

West End Bus Services Review

November 2016

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1 Overview

- 1.1.1 This report summarises the review of bus services in the central area, including the West End and Farringdon, in response to changes in demand. Demand for bus services is falling as other network improvements commence. More frequent and reliable Tube services, the introduction of the Hopper bus fare and improved walking and cycling routes mean historic demands placed on the bus network are evolving. In particular there is increased demand to and from key Overground and Underground stations as people take advantage of improved rail services.
- 1.1.2 Over the past few years a number of schemes have been implemented on the central London road network that has reduced highway capacity and as a direct consequence some bus speeds have reduced. This has also contributed to the decline in passenger demand on central London routes.
- 1.1.3 Introduction of the Elizabeth line will also change how passengers use the bus network. This review focuses on services between Paddington and Liverpool Street, including services in the Oxford Street/Bond Street, Tottenham Court Road and Farringdon areas.
- 1.1.4 The City of Westminster (CoW) and other key stakeholders are committed to improving the pedestrian environment on Oxford Street. This is in light of the uplift in pedestrian footfall expected from the Elizabeth line at Bond Street and Hanover Square and an improvement in air quality and congestion. There is an aspiration to reduce the number of buses on Oxford Street.
- 1.1.5 The Mayor of London has committed to transform Oxford Street by the end of his mayoral term, in 2020. Prior to this decision Transport for London (TfL) and CoW have agreed that a 40% reduction in buses on Oxford Street West (OSW) is achievable and the West End service changes described in this document meet this objective. Proposals for further transformation of Oxford Street will be brought forward when appropriate.
- 1.1.6 A summary of changes to demand in central London is described in Chapter 2, a summary of schemes under review in central London is described in Chapter 3, Chapters 4, 5 and 6 detail the analysis of schemes including some information on option selection methodology, Chapter 7 provides more information about our appraisal, Chapter 8 provides a summary of broken links and Chapter 9 details infrastructure requirements to facilitate these changes.

2 Usage

2.1 Central London

2.1.1 Demand in central London has declined over the past 5 years. The majority of this has happened in the past 2 years.

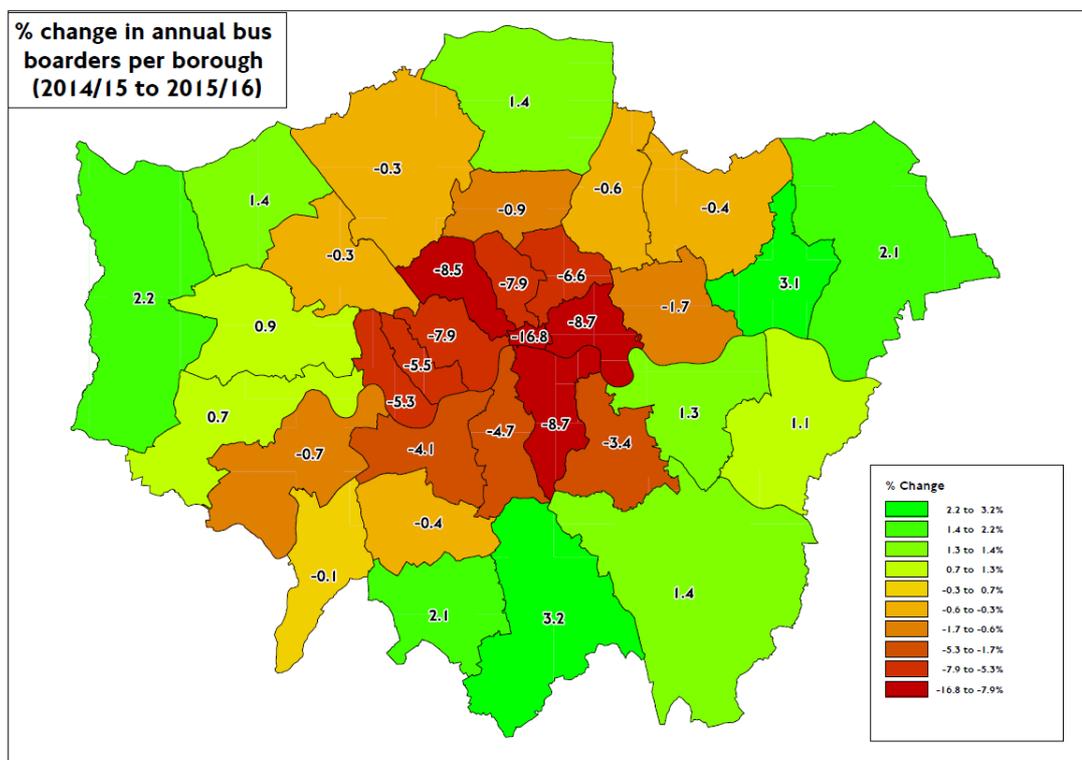


Figure 1 – percentage change in demand by borough

2.1.2 The City of London, London Borough (LB) of Camden, CoW and LB Islington have all had decreases in demand of between 7.9 and 16.8% between 2014/15 and 2015/16, as shown in figure 1. This is due to a combination of reasons that include improvements to rail and slower traffic speeds.

2.1.3 These recent reductions in demand have led to an evolution of option development that started off as a response to the introduction of the Elizabeth line (which will further reduce demand for some services, especially east/west), into proposals that can be made prior to it opening in 2018/19, in most cases.

2.2 The Elizabeth line

2.2.1 The Elizabeth line services are due to begin in December 2018, with the line opening fully in December 2019. This is forecast to reduce demand for bus services between Paddington and Liverpool Street by providing faster journey times and a higher frequency of service. Figure 2 shows Railplan output that indicates changes in demand as a result of the Elizabeth line opening. Railplan is a strategic modelling tool that predicts the public transport mode (eg. rail, underground, bus) and route that a person chooses to get to their destination. It considers journey time, interchange routes, service levels and crowding levels.

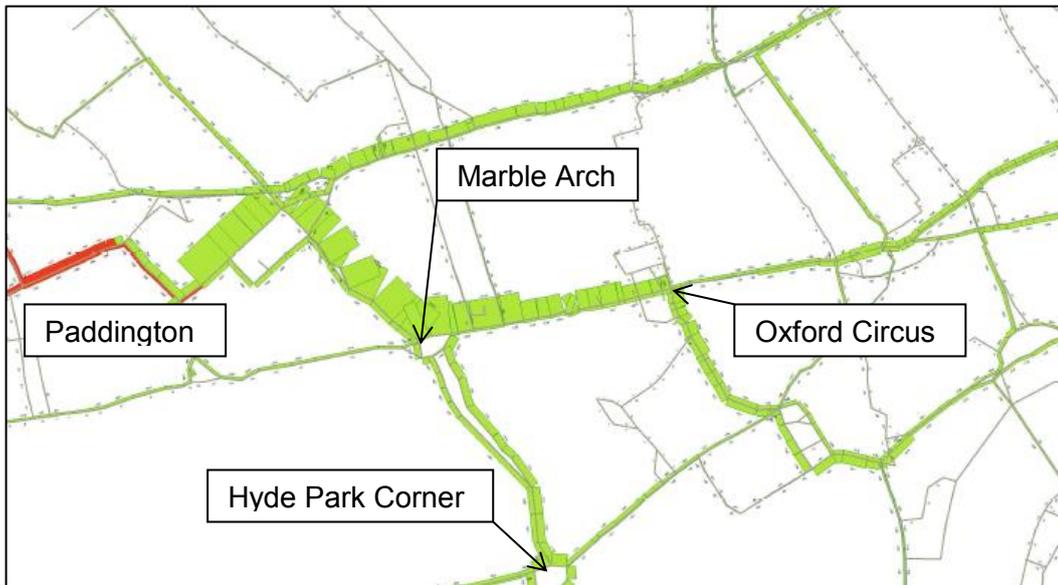


Figure 2 – Railplan output showing forecast change in bus demand in the morning peak due to full introduction of the Elizabeth line (net increases in demand in red and net decreases in demand in green)

