Transport for London

Programme: DLR Upgrade Plan

Project: Night DLR

Document reference

Business Case Narrative

		Signature	Date
Prepared by	Alfonso Saco Diaz		05/10/2018
Approved by	I confirm that this deliverable meets the requirements of the relevant Pathway Product Description and that all consultation comments have been addressed to the satisfaction of consultees.		
	Carol Smales		05/10/2018

Distributed to	Trish Ashton	General Manager Docklands Light Railway
	Geoff Hobbs	Director Public Transport Service Planning

Document History / Business Case Version Information.

Revision	Date	Summary of changes
0	17/11/16	First draft
1	05/10/2018	2018 Update

Glossary of Terms

Abbreviation	Term
DLR	**Docklands Light Railway**
CAZ	**Central Activities Zone**
EWT	**Excess Wait Time**
ELL	**East London Line**
KAD	**Keolis Amey Docklands**
LU	**London Underground**
LO	**London Overground**
PFI	**Private Finance Initiative**
VfM	**Value for Money**

Table of Contents

1 Executive Summary

This document provides an updated business case for Night DLR services based on the latest available data and lessons learnt from Night Tube and Night Overground.

The previous business case, produced in November 2016, proposed a 3-car night time DLR service operating on Fridays and Saturdays between either Bank and Lewisham, or Bank and Lewisham/Woolwich Arsenal. The current business case assumes this same proposed service.

The initial case for change was developed around potential improvements to connectivity, reduced journey times and enhanced journey quality for passengers in east and southeast London who were not benefitting by the current Night Tube service. It showed that all of the options assessed presented strong BCRs although none were financially positive.

The present, revised document has updated the economic case following a revision of the assumptions and calculations behind the quantification of costs, revenues and benefits, and concludes that none of the options appraised now present a good economic case as the resulting BCRs are poor. This is because costs have increased and benefits are lower based on the experience of Night Tube.

2 Strategic Case

2.1 Description

A 3-car night time DLR service operating on Fridays and Saturdays between either Bank and Lewisham, or Bank and Lewisham/Woolwich Arsenal, would improve connectivity, reduce journey times and enhance journey quality for passengers in East and Southeast London who are not benefitting by the current Night Tube or Night Overground service.

All Londoners deserve a range of safe, reliable and cost-effective travel options. This is true for all trip purposes, those travelling for work or leisure, and time of day should not be a factor which stops individuals from moving about our city. This proposal has the potential to not only reduce journey times, but also support economic and cultural activity in London and help ensure our 24-hour city works for all Londoners.

A Night DLR service is therefore being considered for resolving night time connectivity in the south east. This is due to the fact that Night Buses provide a much slower journey time and have experienced deterioration in Excess Wait Time (EWT) in recent years. Furthermore, the tracks and assets required to run a night service already exist, which means the only capital costs required to realise the project are the installation of noise mitigation barriers.

In order to save on maintenance and operating costs, the proposed Night DLR services are not planned to start until both the current franchise with Keolis Amey Docklands (KAD) and current Private Finance Initiative (PFI) end in 2021, which means that the first benefits will not be realised until 2022.

2.2 Strategic Context

Making London a world class, 24 hour City

For London to become a truly 24-hour city, the transport network must serve all areas of our city throughout the day. The Night Tube has undoubtedly created an integrated, night-time transport network within the centre of London, bringing it on-par with great global cities such as New York and Berlin. However the historical lack of the Underground in the South East of London has meant this region has largely missed out on the new night-time service. This is particularly true for late night travel between London's two financial hubs, the City and Canary Wharf, but this is also the case for the Isle of Dogs and South Newham (Royal Docks Area).

At present, Bank to Lewisham is the DLR's busiest branch for late travel on both Weekdays and Saturdays, with the Woolwich Arsenal Branch second. A Night DLR service between Bank and Lewisham or Lewisham and Woolwich would resolve this night-time connectivity gap, linking the major employment hubs of the City of London and Canary Wharf to the major bus interchange at Lewisham town centre. The

Woolwich link would also deliver this connectivity, but importantly it would bring a wider part of South East London into the night-time transport network.

Both options would allow late night workers to travel more quickly to/from central London (CAZ), reducing their reliance on Night Buses or expensive taxis and permitting them a choice of route. Leisure passengers would also benefit, allowing them to make the most of London's world class restaurants, theatres, bars and clubs without having to worry about catching the last train home. There is also a reputational risk to not running a night time service on the DLR, as customers become accustomed to a night service on the Underground and Overground and begin to expect the same level of night time connectivity on our entire network.

