

Programmes and Investment Committee



Date: 28 June 2017

Item: Surface Assets Programme

This paper will be considered in public

1 Summary

Surface Assets Programme				
Existing Financial Authority	Estimated Final Cost	Existing Programme and Project Authority	Additional Programme and Project Authority Requested	Total Programme and Project Authority
£897m	£897m	NIL	£352m	£352m

Authority Approval: *The Committee is asked to approve budgeted Programme and Project Authority of £352m to maintain the safety and reliability of Transport for London's Surface assets. This authority covers financial years 2017/18 and 2018/19 – the programme will return annually to the Committee to renew and validate a rolling two year approval. This enables approvals to be aligned to financial years which complements the nature of this programme and simplifies the approval request.*

Outputs and Schedule: *The Surface Assets Programme maintains the safety and reliability of highway, traffic, bus, coach and river assets through a prioritised programme of cost effective renewals and refurbishments.*

- 1.1 This paper presents the strategic case for the Surface Assets Programme (the Programme), summarises the development and delivery practices, sets out the proposed governance arrangements and the options considered for delivery of each aspect of the Programme. The paper explains that asset condition will decline and whole life costs will increase if further reductions are made to the Programme.

2 Recommendation

2.1 The Committee is asked to note the paper and:

- (a) approve Programme and Project Authority of £352m for delivery of the Surface Assets Programme – covering £179m in 2017/18 and £173m in 2018/19 as described in this paper; and
- (b) note that Procurement Authority in respect of the various elements of the Surface Assets Programme will be sought at officer level in accordance with Standing Orders.

3 Background

Strategic Context

- 3.1 In 'A City for All Londoners' (October 2016) the Mayor sets out his ambition for accommodating growth, housing, the economy, the environment, public space and transport. Transport is a key strand of the Mayor's ambition while also being a core enabler of the other strands – and it is the day-to-day maintenance and renewal of the transport assets that provides the foundation for effective transport services.
- 3.2 Appendix 1 provides a graphical overview of TfL's assets. This paper sets out the investment case for the planned renewal and refurbishment of Surface assets – including roads, footways, bus and coach stations, bus stops and shelters, river assets, traffic signals, bridges, tunnels, street lighting, drainage and trees.
- 3.3 The Programme covers bus infrastructure and traffic signals on all London roads and highway assets on the Transport for London Road Network (TLRN). The TLRN is London's strategic road network – it is 580km long and carries over a third of all traffic. A map of the TLRN and borough principal roads is shown in Appendix 2 - TfL is the statutory highway authority and traffic authority for the TLRN.
- 3.4 These assets are vital to London's economy and social wellbeing. Every day customers use them to get around, whether it's on foot or bike, by car or public transport. Ranging from iconic landmarks to the purely functional, these assets are part of the fabric of the capital. Yet all too often they are taken for granted – that is, until something goes wrong – be it potholes, faulty traffic signals, flooding or weight restricted structures.
- 3.5 Statutory requirements, interpreted through national codes of practice, for example *Well-Managed Highway Infrastructure*, places a requirement on the highway authority to have robust management practices in place. In the event of an accident or incident that is attributed to the design, condition or performance of an asset, TfL must be able to demonstrate that reasonable and appropriate practices are suitably documented and effectively implemented.
- 3.6 The investment plan described in this paper recognises TfL's duties as highway and traffic authority and the vital importance of these assets. This investment plan will maintain these assets in a safe and reliable condition and protect the benefits delivered through past and on-going investment. This is achieved through the robust planning, prioritisation and delivery of asset renewals.
- 3.7 The impact of reducing, or not doing, asset renewals may not immediately be apparent. The assets have long service lives, typically over 20 years, and slow rates of deterioration. The assets can be sweated for a short time, typically three to five years, before the defects become more evident and over which time the backlog and whole life costs grow. The investment plan in this paper represents year two and three of a managed approach to sweating the assets. The assets will be maintained in a safe condition however the overall condition will reduce and whole life costs will increase. Further reductions to this programme will result in accelerated deterioration and further increases in whole life costs.

Asset renewals

- 3.8 Asset renewals are the day-to-day business-as-usual activities that maintain the assets and keep them going; put more technically it is planned maintenance that lengthens the useful life of an asset, either by replacing it with a new one (typically like-for-like or modern equivalent) or through intervention such as reconstruction or refurbishment. Examples of the asset renewals delivered by this Programme and why there are necessary include:
- (a) carriageway – removal and relaying of the carriageway surface, and if required sub-layers, to maintain skid resistance, ride quality, reduce defects and optimise whole life costs;
 - (b) traffic signals – maintain safety and reliability by replacing all or part of the signals, poles, cabling or controllers at a junction or crossing due to faults, defects and/or equipment obsolescence;
 - (c) bus stations – maintain a safe environment for users and, where appropriate and cost effective, use renewals as an opportunity to modernise and improve the customer experience. Works include the renewal of CCTV and personal address systems, lighting renewal, building works, passenger facilities and the complete refurbishment and re-construction of bus stations, for example West Croydon reconstruction was completed in 2016 and design work has commenced on Kingston’s Cromwell Road bus station;
 - (d) bridges – replacing deteriorated/non-functioning components like bearings, expansion joints and waterproofing; and repairing or replacing deteriorated brickwork, concrete and metalwork (including repainting); or where necessary replacing the whole bridge. These works maintain the safety and strength of the bridges; and
 - (e) river assets – replacement of the life-expired Woolwich ferries with modern, cleaner vessels providing improved capacity and lower operating costs; which by law TfL is required to operate free of charge.
- 3.9 Appendix 3 provides a more detailed description of the renewal activities delivered by the programme and why they are necessary.

Planning and prioritising asset renewals

- 3.10 Well established asset management practices, described in Appendix 4, are used to plan and prioritise asset renewals, providing safe assets, agreed levels of service and good value for money.
- 3.11 Renewals are planned and prioritised using risk – that is, the risk the current and future asset condition and performance pose to business objectives and outcomes, namely:
- (a) safety – assessing the impact the asset condition/performance has on customer and worker safety;
 - (b) function – assessing the impact the asset condition/performance has on availability, accessibility, customer satisfaction and load carrying capacity; and

(c) environment – will doing/not doing the renewals have a positive or negative impact on the environment, for example, traffic delays and diversions, tree planting, and energy efficient lights.

3.12 The above risks are monetised and combined with whole life costs to determine investment needs and compare priorities. The approaches are common and consistent across the asset types, allowing the risks and investment needs to be directly compared and allocations made accordingly.

3.13 Appendix 5 describes in more detail the planning and prioritisation techniques used for asset renewals.

Delivering asset renewals

3.14 Asset renewals are delivered through a variety of commercial arrangements. The smaller and more repeatable works (like carriageway resurfacing, bus shelter replacement and traffic signal renewals) are delivered through tendered term maintenance contracts – typically around eight years in duration. Larger, more complex projects, like bridge replacements and bus station reconstructions, are delivered through TfL framework contracts or, in the case of Woolwich Ferry vessels, through a one-off contract.

3.15 Every year there are over 1,000 live schemes in the Programme, be they in feasibility, design or delivery stage. Delivery takes account of a range of factors including:

(a) safety – ways of working must safeguard site staff and customers;

(b) network access – the agreed ways of working seek to minimise network disruption and, like all other planned works, must secure the necessary road space bookings and permits;

(c) working windows – the works must comply with the agreed working windows, be it to avoid peak traffic times or environmental noise restrictions;

(d) coordination – the works must be coordinated with other programmes (e.g. Healthy Streets, borough works, developer works and utilities) to minimise network disruption and deliver better value for money. Utilities and TfL share forward work programmes to inform the coordination of works; and

(e) resources – a steady stream of work, that avoids peaks and troughs in activity, provides a more sustainable and manageable workload for TfL and suppliers.

3.16 It is frequently these factors, rather than the nature of the physical renewals themselves, that make delivery complex and challenging.

Alignment and dependencies with Healthy Streets

3.17 A relatively straightforward way to understand the relationship and difference between the Surface Assets Programme and the Healthy Streets Programme is:

(a) Healthy Streets – enhances existing benefits and provides new benefits to customers, for example Cycle Superhighways; and

(b) Assets – protects and maintains benefits and prevents them from being eroded over time – this is achieved by managing the risks that asset degradation pose

to the benefits, for example, maintaining the condition and ride quality on Cycle Superhighways.

- 3.18 The links and dependencies between the programmes need to be well understood to ensure the Surface Assets Programme is able to sustain the benefits delivered by Healthy Streets, these include:
- (a) coordination – the timing and delivery of renewal projects are flexed, where appropriate, to provide better coordination with Healthy Streets; this may mean deferring or bringing forward renewals works to deliver them before, at the same time or after Healthy Street projects;
 - (b) financial contributions – frequently a Healthy Streets project will result in the early replacement/renewal of an asset when compared to a risk based renewals intervention. However, the asset may have been showing some signs of degradation and, if appropriate, the Assets Programme will make a financial contribution to the Healthy Streets project to reflect asset betterment; and
 - (c) whole life costs – to deliver the agreed benefits it may be necessary for Healthy Streets to demand higher quality materials, non-standard materials and/or provide a higher level of on-going service, for example Cycle Superhighways. These are identified in the Healthy Streets Business Case, and if deemed material, the Business Case must make an appropriate provision for on-going maintenance and renewal costs that are transferred to the Assets Programme at project completion.

Highways asset management London-wide

- 3.19 The funding model for highway renewals is different in London compared to the rest of the England. Outside London the Department for Transport (DfT) provides an annual capital allocation to cover the renewals of all highway assets. In London, through the Local Implementation Plans (LIP) process, TfL makes an allocation for Borough Principal Road Network (BPRN) carriageway renewal and bridge strengthening. This, in general, comes from the annual revenue grant that DfT provides to TfL. This grant, which supplements a wide range of projects other than assets, is £500m in 2017/18 and will be phased out by March 2019. This creates a stark contrast between how highway renewals will be funded within London and outside London; looking forward the changes to Vehicle Excise Duty (VED) and the creation of the ring fenced road fund will benefit highways, however it is unclear what it will mean for London.

