry out the project and contract management of the works. These are included within the above costs and no additional full time equivalents (FTE) are required. The Contractor will be responsible for the construction of the works, including taking design responsibility as a result of the Designer’s (Ramboll) Call-Off Contract with TfL being novated.

7.6 In order to meet TfL’s Strategic Labour Needs and Training policy requirements (SLNT), target figures have been agreed with the Contractor and are listed Table 5.

Table 5

Resource	Apprentices	New Employees	Graduates
	22	35	12

8 Benefits

8.1 Delivery of the project will avoid safety related and journey time related disbenefits associated with restriction or closure of the flyover.

8.2 The value of prevention of fatalities and serious injuries is estimated at some £22.5m.

8.3 The value of preventing delays to journey times is estimated at some £101m per annum.

8.4 The benefit cost ratio for the project is 12:1 based upon a 10 year assessment period.

9 Views of the Projects and Planning Panel

9.1 At its meeting on 3 October 2013, the Projects and Planning Panel noted this project and supported the recommendations to the Committee. The Panel was provided with details of recommendations and findings by the PMO and IIPAG; the Panel was satisfied with the management responses to the findings.

List of appendices to this report:

Appendix 1 – Variance in cost from the approved Business Case (April 2012)

List of Background Papers:

Finance and Policy Committee paper 13 March 2013 – Structure and Tunnels Investment Programme

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Variance in cost from the approved Business Case (April 2012)

	Business Case £m	Current £m	Delta £m	Comment
Replacement PT incl Structure Refurbishment	38.000	46.730	8.730	BC estimate not fully reflecting shift working requirements, full extent of scope and transfer of risk into target cost contract.
Monitoring	1.530	2.100	0.570	Estimated, awaiting tender returns.
Cantilever Strengthening	8.000	0.000	-8.000	The flyover does not currently have sufficient weight capacity to allow abnormal loads to use the flyover. By replacing the post-tensioning, the weight limit can be increased and by managing the movement of abnormal loads over the structure a significant saving can be made by removing the requirement to strengthen the cantilever sections.
Bearing Replacement	4.000	6.970	2.970	Tendered cost for bearing replacement is £4.2m, plus oncost for Preliminaries, Supervision and Fee.
Construction Target Cost Subtotal	51.530	55.800	4.270	
Lane Rental	0.000	0.420	0.420	Lane Rental scheme not in force at time of BC.
Insurances (OCIP)	0.000	0.250	0.250	Not included in BC cost build up.
Subtotal	51.530	56.470	4.940	
TfL Staff Cost	2.505	3.500	0.995	TfL staff plus cost allowance for supervisor support.
RPB Design Cost pre Novation	1.467	2.250	0.783	Based on actual cost.
ECI Costain and Survey Costs	0.000	3.000	3.000	Sunk cost of ECI allowance for design support, surveys and specialist subcontractor input during design.
CAT 3 Check	0.000	0.750	0.750	Independent CAT3 checker.
Subtotal	55.502	65.970	10.468	
TfL Risk	22.201	10.809	-11.392	Based on P50 Monte Carlo analysis, taking account of risks transferred to the contractor.
Total EFC	77.703	76.779	-0.924	
Current EFC	77.703	77.703		
Delta	0.000	-0.924		