Supporting development

The Bank to Lewisham route directly connects 4 opportunity areas as designated within the London Plan (January 2017), with these areas designated to deliver over 30,000 homes and 190,000 jobs. These figures rise to 7 opportunity areas and 50,000 homes/200,000 jobs when the Woolwich Arsenal option is included. This huge growth will evidently lead to increases in demand, and a night time service would begin to address this, all whilst supporting the rapid development of East/South East London. While some demand may be extracted from Night Buses due to the significant journey time savings, the main driver of this proposal will be new and currently suppressed demand for late night travel, which will be spurred by development.

2.3 Objectives and Benefits Criteria

The objectives for this project are shown in the table below.

Table 1: Objectives and benefits criteria

Objectives	Main benefits by stakeholder group
Objective 1 Reduce Night Journey Times between Central and South East London	Passengers Non financial Reduced journey times allow expeditious travel for all trips along these routes, compared to alternatives. Connections to the Night Tube would also become easier, with connections with the Jubilee Line possible at Canary Wharf, North Greenwich and Canning Town, and with the Overground (East London Line) at Shadwell.
Objective 2 Support regeneration	Local residents/passengers Non financial Access to public transport is vital for new developments, and a service increase will allow greater passenger movements

2.4 Existing Arrangements and Business Needs

Existing Arrangements

The last DLR service from Bank to Lewisham departs at 00:30 and 00:32 for Woolwich Arsenal. Current night time travel options between Bank and Lewisham/Woolwich therefore consist of Night Buses, taxis or a combination of modes. The 'do-nothing' option would retain this connectivity gap to the South East, meaning night time journeys would continue to be difficult. Night time trips between the City and the Isle of Dogs would remain at around 25 minutes, and Woolwich Arsenal would remain more than 50 mins away by Night Bus.

Business Needs

The Night-tube is causing 'neighbour envy' for the DLR, with passengers in the South East currently only able to reach Canary Wharf, North Greenwich, Canning Town and New Cross Gate. The reputational risk of not running a Night DLR service will grow over time.

2.5 Potential Scope and Service Requirements

The scope of this business case is the provision of a night time 3 car DLR service on the Bank – Lewisham branch or Bank – Lewisham & Woolwich Arsenal branches. These services would operate at either 4tph or 6tph (current 'late' headway). Services would run identical routes and run times as earlier off peak DLR routes on Friday and Saturday nights, thanks to the automated nature of the service.

The scope is limited to these 5 options (Do nothing, 2 routes & 2 tph options) and does not include consideration of other DLR branches or frequencies.

2.6 Constraints and Dependencies

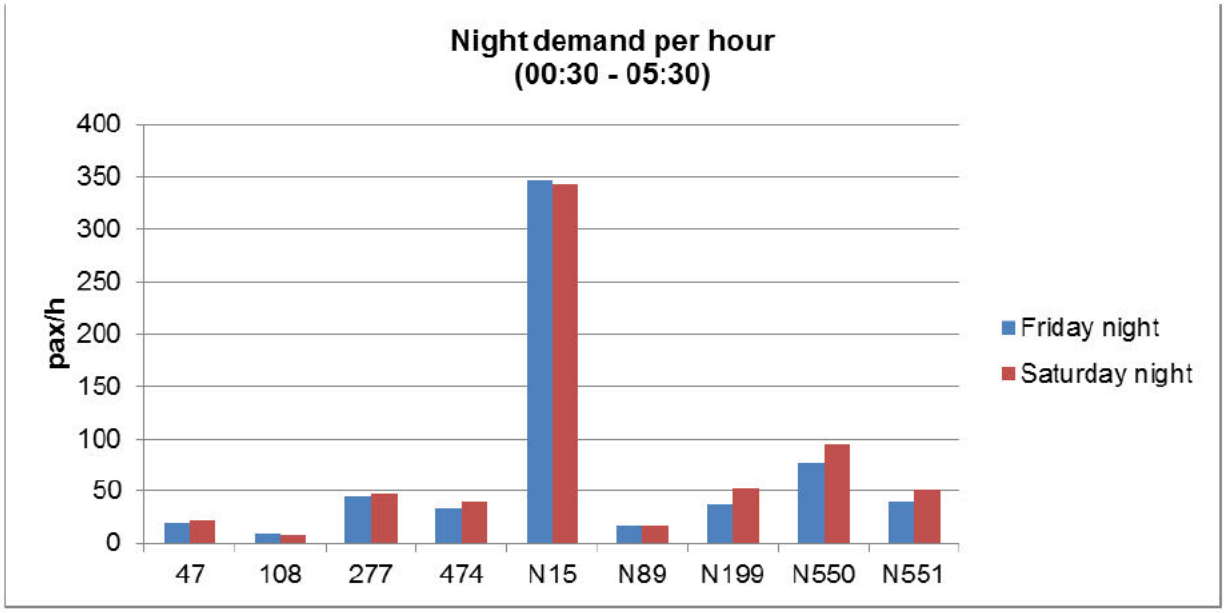
The key constraints for a night time DLR service are likely to be operational, with more clarity required as to the maintenance schedules and track access issues. There would also be issues affecting the public such as noise, vibration and lighting which would need to be mitigated against. A provision for the installation of noise reduction barriers similar to the ones installed in the East London Line following the introduction of Night Overground services has been included.