2.2.2 Figure 2 shows demand increases to the west of Paddington and reduces significantly to the east of Paddington.

2.2.3 Table 1 shows peak hour forecast change in trips from Railplan by corridor.

Corridor	Peak trips	peak bph change
Edgware Road , south of Paddington	-1770	-25
Paddington Praed Street	-1630	-23
Oxford Street West	-1390	-20
Marylebone Road	-710	-10
Regent Street	-430	-6
Eastbourne Terrace	-380	-5
Victoria (Grosvenor)	-330	-5
Edgware Road North of Westway	-240	-3
Harrow Road	-240	-3
Park Lane	-240	-3
Hyde Park Corner (Park Lane)	-240	-3
Hyde Park Corner (Piccadilly)	-210	-3
Knightsbridge	-200	-3
Kensington Road	-150	-2
Bayswater Road	-140	-2
Millbank	-110	-2
Victoria (Victoria Street)	-110	-2
Porchester Road	170	2
Bishops Bridge Road	480	7

Table 1: Forecast change in AM peak hour trips and bus frequency required in buses per hour (bph). Red indicates a decrease in demand.

2.2.4 The largest forecast drops in demand are on Praed Street, OSW and Marylebone Road. The drop in demand on OSW is proportional to 20 bph. Therefore reducing services between Paddington/Edgware Road and Oxford Street is deemed appropriate as well as on other corridors like the Marylebone Road and Regent Street.

2.2.5 A comprehensive package of changes to the bus network in the central area is being consulted on which:

- Takes account of recent and forecast changes in bus demand in the central area
- Consider changes to connectivity required due to the opening of the Elizabeth line
- Considers stakeholder aspirations, including a reduction in the number of buses on Oxford Street

3 Schemes under review

3.1 Summary

3.1.1 TfL are in the process of consulting on two major schemes; The North West London Review and Liverpool Street bus service changes. Both schemes affect routes that serve the central area. It is planned to introduce both schemes in the first half of 2017, subject to consultation.

3.2 Inner North West London Review

3.2.1 The Inner North West London Review proposes changes to routes 13, 82, 113, 139 and 189 serving Abbey Road and Finchley Road. A map of the day proposals is below:

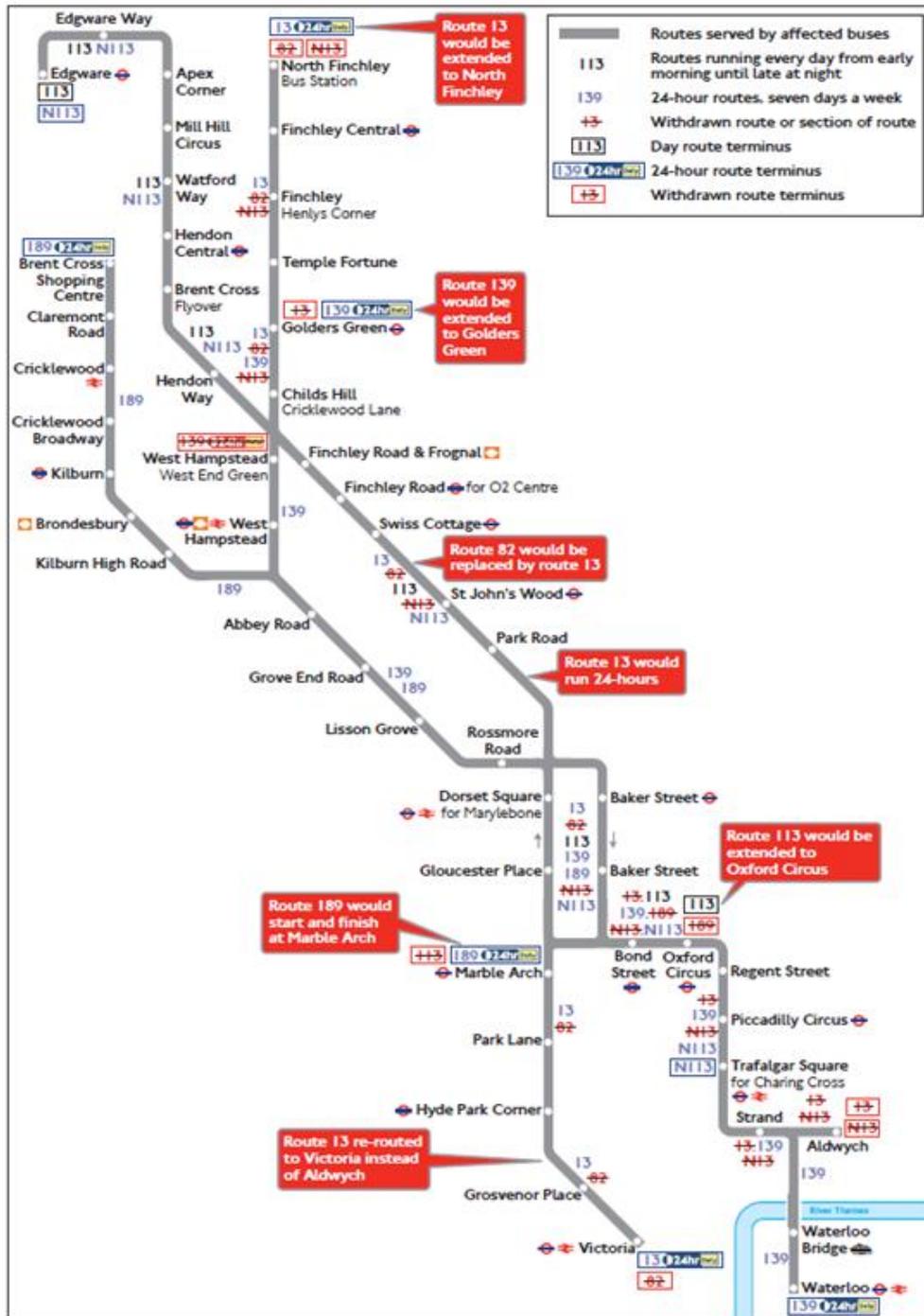


Figure 3: Proposed day bus network for Abbey Road and Finchley Road

3.2.2 The scheme:

- Extends route 13 northwards from Golders Green to North Finchley and diverts it at Baker Street/Gloucester Place to run to Victoria rather than Aldwych.
- Increases frequencies on route 13 from 8 to 10 bph Monday to Friday daytimes (with additional peak hour, peak direction journeys), from 7 to 10 bph on Saturdays and from 5 to 6 bph on evenings and Sundays.
- Converts route 13 to 24 hour operation with route N13 withdrawn.
- Withdraws route 82
- Extends route 113 to Oxford Circus and increases frequencies from 6 to 8 bph Monday to Saturday daytimes (with additional peak hour, peak direction journeys) and from 3 to 5 bph evenings and Sundays. Does not change the night service
- Extends route 139 northwards from West Hampstead to Golders Green and withdraws the morning peak journeys
- Cuts back route 189 from Oxford Circus to Marble Arch and withdraws the morning peak journeys.

3.2.3 Consultation on this scheme has closed, and a decision on whether to proceed is expected shortly. This would reduce the number of buses on Oxford Street by 8 bph and is included in the future baseline assumptions for the West End proposals.

3.3 **Liverpool Street bus service changes**

3.3.1 Changes to buses serving Liverpool Street station are as follows:

- Route 11 would be withdrawn between Bank and Liverpool Street Station and extended via Threadneedle Street and Bishopsgate to Worship Street.
- Route 23 would no longer run between Aldwych and Liverpool Street Station
- Routes 42 and 78 would be diverted to Liverpool Street Bus Station.