4 Equality, diversity and inclusion

- 4.1 The majority of the Programme is like-for-like renewals and, as such, maintains the existing provisions. However, as part of the renewals process, the opportunity is taken, at programme and project level, to review provisions, and determine if these should be amended during the work in order to make a positive contribution to equality, diversity and inclusion. Examples include:
- (a) improving bus stations – where works change how a bus station operates, an Equality Impact Assessment is completed and actions are addressed through the design process, examples include West Croydon and Kingston Cromwell Road reconstruction projects;

- (b) changing bus stops - alternative and/or new stops are checked to ensure they are accessible, safe and easy to find through wayfinding and publicity;
 - (c) providing tactile paving and dropped kerbs at crossings; and
 - (d) installing audible and countdown facilities at traffic signals.
- 4.2 All works are designed to minimise disruption to mobility impaired and visually impaired users, this includes:
- (a) access ramps where the footpath cannot be used to assist mobility impaired users change levels;
 - (b) phasing works so most disruptive works are completed at night - where safe, practicable and permitted;
 - (c) checking that alternative pedestrian routes are fully accessible; and
 - (d) using gatemen on sites to ensure no-one encroaches into the worksite, or to escort residents (including visually impaired) to their property through a worksite where this cannot be avoided – for example, a scheme on Kennington Park Road used gatemen for a number of reasons including a mobility impaired resident who required assistance.

5 Proposal

Preferred Option

- 5.1 The preferred option is to deliver the full scope of the Programme as described in Table 5.1. The table provides the following information on each discrete project and annualised sub-asset programme:
- (a) **activity** – the name of the project or sub-asset programme;
 - (b) **description** – a description of the purpose and the type of works involved;
 - (c) **financial authority** – the funding that has been allocated for each project and sub-asset programme in the TfL Business Plan; and
 - (d) **authority request** – the authority that is being requested from the Committee in this paper – this covers proposed expenditure in 2017/18 and 2018/19.
- 5.2 It should be noted that while the authority request relates to two financial years the Programme will return to the Committee every year for authority. The rolling two year authority reflects (i) the need to continually flex the Programme based on emerging risks, opportunities and constraints, and (ii) the need for authority to align with financial years to ensure continued compliance with Authorities. It should also be noted that:
- (a) the proposed investment plan will result in a decline in the State of Good Repair (SOGR) for the next two years after which the proposed increase in Business Plan budget will enable the SOGR to be improved;
 - (b) in the short-term the proposed investment plan will place greater pressure on operational budgets due to an increase in the number of defects requiring minor repairs and interventions;

- (c) if investment remains at current levels (2017/18) for the medium to long-term then asset condition will decline further and whole life costs will increase and place greater pressure on future budgets; and
- (d) if investment remains at current levels (2017/18) for the medium to long-term then the current asset strategies are not sustainable; alternative strategies based on amended value criteria, material choices and levels of service would need to be developed and implemented.

5.3 The Committee will be updated on a quarterly basis on progress with the projects and sub-asset programmes described in Table 5.1; a more detailed breakdown of the Programme activities and deliverables is provided in Appendix 6.

Table 5.1: Assets Programme – Constituent projects and programme and Project Authority requested from PIC

(a) Activity	(b) Description	(c) Financial Authority £m	(d) Authority Request £m		
			2017/18	2018/19	Total
Asset Capital Renewals Programme	The planned renewal, refurbishment and modernisation of a wide range of assets, including bus stations, shelters and stops, traffic signals, carriageway, footway, lighting, drainage, bridges and tunnels	494	83	85	168
	Developer funded schemes and other Assets Renewals includes 3rd party Signal Enhancements, Kingston Cromwell Road, LRS Infrastructure and Safety Camera replacement		9	7	16
Borough roads and bridges	Carriageway renewals on the Borough Principal Road Network (BPRN) and borough bridge strengthening	131	26	27	53
Structures & Tunnels Investment Programme: Tranche 1 (STIP 1)	A programme of major bridge works to address high priority risks. STIP 1 started in 2010 and includes Hammersmith Flyover. Remaining works are four road-over-rail bridge replacements; Ardleigh Green, Upper Holloway Road, Highbury Corner and Power Road	42	35	24	59
Structures & Tunnels Investment Programme: Tranche 2 (STIP 2)	A programme of major bridge and tunnel refurbishments to address high priority risks, including Rotherhithe and Blackwall tunnels, the Westway, Vauxhall Bridge and Lambeth Bridge	207	13	19	32
River schemes	Includes the life extension of Woolwich Ferry through the provision of new vessels and berths, Embankment Pier extension to support the growth of river services - Bankside and Westminster Pier are complete.	30	17	14	30
Coaches	Includes the development of proposals and feasibility works for new coach facilities and works to maintain the existing Victoria Coach Station	8	7	0	7
Over programming and value engineering	Targeted efficiency savings and over programming allowances to reflect delivery risk assessments	(15)	(11)	(2)	(13)
Third party projects	Authority to enable TfL to work with developers to safeguard and enable infrastructure improvements as part of their developments; also supports TfL Commercial Development to generate revenue and benefits	-	-	-	-
Total		897	179	173	352

The Committee is requested to approval full Project Authority, noting that the Committee has already seen and approved £92m in March 17 for Assets Capital Renewal Programme and STIP 2 (Westway).

Note: the total authority request for STIP 1 is higher than current Financial Authority, but this will be reviewed again as part of next Business Plan

Benefits and Value

- 5.4 The benefits and value of the Programme will be monitored and reviewed by the Asset Programme Board and sub-boards (programme governance is described in the following section).
- 5.5 The assets that are renewed, refurbished and modernised by this Programme are service enablers, as such the benefits of the Programme are assessed in terms of:
- (a) service provision – the assets are maintained to the necessary level of condition and performance to support the service, for example, condition of carriageways and footways, availability of traffic signals and load carrying capacity of bridges;
 - (b) risk management – risks posed to the service by the assets are assessed and managed in a systematic and transparent manner (see Appendix 5), ensuring budgets are effectively targeted;
 - (c) customer satisfaction – providing a safe and functional level of condition and performance does not always meet customer expectations. Customer surveys are used to inform and assess the benefits and value of the programme; and
 - (d) whole life value – asset investment planning adopts a whole life value approach that seeks to balance the above and other factors over the long-term, including the full costs (operational and capital) of management.
- 5.6 Outcomes delivered by the proposed investment plan are presented in Table 5.2.

Table 5.2: Expected 2017/18 outcomes from the Assets Programme

Key Performance Indicator	2016/17 Target	2016/17 Actual	2017/18 Target
State of Good Repair of carriageway (TLRN)	91	91	90
State of Good Repair (BPRN)	88	88	88
Customer satisfaction with carriageway condition	73	66*	66
State of Good Repair of footway	93	94	93
Customer satisfaction with footway condition	70	63*	63
Availability of traffic signals	99.1	99.5	99.1
Customer satisfaction with traffic signal condition	78	73	73
Bus stations – Customer Satisfaction	79	n/a**	79
State of Good Repair of bridges/structures	82	82	84

* change in survey rules means 2016/17 actuals are not directly comparable to targets

** a survey was not undertaken in 2016/17, a survey is currently in progress

- 5.7 SOGR is measured through a combination of visual and machine based condition surveys that follow national standards. The SOGR for carriageways and footways remained within the acceptable ranges that were set through customer surveys (90 to 94 per cent for carriageway and 92 to 96 per cent for footway) and traffic signals where above their availability target. However sustaining the condition is not

reflected in the customer satisfaction scores for carriageway, footway and traffic signals (although this is due in part to a change in survey rules).

- 5.8 It has been difficult scientifically to establish the reasons for the declining satisfaction scores, however evidence indicates:
- (a) satisfaction with TLRN footways and carriageway is skewed by customers' experience with their end to end journey, that is, the majority of journeys take place on a range of networks, both local and strategic;
 - (b) journey speeds and reliability are impacting on the traffic signal satisfaction scores – and on satisfaction with other assets as well; and
 - (c) the overall journey experience is influenced by other factors, e.g. weather.
- 5.9 The proposed investment plan will see a minor decline in the condition of carriageways and footway in 2017/18 – although they will remain within the acceptable ranges quoted above. This is likely to have a minor impact on customer satisfaction scores - however, as stated above, the overall journey experience may have a greater impact on the scores than changes in condition.
- 5.10 Figure 5.1 shows the distribution of risks by project, using the scale described in Appendix 5, for the Programme - it excludes the borough LIP programmes and Woolwich Ferry. Borough renewals are prioritised using the same approach for bridges and a similar although not directly comparable approach for carriageways – all borough bridge works are high/very high priority strengthening schemes.

