

# Future Bus Demand In The Vauxhall Nine Elms Battersea (VNEB) Opportunity Area

TfL Surface Transport – Buses Directorate

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## 1. Introduction and overview

1.1. This report outlines the analysis undertaken on future bus demand and the need for bus service enhancement in the Vauxhall Nine Elms Battersea (VNEB) area. The report is structured as follows:

- Section 2 describes the planning background and the current bus network;
- Section 3 discusses the effect of the Northern Line Extension (NLE) and new development on bus demand;
- Sections 4 & 5 outlines different options for bus service enhancements;
- Section 6 discusses the phasing of bus network changes based on NLE and development timescales; and
- Section 7 examines existing & potential new bus priority measures and infrastructure.

1.2. VNEB is one of the Opportunity Areas (OA) identified in the London Plan. It is located south of the River Thames between Lambeth Bridge and Chelsea Bridge and includes areas such as Vauxhall, Nine Elms, Albert Embankment, Battersea Power Station (BPS) and Queenstown Road. A significant number of developments are expected in the VNEB area. The Opportunity Area Planning Framework (OAPF) supports the delivery of a high density mixed use development scenario comprising 16,000 new homes and a range of 20,000 to 25,000 jobs<sup>1</sup>.

1.3. In accordance with London Plan policies, the OAPF identifies the need for additional public transport capacity in the area including an extension of the Northern line from Kennington to Battersea, which could be open by 2020. Although NLE will mitigate some of the impact of the developments on public transport, it will also generate additional bus trips and a significant increase in bus patronage is expected.

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<sup>1</sup> Vauxhall Nine Elms Battersea Opportunity Area Planning Framework p.6

## 2. Planning background and current network

### *Details of development*

2.1. A number of planning applications have been submitted for developments located in the VNEB area over the past number of years. As part of the planning process, TfL commented on the Transport Assessments (TA) submitted with the applications. The developments are listed in table 1 and this represents a total of 13,700 new homes and 300,000 square metres of office space.

2.2. Not all the developments have been given planning permission. However when a TA was produced the data was included in the analysis in section 3.

LUP reference	Development	Map Number	Stage	Residential (Units)	Commercial (retail) GEA	Commercial (food and beverage) GEA	Office (GEA)	NLE considered in the TA
11/0313	53 Nine Elms Lane Parkside (South London Mail Centre)	1	Application approved	1,870	2,783	-	16,299	Yes
11/0242	Embassy Gardens (Former Stationery Office site)	2	Application approved	1,994	12,098	-	22,375	No
10/0338	Tideway Wharf (Industrial)	3	Construction started	806	3,900	-	-	No
10/0041	Vauxhall Sky Gardens	4	Application approved	239	1,180	-	4,200	No
12/0072	Glass House Spring Mews	5	Application approved	-	390	-	517	No
12/0625	30-34 Albert Embankment (Eastbury House)	6	Application approved	46	937	-	-	No
12/0102	1 Nine Elms (Market Towers)	7	Application approved	491	1,066	-	11,551	No
09/0530	Battersea Power Station	8	Application approved	3,444	51,349	14,975	160,933	Yes
12/0053	New Covent Garden Market (Nine Elms)	9	Application approved	2,443	4,231	8,408	4,243	Yes
09/0077	US Embassy	10	Application approved	-	-	-	45,000	No
11/0217	Marco Polo House (Queenstown Road 346)	11	Application approved	456	1365	-	-	Yes
11/0046	8 Albert Embankment (fire Brigade HQ)	12	Application in process	276	696	8,554	-	Yes
10/0255	Vauxhall Cross (Island site)	13	Application approved	291	-	712	2,420	No
11/0393	Wandsworth Road 62 (Sainsburys Nine Elms)	14	Application approved	737	1,740	7,432	1,860	No
12/0017	Parry Street Vauxhall Square	15	Application submitted	520	7,595	-	23,880	No
11/0566	Pascal Street 10	16	Application in process	63	-	-	3,964	No
12/2356	Hampton House (20 Albert Embankment)	17	Application approved	168	-	732	1,144	Yes
<b>Total</b>				<b>13,844</b>	<b>89,330</b>	<b>40,813</b>	<b>298,386</b>	

Table 1: List of developments for which a transport assessment was available

2.3. Figure 1 shows the locations of the developments. The largest, BPS (8), Embassy Gardens (2) and 53 Nine Elms Lane Parkside (1), are located along Nine Elms Lane and a large proportion of the additional bus demand is therefore expected along this corridor. New Covent Garden Market (9) is also a major development. Although the

largest part is closer to Wandsworth Road, the residential element of the development is spread across the site with 1,600 units located on the northern part.