Internal dependencies would need to be reviewed with the Bus Network Development team in order to optimise and coordinate the operation of the Night Bus and Night DLR fleets. This would include timetabling and diverting directly parallel services. A high-level assessment of current Night Buses (including 24 hour buses) is shown in Table 2, including frequency, alignment to relevant sections of the proposed Night DLR routes and total Friday and Saturday night demand (both boarders and alighters).

Table 2: Night Bus routes analysis

Bus Route	Frequency (buses per hour, Fri and Sat)	Section of DLR that it aligns with	Alignment (1to 3, poor to good)	Friday night demand (00:30-05:30)	Saturday night demand (00:30-05:30)
47	2	Deptford Bridge - Lewisham	3	96	107
108	2	Poplar - Lewisham	2	51	45
277	2	Crossharbour - Island Gardens Westferry - Island Gardens	3	225	241
474	2	Canning Town - King George V	3	171	200
N15	6	Poplar - Canning Town	3	1,734	1,716
N199	3	Cutty Sark - Greenwich	3	188	259
N550	2	Bank - Westferry Blackwall - Canning Town Westferry - Island Gardens	3	383	474
N551	2	Bank - Poplar Poplar - Canning Town	3	203	254
N89	2	Deptford Bridge - Lewisham	2	84	86

Figure 1: Bus night demand



A more detailed assessment of the impact on the Night Bus network would be required in order to better understand the impact on revenue and operating costs that may arise from a redesign of the network in the area covered by the introduction of the Night DLR. Changes to the Night Bus network may be implemented once a Night DLR service has been introduced and evidence has been collected on journey patterns. This may mean a reduction or redesign of the current routes operating in the area in order to reduce route redundancy or improve services that may act as feeders to the newly introduced Night DLR services.

It must be noted that Night Bus routes would not be reduced below 2 buses per hour (30 minute frequency). Based on this, only the N15 and N199 routes could be subject to revised frequencies.

3 Economic Case

3.1 Options

The following options were considered when investigating the provision of a Night DLR service on the 2 branches described earlier in the document:

1. Do nothing (continue to not operate any Night DLR services on any branches).
2. A 4tph service between Bank and Lewisham
3. A 4tph service from Bank to both Lewisham and Woolwich Arsenal
4. A 6tph service between Bank and Lewisham
5. A 6tph service from Bank to both Lewisham and Woolwich Arsenal

Preferred option:

None of the options present a good BCR, although the Lewisham only options present a better BCR than options 3 and 5.

3.1.1 Overview

The following table presents the annual net operating cost in outturn values during the first 5 years of operation for Option 2 (4tph to Lewisham only). Net cost is approximately [redacted] per annum.

Table 3: Outturn net financial impact (£k)

	2021-22	2022-23	2023-24	2024-25	2025-26	2026-27
Project Costs (EFC)	[redacted]					
Opex Total						
Revenue Increase						
Net Financial Impact						

3.1.2 Capital Costs

No capital costs other than the installation of noise mitigation barriers have been assumed for the introduction of Night DLR services. In lack of a detailed noise assessment for Night DLR, the project costs for this have been based on information from the night Overground services running on the ELL. Like the DLR network, the ELL mostly runs above ground and therefore noise barriers to mitigate against the noise impact resulting from its operation had to be installed.

A Night DLR noise paper was produced in February 2017 which referenced a previous assessment undertaken in 2014 to determine the impact of a 3 or 4tph night service on both the Bank to Lewisham and Bank to Woolwich Arsenal routes. This paper stated both the noise targets for the DLR as well as a list of locations where noise policy is likely to be exceeded following the introduction of a night service. Based on the number of locations stated in this paper, and the noise barriers cost per location from the ELL, an estimate of the cost of installing noise barriers at the identified DLR locations was produced.