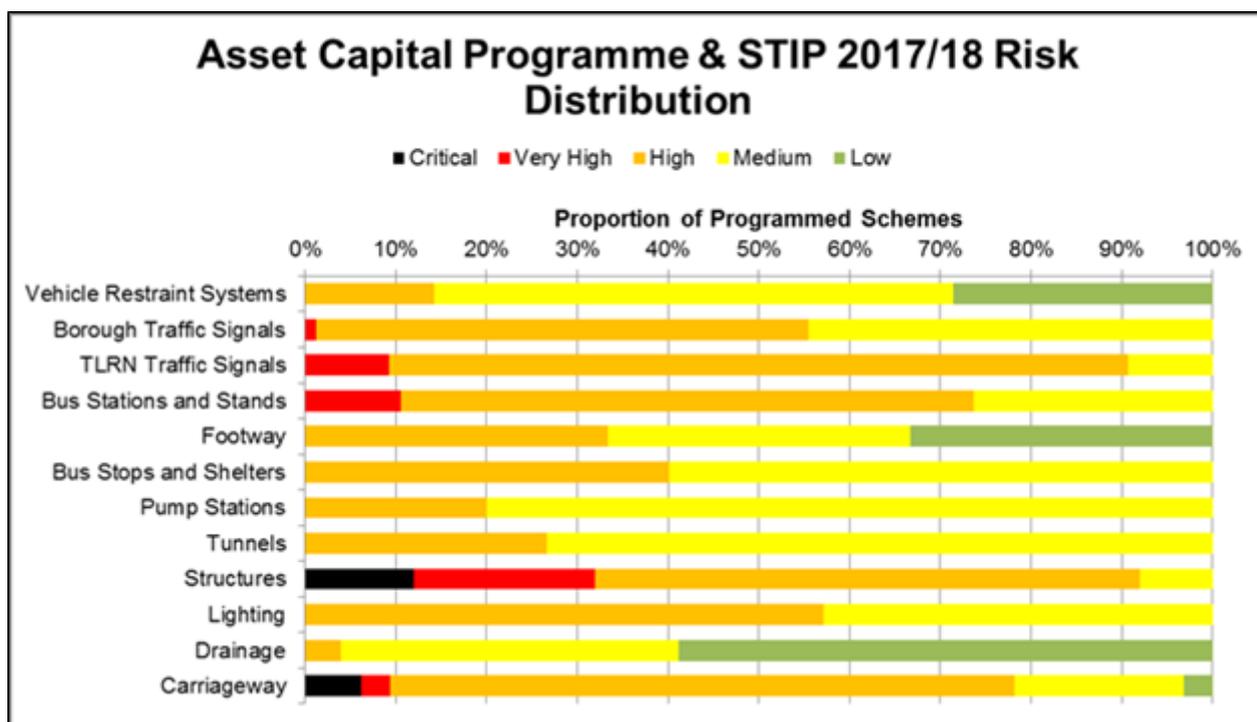


Figure 5.1: Risk distribution of 2017/18 programme

- 5.11 The highest proportion of higher priority work is on structures and this is reflected in the level of investment targeted to these assets both in the annualised asset programme and through STIP 1 and 2. The overall risk profile is broadly comparable to the 2015/16 and 2016/17 profiles with a slight increase, between 5 and 10 percent, of high priority activities. This is a result of a lower level of

investment (around £10m per annum) in the 2016/17 and 2017/18 in the annualised asset programme compared to 2015/16.

Assets Programme Governance

5.12 The governance structure for the Programme includes a well defined hierarchy of boards (covering projects and sub-asset programmes) with consistent terms of reference, clear accountabilities and authorities, and coordinated meeting cycles. These boards will monitor and review delivery progress and either take or escalate decisions (for example on costs, risks, milestones, priorities and policies) as defined in their terms of reference. The overarching Assets Programme Board has additional responsibilities which include:

- (a) agreeing on the allocation of the programme budget between projects and sub-asset programmes using the asset planning and prioritisation information;
- (b) providing strategic direction on asset policies and strategies and ensuring they align with Mayoral strategies and TfL priorities;
- (c) providing programme and project authority for individual projects within the Programme;
- (d) reviewing project progress by exception (based on agreed parameters);
- (e) reviewing escalated delivery risks;
- (f) approving escalated change requests (based on agreed thresholds and decision rules); and
- (g) approving appropriate risk drawdown.

5.13 Members of the Assets Programme Board include the Surface Transport Directors of Asset Management, Road Space Management, Project and Programme Delivery; Strategy and Planning and Finance. The Board will provide quarterly delivery progress reports to the Committee that will include:

- (a) Project Assurance and IIPAG commentary;
- (b) any significant changes (for example in scope, milestones or cost) and associated authority requests relating to the projects and sub-asset programmes; and
- (c) when individual projects require decisions on procurement, for example, contract award.

Impact on Operations

5.14 Asset renewals impact on operations in three primary ways:

- (a) operational performance - renewals maintain, or improve, the operational performance of the asset through repair, replacement and/or modernisation. This ensures the benefits delivered or enabled by the asset are sustained;
- (b) operational expenditure – the asset management strategies seek to maximise whole life value through the appropriate balance of operational and capital interventions. In general, as an asset ages, the rate of defect occurrence increases to the point where, to maintain services and manage costs, a capital renewal intervention is required. If the capital intervention is not undertaken

then operational costs to repair defects increases and services are disrupted;
and

- (c) temporarily out of service – asset renewals typically remove the asset from service, either partially or fully, during the works. All renewal works are planned to minimise service disruption, with the vast majority of works taking place off-peak and at night.

6 Asset Investment: Options Analysis

- 6.1 The asset investment techniques described in Appendix 5 enable a range of investment and SOGR strategies to be analysed. The range of strategies analysed include Business Plan (to 2022 and projected forward at that level), maintaining SOGR at current (and minimum) levels, improving SOGR to upper bound levels, and 5, 10, 15 and 20 per cent budget reductions. Appendix 7 presents the findings from some of these analyses. Figure 6.1 shows the difference between the current Business Plan allocation and the optimum level of investment.

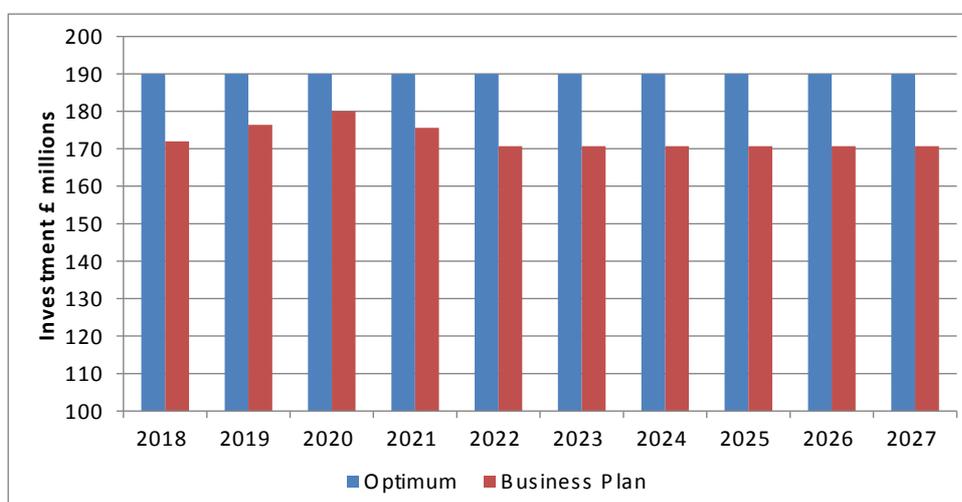


Figure 6.1: Optimum vs. Business Plan investment

- 6.2 This shows a £15m to £20m per annum short fall between the current Business Plan (and its projection forward) and the optimum steady state level of investment. Table 6.1 compares some the cost and SOGR of these options.

Table 6.1: Comparison of optimum and Business Plan outcomes

Key Performance Indicator		2016/17	2017/18	2021/22	2026/27
Carriageway SOGR	Business Plan	91	90	90	90
	Optimum	91	91	93	94
Footway SOGR	Business Plan	94	93	90	89
	Optimum	94	94	94	94
Structures SOGR	Business Plan	82	82	87	82
	Optimum	82	82	87	89

6.3 Over the 10 year period shown, the Business Plan option will cost £172m less than the optimum level in terms of renewals. However, to regain the lost SOGR would require in excess of £172m to be reinvested due to the impact of further deterioration and in the interim there would be ten years of additional operational costs (between £5m and £10m per annum) to manage the increased level of defects. This increases whole life costs by between seven and nine per cent which does not take account of the impact of potential liability claims.

7 Financial Implications

7.1 A summary of the draft Budget for 2017/18 and Business Plan costs to 2021/22 is shown in table 7.1. Appendix 8 summarises the approaches to cost estimating and risk allocation.

Table 7.1: Summary of the costs and funding

Assets Portfolio		Budget	Business Plan				Total
Rounded to £m		17/18	18/19	19/20	20/21	21/22	
Portfolio Total		188	175	190	179	178	909
Over- programming		(8)	(2)	(0)	(0)	(1)	(12)
Budget or Plan	TfL element	169	168	186	176	173	871
	Third party funding	10	5	4	4	4	26
Surplus / (Shortfall)		-	-	-	-	-	-
2017/18							
	PIC Approved	89	4	-	-	-	92
	Not Approved	91	-	-	-	-	91
2018/19							
	Additional approval	-	118	-	-	-	118
	Contingency	-	-	-	-	-	-
Incremental cost to end of stage		-	51	-	-	-	51
Project Authority	This request	179	173	-	-	-	352
Future Authority Requests		-	-	189	179	176	545

* 2017/18 third party: £0.9m stops and shelters; £4.3 Highbury Corner Bridge (Network Rail contribution); and £5.2m signal enhancements; 2018/19 third party: £3.5m signal enhancements and £1.6m Embankment Pier; 2019/20 onwards: £3.5m for signal enhancements

Over-Programming

7.2 The Assets Programme includes £8m of over-programming in 2017/18. This level of over-programming reflects TfL's experience with asset programmes in terms of:

- opportunities, constraints and risks that materialise in-year and require the programme to be adjusted accordingly; and
- the ability to flex in-year delivery to accommodate movements and deferrals in the sub-asset programmes.