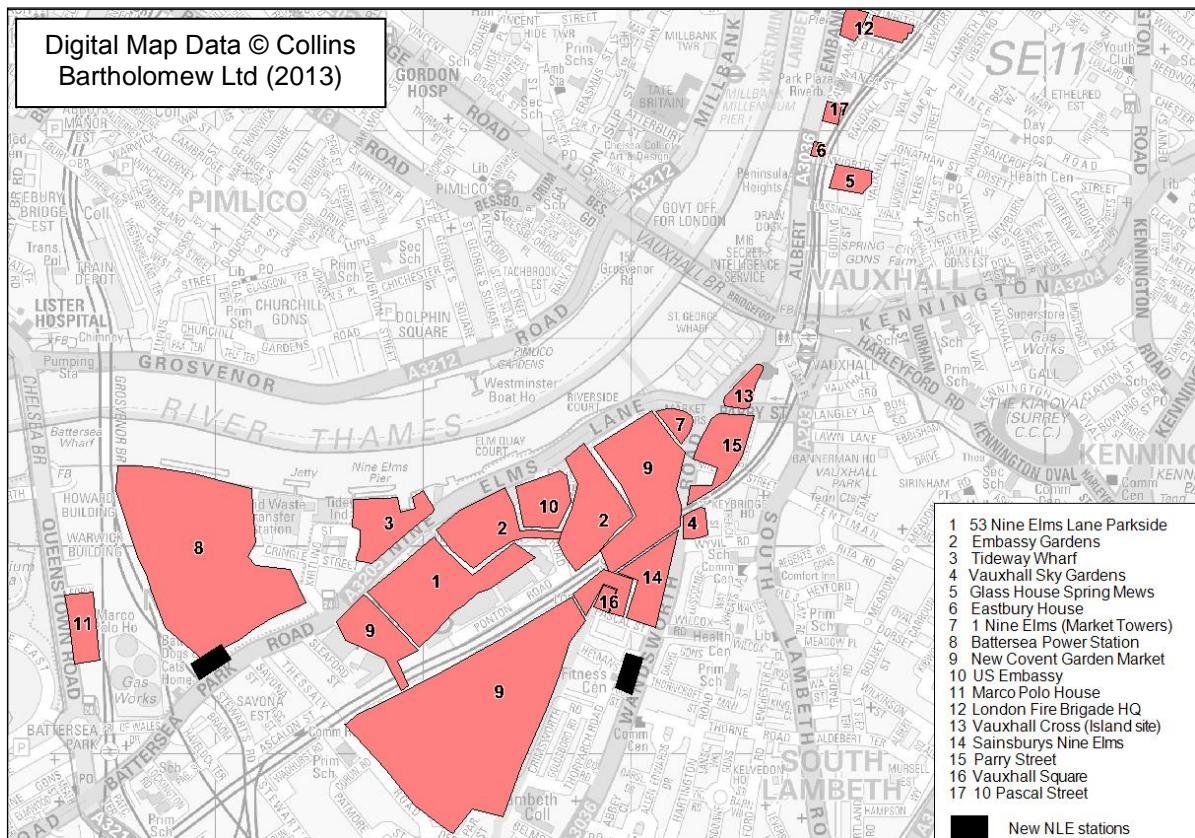


Figure 1: Map of developments

2.4. There are a number of developments that could not be considered as part of the analysis as the transport assessment is not available yet. It is however understood that the developments comprised in the analysis represent a large proportion of the future bus demand in the area as the majority of developments have submitted a planning application. In addition, any calculations can be reviewed when a new or revised application is submitted.

### **Existing bus network and current capacity**

2.5. Although the VNEB area is well served by the bus network, there are some constraints due to railway lines and existing developments. It is expected that north-south access across Battersea Park Road will be opened when new developments come forward.

2.6. There are four corridors. These are set out below, with peak frequencies. All routes use double deck buses apart from routes 360 and P5.

- Battersea Park Road/Nine Elms Lane:
  - Route 156 operates between Wimbledon and Vauxhall at 7.5 buses per hour (bph) via Clapham Junction and Queenstown Road.

- Route 344 operates between Clapham Junction and Liverpool Street via Vauxhall and Elephant and Castle at 10 bph.
- Wandsworth Road:
  - Route 77 operates between Tooting and Waterloo via Clapham Junction, Vauxhall and Albert Embankment at 6 bph.
  - Route 87 operates between Wandsworth and Aldwych via Clapham Junction, Vauxhall and Trafalgar Square at 10 bph.
  - Route 196 operates between Norwood Junction and Elephant and Castle via Brixton, a section of Wandsworth Road and Vauxhall at 5 bph.
  - Route P5 also serves a section of Wandsworth Road and operates with single deck buses. It runs between Patmore Estate and Elephant and Castle via Brixton and Loughborough Road at 4 bph during the peaks.
- Queenstown Road:
  - Route 44 operates between Tooting and Victoria via Battersea Park Road, Queenstown Road and Victoria Coach Station at 6 bph.
  - Route 137 operates between Streatham Hill and Oxford Street via Clapham Common, Queenstown Road, Sloane Square and Marble Arch at 12 bph.
  - Route 452 operates between Wandsworth Road and Kensal Rise via Queenstown Road, Sloane Square and Kensington High Street at 7.5 bph.
- Albert Embankment:
  - Routes 77 and 344 both operate along Albert Embankment.
  - Route 360 operates between Elephant and Castle and South Kensington via a section of Albert Embankment, Vauxhall, Pimlico and Sloane Square at 5 bph with single deck buses.