3.3.2 These proposals respond to changes in demand leading up to the opening of the Elizabeth line in 2018/19.

3.3.3 Route 23 forms part of the West End service changes covered in this report and is shortened significantly as a consequence of the Liverpool Street bus service changes.

3.3.4 The next three chapters outline the analysis and proposals in and around Paddington, Bond Street, Tottenham Court Road and Farringdon Elizabeth line Stations.

4 Paddington

4.1 Background

- 4.1.1 Routes at Paddington have been reviewed in response to changes in demand outlined in chapter 3. Two schemes have been considered that improve connectivity to Paddington Station and better match capacity to demand, where demand is forecast to change, focussing on the decrease in demand east of Paddington station.

4.2 Routes 23, 46 & 452

Frequency and structure

- 4.2.1 Route 23 runs between Liverpool Street and Westbourne Park bus garage at 7.5 bph Monday to Saturday daytimes and 5 bph on Sundays and evenings. It operates at 2 bph on all nights. 87-capacity double deck buses are used. Subject to consultation it will be withdrawn between Aldwych and Liverpool Street Station in 2017, as detailed in paragraph 3.3.1.
- 4.2.2 Route 46 runs between Lancaster Gate station and St. Bartholomew's Hospital at 6 bph Monday to Saturday daytimes and 4 bph Sundays and evenings. 55-capacity single deck buses are used.
- 4.2.3 Route 452 runs between Kensal Rise station and Vauxhall station at 7.5 bph Monday to Saturday daytimes and 5 bph on Sundays and evenings. 87-capacity double deck buses are used.

Reliability

- 4.2.4 Route 23's day service currently achieves 1.5 minutes Excess Wait Time (EWT) against a minimum standard of 1.3 minutes EWT. Mileage lost due to traffic is 4.3% on weekdays, 5% on Saturdays and 3.3% on Sundays.
- 4.2.5 Route 23's night service currently achieves 80% on time departures over the past year against a minimum standard of 82%.
- 4.2.6 Route 46 currently achieves 1.3 minutes EWT over the past year against a minimum standard of 1.3 minutes.
- 4.2.7 Route 452 currently achieves 1.1 minutes EWT against a minimum standard of 1.2 minutes EWT. Mileage lost due to traffic is 3.8% on weekdays, 1.7% on Saturdays and 1.3% on Sundays.

Usage

- 4.2.8 Route 23's day service usage has fallen by 2% on weekdays, 4% on Saturdays and risen by 5% on Sundays between 2011 and 2015. In the past year increased congestion due to reductions to highway capacity have led to a worsening in performance and usage has fallen by a further 11% on weekdays and 12% on weekends.
- 4.2.9 Route 23's night service usage has risen on weekdays by 3%, fallen by 9% on Saturdays and 12% on Sundays between 2011 and 2015. Since then usage has fallen by a further 9% on weekdays and 20% on Saturdays and 17% on Sundays
- 4.2.10 Route 46's usage increased by 3% on Mondays to Fridays, and by 2% on Saturdays over the past 5 years. The change in trips on Sundays is negligible.

- 4.2.11 Route 452's usage has fallen by 8% on weekdays, 7% on Saturdays and 4% on Sundays between 2011 and 2015. In the past year an increase in congestion as a result of a reduction in highway capacity have led to a worsening in performance and usage has fallen by a further 1% on weekdays, 2% on Saturdays and 3% on Sundays.

Capacity

- 4.2.12 The busiest point on route 23 is Marble Arch towards Aldwych where 7 bph is required to meet demand. The busiest point at night is Marble Arch towards Westbourne Park where 2 bph is required to meet demand at weekends.
- 4.2.13 The busiest point on route 46 is at St Pancras station where 5 buses are required towards Lancaster Gate in the afternoon peak.
- 4.2.14 The busiest point on route 452 is Ladbroke Grove station towards Vauxhall where 7 bph is required to meet demand. Sufficient capacity is provided on route 52 north of Ladbroke Grove to meet demand across routes 52 and 452.

Proposals

- 4.2.15 Demand from Paddington into the West End is forecast to reduce significantly due to many west London rail passengers choosing to transfer to Elizabeth line services at Paddington. In response to this it is proposed to withdraw route 23 between Paddington and Aldwych (following the cut back from Liverpool Street to Aldwych, as outlined in Chapter 3). Two routes currently run between Paddington and Oxford Circus, routes 7 and 23. Both were considered for shortening but route 23 was progressed because it creates significantly higher savings and is more worthwhile. Route 7 has already been significantly shortened in October 2014, when it was withdrawn between Russell Square and Oxford Circus.
- 4.2.16 Cutting route 23 back to Paddington creates a short route between Westbourne Park Garage and Paddington. Therefore extending the route further to the north-west would create new connections and additional capacity in areas where growth is expected in the future, like Wembley. In order to extend the route further northwest it is necessary to withdraw the northern end between Westbourne Park Garage and Ladbroke Grove Sainsbury's. Re-routeing the 452 to Westbourne Park via Kensal Road would retain links between Kensal Road and Ladbroke Grove. Routes 52 and 452 currently parallel each other between Kensal Rise and Knightsbridge, therefore the number of broke links is very low (290).
- 4.2.17 It is proposed to withdraw route 46 between Lancaster Gate and Paddington to accommodate route 23 at Lancaster Gate.
- 4.2.18 Route 452 would terminate at Harrow Road, Prince of Wales. Westbourne Park garage is not available for use by other bus operating companies.
- 4.2.19 The extension of route 23 further west requires further consideration and the routeing details will be subject to further analysis and a future consultation.

Benefits

- 4.2.20 The main benefits of the scheme are:
- Makes significant savings
 - Matches capacity to demand between Paddington and Aldwych, reflecting the drop in demand forecast due to Elizabeth line
 - Increases available stand capacity at Aldwych, which could be used for future changes

- New connections and additional capacity to areas north-west of Ladbroke Grove (if extension of route 23 further is progressed in the future).

Disbenefits

4.2.21 The main disbenefits of the scheme are broken links. The scheme breaks:

- 2,400 (12% of route total) weekday trips on route 23 from Central London although this is expected to reduce by up to 30% once the Elizabeth Line opens. Around a third of these are between Paddington and the West End, where a significant reduction is expected in demand following opening of the Elizabeth line. Another third are from the Westbourne Grove area and the remainder are from Ladbroke Grove where other transport options exist.
- 220 (2% of route total) weekday trips on route 23 to/from Kensal Road.
- 290 (2% of route total) weekday trips on route 452. These are long trips between Kensal Rise and South of Royal Albert Hall.
- 190 (2% of route total) weekday trips on route 46. All broken links are within at least 700 metres of alternative stops.

4.3 Route 332

Frequency and structure

4.3.1 Route 332 runs between Neasden, Tesco and Paddington, Eastbourne Terrace at 6 bph Monday to Saturday daytimes and 5 bph Sundays and all evenings. 87 capacity double deck buses are used.

Background

4.3.2 This proposal is to improve connectivity to Elizabeth line (and other rail services) at Paddington. Parts of Maida Vale currently have no direct link to Paddington.

4.3.3 The southern terminus of route 332 runs in a loop around Paddington Station via Edgware Road, Harrow Road, Bishop's Bridge Road, Eastbourne Terrace and returns via Praed Street and Edgware Road. This means passengers wishing to alight at the main station entrance or St. Mary's Hospital have to do so on Bishops Bridge Road and walk up to 500 metres to Praed Street.

4.3.4 In order to improve connections between Maida Vale and Paddington a scheme to re-route the 332 via Kilburn Park Road, Shirland Road and Warwick Avenue to Lancaster Gate via Paddington has been identified. This would remove it from the southern end of Edgware Road between Kilburn High Road and Praed Street, where demand has fallen over the past few years.