Table 4: Number of sites required noise mitigation and cost (£k, 2018 prices)

Branch	Number of sites	Cost per site	Total cost
Lewisham	16	[redacted]	
Woolwich Arsenal	6		
Bank + Woolwich Arsenal	22		

The Capital Costs of installing noise mitigation barriers have been assumed to be dependent on geographical scope only (number of sites) and not service frequency; therefore there is no difference in costs between the 4tph and the 6tph options.

Table 5: Capital costs (£k, 2018 prices)

	Option 2	Option 3	Option 4	Option 5
Capital Cost (£k, 2018 prices)	[redacted]			

The Capital Costs have been inflated by TRUCv (TPI Rail & Underground Civils) and have an optimism bias of 66% applied on top of the above 2018 prices in the appraisal.

The increase in capital costs in relation to the previous version of the Night DLR business case is explained by the fact that the former did not include a requirement for noise barriers.

3.1.3 Operating Costs

The Operating Costs for operating a Night DLR service are dependent on levels of staffing required, train operating costs (including additional vehicle kilometres), energy costs and maintenance of the noise mitigation barriers.

Staff costs

An assumption around staffing levels has been made following conversations with operational colleagues and information contained in various internal documents that reflect the current levels of staff employed by the franchisee KAD and their cost in 2015 prices. Station Staff (CSA) are assumed to be required at Section 12 stations (Bank, Island Gardens, Cutty Sark and Woolwich Arsenal) only.

For night operation, it is assumed that the following numbers of staff will be required.

Table 6: Staff assumptions and costs (£k, 2018 prices)

Staff category	Option 2	Option 3	Option 4	Option 5	Cost per person per annum	Cost per person per annum
FLRT (First Line Response Technicians)	1	1	3	3	[redacted]	
TSA (Train Service Assistant)	4	5	7	8		
Mobile Supervisor	1	1	3	3		
Planned maintenance	1	1	2	2		
BTP (British Transport Police)	4	5	7	8		
CSA (Station Staff)	3	3	4	4		
TSO (Travel Safe Officers)	1	1	2	2		

Staff costs have been inflated as per the Nominal Earnings index as stated in the latest version of WebTAG, Table A5.3.1.

Train operating costs

The DLR Development & Planning Service Model (v5-2) has been used to estimate the train operating costs, including on train staff, for the different options, which are summarised below.

Table 7: Train operating assumptions and costs (£k, 2018 prices)

	Option 2	Option 3	Option 4	Option 5
Number of trains in service	4	9	6	13
Number of vehicles in service	12	27	18	39
Operating train km (annual)	46,100	105,250	69,130	157,880
Operating vehicle-km (annual)	138,250	315,750	207,380	473,630
Staff hours (annual)	2,040	4,580	3,060	6,620
Indicative annual operating cost (£k, 2018 prices)	[redacted]			

Train operating costs have been inflated by RPI.

Energy costs

Energy costs are based on annual train kilometres and an assumed electricity cost in 2015 prices of of 81 pence per 3-car train km.

Table 8: Energy costs (£k, 2018 prices)

	Option 2	Option 3	Option 4	Option 5
Energy costs (£k, 2018 prices)	[redacted]			

Electricity costs have been inflated using the nominal increase for the resource cost of electricity for Rail as stated in the latest version of WebTAG, Table A1.3.7.

The increase in energy costs in relation to the previous version of the Night DLR business case is explained by the fact that the latter assumed 1 train less for the operation of the Woolwich Arsenal services, which is directly related to the energy cost.

Maintenance costs

The maintenance of the noise mitigation barriers has been assumed to cost 1 per cent of its capital expenditure per annum, inflated by RPI.

3.1.4 Impact on Revenue

Revenue has been estimated by applying an elasticity of 0.28 to the Passenger Benefits generated by each option. The elasticity applied corresponds with the recommended average value for LU/Rail/DLR projects.

Previously, a very conservative revenue assumption had been made, with only 10% of users paying the off-peak fare. A comparison between the revenue generated by the Night Tube in relation to its normal 'day' operation demonstrated that this assumption was indeed too low, and therefore the standard approach of applying an elasticity has been used in the current appraisal. Revenue is forecast to build over four years in line with standard assumptions.

3.2 Explanation of Social / Strategic Benefits

The primary benefit of this project is to reduce journey times for those travelling to and from the Isle of Dogs and the wider South East during the night. As with the Night Tube, this will benefit passengers of all purposes, from workers to revellers, and will also avoid the reputational risk of not operating a night service on the DLR.

Other benefits not yet monetised include the journey comfort and directness that the DLR offers over Night Buses. The operational record of the DLR is incredibly strong, whereas in recent years Excess Wait Time (EWT) has been increasing across the bus network. Customers switching from bus would likely see the service as superior in spite of the slightly more expensive fare.