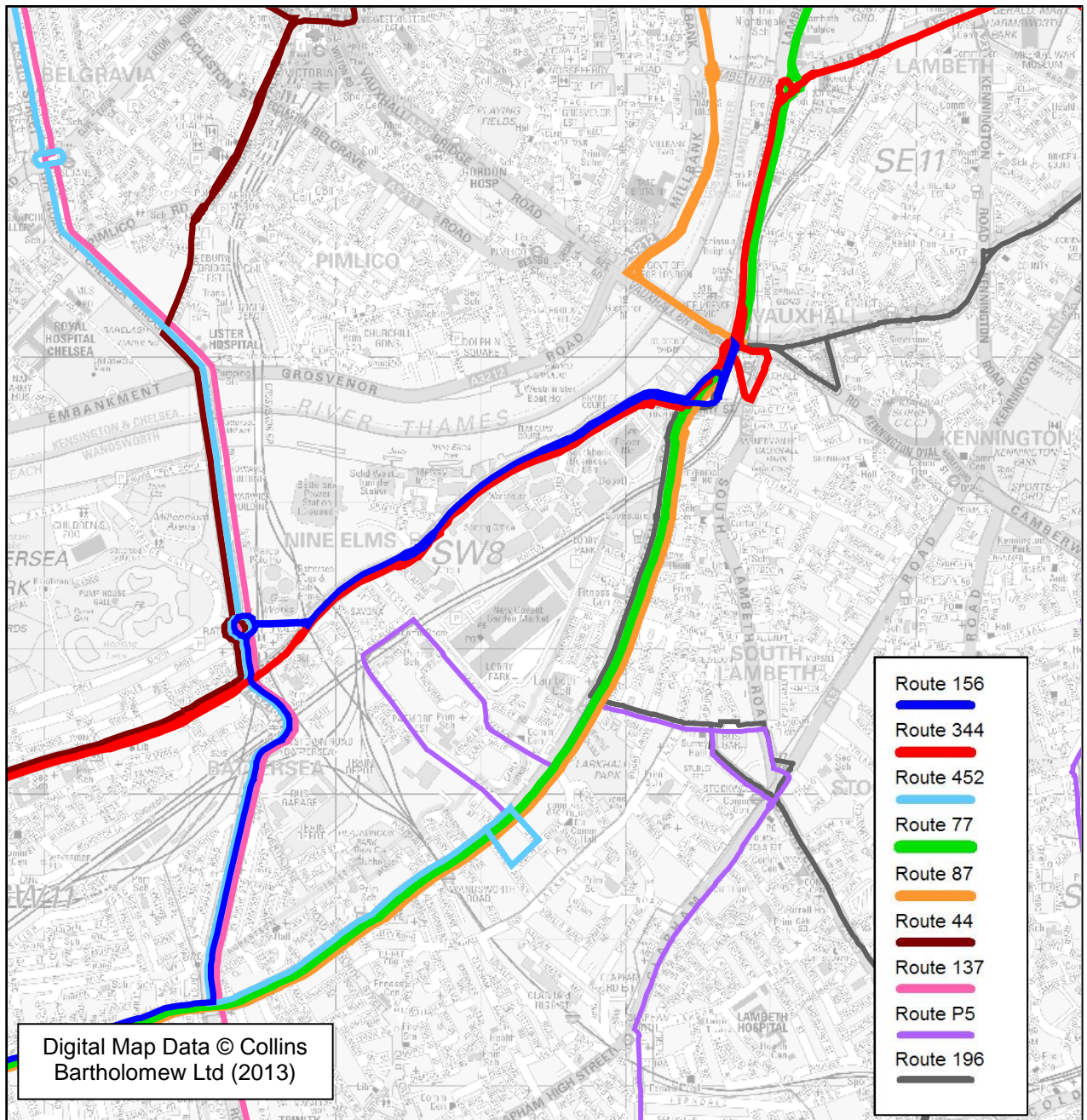


Figure 2: Bus network in the VNEB area

2.7. Bus routes that run from VNEB beyond Vauxhall and providing links to the City and West End have little spare capacity. In general average loads of over 70 across an hour indicate that the service is operating at a near capacity. In the morning peak hour, buses on route 344 arrive and depart Vauxhall Station with an average load of 65 passengers. Buses on route 87 arrive and depart Vauxhall with an average load of 73 passengers. On route 77, buses arrive at Vauxhall with an average load of 60 passengers and depart with an average load of 50 passengers. Route 137 also has little spare capacity in the morning peak hour towards Sloane Square. There is spare capacity in this area on routes 156 and 196.

### 3. Additional bus demand with NLE

3.1. This section examines the effect of development in the VNEB area once developments are built and occupied (2031) and NLE is operational (2021). In order to estimate the number of trips generated in the VNEB area, two different sources of data have been used:

- Trip generation calculations extracted from TAs; and
- Railplan outputs which takes into account the impact of the NLE and development.

3.2. As there is less spare capacity in the morning peak on routes serving VNEB, this section focuses on the additional demand in the morning peak hour. All TAs contained figures on trip generation by peak hour in and out of the developments however there were inconsistencies regarding the level of detail and whether the NLE was considered. Therefore a series of assumptions were made in order to understand where the bus demand would be located and the direction of travel. The full detail of the calculation is contained in Appendix C.

3.3. Railplan outputs were extracted and compared with the trip generation outputs. As Railplan also includes background growth on the network, some of the extra demand was reduced based on the trip generation calculations. This is notably the case for the demand along Queenstown Road where there is a significant increase from Railplan however it is only partially related to the developments in the VNEB area.

3.4. Finally, Bus Origin Destination Survey (BODS) and Keypoints (roadside loadings data) were used to assess the spare capacity. From this, it was possible to evaluate the level of extra demand that could be accommodated by the spare capacity on the current network.

3.5. The map below (figure 3) shows the number of trips that cannot be absorbed on the network and therefore service enhancement is required.

- Nine Elms Lane Corridor: although bus demand will decrease in the eastbound direction to the west of the new station at Battersea Power Station as people will be using the new NLE station, extra capacity will be required further along the corridor up to Vauxhall.
- Wandsworth Road corridor: demand between Nine Elms Station and Vauxhall Station will significantly decrease as a result of the introduction of the NLE. However this is only for a short section and extra capacity will still be required further south to the new Nine Elms Lane Station.
- Queenstown Road and Albert Embankment: both corridors will require extra capacity.
- Vauxhall Bridge: No significant change in demand is forecast. However if the demand actually increases on this corridor, the capacity released on route 87 on Wandsworth Road should cater for it.