Proposal

4.3.5 It is proposed to re-route the 332 between Kilburn Park Station and Paddington via Kilburn Park Road, Shirland Road, Warwick Avenue, Bishops Bridge Road and Eastbourne Terrace and extend it to Lancaster Gate station.

Benefits

4.3.6 The main benefits of this scheme are that it:

- Provides Maida Vale residents with a direct link to Paddington Station and the new Elizabeth line entrance on Eastbourne Terrace.
- Removes the circular routing of route 332 at Paddington and provides a two-way route on Eastbourne Terrace.

- Reduces capacity on Edgware Road to better match demand, which has fallen over the past few years, allowing for a better use of limited funds.
- Provides new links to Lancaster Gate.

Drawbacks

4.3.7 The main drawbacks of the scheme are that it:

- Breaks 600 (4% of total trips on the route) weekday trips on route 332.

Alternative option considered

4.3.8 Another option for improving connections to Maida Vale was considered which diverted route 414 via Paddington and Warwick Avenue. However this option breaks 2,100 (13% of total) weekday trips on route 414 and does not provide new connections to most of Kilburn Park Road.

5 Oxford Street and Bond Street

5.1 Background

- 5.1.1 Demand to/from OSW and Bond Street stops has decreased over the past few years. Table 3 shows boarding and alighting data for the three pairs of stops on OSW. The data is taken from two Wednesdays in September 2015 and 2016.

Stops	Total trips 2015	Total trips 2016	Change	% Change
Oxford Circus Station	19,800	18,200	-1,600	-8%
Bond Street Stn	8,200	6,500	-1,700	-21%
Selfridges	13,400	13,400	0	0%
Total	41,400	38,100	-3,300	-8%

Table 2: Total trips to/from OSW stops

- 5.1.2 It shows a clear drop in usage from two of the three pairs of stops and a 3,200 drop overall, which equates to 8%. Demand to/from Selfridges stops has remained fairly level.
- 5.1.3 A significant number of trips on routes that serve OSW are through trips across the central area or to other major attractors in central London like Victoria, Waterloo or other parts of the West End.
- 5.1.4 Oxford Street is not the busiest point of any route that serves OSW. The busiest points tend to be departing or entering zone 1, with the exception of a few routes where the busiest point is slightly further out. Capacity provided on Oxford Street is not required to meet demand on Oxford Street, buses tend to be about half full in the busiest hour.
- 5.1.5 The proposals in this chapter also respond to the decrease in demand forecast when the Elizabeth line opens, which is a decrease equivalent to around 20 bph in the AM peak on OSW.

5.2 Routes 3, 22, 137 and C2

Frequency and structure

- 5.2.1 Route 3 runs between Oxford Circus and Crystal Palace at 8 bph Monday to Saturday daytimes. It was temporarily curtailed at Conduit Street in January 2015 to mitigate against the effects of Road Modernisation Plan (RMP) on Embankment. 87-capacity double deck buses are used.
- 5.2.2 Route N3 runs between Bromley North Station and Oxford Circus at 2 bph on weeknights. On weekends it operates in two legs at 2 bph between Bromley North Station and Oxford Circus and 2 bph between Crystal Palace and Oxford Circus. 87-capacity double deck buses are used.
- 5.2.3 Route 22 runs between Putney Common and Piccadilly at 10 bph in the peaks, 8 bph Monday to Saturday daytimes and 6 bph evenings and weekends. 87-capacity double deck buses are used.
- 5.2.4 Route N22 runs between Fulwell and Piccadilly at 2 bph weeknights and 3 bph weekends. 87-capacity double deck buses are used.
- 5.2.5 Route 137 runs between Streatham Hill and Oxford Circus at 10 bph Monday to Saturday daytimes, 7.5 bph Sunday shopping hours and 6 bph all evenings. Towards

Oxford Circus 15 buses are specified to arrive at Knightsbridge between 0805 and 0905. 87-capacity double deck buses are used.

5.2.6 Route N137 runs between Crystal Palace and Oxford Circus at 2 bph weeknights and 4 bph weekend nights. 87-capacity double deck buses are used.

5.2.7 Route C2 runs between Parliament Hill Fields and Victoria Station at 8 bph Monday to Saturday daytimes and 6 bph Sundays and all evenings. It has a night service that operates at 2 bph on all nights. 80-capacity double deck buses are used.

Reliability

5.2.8 Routes 3, 22, 137 and C2 have met their reliability minimum standard set by TfL for the past year. The night services have also met their minimum standards with the exception of route NC2, which has narrowly missed its minimum standard of 86% on time departures.

Usage

5.2.9 Route 3's usage has fallen by 7% on weekdays, 8% on Saturdays and 6% on Sundays between 2011 and 2015. In the past year a reduction in highway capacity has led to a worsening in performance and usage has fallen by a further 8% on weekdays and 9% on weekends.

5.2.10 Route N3's usage has risen by 8% on weekdays, fallen by 15% on Saturdays and 14% on Sundays between 2011 and 2015. In the past year a reduction in highway capacity has led to a worsening in performance and usage has fallen by a further 14% on weekdays and 23% on weekends.

5.2.11 Route 22's usage has fallen by 4% on weekdays and 5% on Saturdays between 2011 and 2015 and risen by 3% on Sundays. In the past year a reduction in highway capacity has led to a worsening in performance and usage has fallen by a further 1% on weekdays and 4% on weekends.

5.2.12 Route N22's usage has fallen by 10% on weeknights, 14% on Friday nights and 15% on Saturday nights between 2011 and 2015. In the past year a reduction in highway capacity has led to a worsening in performance and usage has fallen by a further 1% on weeknights, 15% on Friday nights and 11% on Saturday nights.

5.2.13 Route 137's usage has risen by 8% on weekdays, 11% on Saturdays and 14% on Sundays. Although a reduction in highway capacity has led to a worsening in performance over the past year usage has continued to rise by 3% on weekdays and remained level on weekends.

5.2.14 Route N137's usage has risen by 12% on weeknights, 7% on Friday nights and 2% on Saturdays between 2011 and 2015 due to continued growth in the Battersea area. In the past year a reduction in highway capacity has led to a worsening in performance and usage has fallen by 5% on Friday nights and 1% on Saturday nights. However usage on weeknights has continued to rise by 4%.

5.2.15 Route C2's daytime service usage has fallen on a continued downward trend by 11% on weekdays, 14% on Saturdays and 9% on Sundays over the past 5 years. Performance does not seem to have been affected by highway changes much in the past year.

5.2.16 Route C2's night time usage has fallen by 14% from 190 to 160 trips on weeknights, 40% from 350 to 210 trips on Friday nights, and 44% from 430 to 240 trips on Saturday nights.

Capacity

- 5.2.17 The busiest point on route 3 is Kennington where 7 bph is required to meet demand.
- 5.2.18 The busiest point on route 22 is the Kings Road, Sloane Square towards Piccadilly in the AM peak where 9 bph is required to meet demand and 11 bph are provided.
- 5.2.19 The busiest point on route 137 is Chelsea Bridge towards Oxford Circus in the AM peak where 15 buses are required and 15 are provided.
- 5.2.20 The busiest point on route C2 is Kentish Town Station towards Parliament Hill Fields in the PM peak where 6 bph are required and 8 bph are provided.
- 5.2.21 Capacity is well matched to demand on routes N3, N22 and N137. Surplus capacity is currently operated on the C2 night service, which only requires 1 bph to meet demand.