7.3 Over-programming will be managed by the Assets Programme Board.

Value Engineering

- 7.4 The objective of Value Engineering is to deliver the same for less, finding efficiencies and savings within delivery while maintaining the same scope and benefits. These savings are being actively pursued across the programme and activities include:
- (a) consistent value management (prioritisation) across the asset types to ensure risks and value are effectively targeted by the programme;
 - (b) value engineering workshops at project gates to identify saving opportunities and remove unnecessary activities that may have crept into the project scope;
 - (c) robust governance to monitor and control delivery and changes;
 - (d) identifying opportunities to offset costs via third party collaboration, commercial income and/or better alignment with other projects on the network;
 - (e) maximising Section 278 opportunities and ensuring appropriate commuted sums are agreed; and
 - (f) ensuring lessons learned are implemented and acted upon to drive better delivery value, for example, using the lessons learned from STIP 1 to improve the contract and pricing arrangements, and risk incentivisation, for STIP 2.
- 7.5 In the event that the full value engineering savings do not materialise, then 2017/18 priorities will be reviewed and the Board will agree which are to be deferred to 2018/19. This would impact 2017/18 outputs however, looking at the longer-term and the rolling nature of the asset renewals programme, this could be accommodated if it is a small proportion of the total (less than 2 per cent of value).

8 Assurance

- 8.1 TfL Project Assurance conducted an Integrated Assurance Review (IAR) on the Assets Programme in May 2017.
- 8.2 The objective of the IAR was to assess the Programme's readiness to deliver its outcomes. The IAR followed nine lines of inquiry to answer the challenge of "Is the Programme sufficiently well managed for the Programme and Investment Committee to award authority (and delegated authority where appropriate)?"
- 8.3 There were no critical issues identified through the IAR. An agreed Integrated Assurance Plan (IAP) for the Programme, covering the following 12 months, has been produced under the Programme Review. The IAP sets out those projects within the Programme that are expected to come forward for an Assurance Review in the next 12 months. The IAP document sets out:
- (a) when project and procurement authority will be requested;
 - (b) the planned review schedule for Project Assurance; and
 - (c) to which Board or Committee might delegate its authority.

List of appendices to this paper:

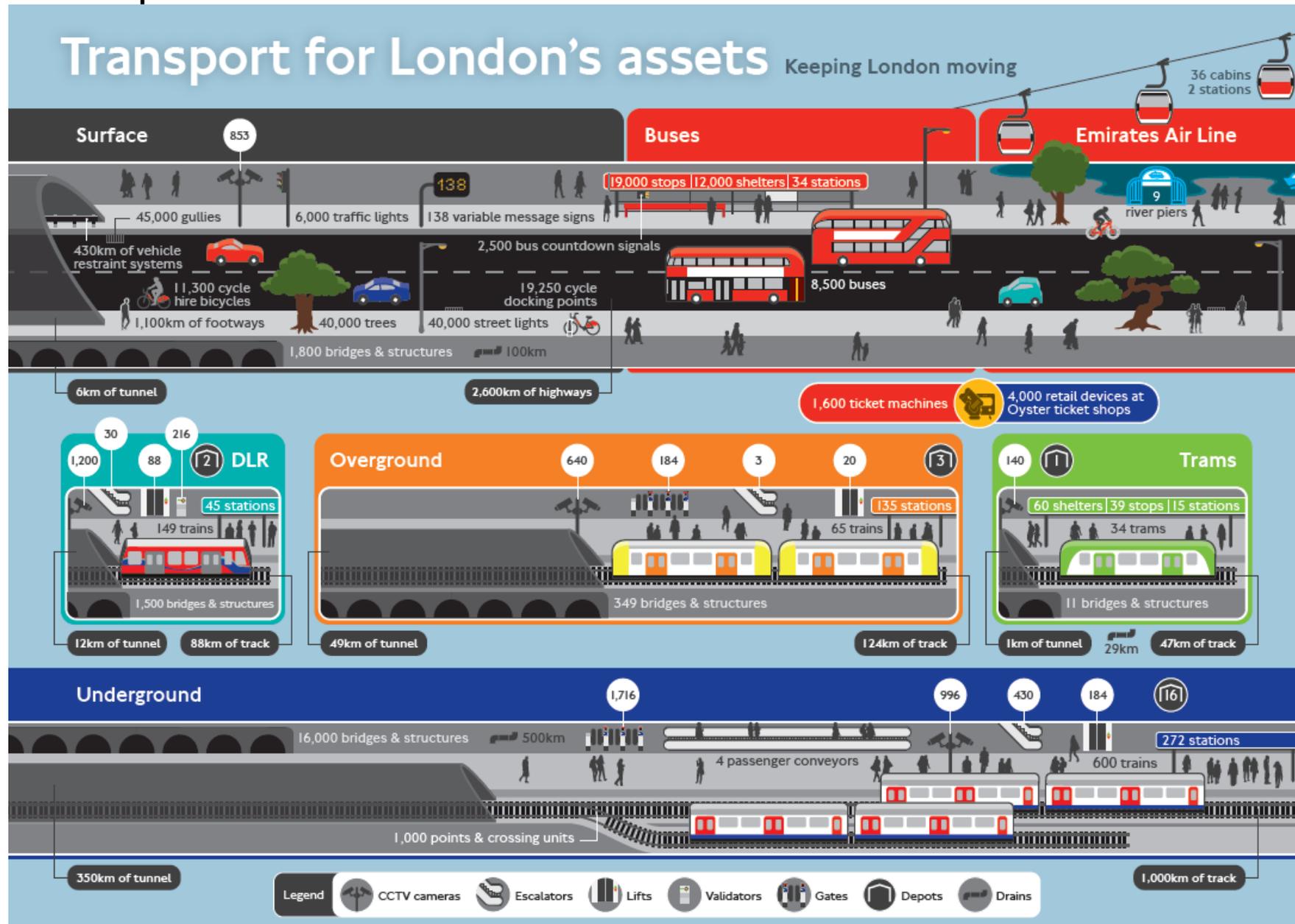
- Appendix 1: Transport for London Assets
- Appendix 2: Transport for London Road Network
- Appendix 3: Asset Renewals
- Appendix 4: Overview of Asset Management
- Appendix 5: Asset Planning and Prioritisation
- Appendix 6: Asset projects and sub-asset programmes
- Appendix 7: Summary of programme benefits and value
- Appendix 8: Costs estimation and risk

List of background papers:

IIPAG and PMO Reports
Management response to IIPAG and PMO Reports, IAP

Contact Officer: Leon Daniels, Managing Director Surface Transport
Number: 020 3054 0180
Email: LeonDaniels@tfl.gov.uk