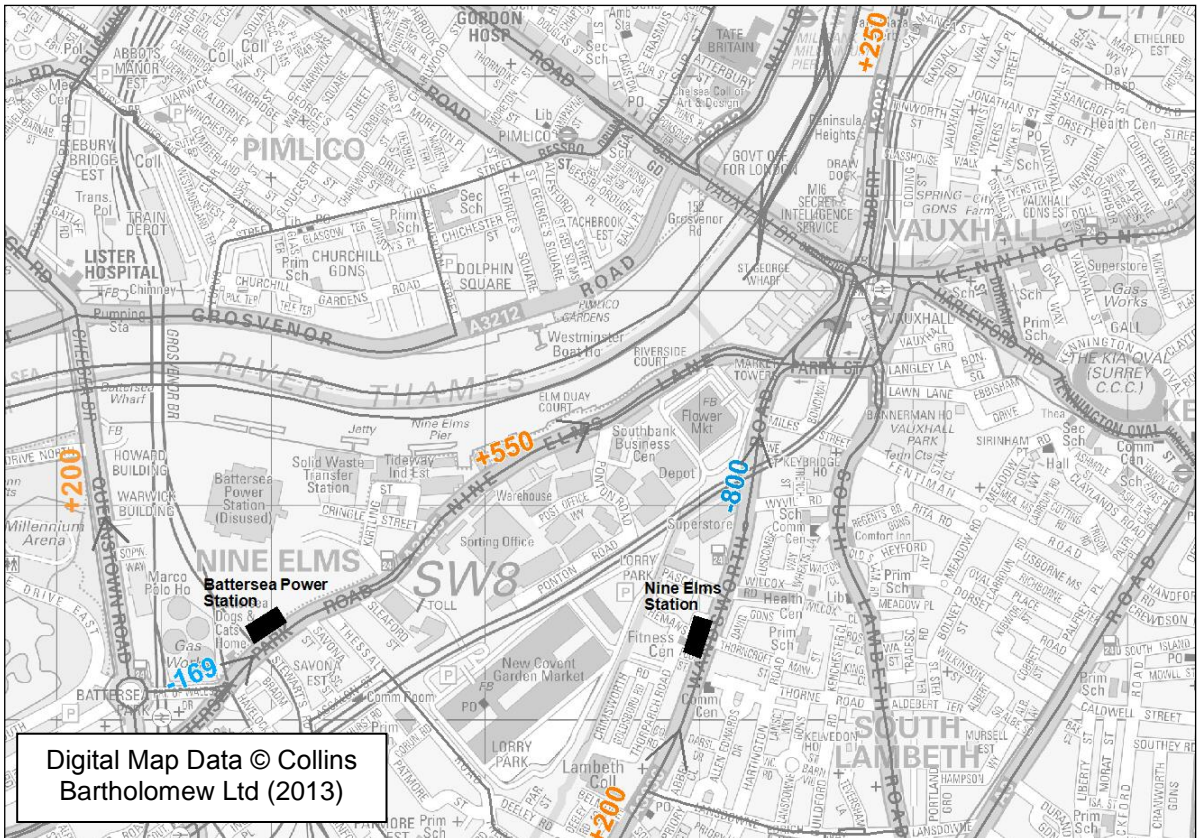


Figure 3: Change in demand in the morning peak hour in the busiest direction



#### 4. Additional capacity required and associated cost

4.1 Table 2 below shows the number of double deck buses required to cater for the extra demand.

Corridor	Demand (Number of extra trips)	Number of extra double deck buses
Battersea Park Road/Nine Elms Lane	550	8
Wandsworth Road (South of NLE Nine Elms Station)	200	3
Queenstown Road (North of Battersea Park Road Station)	200	3
Albert Embankment	250	A frequency increase on routes serving Nine Elms Lane and Albert Embankment will cater for this additional demand

Table 2: Extra capacity required in the morning peak hour in the busiest direction

4.2 Sample service changes which would cater for this are shown in table 3.

Route	Frequency Enhancement	Annual Gross Cost
77	Peaks and Interpeak from 6 to 9 bph	£1,550,000
137	Peaks from 12 to 14 bph Interpeak from 10 to 12 bph	£1,450,000
156	Peaks and Interpeak from 7.5 to 10 bph	£1,350,000
344	Peaks from 10 to 18 bph Interpeak from 8.5 to 15 bph	£2,000,000
Total		£6,350,000

Table 3: Option 1 - Cost associated with frequency increase on existing routes (this does not include any enhancements on night services)

4.3 This would provide adequate capacity in the VNEB area however a frequency of 18 bph is not required on the rest of route 344. In addition, the frequency increase on route 156 would only provide extra capacity up to Vauxhall Station. The following section therefore considers whether there are further options to altering the existing network which would provide adequate capacity in more effective ways, including new links.

## 5. Option review

5.1 For the following options, it is assumed that route P5 will be extended to BPS from the Patmore Estate via a new highway link across Nine Elms Lane as this should be possible at a low cost. However the operational feasibility of this scheme has yet to be confirmed. It should be noted that the following options do not include any enhancement of night services at this stage. This will be considered further once day network options are developed.

### ***Option 2: Route 417 diverted to Waterloo and route 452 extended to Vauxhall***

5.2 Route 417 will be withdrawn from Clapham Old Town and extended to Waterloo via Nine Elms Lane and route 452 will be extended to Vauxhall from Wandsworth Road terminus.