Proposal

- 5.2.22 A scheme that rebalances demand and supply in the West End, including a reduction in the number of buses on OSW has been identified.
- 5.2.23 The scheme would:
- Withdraw route 137 between Oxford Circus and Marble Arch
 - Withdraw route 22 between Piccadilly and Green Park and extend it via Berkeley Square to Oxford Circus
 - Withdraw route C2 between Victoria and Regent Street, Conduit Street
 - Withdraw route 3 between Oxford Circus and Trafalgar Square and extend it to Russell Square via Charing Cross Road and Great Russell Street.
- 5.2.24 Night services on routes N3, N22 and C2 would also change as part of the proposals. Route N3 would follow route 3 to terminate at Russell Square at its northern end, N22 would follow route 22 at its eastern end to terminate at Oxford Circus, the night service on route C2 would be withdrawn between Victoria and Conduit Street. Route N137 would remain unchanged.
- 5.2.25 The extension of route 3 from Trafalgar Square to Russell Square is to provide connections to the Elizabeth line at Tottenham Court Road. Extending route N/3 to Russell Square is not required for capacity but due to a lack of available stand space at Tottenham Court Road, Russell Square was chosen as an appropriate alternative. This creates some useful new connections between Russell Square and Charing Cross, Whitehall and Millbank and is a worthwhile alternative. Other schemes considered included withdrawing it between Oxford Circus and Trafalgar Square or Piccadilly. However neither was as worthwhile as the proposed option.

Benefits

- 5.2.26 The main benefits of the scheme are as follows:
- Makes a significant saving
 - Matches capacity with demand
 - Provides a direct link between Kings Road and Oxford Circus/Berkeley Square.
 - Provides a new direct link to the Elizabeth line at Tottenham Court Road from Millbank, and increased frequency from Whitehall/Trafalgar Square
 - Creates new links between Millbank and the British Museum/Russell Square
 - Retains local links between Sloane Square, Sloane Street and Oxford Street. Increases available stand capacity at Victoria, which could be used for future changes

Drawbacks

5.2.27 The main drawbacks of the scheme are the broken links as follows (based on current demand):

- 860 (5% of route total) weekday trips on route 3 around half of which are between Millbank and Oxford Circus. The other half are longer trips made mainly to/from south of Herne Hill.
- 850 (4% of route total) weekday trips on route 22. 320 are to/from the Kings Road, 350 to/from the Fulham area and 200 to/from Putney Heath.
- 2,300 (10% of route total) weekday trips on route 137. Around 600 of these are made to stops on Oxford Street, within walking distance of the alternative stops on Park Lane. Most broken trips, around 1,900, are to/from south of the river and 420 are to/from the Chelsea Barracks area. Around 75% of broken links can be made by walking under 400 metres.
- 1,500 (11% of route total) weekday trips on route C2. The majority of links broken are to/from Victoria, while around half are made south of the Euston Road. Around 200 broken links are fairly short trips to/from Albany Street, which would require interchange at Oxford Circus.

Alternative option considered

5.2.28 The proposals reduce the length of route C2 significantly. Consideration was given to re-routing the 88 via Albany Street and Parkway and extending it via the C2 routing to Parliament Hill Fields, which would allow route C2 to be withdrawn. This would create significant savings and remove a route from Hampstead Road, which is likely to be adversely affected by HS2 from 2017. However route 88 currently has a PM peak cycle time of 185 minutes and the extension adds an additional 32 minutes, making route 88 too long to operate reliably and was therefore not progressed further.

5.3 Route 6

Frequency and structure

5.3.1 Route 6 runs between Willesden Green and Aldwych at 8 bph Monday to Saturday daytimes and at 6 bph Sundays and evenings. 87-capacity double deck buses are used.

Proposals

5.3.2 A scheme to re-route the 6 away from Oxford Street has been identified. It would run via Park Lane and Piccadilly to line of route, instead of running via Oxford Street and Regent Street. This breaks 1,700 (8% of route total) weekday trips on route 6 but it meets the aspirations of the City of Westminster and other key stakeholders for reducing buses on Oxford Street and creates some new local links between Park Lane and Piccadilly, which currently do not exist. Of the 1,700 broken links nearly a half are within walking distance of alternative stops on Oxford Street or Regent Street.

5.3.3 The night service element of the scheme is all lose due to low frequencies at night, the minimal journey time saved and an increase in operated mileage. However it breaks 180 weekday trips in total on weeknights, which is proportional to the day service and retains a 24-hour network.

Benefits

5.3.4 The benefits of the scheme are that it:

- Makes significant savings
- Creates a new connection between Park Lane and Piccadilly
- Improves operational resilience.
- Provides faster journey times between Edgware Road and Piccadilly.

Drawbacks

5.3.5 The drawback of the scheme is that it:

- Breaks 1,700 (8% of route total) direct links between Maida Vale and Oxford Circus

5.4 Route 15

Frequency and Structure

5.4.1 Route 15 runs between Blackwall Station and Regent Street at 7.5 bph all day Monday to Friday. Two journeys are used to increase frequency to 10 bph towards Regent Street in the morning peak hour, and two journeys are used to increase frequency to 10 bph in the afternoon peak hour. It operates at 8.5 bph during the day on Saturday, 7.5 bph during the day on Sunday, and 6 bph on all evenings. 87-capacity double deck buses are used.

5.4.2 The route was temporarily cut back to Trafalgar Square in May 2013 due to changes to the highway in Cockspur Street. This has been maintained to date in order to mitigate increased journey times due to a variety of other schemes which have reduced highway capacity.

Reliability

5.4.3 It achieved an average of 1.4 minutes EWT over the last four quarters against its minimum standard of 1.3 minutes. Traffic lost mileage over this period was 3.6% on Mondays to Fridays, 1.4% on Saturdays and 1.3% on Sundays.

5.4.4 A number of highway schemes have impacted the reliability of route 15 over the last year, notably Aldgate Gyratory removal, CS2 upgrade and East-West Cycle Superhighway.

Usage

5.4.5 Route 15's usage over the last 5 years has decreased by 20% on Mondays to Fridays, by 29% on Saturdays and by 30% on Sundays.

Capacity

5.4.6 The busiest point in the morning peak is westbound at Limehouse where 8.2 buses are required and 10 are provided. Analysis of the 15, 115 and 135 corridor at Limehouse Station indicates that the existing capacity will be required when the Elizabeth line becomes operational.

Analysis

5.4.7 A permanent cutback of route 15 from Regent Street to Trafalgar Square has been evaluated as part of this review. Evidence indicates a general decline in usage on central London routes which has been acknowledged as part of the evaluation.

5.4.8 Should the 15 be returned to terminating at Regent Street, additional resource would be required in order to accommodate increased run time and mitigate against

congestion in the area. Cycle time with the terminus at Trafalgar Square is approaching three hours. Extending this cycle time further would make the route harder to operate reliably.

- 5.4.9 In addition, changes to other routes in the area are being considered which would require the use of the Conduit Street stand. Therefore returning route 15 to stand on Conduit Street would impact these ideas and would require alternative stand space to be sought.
- 5.4.10 Withdrawing route 15 between Regent Street and Trafalgar Square is expected to break approximately 900 (5%) trips, although most of these trips have already been lost.
- 5.4.11 Cutting the route back to Aldwych was considered. However this would break a significant number of trips and create capacity problems on Strand in the PM peak. It was not expected to provide value for money and was therefore not progressed.

Proposals

- 5.4.12 It is proposed to withdraw route 15 between Trafalgar Square and Regent Street, as per the existing curtailment, with existing frequencies.

6 **Tottenham Court Road and Farringdon**

6.1 **Background**

- 6.1.1 The schemes identified aim to improve connectivity to Tottenham Court Road Elizabeth line station and Farringdon Elizabeth line (and Thameslink) station and to better match capacity to current and future demand.