Appendix 1: Transport for London Assets



Appendix 2: Transport for London Road Network

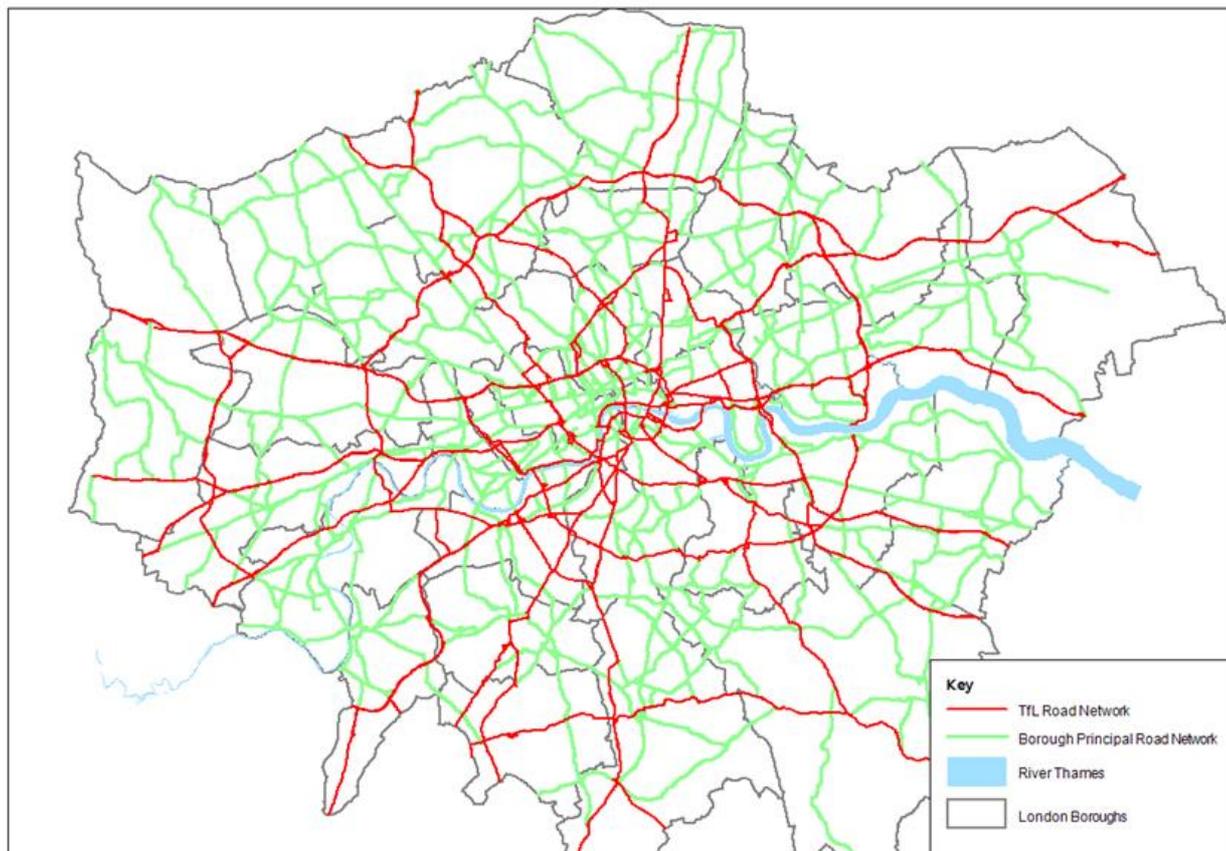


Figure A2.1: Transport for London Road network and principal borough roads

Appendix 3: Asset renewals

Asset type	Renewal Activity	Reason for renewal
Carriageway	Removal of surface layers, and if required sub-layers, and replacing them with new materials. This may also include repairs to carriageway drainage and ironwork.	<p>Deteriorated and defective surface layers that are causing one or more of the following impacts:</p> <ul style="list-style-type: none"> • safety concerns, e.g. due to low skid resistance; • increase in third party claims due to property damage; • poor ride quality for cyclists and motorists due to potholes, cracks and rutting; • water ponding on carriageway impacting on pedestrians and cyclists; and • increasing whole life costs as more minor defect repairs are required and sub-surface layers become damaged if surface layers are not renewed at the optimum time.
Traffic signals	Replace all or part of the signals, poles, cabling and controllers at a junction or crossing	<p>Deteriorated and defective signals that are causing one or more of the following impacts:</p> <ul style="list-style-type: none"> • safety concerns, e.g. due to a high frequency of failures, or deteriorated signal poles; • increased times to repair failures due to obsolete equipment; and • associated network disruption.
Drainage	Investigation and initial clearance of drainage systems and relining or excavation and replacement of structurally unsound sub-surface piping.	<p>Deteriorated and defective drainage systems cause one or more of the following impacts:</p> <ul style="list-style-type: none"> • safety concerns due to presence of flooding on the highway; • where flooding occurs the network capacity is reduced; • pollution risk to environment where highway runoff is not diverted to appropriate waste systems and contaminates surrounding areas; and • reduce TfL's ability to deliver sustainable drainage systems in line with sustainable drainage guidance.
Footway	Removal of defective slabs or surfacing material. Slabs are either cleaned and reset or new slabs or surfacing material installed. This may also include decluttering and accessibility works.	<p>Footways damaged due to vehicle overruns, tree roots, and deteriorated due to ageing and weathering cause one or more of the following impacts:</p> <ul style="list-style-type: none"> • safety issues due to tripping hazards and rocking slabs; • increase in third party claims due to personal injury; • poor ride quality for cyclists (shared use cycle tracks) and people using mobility devices; • water ponding on the footway; and • increasing whole life costs as more minor defect repairs are required.

Asset type	Renewal Activity	Reason for renewal
Furniture	Review and subsequent (if applicable) removal/installation of Pedestrian Guard Rail (PGR) and Street Furniture	PGR is reviewed against specific standards to assess the impact its presence has on safety and pedestrian movement
Landscaping	Removal and replanting of trees	Trees removed due to age, damage, disease or structural concerns. New trees planted to meet agreed targets.
Street Lighting	Remove structurally defective lighting columns and replace with new. Conventional high intensity discharge luminaires (or defective lamp assets) are replaced with energy efficient LED units	<p>Deteriorated and structurally unsound columns cause the following impacts:</p> <ul style="list-style-type: none"> • safety concerns, e.g. due to potential of collapse; • poor public perception where units are removed and affected area is no longer illuminated; and • increasing whole life costs as more reactive repairs are required to make units safe. <p>Utilising LEDs reduces the following operational costs:</p> <ul style="list-style-type: none"> • energy consumption and associated costs are up to 35 per cent less; and • bulk lamp changing is reduced from a frequency of an average of once every 3 years to once every 15 years. <p>Also, there is reduced disruption to the network due to less operational activity on the highway</p>
Vehicle Restraint Systems	Replace structurally defective barriers with new or permanent removal where it is no longer required	<p>Deteriorated and defective barriers cause one or more of the following impacts:</p> <ul style="list-style-type: none"> • safety concerns, e.g. asset failure during vehicular impact; • increasing whole life costs as more minor defect repairs are required; and • associated network disruption. <p>Where a barrier is reviewed and deemed to be no longer be required through the road restraint risk assessment process (RRRAP), its removal reduces ongoing lifecycle costs.</p>
Structures	Repair and maintain all the different types of elements, components and materials on bridges and structures	<p>Deteriorated structural elements increase the following risks to the road network:</p> <ul style="list-style-type: none"> • safety – element failures may cause injuries to road users and/or pedestrians in the vicinity of the structure; • network disruptions and delays due to element failures and/or restrictions to safeguard road users; and • increased future maintenance costs and increased disruption to road users if repairs are not carried out at the optimum time.

Asset type	Renewal Activity	Reason for renewal
Tunnels	<p>Replacing mechanical, electrical or communications and control equipment like-for-like or with a modern equivalent (e.g. lighting upgraded to LED), or, installation of new equipment that improves tunnel safety, resilience and whole life cost.</p> <p>Asset examples: CCTV, incident detection, tunnel lighting, drainage equipment, fire and safety equipment.</p>	<p>Deteriorated and defective mechanical, electrical or communications and control equipment that cause one or more of the following impacts:</p> <ul style="list-style-type: none"> • safety concerns, e.g. potential asset failure that could impact on road user safety; • reduced tunnel availability - the Minimum Operating Requirements (MOR) define thresholds of acceptable equipment performance for the operation of each tunnel; • environmental concerns, e.g. pollution risk; and • increasing whole life costs as more defect/fault repairs are required. <p>Other examples could include:</p> <ul style="list-style-type: none"> • utilising technology to reduce the operational/maintenance costs, e.g. LED; and • installing new equipment that detects incidents, improves safety, reduces tunnel closure time and disruption.
Bus garages	<p>Repair to structural building elements or associated civil asset areas which are under lease to operators</p>	<p>Works are carried out in order to satisfy our duties as landlords. These are generally undertaken between leases.</p>
Vehicle Message Signs (VMS)	<p>Replace all or part of the sign, pole, cabling and controller of a Overheight Vehicle Detector or Variable Message Sign</p>	<p>Deteriorated and defective message signs cause one or more of the following impacts:</p> <ul style="list-style-type: none"> • safety concerns, e.g. asset failure; • inability to rely on an asset to function when required; and • associated network disruption.
Pump Stations	<p>Replacing mechanical or electrical equipment such as pumps, pipes, valves, power supply, or, installation of new equipment that improves pump station safety, resilience, whole life cost, such as standby pumps and telemetry.</p>	<p>Deteriorated and defective mechanical and electrical equipment that are causing one or more of the following impacts:</p> <ul style="list-style-type: none"> • safety concerns, e.g. due to flooding on the network; • associated network disruption; and • increasing whole life costs as more defect/fault repairs are required.
Bus stations and stands	<p>Partial or full renovation of buildings, including mechanical and electrical equipment, building fabric, commercial,</p>	<p>There are a number of potential triggers for undertaking bus station renewals or upgrades:</p> <ul style="list-style-type: none"> • poor condition of buildings or civil assets which either pose safety hazards or risk the function of the site for the bus network;

Asset type	Renewal Activity	Reason for renewal
	<p>public and staff areas, as well as structural elements.</p> <p>Resurfacing of bus standing areas, relaying of pedestrian footways and/or associated civils works, e.g. drainage or lighting.</p>	<ul style="list-style-type: none"> • expensive maintenance activity to keep site open and safe; • changes to the function of the bus network, e.g. additional standing required; • changes to passenger use of the site; • poor configuration of the site either in terms of customer usage or bus operations; and • commercial opportunities in combination with one or more of the above.
Bus stops and shelters	<p>Replacing bus shelters and installing new shelters. Where necessary upgrades/downsizing are done at the same time</p>	<p>Poor condition of shelters (e.g. leaking roofs, damaged or rusted frames, faulty electrical supplies) which may result in either a safety risk or the shelter no longer being usable.</p> <p>A road traffic accident where the bus shelter has been damaged beyond repair and needs replacement.</p>
River Piers	<p>Repair/maintain components of river piers, including mechanical and electrical components</p>	<p>Deterioration of the river pier elements pose the following risks to river services:</p> <ul style="list-style-type: none"> • safety risk – increased risk of failure which may cause injuries to travellers and/or operatives of river services; • delays to travellers in the event of pier closure; • loss of revenue to TfL in the event of pier closure; and • litigation from boat operators for loss of revenue in the event of pier closure.

Appendix 4: Overview of Asset Management

International Standards

Asset management is a recognised discipline with an established international standard (ISO 55000) and a growing Institute of Asset Management (IAM). ISO 55000 defines the high level, internally accepted, requirements for asset management – the core areas and capabilities this covers are illustrated by the IAM six box model, shown below. TfL adheres to ISO 55000 and the good practice published by the IAM.

TfL is at the forefront of asset management thinking and is an active member of the IAM. TfL has established a strong internal asset management community and productive relationships with similar organisations.



Figure A4.1: Institute of Asset management six box model

The IAM six box model shows the linkage between strategic goals and priorities and day-to-day asset activities. The *Asset Strategy & Planning* component of the framework, supported by the *Asset Management Decision Making* component, describes the tools and techniques used to analyse investment needs, priorities and whole life costs.

Asset management in Transport for London

The TfL Asset Management Policy defines the discipline as: *the co-ordinated activities we use to select, inspect, maintain, renew, improve and dispose of our assets in order to*

maximise customer satisfaction, maintain high levels of safety, manage risks, minimise whole life costs and enable delivery of our outcomes and priorities. The full TfL asset management policy is provided below.

The history and organisational structure of TfL means there are a number of asset management/investment teams across the business – for example in Surface, Rail, Underground and Facilities. Prior to 2014 these teams had been working in relative isolation, implementing their own interpretations of asset management to meet their specific business needs and priorities.

In 2015 the TfL Asset Management Steering Group (AMSG) was set up to coordinate asset management across the business, driving consistency and sharing good practice. The AMSG has focused on the following areas:

- (a) Asset Management Policy and Strategy – creating one Policy and a consistent approach to Asset Management Strategies;
- (b) Asset Management Information Systems (AMIS) – working towards a rationalisation and standardisation of AMIS on the TfL estate;
- (c) Whole Life Value – developing and promoting consistent guidance and training on Whole life Value;
- (d) Building Information Modelling (BIM) – to oversee and promote the implementation of BIM in TfL;
- (e) Asset Management Maturity – a consistent approach to assessing asset management maturity, gaps and improvement opportunities; and
- (f) Asset Management Training – developing and implementing a pan-TfL training programme for asset management.