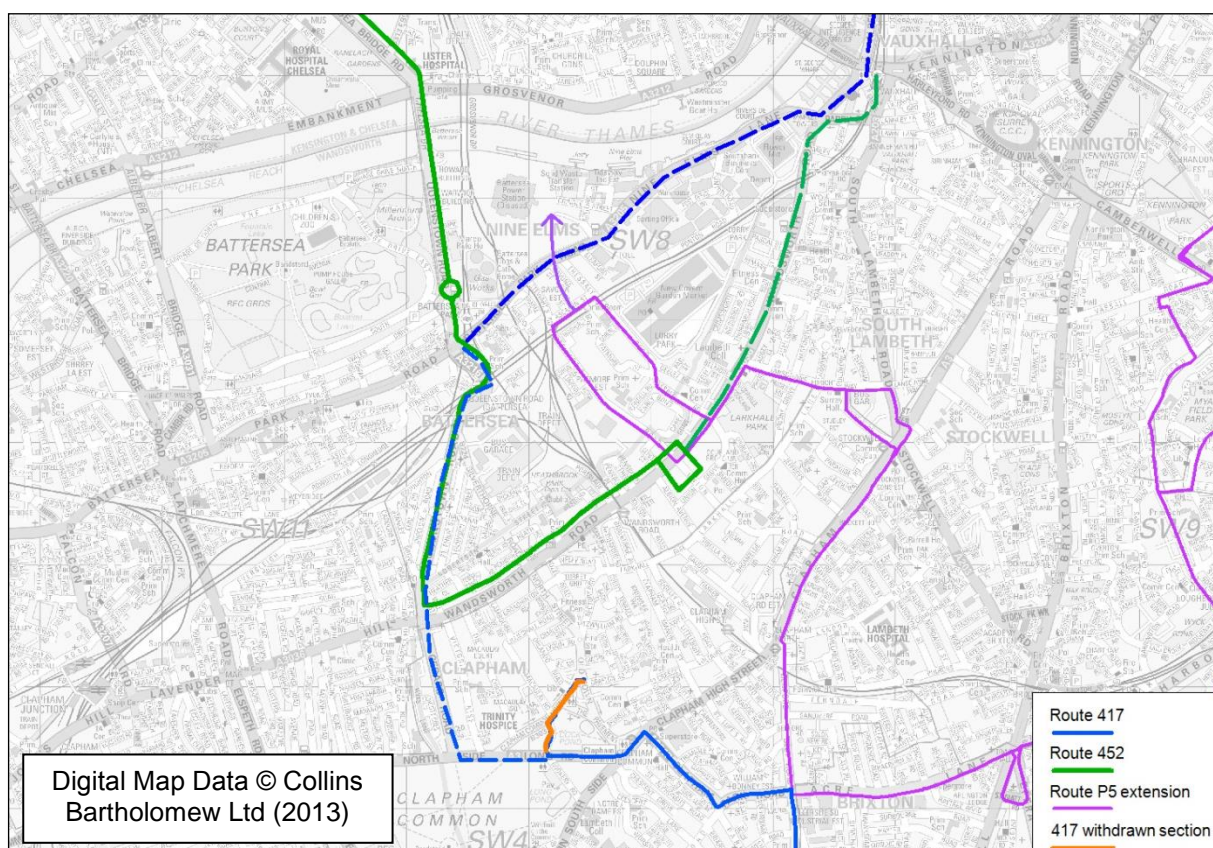


Figure 4: Option 2 - Route 417 extended to Waterloo and route 452 to Vauxhall Station

Route	Routeing	Service Enhancement	Bus type	Annual Gross Cost
137	As per now	Peak times from 12 to 14 bph Interpeak from 10 to 12 bph	DD	£1,480,000
417	Curtailed at Clapham Common and extended to Waterloo	Peak times from 6 to 8 bph Interpeak from 6 to 7.5 bph	DD	£2,220,000
452	Extended to Vauxhall	Peaks and Interpeak remain at 7.5 bph	DD	£320,000
<b>Total</b>				<b>£4,020,000</b>

Table 4: Cost of Option 2

5.3 This option provides sufficient capacity on Nine Elms Lane, Wandsworth Road and Queenstown Road while creating a new bus link between Clapham Common and BPS. However it does not provide any links between the Sloane Square area and BPS. There would be a new link to the Northern line Station at Nine Elms Lane albeit the Clapham Common area already has access to the Northern line. In addition, a frequency increase may be required on route 452 as the extension to Vauxhall may not be sufficient to cater for the extra demand on Wandsworth Road.

### **Option 3: New Nine Elms Lane route with enhancement of route 77**

5.4 This looks at providing the right level of capacity along both Nine Elms Lane and Queenstown Road with the introduction of a new route (there is no existing route serving both roads). The new route gives the extra benefits of direct links between Sloane Square and the VNEB area and between Nine Elms Lane and Waterloo. Frequency on route 77 will be increased from 6 to 9 bph on Monday to Friday daytimes but service enhancement on routes 137, 156 and 344 will not be needed.