6.2 **Routes 8, 172 and 242**

Frequency and Structure

- 6.2.1 Route 8 day service runs between Bow Garage and Oxford Circus at 10 bph Monday to Friday peaks and 9 bph Monday to Friday interpeaks and Saturday shopping hours and 6 bph Sundays and all evenings. 87-capacity double deck buses are used.
- 6.2.2 Route N8 runs between Hainault and Oxford Circus at 3 bph weeknights. At weekends it operates in two legs: 4 bph between Hainault and Oxford Circus and 4 bph between Stratford and Oxford Circus. 87-capacity double deck buses are used.
- 6.2.3 On the 24 August 2013 route 8 was temporarily curtailed to operate between Old Ford and Tottenham Court Road instead of Bow and Oxford Circus due to junction improvements at Holborn Circus and Elizabeth line works taking place on the northbound slip road of the A12. Since then it has been subjected to a number of schemes that have increased congestion as a result of reduced highway capacity in the central area and as a consequence has not returned to Oxford Circus. The route returned to Bow in December 2013. Route N8 remained unchanged.
- 6.2.4 The stand it currently uses on Tottenham Court Road is a temporary stand and is due to be withdrawn as part of the West End Project by July 2017. A replacement stand could not be provided as part of the project and no other spare stand space is available at Tottenham Court Road within the planned road layout.
- 6.2.5 Route 172 currently runs between Brockley Rise, Honor Oak Park and St. Pauls Station, King Edward Street at 6 bph Monday to Saturday daytimes, and 4 bph on Sundays and all evenings. An additional journey runs in the AM peak towards St. Pauls. 87-capacity double deck buses are used.
- 6.2.6 Route 242 day service runs between Homerton Hospital and Tottenham Court Road at 8 bph Monday to Saturday daytimes and 6 bph Sundays and evenings. The night service runs at 3 bph on weeknights and 4 bph on weekends. 87-capacity double deck buses are used.

Reliability

- 6.2.7 Route 8 day service achieves 1.4 minutes EWT against a standard of 1.2 minutes EWT. Mileage lost due to traffic is 3.0% on weekdays, 1.6% on Saturdays and 0.6% on Sundays.
- 6.2.8 Route N8 achieves 1.4 minutes EWT against a minimum standard of 1.0 minutes EWT.
- 6.2.9 Route 172 achieves 1.4 EWT against a standard of 1.2 minutes EWT. Mileage lost due to traffic is 4.6% on weekdays, 2.6% on Saturdays and 1.0% on Sundays.
- 6.2.10 Route 242 day service achieves 1.0 EWT against a standard of 1.3 minutes EWT. Mileage lost due to traffic is 3.0% on weekdays, 1.6% on Saturdays and 0.6% on Sundays

6.2.11 Route 242 night service achieves 92% on time departures against a minimum standard of 86% on time departures.

Usage

6.2.12 Route 8's usage has decreased by 14% on weekdays, 18% on Saturdays and 21% on Sundays over the past 5 years, not including the effects of RMP schemes, which have resulted in a further decrease of around 7 % on all weekdays. The cut back to Tottenham Court Road has in part accounted for this although routes 25 and 242 have experienced similar drops in usage across the same corridor, which indicates the decrease in usage is a more general trend and not just the effects of the curtailment

6.2.13 Route N8's usage has decreased by 5% on weeknights and 25% on weekends over the past 5 years.

6.2.14 Route 172's usage has decreased by 12% on weekdays, 14% on Saturdays and 11% on Sundays, the majority of this has been within the past year.

6.2.15 Route 242's day service usage has decreased by 17% on weekdays, 17% on Saturdays and 14% on Sundays over the past 5 years. Usage on the night service has decreased by 20% on weeknights and 60% on weekends. The majority of this decrease is as a direct result of reduced highway capacity and RMP schemes affecting the route including Holborn Circus and the closure of the Narrowway in Hackney Town Centre.

6.2.16 Route 242's night service usage has decreased by 19% on weeknights and around 60% on weekends over the past 5 years. The majority of the decrease has come in the last 2 years, which is similar to the trend observed on other central London night services.

Capacity

6.2.17 The busiest point on route 8 is Bethnal Green Station towards Oxford Circus in the AM peak where 11 bph are required to meet demand and 11 buses are provided. Excess capacity on the corridor between Bank and Oxford Circus is currently operated with 14 buses required at the busiest point, Bank towards Oxford Circus across routes 8, 25 and 242, where 26 buses are provided.

6.2.18 The busiest point on route 172 is Old Kent Road in the AM peak towards St. Pauls where 7 buses are required to meet demand and 7 are provided.

6.2.19 The busiest point on route 242 is Shoreditch in the AM peak towards Tottenham Court Road where 9 buses are required to meet demand and 9 are provided.

Options

6.2.20 The following three schemes were considered:

- Option 1: Re-extend route 8 to Oxford Circus
- Option 2: Withdraw route 8 between Oxford Circus and Holborn and re-route to Russell Square.
- Option 3: Withdraw route 8 between Oxford Circus and Tottenham Court Road and withdraw route N/242 between Tottenham Court Road and St. Pauls.

6.2.21 Of the three options tested only option 3 is worthwhile. Option 1, extending route 8 back to Oxford Circus, would cost an additional 3 Peak Vehicle Requirement (PVR) and was not worthwhile. Option 2, withdrawing route 8 between Oxford Circus and

Holborn and extending it to Russell Square was not worthwhile because it saves 1 PVR and does not generate sufficient new demand.

6.2.22 Withdrawing route 8 between Oxford Circus and Tottenham Court Road is preferred to re-extending it to Oxford Circus as it meets WCC aspirations of reducing buses on Oxford Street and saves 1 PVR.

6.2.23 Withdrawing route N8 between Oxford Circus and Tottenham Court Road, in order to reflect the day service breaks 300 (20% of total) weekday trips on weeknights.

6.2.24 In order to create new links between Fleet Street and Farringdon Elizabeth line station a scheme was identified that withdraws route 172 between St. Pauls Station and Ludgate Circus and extends it to Clerkenwell Green. This also reduces the number of buses on Ludgate Hill, where bus demand is forecast to decrease in the future. It allows route 242 to use the stand vacated by route 172 at St. Pauls, King Edward Street.

Proposals

6.2.25 It is proposed to:

- Withdraw route 8 between Oxford Circus and Tottenham Court Road permanently, using the 242 stand
- Withdraw route N/242 between Tottenham Court Road and St. Pauls Station.
- Withdraw route 172 between St. Pauls Station and Ludgate Circus and extend it to Clerkenwell Green via Farringdon

6.2.26 The night service element of the route 242 scheme is not worthwhile as a stand alone proposal. However it breaks a low amount of weekday trips (140 in total on weeknights) and retains a 24-hour network. Therefore it will be progressed as part of the wider scheme.

6.2.27 Withdrawing route N8 between Oxford Circus and Tottenham Court Road breaks 300 weekday trips on weeknights and is all lose. Therefore it will remain unchanged.

Benefits

6.2.28 The main benefits of the scheme are:

- Makes significant savings
- A reduction in excess capacity in central London.
- An improved operational resilience on routes 8 and 242.
- New connections between Fleet Street and Crossrail at Farringdon.

Drawbacks

6.2.29 The main disbenefits of the scheme are:

- 1,900 (8% of route total) weekday trips on route 8 are broken, 1,800 (7% of route total) weekday trips on route 242 are broken and 420 (3% of route total) weekday trips on route 172 are broken.

Alternative options considered

6.2.30 Several options have been considered that achieve the objectives set out in paragraph 6.1.1 such as cutting back routes 8 or 25 to St. Pauls and leaving route 242 at Tottenham Court Road but the proposals above break fewer weekday trips than other options.