These activities have matured TfL's asset management practices – giving staff the skills and tools to make better decisions and an improved forum for sharing and collaboration (reducing duplication of effort and costs). As TfL progresses through its transformation programmes further opportunities should be identified to harmonise and bring together asset management practices – striving towards one common approach and, in time, a one team approach.

Asset management training

To improve asset management maturity and promote consistent practices a set of training courses were developed and implemented in 2015. To date the courses have had over 1800 attendees and cover the following:

- (a) Level 1 – a half-day course that is an introduction to asset management
- (b) Level 2 – Principles of Asset management – a three day course that provides important knowledge and skills for asset management practitioners and leads to the IAM Certificate in asset management.
- (c) Level 3 – staff can select from up to five specialist courses (each 2 to 3 days) that delve into the detail of specific topics, including asset strategy, whole life cost/value and asset information. At the end of these courses staff can select to sit the IAM diploma in asset management.

TfL Management System

P020

Asset Management Policy

Issue No.: A2

Issue date: April 2015

Review date: April 2018

Policy Statement

TfL will use co-ordinated asset management activities to select, inspect, maintain, renew, improve and dispose of our assets in order to maximise customer satisfaction, maintain high levels of safety, manage risks, minimise whole life costs and enable delivery of our outcomes and priorities.

Strategic Objectives

To support and deliver the Policy Statement TfL shall:

- Establish, maintain and review asset management objectives, strategies and plans
- Engage with customers to understand their requirements and take account of these in the asset management objectives, strategies and plans
- Establish, maintain and review the organisation structure, roles and responsibilities for controlling, directing and delivering asset management
- Establish, maintain and review the activities (including people, processes, data and technology) that deliver the asset management policy, objectives and strategy
- Identify and manage asset related risks
- Consider Whole Life Value (including capital and operating costs) when making decisions at each stage of the asset lifecycle, and embed practices that support and inform consistent decision making and prioritisation
- Identify, manage and continually improve the information that supports decisions, ensuring it is accessible and of the required quality
- Develop and implement asset performance measures that inform decisions, monitor the delivery and effectiveness of strategies and plans, and support benchmarking
- Measure and continually improve asset management maturity including the training and competence of our people
- Share, develop and implement asset management practices to be consistent across TfL's portfolio of infrastructure assets
- Regularly review asset management practices to assess their appropriateness to the business and to identify areas for change and/or improvement

Lead Directors

TfL's Commissioner and Managing Directors are committed to this policy and are accountable for its provision, application and delivery. This policy shall be available to all employees and be publicly available.

Signed: TfL Commissioner



Appendix 5: Asset Planning and Prioritisation

Planning and prioritisation tools inform the development of the assets management strategies and the Surface Asset Programme. The strategies set the overall policies, priorities and outcomes for the assets – taking into account legislation, mayoral strategy and TfL goals and priorities (summarised below) and other influencing factors (e.g. risks, customers and sustainability) and constraints (e.g. financial and access to do works).

This section explains the key drivers for renewals and describes the planning and prioritisation techniques used to develop the assets strategies and Programme.

Interpreting asset requirements from legislation and strategic priorities

The table below shows how requirements for the Surface Assets Programme have been interpreted from and aligned to legislation, mayoral strategies and TfL priorities.

Table A5.1: Aligning asset requirements to strategic goals and priorities

Source	Duty, Goals & Outcomes	How this is supported by the Assets Programme
The Highways Act 1980	Maintain the public highway	This programme directly supports this duty through the timely and appropriate repair and renewal of assets.
Traffic Management Act 2004	To manage the road network with a view to securing and facilitating the expeditious movement of people and goods	This includes the provision and maintenance of the assets that support and enable the movement of people and goods, in particular the traffic signals for all of London.
Mayor's Transport Strategy	Bring our assets up to, and maintain them in, a State of Good Repair	Asset renewal and modernisation is essential for achieving and maintaining the State of Good Repair (SOGR), which cannot be achieved through routine and reactive maintenance alone.
TfL Priorities	To put customers and users at the core of all of our decision making	Minimising traffic disruption and maintaining and developing Surface Transport assets to make a positive contribution to customer satisfaction. Making the right asset development choices, rather than always replacing like-for-like, provides opportunities to improve the customer experience.
	To drive improvement in reliability and safety across our network	Efficient and effective delivery of the right investment in the right assets to provide safe, reliable, clean, sustainable and accessible transport.
	To cost less, be more affordable and to generate more income	Well targeted renewals, modernisations and asset developments that take a whole life view, reduce network disruption by minimising reactive maintenance and provide opportunities to generate commercial income. Co-ordination of programmes between different asset types delivers maximum benefits from network occupation.

Safe, reliable and cared for assets

Further to the above strategic alignment, the vision for Surface assets is:

Safe, Reliable and Cared for Assets – designed for London's future.

Safety is first and foremost, both for customers and those who work on the assets. Safe assets are provided by adopting industry legislations and standards (for example fire safety in road runnels), applying risk based inspection and maintenance regimes, and defining and monitoring defect responses in maintenance contracts. For example, in 2017/18 over 99 per cent of emergency call outs were effectively dealt with inside the contractual response time.

Further to being safe, the assets must also be reliable, be it to light streets, control traffic, ventilate tunnels or drain rainwater. Failure to deliver their function, partially or completely, may result in disruption, safety and security issues, and reputation damage. Lifecycle strategies set out inspection, maintenance, renewal and improvement plans for each asset type – providing an optimum balance of safety, reliability and whole life cost.

The asset strategies also take account of customer requirements, not simply from a functional point of view, but also from a cared for perspective. This includes surveys about customers' experience with, for example, bus stations, footways, traffic signals and cycle routes. This helps to inform and direct the asset strategies, identifying where more focus is required to meet customer expectations.

Asset deterioration and technology improvements

There are two key drivers of asset renewals and refurbishment:

- (a) Asset deterioration – asset condition and performance deteriorates over time due to a range of factors including general wear and tear, day-to-day weathering, severe weather, vandalism, accidents and ageing. Over time these factors erode the service performance and customer benefits – investing in timely asset renewals maintains the service and benefits.
- (b) Technology – improvements and advances in technology mean that previously installed units, such as traffic signs and CCTV, become more difficult and expensive to maintain due to the availability of parts and relevant skills. Furthermore, technology advances can provide improved performance and reduced whole life costs.

These key drivers inform asset investment and, as part of a robust asset management approach, enable TfL to develop asset policies, strategies and plans that cost effectively manage the assets and maintain the service.

Asset Investment Planning

Investment planning techniques are used to analyse a range of factors and constraints. An analysis typically looks ten years or more into the future, enabling the benefits and drawbacks of different investment strategies to be assessed and compared, for example, do short-term increases in expenditure reduce whole life costs?

The factors that a long-term analysis covers and the questions it asks, include:

- (a) What is the current condition or performance of the assets?

- (b) What are the future condition/performance requirements of the assets?
- (c) What is the rate of deterioration of the assets?
- (d) What commercial or development opportunities exist and can be incorporated into the asset lifecycle?
- (e) What factors influence deterioration and how do they influence it, for example, changing traffic volumes, severe winters, changing frequency and intensity of rainfall, and work by utility companies?
- (f) When is maintenance applied and what effect does it have on the asset, for example, how does it change the condition/performance and what is the subsequent rate of deterioration?
- (g) What is the cost of maintenance and renewal?
- (h) What is the impact of not doing maintenance, for example, safety risks, traffic delays, accidents, road closures, customer satisfaction or increased rate of deterioration?
- (i) Which assets should receive higher priority when resources are limited?

There may be a number of viable strategies for an asset, whereby the alternative timing and type of intervention result in different benefits, costs, performance and risk. Alternative strategies are compared and the most appropriate selected.

This is not the type of analysis that can be easily or quickly done by hand for thousands of assets. Computer models are used to analyse a wide range of investment strategies and scenarios. Outputs from some of these analyses are presented in Appendix 7.

The asset strategies set out investment levels, volumes of work and the types of interventions; they do not detail specific projects or a programme of works. The projects and programmes are identified and prioritised using a Value Management process.

Asset Prioritisation – Value Management

Value Management is used to prioritise and compare competing asset needs and solutions. This informs the best use of investment by identifying where it will deliver the greatest value and benefits. Value Management principles are applied across the whole assets programme, with over 80 per cent of the programme covered by a consistent approach and plans are in place to extend this to the full programme in 2017/18.

The Value Management process is used to develop a three year plus prioritised programme of work that will deliver the business outcomes. The prioritisation is risk based (likelihood and consequences) and uses Safety, Functionality and Environment criteria to prioritise needs – this is then further refined by assessing whole life costs, development opportunities and Value for Money. Table A5.1 shows the risk categories used to assess works.

Table A5.1: Prioritisation categories

Risk Category (£k)	Description ¹	Risk Acceptable
≥ 5,000	Critical – the asset represents an unacceptable risk to network safety and/or reliability and TfL’s reputation, action must be taken to reduce the level of risk	
≥ 1,000 & < 5,000	Very High – network safety and/or reliability are at or below broadly acceptable levels, and action must be taken to improve safety and reliability	
≥ 50 & < 1,000	High – action must be taken to maintain network safety, reliability and/or State of Good Repair at or above acceptable levels, interventions may be further justified on the basis of reduced whole life costs	
≥ 5 & < 50	Medium – action should be taken to deliver preferred levels of network safety, reliability and State of Good Repair, to fully achieve Surface Transport and TfL outcomes, and to reduce whole life costs	
< 5	Low – action may be appropriate on the basis of whole life cost savings and reducing future disruption.	