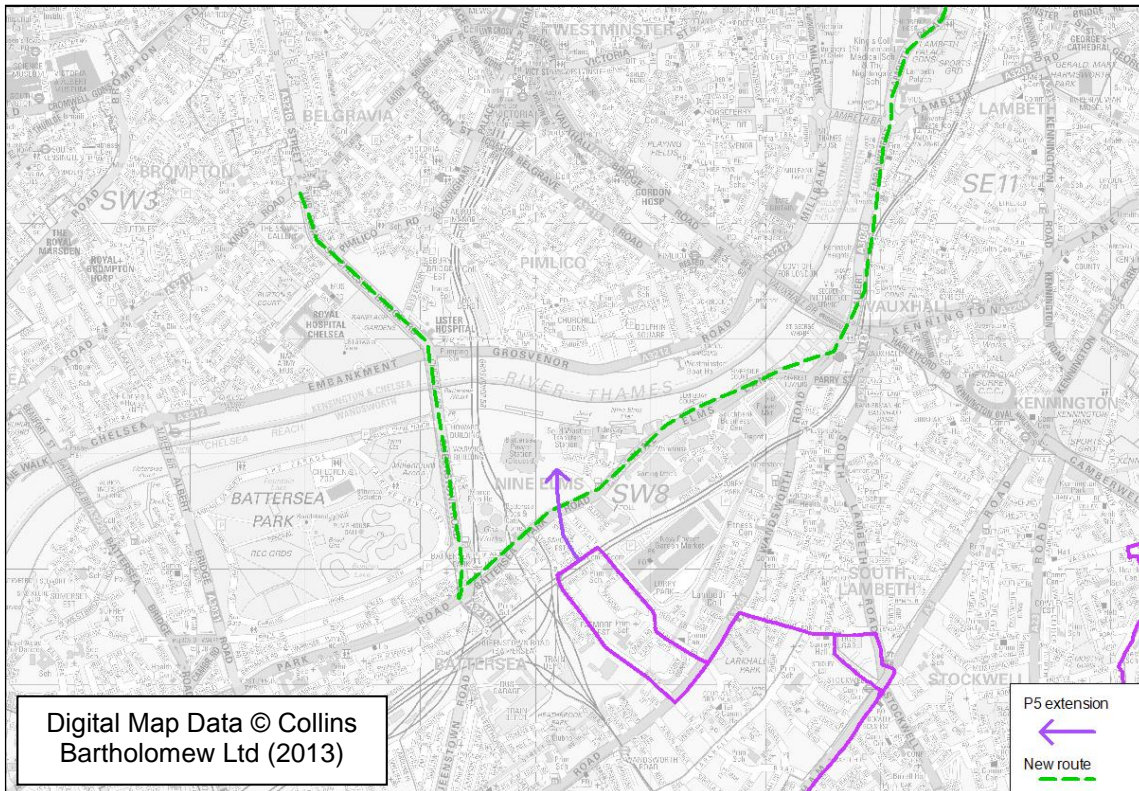


Figure 5: Option 3 - New route, P5 extension to Battersea Power Station

Route	Routeing	Service Enhancement	Bus type	Annual Gross Cost
New route	Sloane Square - Waterloo Station via Chelsea Bridge Rd, Queenstown Rd, Battersea Park Rd, Nine Elms Lane, Albert Embankment. Stamford St	Peak times at 8 bph	DD	£2,650,000
		Interpeak at 7.5 bph		
77	as per now	Peaks and Interpeak from 6 to 9 bph	DD	£1,540,000
<b>Total</b>				<b>£4,190,000</b>

Table 5: Cost of Option 3

5.5 With the new route, this option caters for the extra demand on Nine Elms Lane and Queenstown Road. It provides a new bus link between Nine Elms Lane and Waterloo not currently provided by the 344. It also provides a link between the Sloane Square area and Battersea Power Station development and it creates a direct link to the Northern line from Queenstown Road and the Sloane Square area.

### **Other options**

5.6 It has to be born in mind that those two options are illustrative, to show how capacity and new links could be provided together. Changes to nearby developments (such as Wandsworth Riverside) or Vauxhall Gyratory could bring other network planning opportunities e.g. to extend routes from north of Vauxhall to VNEB or from areas

west of VNEB (Wandsworth Riverside Quarter, Clapham Junction). Such opportunities will be reviewed at a later stage.

## 6. Medium term: before NLE

6.1 The above options are based on demand requirements post-NLE however a large amount of new development is expected to be built before this. Although the phasing information is not available for all developments, the table below shows the phasing for some of the residential units in VNEB. It illustrates how bus patronage might increase over the years and when services enhancement could be required. Highlighted in green are the developments that will affect Nine Elms Lane.

Developments		2014	2015	2016	2017	2018	2019	2020	2022	2026	2031	2038
53 Nine Elms Lane Parkside (South London Mail Centre)	1	0	0	63	221	305	389	473	715	1123	1603	1870
Embassy Gardens (Former stationary Office site)	2	152	272	392	512	838	958	1078	1316	1796	1994	1994
Tideway Wharf (Industrial)	3	180	399	519	639	752	752	752	752	752	752	752
Vauxhall Sky Gardens	4	No information available										
Glass House Spring Mews	5	No information available										
30-34 Albert Embankment (Eastbury House)	6	No information available										
1 Nine Elms (Market Towers)	7	67	109	193	277	361	444	444	444	444	444	444
Battersea Power Station (planning application)	8	84	196	308	420	532	645	765	1452	1988	2586	3356
New Covent Garden Market (Nine Elms)	9	0	67	200	333	467	600	733	1000	1500	2000	2350
US Embassy	10	No information available										
Marco Polo House (Queenstown Road 346)	11	0	0	115	230	344	426	445	456	456	456	456
8 Albert Embankment (fire Brigade HQ)	12	93	177	261	293	293	293	293	293	293	293	293
Vauxhall Cross (Island site)	13	No information available										
Wandsworth Road 62 (Sainsburys Nine Elms)	14	0	0	0	0	0	84	168	450	737	737	737
Parry Street Vauxhall Square	15	0	0	30	150	270	390	510	511	511	511	511
Pascal Street 10	16	No information available										
Hampton House (20 Albert Embankment)	17	161	238	242	242	242	242	242	242	242	242	242
<b>Total number of residential units built</b>		<b>737</b>	<b>1458</b>	<b>2323</b>	<b>3317</b>	<b>4404</b>	<b>5223</b>	<b>5903</b>	<b>7631</b>	<b>9842</b>	<b>11618</b>	<b>13005</b>
<b>As a percentage</b>		<b>6%</b>	<b>11%</b>	<b>18%</b>	<b>26%</b>	<b>34%</b>	<b>40%</b>	<b>45%</b>	<b>59%</b>	<b>76%</b>	<b>89%</b>	<b>100%</b>

Table 6: Construction phases for the residential units by developments

6.2 Based on the table above, extra capacity will be required on Nine Elms Lane from 2018 as around 34% of the residential units would be built (this could potentially generate 4,000 bus trips per day along Nine Elms Lane). As the NLE is planned to open in 2020, at this stage extra capacity will be required on Wandsworth Road. Finally from 2022, a large number of residential units will be built at Battersea Power Station and Marco Polo House, thus service enhancements will be required on Queenstown Road. The table below displays how the bus services enhancements could be progressively implemented for options 1 and 2:

Corridors	2018		2020		2022		2026	
	Option 2	Option 3	Option 2	Option 3	Option 2	Option 3	Option 2	Option 3
Nine Elms Lane	Route 417 extended to Waterloo	Introduction of a new route at 5 bph during peak times	No further change	No further change	No further change	No further change	Route 417 frequency is increased by 2 bph	New route frequency increased from 5 to 8 bph at peak times
Wandsworth Road	No extra capacity required	No extra capacity required	Route 452 extended to Waterloo	Route 77 frequency is increased by 3 bph	No further change	No further change	No further change	No further change
Queenstown Road	No extra capacity required	Introduction of a new route at 5 bph during peak times	No extra capacity required	No further change	Route 137 frequency increased by 1 bph at peak times	The new route caters for the extra demand this corridor	Route 137 frequency is increased by a further 2 bph	New route frequency increased from 5 to 8 bph at peak times
<b>Annual Gross Cost</b>	£1,200,000	£1,750,000	£1,520,000	£3,290,000	£2,120,000	£3,290,000	£4,020,000	£4,190,000

Table 7: Phases of bus services enhancement implementation and associated costs (illustrative)

## **7. Bus priority and bus infrastructure**

7.1 There are a number of bus lanes in the VNEB area:

- On Nine Elms Lane, in each direction between the junction with Cringle Street and Vauxhall Bus Station. Both are operational during daytimes.
- On Wandsworth Road, northbound between the junction with Lansdowne Way and Vauxhall Bus Station operational in both peaks. There is a southbound bus lane between the junction with Lambourn Road and the junction with Victoria Rise operational in the evening peak.
- On Queenstown Road, on the southern part between Robertson Street and 91 Queenstown Road, operational in the evening peak. There is a northbound bus lane between 91 Queenstown Road and the junction with Battersea Park Road operational in the morning peak.

7.2 At this stage, roads schemes for the VNEB area seek to maintain the existing bus lanes. However, opportunities for enhanced bus priority measures should be considered as there will be additional traffic and bus demand.

7.3 Space for two bus stands has been secured as part of the BPS, for an extension of route P5.

7.4 As mentioned previously, options to change Vauxhall Gyratory are being discussed and this could potentially involve the removal of the bus station. The impact on the VNEB area will be reviewed once a definite scheme comes forward for Vauxhall Gyratory.

7.5 High quality facilities for bus passengers should include adequate space for shelters and close integration with the footway network.



## **8. Conclusion**

- 8.1 The review has identified two suitable options catering for the future bus demand in the VNEB area with a similar cost (around £4 Million per year). Although option 3 appears to be the preferred option as it creates additional bus links, further work will have to be undertaken to assess the best use of subsidy and the comparative benefits of each option. In addition, those options are illustrative and other network planning opportunities will be considered at a later stage.
- 8.2 TfL's budget including for the bus network is under constraint and therefore financial contributions from developers under the Section 106 process are essential when introducing new services to cater for the new bus demand.
- 8.3 Finally, further discussion within TfL and with stakeholders will take place to discuss the different options and associated cost.

## Appendix A – Trip generation by development

Development	Map Number	AM peak hour		PM peak hour	
		In	Out	In	Out
53 Nine Elms Lane Parkside (South London Mail Centre)	1	234	321	272	212
Embassy Gardens (Former stationary Office site)	2	224	304	425	325
Tideway Wharf (Industrial)	3	43	156	44	27
Vauxhall Sky Gardens	4	17	19	13	21
Glass House Spring Mews	5	37	88	143	109
30-34 Albert Embankment (Eastbury House)	6	3	4	2	4
1 Nine Elms (Market Towers)	7	40	62	49	44
Battersea Power Station (planning application)	8	663	407	670	993
New Covent Garden Market (Nine Elms)	9	228	335	455	370
US Embassy	10	105			
Marco Polo House (Queenstown Road 346)	11	16	47	34	24
8 Albert Embankment (fire Brigade HQ)	12	24	27	22	27
Vauxhall Cross (Island site)	13	18	33	25	22
Wandsworth Road 62 (Sainsburys Nine Elms)	14	34	71	70	46
Parry Street Vauxhall Square	15	102	95	94	126
Pascal Street 10	16	19	7	5	18

Source: Transport Assessments

## Appendix B – Trip generation by corridor

Queenstown Road Corridor				
Marco Polo House (Queenstown Road 346)	16	47	34	24
Towards Sloane Square	11	33	24	17
Towards Clapham	5	14	10	7
Battersea Power Station (planning application)	265	163	268	397
Towards Sloane Square	186	114	188	278
Towards Clapham	80	49	80	119
<b>Total</b>				
<b>Towards Sloane Square</b>	<b>197</b>	<b>147</b>	<b>211</b>	<b>295</b>
<b>Towards Clapham</b>	<b>84</b>	<b>63</b>	<b>91</b>	<b>126</b>

Battersea Park Road/Nine Elms Lane Corridor				
Tideway Wharf (Industrial)	43	156	44	27
Towards Vauxhall	26	94	26	16
Towards Battersea	17	62	18	11
53 Nine Elms Lane Parkside (South London Mail Centre)	234	321	272	212
Towards Vauxhall	140	193	163	127
Towards Battersea	94	128	109	85
Embassy Gardens (Former stationary Office site)	224	304	425	325
Towards Vauxhall	134	182	255	195
Towards Battersea	90	122	170	130
US Embassy	105	10		
Towards Vauxhall	63	6	0	0
Towards Battersea	42	4	0	0
New Covent Garden Market (Nine Elms)	114	168	228	185
Towards Vauxhall	80	117	159	130
Towards Battersea	34	50	68	56
1 Nine Elms (Market Towers)	20	31	25	22
Towards Vauxhall	14	22	17	15
Towards Battersea	6	9	7	7
Battersea Power Station (planning application)	398	244	402	596
Towards Vauxhall	298	183	302	447
Towards Battersea	99	61	101	149
<b>Total</b>				
<b>Total towards Vauxhall</b>	<b>756</b>	<b>797</b>	<b>923</b>	<b>930</b>
<b>Total towards Battersea</b>	<b>382</b>	<b>437</b>	<b>473</b>	<b>437</b>