6.2.31 Other ways of providing new direct connections to Farringdon station were considered which included re-routeing the 172 via Fetter Lane and diverting route 341 via Farringdon Road, instead of Grays Inn Road. Re-routeing route 172 via Fetter Lane would provide a quicker link from Aldwych to Farringdon Station but breaks more direct trips on route 172 and does not provide some parts of Fleet Street with a direct service to Farringdon station. Diverting route 341 to Farringdon Lane breaks 1,500 (6% of route total) weekday trips on route 341 and was not progressed further.

6.3 Routes 25 and 425

Frequency and Structure

6.3.1 Route 25 runs between Oxford Circus and Ilford. It runs in legs during Monday to Saturday daytimes with 8 bph between Oxford Circus and Ilford and 8 bph between Mile End and Ilford. Two additional journeys operate from Ilford to Oxford Circus in the AM peak, and two additional journeys operate from Oxford Circus to Ilford in the PM peak. It operates at 12 bph Sunday daytimes. The night service operates at 7.5 bph on weeknights and 10 bph on weekend nights. 87-capacity double deck buses are used

6.3.2 Route 425 runs between Stratford and Clapton at 5 bph Monday to Saturday daytimes, 4 bph Sunday shopping hours and 3 bph all evenings. 87 capacity double deck buses are used.

Background

6.3.3 Route 25 has been affected by a number of roadworks and permanent highways schemes that have reduced highway capacity over the past few years. The effects of this have been particularly severe in the past year with a weekday drop in usage of nearly 20% and an increase in journey times of around 10%, and up to 20% on the section between Stratford and Aldgate.

6.3.4 It is not expected that journey times will reduce significantly and is therefore assumed that the current situation is now business as usual. Given this, it is not expected that passenger numbers will increase significantly in the near future.

Reliability and Mileage

6.3.5 The table below shows EWT figures over the last 2 years. The minimum standard is 1.4 minutes. It can be seen that performance deteriorated from around period 7 2014/15 but was particularly bad between period 3 and period 12 2015/16. The improvement in performance from period 13 corresponds with the further curtailment of the Monday to Saturday City leg from Bank to Mile End and the reduction in frequency on Sundays.

Date Range / Period	4	5	6	7	8	9	10	11	12	13	1/16	2	3
27/06/2015 to 24/06/2016	2.01	1.65	2.22	2.26	2.68	2.65	1.86	2.09	1.79	1.41	1.42	1.47	1.69
21/06/2014 to 26/06/2015	1.16	1.14	1.16	1.52	1.64	1.70	1.55	1.40	1.72	1.60	1.37	1.58	1.90
Min Standard	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40	1.40

The Excess Waiting Time figures are based on four weeks data

Table 3: Route 25 - EWT by period between 21/06/14 and 24/06/16

6.3.6 In the last year traffic lost mileage has been 7% Monday – Friday, 5% Saturday and 3% Sunday. The table below shows lost mileage over the last 2 years and again it can be seen that performance improved when the City leg was further cut back to Mile End.

Date Range / Period	4	5	6	7	8	9	10	11	12	13	1/16	2	3
27/06/2015 to 24/06/2016	91.94	94.76	89.71	90.94	86.53	87.22	93.88	91.99	95.29	98.03	98.22	97.95	95.98
21/06/2014 to 26/06/2015	98.64	98.90	98.72	96.71	96.28	95.89	94.75	94.86	93.67	96.72	97.51	97.34	93.69
Min Standard	98.00	98.00	98.00	98.00	98.00	98.00	98.00	98.00	98.00	98.00	98.00	98.00	98.00

Table 4: Route 25 – Traffic Lost Mileage by period between 21/06/14 and 24/06/16

Journey Times

6.3.7 An investigation of actual journey times has been undertaken. Due to the number of changes to the route a period of 3 weeks in May 2016 (after the Aldgate and CS2 upgrade works but before the Newgate Street diversion) has been compared to a similar period in 2015. This shows an average increase in actual end to end journey times of 10%. This varies across the day with more than 10% between 1200 and 1900 (inclusive) and up to 17% in the 1600 hour.

6.3.8 The graph below shows weekday speeds on route 25 since the middle of 2012. As can be seen speeds were reasonably consistent until the middle of 2014. Since then they have fallen considerably in all weekday periods. Speeds at the weekend have a similar pattern.

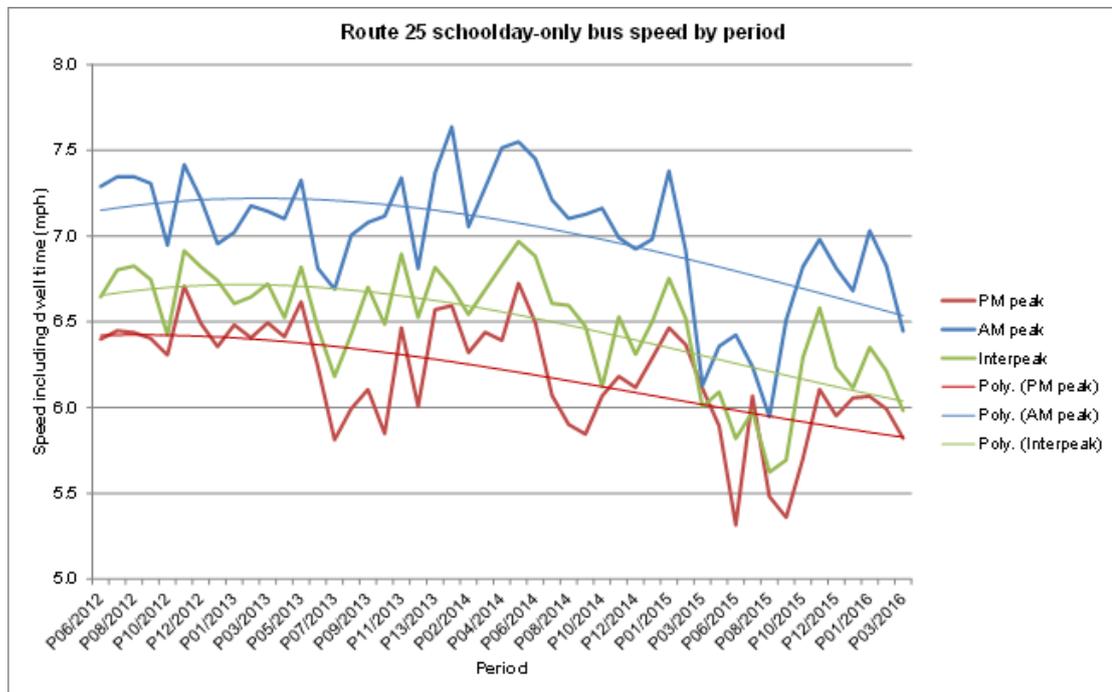


Figure 4: Route 25 change in bus speeds

6.3.9 Breaking it down into sections shows an increase in average actual running time of 4% Ilford to Stratford, 20% Stratford to Aldgate and 14% Aldgate to Oxford Circus. It's also worth noting that the increase Aldgate to Oxford Circus is particularly high from Bank to Aldgate from around 5 to 6 minutes to 11 to 15 in the afternoon. This could well be to do with changes at Aldgate due to the highway scheme there and/or the CS2 scheme.

6.3.10 It seems clear from this that there has been some general deterioration in journey times, shown by the data east of Stratford. However journey times have increased substantially west of Stratford and particularly on the section of routing directly affected by the CS2 scheme.

Usage

6.3.11 As can be seen from the table below usage on route 25 was still rising between year 1 and year 2 (mid 2011 to 2012 and mid 2012 to 2013). However it then started to fall

significantly. In the year mid 2015 to mid 2016 it fell by nearly 20% on weekdays and 13% at weekends. Overall it has fallen by 19.6% a week over the last 5 years, despite the increase in 2011/12.