Notes:

1. The acceptability of risk is used to prioritise activities
2. Unacceptable region – risks cannot be justified except in the most extraordinary circumstances
3. ALARP region – acceptable only if risk reduction is impractical or if its cost is disproportionate to the improvement gained – the degree of acceptability depends on the level of disproportionality between risk reduction (or benefit gained) and cost

Broadly acceptable region – risk reduction unlikely to justify intervention, however, whole life cost savings may justify intervention

Appendix 6: Asset projects and sub-asset programmes

Activity	Description	Milestones and deliverables
Asset Capital Renewals Programme	The planned renewal, refurbishment and modernisation of a wide range of assets, including bus stations, shelters and stops, traffic signals, carriageway, footway, lighting, drainage, bridges and tunnels. Key programme activities and deliverables for 2017/18 include:	
	Carriageway	404,000m ²
	Footway	36,400m ²
	Lighting	1,600 units
	Bus Shelters	550
	Traffic signals	180 sites
Borough roads and bridges	Borough carriageway allocations have been made for 2017/18 and delivery is progressing. Inspections to inform the 2018/19 programme are underway.	SOGR – 88 per cent
	Bridge strengthening – 2017/18 works include 20 assessments, six interim measures, seven feasibility studies for strengthening, two designs and three strengthening schemes. The works include Hammersmith Bridge which will have detailed investigations and studies undertaken.	Complete 3 strengthening schemes
Structures & Tunnels Investment Programme: Tranche 1 (STIP 1)	A programme of major bridge works to address high priority risks. STIP 1 started in 2010 and includes Hammersmith Flyover. Remaining works are four road-over-rail bridge replacements;	
	Upper Holloway Road – works are substantially complete and the bridge is open to traffic. Finalising minor works and handover back into operations.	Handover – July 2017
	Ardleigh Green – progress works on the installation of the new east bridge deck over the railway and the associated highway works	Install east bridge deck – Nov 2017
	Highbury Corner – the 2017/18 work includes a number of complex utility diversions (water, gas and British Telecom). These works will divert the utilities out of the bridge deck where they will remain after the bridge replacement is complete, greatly simplifying future bridge works. The main carriageway bridge is to be demolished by March 2018, and reconstruction completed by September 2018.	Utility works complete – Jan 2018

Activity	Description	Milestones and deliverables
	Power Road – the main works in 2017/18 include the demolition of the western bridge deck.	Demolish west deck – Oct 2017
Structures & Tunnels Investment Programme: Tranche 2 (STIP 2)	A programme of major bridge and tunnel refurbishments to address high priority risks, including Rotherhithe and Blackwall tunnels, the Westway, Vauxhall Bridge and Lambeth Bridge. Structural, mechanical and electrical investigation and studies are being carried out until August/September 2017. This information will be used to review risks, priorities and costs – enabling STIP 2 to be programme accordingly.	Priority paper to board - February 2018
River schemes	To increase pier capacity at Bankside, Embankment and Westminster as they are already operating at their maximum berthing capacity. The increased capacity will accommodate growth in River Bus and/or River Tour services. The Bankside and Westminster works are complete and Embankment is proposed for 2018/19.	Feasibility study outcome - October 17
	Life extension of Woolwich Ferry through the provision of new vessels and berths. This will replace the existing three vessels and their berths with two modern and environmentally friendly vessels. Delivery is expected by the end of 2018 and will produce operational savings. Status – vessels under construction, demolition nearing complete, and contractor appointed for berths reconstruction	July 2017 – seek authority for remaining works
Coaches	New coach facility for London - to develop alternative facilities to Victoria Coach Station (VCS) – this is required due to lease expiry and Crossrail 2 work from 2025. The passenger and operational impacts at VCS are substantial while there are also significant commercial advantages through the early release of leasehold interests combined with the long-term redevelopment potential. The next phase will identify the preferred location for a new coach facility - taking account of road capacity, traffic impacts, passenger benefits, whole life costs, potential commercial return and risks.	Programme Gate B (feasibility) approval – October 2017
	Victoria Coach Station (VCS) - the strategy is to re-invest profits into the premises to maintain and upgrade assets – based on safety, function, customer satisfaction and whole life costs. Maintaining VCS to an appropriate standard supports tariff negotiates with operators, with any profits being reinvested back into the station. Planned works are based a retaining the facility to 2024. While the new coach facility strategy is developed and agreed, asset renewal and refurbishment activities will continue on VCS to ensure it is safe and fit for purpose	July 2017 – seek authority for 2017/18 annualised programme

Activity	Description	Milestones and deliverables
	Victoria Coach Station - repair and refurbishment of the Grade II Listed main canopy in VCS.	July 2017 – approve designs
Over programming and value engineering	Targeted efficiency savings and over programming allowances to reflect delivery risk assessments	n/a
Third party projects	Authority to enable TfL to work with developers to safeguard and enable infrastructure improvements as part of their developments; also supports TfL Commercial Development to generate revenue and benefits	n/a

Appendix 7: Summary of programme benefits and value

The graphs in this section show the impact that different investment options have on the SOGR of carriageway, footway and structures. This is in the context of improved contracts and more efficient delivery costs, which are delivering more for less. For example, since 2007 the cost of carriageway and lighting have been reduced by over 30 percent and 20 percent per measurement unit respectively.

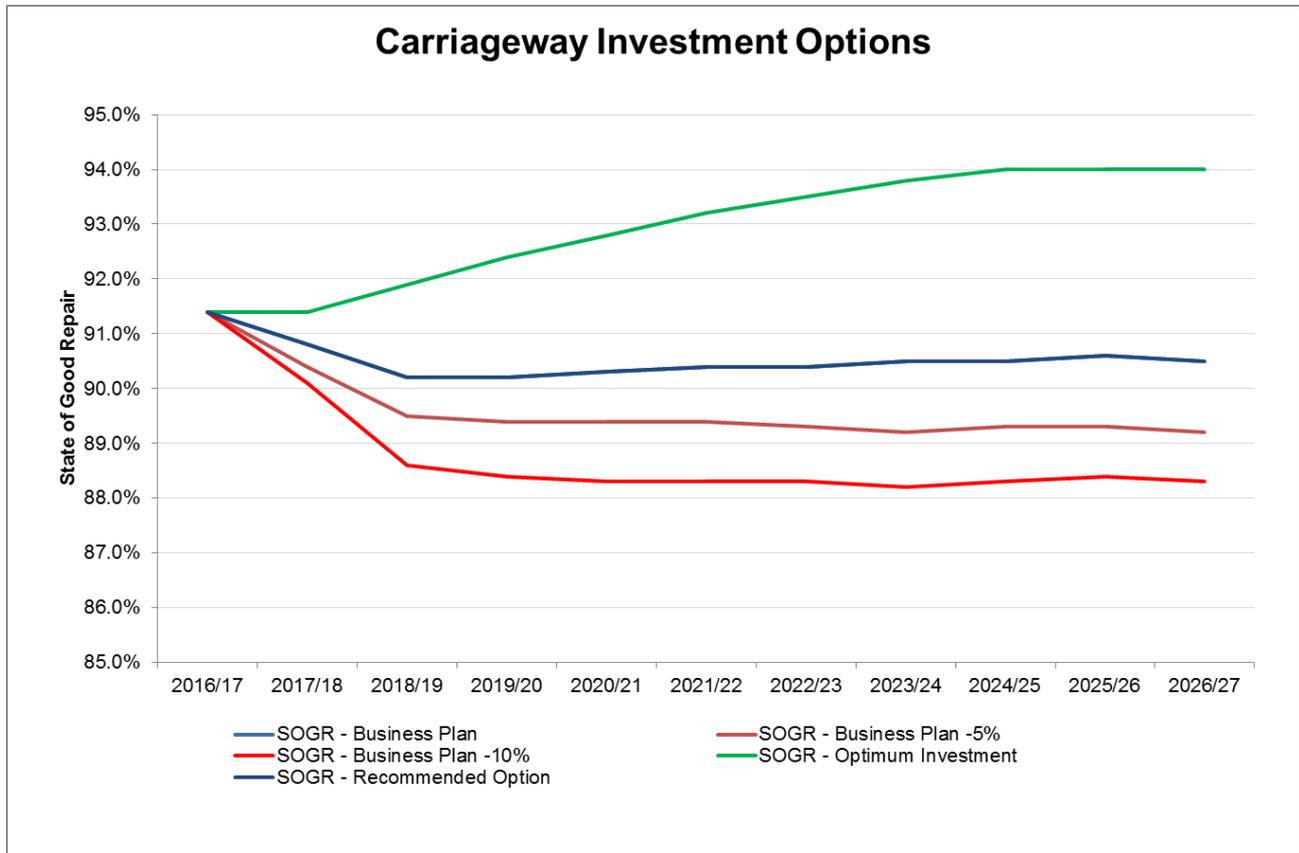


Figure A7.1: Impact of different investment levels on carriageway SOGR

This graph shows that the current Business Plan investment is projected to maintain SOGR just above 90 per cent over the next 10 years. The acceptable range for carriageway SOGR, based on customer consultation and whole life cost analysis, is 90 to 94 per cent. TfL has set a target of 94 per cent to reflect the higher standard required to support an increase in cycling in London. This target cannot be achieved with the current Business Plan investment levels.

Investment modelling indicates that a further reduction in budget of 5 per cent for two years would result in a reduction in the SOGR to below 90 per cent. A 10 per cent reduction for two years would result in a gradual decline in SOGR with a projected SOGR of 88 per cent by the end of 2026/27. The current Business Plan assumes higher investment levels in 2019/20 onwards; these would sustain the SOGR level reached in 2018/19.

Declining SOGR places additional pressure on operational expenditure to rectify defects. The analysis presented above assumes operational expenditure (e.g. pothole repairs) would remain at current levels. A decrease in operational expenditure will increase the rate of SOGR deterioration.

The above analysis excludes the impact of severe weather events, for example extreme rainfall, snow and/or ice. The timing of and impact that these events have is uncertain and experience has shown they are best dealt with as and when they happen. This allows the impact to be more accurately assessed and the established asset management practices are used to assess needs and allocate resources accordingly.