The DLR provides an affordable and accessible alternative to taxis and private hire, which can be prohibitively expensive especially in the early hours.

Developments on the Night DLR network would become more accessible for those on all incomes, therefore sites will become more attractive to buyers and developers alike. This will aid the Mayor's house building ambition.

3.2.1 Monetised Benefits

Journey time saving benefits have been modelled and monetised for the 4 different options using clock time rather than generalised journey time in absence of detailed information on travel patterns.

The modelling of these journey time savings was done through a comparison between the night journey time using DLR services (based on current 'day' time operation) and the current provision of night journeys (using buses and Night Tube, including night

Overground services on the ELL). In order to capture the expected longer wait times under the 4tph scenarios, an additional 2.5 minutes (5 minutes additional wait per train, divided by two) was added to the resulting journey times. A summary of average journey time savings per trip is shown in the table below.

Table 9: Average journey time saving per trip (minutes)

	Option 2	Option 3	Option 4	Option 5
Average journey time saving per trip (minutes)	9.6	9.5	12.0	11.9

The resulting monetised benefits (using a VoT of £8.27/hour) are however lower in the present appraisal than in the previous business case analysis. This is mainly due to the forecast Night DLR demand being lower following the latest LUTE forecasts and observed Night Tube demand for the Jubilee line and Overground (ELL). Whereas the latest demand figures for Night Tube show an average night demand reduction of 76 per cent from the last full hour of normal operation (assumed to be 23:00 – 00:00), the previous business case analysis assumed an average reduction of only 21 per cent.

Table 10: Demand per night

Demand per night	Option 2	Option 3	Option 4	Option 5
Current appraisal	5,066	8,165	5,066	8,165
Previous appraisal	15,958	22,683	15,958	22,683

A summary of the monetised benefits per annum based on the year that benefits start to arise (2022) is provided below for the. The previous business case results have been adjusted to reflect 2022 instead of 2017.

3.3 Key Assumptions

No non-standard assumptions have been in the analysis of cost of benefits with the exception of two user-defined indices derived from the latest version of WebTAG (Nominal Earnings index and Nominal Power Cost). These have been used to inflate staff and energy costs respectively.

3.4 Feasibility, Risk

The main risks to the feasibility of the proposed Night DLR service are:

- Night service demand trends. As seen in the Night Tube, night demand has not met the levels forecasted in the business case which is resulting in a patronage of approximately 50% of the initial estimates.
- Residents may be adversely affected by noise and vibration although this will be mitigated by noise barriers.

- The Night Tube was significantly delayed by Industrial Relations issues. This may also be the case for Night DLR.

3.5 Outcome of Quantified Analysis

Table 11 shows a summary of the appraisal over 30 years. None of the options present a good BCR or are financially positive.

Notwithstanding the above, it appears that the imposition of additional wait times for a 4tph service compared with a 6tph service has limited impact on the benefits gained. This is perhaps due to the high existing journey times which mean that customers would still be very likely to use a night service, whilst TfL recoup efficiency savings.

The addition of the Woolwich Arsenal Branch (Options 3 and 5) brings the BCR down. As stated earlier, the Lewisham branch is the busiest and it appears that the significantly higher level of demand on this line makes it a more attractive proposition.

Table 11: Economic Appraisal, Net Present Values (NPV) (£k)

	Option 2	Option 3	Option 4	Option 5
CAPEX – Noise Mitigation	[redacted]			
Project EFC (Discounted)				
Project Optimism Bias				
Operating Costs (exc. Staff)				
Staff	[redacted]			
Revenue Change				
Net Financial Effect (NFE)				
Payback Period (years)	[redacted]			
Net Benefits				
Benefit to Cost Ratio				

4 Summary

4.1 Overall Assessment

The current business case for Night DLR services provides poor Value for Money (VfM) as its BCR is below 1.0. Therefore it does not justify a case for investment.

None of the options are financially positive although all of them bring benefit to society in the form of reduced journey times. However, the forecasted demand for Night DLR services is not sufficiently high to generate sufficient revenue or monetised benefits to deliver a good BCR or a positive financial outcome.

The reason behind the low demand forecast is a direct result of the better understanding of Night Tube demand as the service matures. The latest demand data for Night Tube shows that patronage has not increased or materialised at the rate that it had been forecasted.

It must be noted that Night Bus analysis has not been conducted yet and cost savings might be identified if Night Bus routes are modified.

4.2 Next Steps

Based on the poor BCRs presented by all the options assessed, it is recommended that the Night DLR project is not progressed on economic grounds.

Further analysis on Night Buses may identify potential cost savings.