Year 1 to 2	Year 2 to 3	Year 3 to 4	Year 4 to 5	Year 1 to 5
6.07%	-2.19%	-6.40%	-19.26%	-21.59%
0.65%	2.13%	-1.70%	-13.68%	-12.79%
0.23%	0.80%	-0.96%	-13.31%	-13.26%

Table 5: Route 25 change in usage

6.3.12 Data suggests that changes in usage have not been uniform across the route. Over the last 2 years there has been a 20% fall in boarders and alighters on the Ilford to Stratford section, around 30% on the Stratford to Whitechapel and Bank to Oxford Circus sections and between 55% and 65% on the Whitechapel to Bank section.

6.3.13 The table below gives a summary of peak hour loadings data at various points along route 25 westbound in the morning peak between Stratford and Whitechapel. This has traditionally been the busiest direction on this section of route. The data also includes major parallel services 86 and 205.

			2012/13		2014/15		2016	
			Arrive	Depart	Arrive	Depart	Arrive	Depart
Stratford Leisure	25	86	1609	1772	1812	1937	N/a	N/a
			23.0	25.3	25.9	27.7	-	-
Stratford Broadway	25	86	1502	1484	1337	1244	N/a	N/a
			21.5	21.2	19.1	17.8	-	-
Bow Church	25		386	687	743	819	N/a	N/a
			5.5	9.8	10.6	11.7	-	-
Mile End	25	205	1421	1518	1146	1174	824	784
			20.3	21.7	16.4	16.8	11.8	11.2
Whitechapel	25	205	1366	1439	1212	1190	660	594
			19.5	20.6	17.3	17.0	9.4	8.5

Table 6: Route 25 westbound morning peak loadings

6.3.14 As can be seen there was generally a drop in the usage west of Stratford between 2012/13 and 2014/15 of between 2 and 4 bph. The exception to this, at Bow Church, can partly be explained as the 2012/13 data was collected in July. However by 2016 demand at Mile End and Whitechapel had halved, although again the latest data was collected in July.

6.3.15 Comparison of ticket data over the last 2 years shows that the reductions in usage have been uniform across ticket types. So for example the proportion of Travelcard users was 33% in 2014 and 32% in 2016.

Proposal

6.3.16 It is proposed to restructure routes 25 and 425. The 25 will operate between Ilford and Oxford Circus at 10 bph Monday to Saturday daytimes and 8 bph evenings and Sundays. Route 425 runs between Stratford and Clapton, Nightingale Road. It will be extended to run from Ilford to Clapton, Nightingale Road. It will be increased in frequency to run at 6 bph Monday to Saturday daytimes and 5 bph evenings and Sundays.

6.3.17 This pattern of service provides the current capacity between Ilford and Stratford where it is required. It reduces frequencies between Stratford and Mile End where there is spare capacity, by 5 bph. It increases frequencies west of Mile End by 2 bph, although it should be remembered that this is still a reduction of 6 bph compared to the service pattern prior to February this year. On current loadings this provides too much capacity west of Mile End. However demand might increase somewhat when

journey times reduce following the end of the Newgate Street works. If not these frequencies can be further reviewed.

- 6.3.18 Route 425 does become a long route with a PM peak cycle time of 210 minutes, but should be able to operate reliably. Options to reduce cycle times were examined, but were not worthwhile. These included removing the double run to serve Homerton Hospital.

7 Appraisal

7.1 Summary

- 7.1.1 The proposals were appraised using standard London Buses processes. These estimate the changes in cost, passenger numbers, revenue and passenger benefit attributable to a scheme, and evaluate how worthwhile a scheme is, based on these estimates.
- 7.1.2 For a scheme that carries an annual cost, it must have a benefit to net cost ratio of 2.0 to 1 to be worthwhile and for a scheme that reduces the annual cost, it must have a disbenefit to net saving ratio of less than 2.0 to 1 to be worthwhile. The appraisal of this scheme is summarised in table 9.

Scheme	Estimated Gross Cost £pa	Estimated Revenue £pa	Estimated Passenger Benefits £pa	Estimated Net Cost £pa	Benefit to Net Cost Ratio X:1	Estimated Mileage	Estimated PVR
Day services	(£8,352,945)	(£1,408,939)	(£5,255,658)	(£6,944,006)	0.8	(1,122,964)	(39)
Night services	(£42,020)	(£16,502)	(£74,261)	(£25,517)	2.9	(18,737)	0
Total	(£8,394,964)	(£1,425,441)	(£5,329,919)	(£6,969,523)	0.8	(1,141,702)	(39)

Table 7: total appraisal of all schemes (estimated costs)

- 7.1.3 The proposals are forecast to save TfL around £7 million per annum, taking account of reductions in revenue. The proposals had negative effects for passengers (disbenefit) that is quantified at £5.3 million per annum. Overall the schemes have a disbenefit to net saving ratio of 0.8 to 1 which is worthwhile. It should be noted that this does not include the costs, benefits or revenue for extending route 23 from Ladbroke Grove to the north-west.
- 7.1.4 The night bus element does not meet the usual TfL criteria as it saves money but has a benefit to net cost ratio of more than 2.0 to 1. However as the joint day and night scheme did meet the criteria and as there are unquantified benefits in having similar route structures across the day and night, taking these changes to consultation was judged appropriate.
- 7.1.5 The benefits of the proposals are mainly to TfL in that they save money. This would release funding to be re-invested elsewhere in the network where demand is growing. Overall there is disbenefit to passengers due to lower frequencies and broken links. There are some increases in passenger benefit, predominately due to the provision of new direct links and some frequency increases like on route 390.

8 Broken Links

- 8.1.1 The proposed changes to day services outlined above lead to a total of around 17,000 broken links on weekdays across the routes affected. The worse affected routes are the 23 and 137. The disbenefit to passengers on route 23 is reduced when the Elizabeth line opens and the extension of route 22 to Oxford Circus provides an alternative connection to the West End from Sloane Square/Street.
- 8.1.2 The majority of routes were surveyed prior to 2015 and therefore are an overestimation as demand has dropped since the time of surveys, as outlined on page 8.
- 8.1.3 Where possible the impact on passengers has been minimised, ensuring that same stop interchange is available where direct journeys are no longer achievable. Other measures to minimise the impact on passenger journeys have also been made, a new one hour Hopper Fare was introduced in September 2016. If passengers use pay as you go with Oyster cards or contactless payments they will automatically be given the Hopper fare. This will allow passengers to make an extra bus journey free of charge, as long as it is within one hour of touching in on the first bus. This will remove the financial burden of changing buses for most journeys.

9 Glossary

BPH	buses per hour in each direction. 8 bph is equivalent to a bus every 7.5 minutes.
EWT	reliability is measured in Excess Wait Time i.e. the additional time the average passenger has to wait compared to the service running to schedule.
OSW	Oxford Street West, defined as the section of road between Selfridges and Oxford Circus.
PVR	Peak Vehicle Requirement is the number of buses required to operate the level of service on a route. The average network cost per PVR is around £250,000, which includes all associated costs like vehicle leasing costs, driver wages and fuel.
RMP	the Road Modernisation Plan is a series of TfL lead programmes and initiatives, including TfL's responses to the Roads Task Force and the Mayor's Cycling Vision.
Trip or link	a journey made by a passenger on one bus between point A and point B. A 'broken link' or 'broken trip' is when a passenger will be required to change buses due to a network redesign scheme, when they previously had a through bus (based on weekday data).
Worthwhile	is a scheme that meets TfL's benefit to net cost criteria of 2:1 for bus service changes, e.g. a worthwhile spend scheme requires £2 of benefit for every £1 spent and a worthwhile saving scheme requires no more than £2 of disbenefit for every £1 saved.