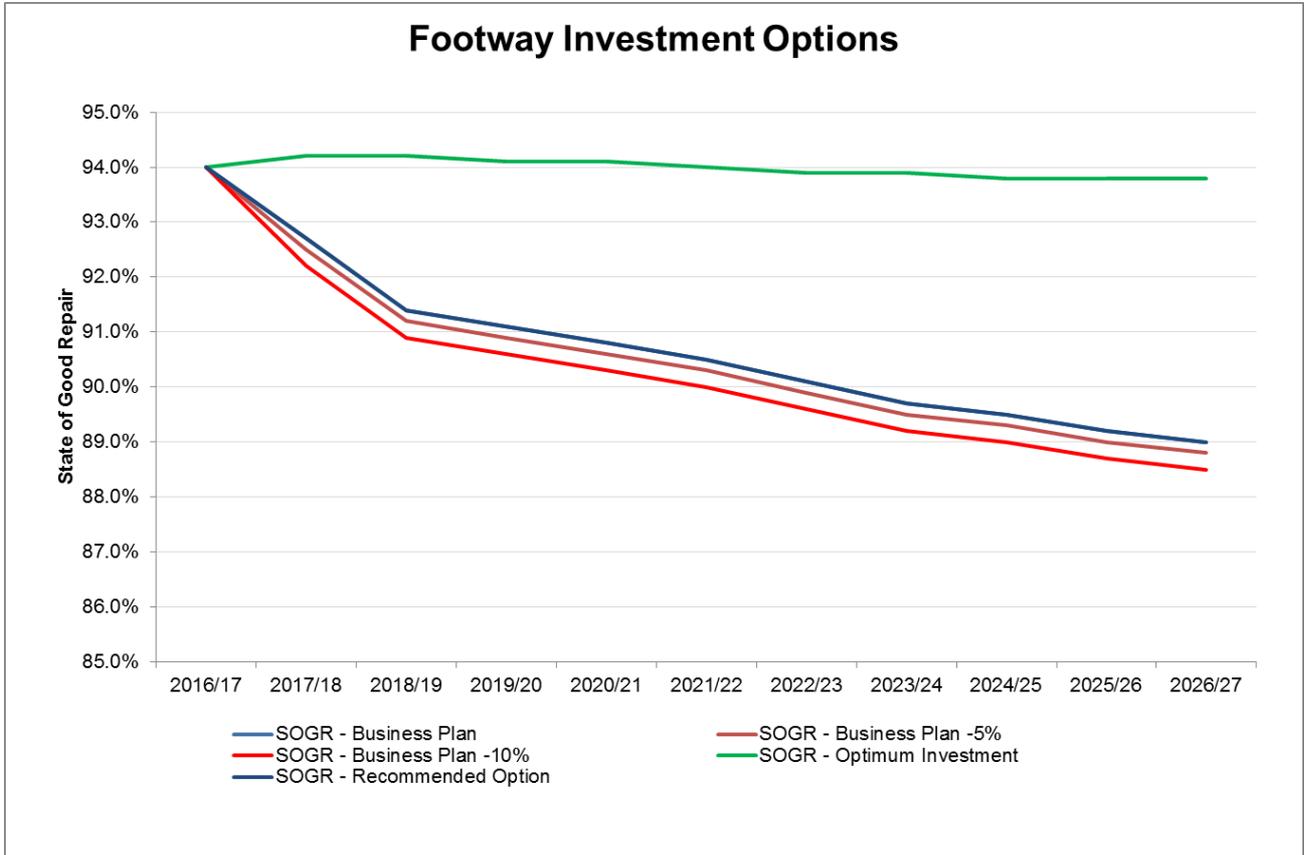


Figure A7.2: Impact of different investment levels on footway SOGR

The SOGR of footway is currently at 94 per cent. Investment modelling indicates that the current Business Plan investment is unable to maintain the SOGR, dropping to 93 per cent in 2017/18. The acceptable range for footway SOGR, based on customer consultation and whole life cost analysis, is 92 to 96 per cent. The above options (Business Plan, 5 and 10 per cent reduction) all result in a decline in SOGR to the 91 per cent by 2018/19. The SOGR is predicted to reduce to 89 per cent by 2026/27 for all three options.

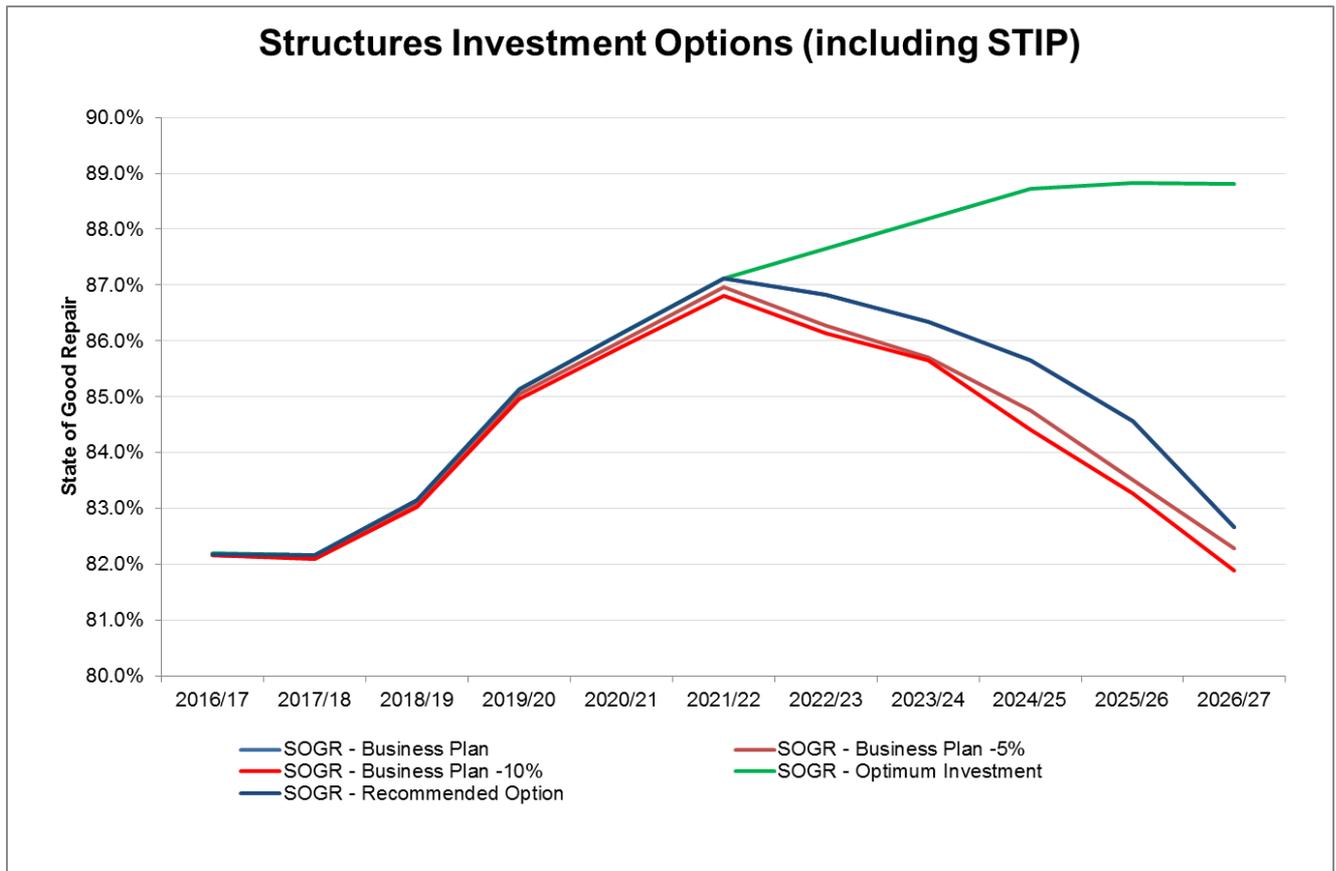


Figure A7.3: Impact of different investment levels on structures SOGR

The SOGR of structures gradually improves, under all scenarios, until 2021/22, largely due to the Structures and Tunnels Investment Programme (STIP) - over £600m of additional investment above the Asset Capital Programme. The minimum SOGR target for structures is 88 per cent based on optimum whole life costs. The above options do not fully achieve this, and after 2021/22 the asset condition would decline if the STIP programme comes to an end.

From 2021 onwards, the analysis indicates that the steady state budget for the asset capital programme will need to sustain £50m per annum for major bridge/tunnel renewals to prevent a subsequent decline in the SOGR, and to accommodate other major works on bus stations, embankments and drainage. This will negate the need for future spikes in investment, like STIP, and deliver whole life cost savings of circa 10 to 20 per cent compared to a 'peak' and 'tough' approach to asset investment.

Appendix 8: Cost estimation and risk

Cost estimates are based on an assessment of the project requirements and data collected from past delivery, with appropriate risk allowances and optimism bias. For example, for standard renewal schemes the average unit rates are derived from an assessment of past delivery, e.g. the cost to renew carriageway per m², or the average cost of a signal modernisation.

Project specific cost estimating and risk assessment exercises are undertaken for the more unique projects, for example Woolwich Ferry, bus station reconstructions and STIP works. Recent experience on STIP and other civil works has helped to build a database of costs which are used to inform project estimates.

There will not be a strategic risk budget for the Programme. All risks will be held at the project or sub-programme level and, in accordance with agreed governance arrangements, will be approved for drawdown at Project Board or Programme Board level depending on value. The exception is the Asset Capital Renewals sub-programme. This sub-programme, and the projects within it, will not have risk budgets; instead risks will be managed within the overall sub-programme allocation which is made possible by the sub-programme being comprised of around 1,000 individual projects.

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