Wandsworth Road				
1 Nine Elms (Market Towers)	20	31	25	22
Towards Vauxhall	15	23	18	17
Towards Battersea	5	8	6	6
Vauxhall Sky Gardens	17	19	13	21
Towards Vauxhall	13	14	10	16
Towards Battersea	4	5	3	5
New Covent Garden Market (Nine Elms)	114	168	228	185
Towards Vauxhall	86	126	171	139
Towards Battersea	29	42	57	46
Parry Street Vauxhall Square	26	29	28	34
Towards Vauxhall	21	23	23	27
Towards Battersea	5	6	6	7
Pascal Street 10	19	7	5	18
Towards Vauxhall	14	5	4	14
Towards Battersea	5	2	1	5
<b>Total</b>				
<b>Towards Vauxhall</b>	<b>148</b>	<b>191</b>	<b>225</b>	<b>211</b>
<b>Towards Battersea</b>	<b>48</b>	<b>62</b>	<b>73</b>	<b>68</b>

Albert Embankment	AM peak hour		PM peak hour	
	In	Out	In	Out
Glass House Spring Mews	37	88	143	109
Towards Vauxhall	15	35	57	44
Towards Waterloo	22	53	86	65
30-34 Albert Embankment (Eastbury House)	3	4	2	4
Towards Vauxhall	1	2	1	2
Towards Waterloo	2	2	1	2
8 Albert Embankment (fire Brigade HQ)	24	27	22	27
Towards Vauxhall	10	11	9	11
Towards Waterloo	14	16	13	16
<b>Total towards Vauxhall</b>	<b>26</b>	<b>48</b>	<b>67</b>	<b>56</b>
<b>Total towards Waterloo</b>	<b>38</b>	<b>71</b>	<b>100</b>	<b>84</b>

Vauxhall station	AM peak hour		PM peak hour	
	In	Out	In	Out
Vauxhall Cross (Island site)	18	33	25	22
to/from Albert Embankment	9	17	13	11
to/from Vauxhall Bridge	9	17	13	11
Parry Street Vauxhall Square	61	67	66	78
to/from Albert Embankment	30	33	33	39
to/from Vauxhall Bridge	30	33	33	39

Source: Transport Assessments

## Appendix C – Additional demand calculations

Link	Route	Bus Plannin g Cap	AM Pk BPH	Current Planning Capacity	Current demand	Spare capacity	1 hr VNEB Demand	Current Demand + VNEB 1 hr Demand	Spare capacity	Railplan vs Transport Assessments
Nine Elms Lane (Battersea Station - Vauxhall) EB	156	70	7.5	525	157	368				From the TAs, it was estimated that 900 trips would be generated and among which 580 would be beyond Vauxhall (65%) therefore the results are very similar
Nine Elms Lane (Battersea Station - Vauxhall) EB	344	70	10	700	654	46				
<b>Nine Elms Lane (Battersea Station - Vauxhall) EB</b>				1225	811	414	948	1759	-534	
Nine Elms Lane (Battersea - Battersea NLE) EB	156	70	7.5	525	129	396				there is no data from TA on this link so railplan outputs to be used
Nine Elms Lane (Battersea - Battersea NLE) EB	344	70	10	700	642	58				
<b>Nine Elms Lane (Battersea - Battersea NLE) EB</b>	Total			1225	771	454	16	1394	-169	
Wandsworth (Nine Elms Lane NLE-Vauxhall) EB	77	70	6	420	357	63				Outputs from TA is different as Railplan takes into account the impact of NLE
Wandsworth (Nine Elms Lane NLE-Vauxhall) EB	87	70	10	700	725	-25				
<b>Wandsworth (Nine Elms Lane NLE-Vauxhall) EB</b>				1120	1082	38	-730	352	768	
Wandsworth Road (Queenstown Rd jct-Nine Elms Lane NLE) EB	77	70	6	420	346	74				From TA, increase on Wandsworth Rd but related to development not NLE however the increase in Railplan is mainly linked to the NLE
Wandsworth Road (Queenstown Rd jct-Nine Elms Lane NLE) EB	87	70	10	700	729	-29				
<b>Wandsworth Road (Queenstown Rd jct-Nine Elms Lane NLE) EB</b>				1120	1075	45	267	1342	-222	
Queenstown Rd south of Battersea Pk Rd Jnc NB	137	70	12	840	740	100				From TA there is no extra trips along this link and the increase in Railplan is linked to general growth
Queenstown Rd south of Battersea Pk Rd Jnc NB	156	70	7.5	525	122	403				
Queenstown Rd south of Battersea Pk Rd Jnc NB	452	70	7.5	525	258	267				
<b>Queenstown Rd south of Battersea Pk Rd Jnc NB</b>				1890	1120	770	680	1800	90	
Queenstown Road/North of Battersea Pk Rd Junc NB	44	70	6	420	302	118				From TA there are around additional trips (150) but it is higher in Railplan as it takes into account normal growth
Queenstown Road/North of Battersea Pk Rd Junc NB	137	70	7.5	525	887	-362				
Queenstown Road/North of Battersea Pk Rd Junc NB	452	70	7.5	525	419	106				
<b>Queenstown Road/North of Battersea Pk Rd Junc NB</b>				1470	1608	-138	588	2196	-726	
Albert Embankment North of Vauxhall (EB)	77	70	6	420	242	178				From TA 80 trips at Vauxhall Station and 70 trips on Albert Embankment but Railplan has more trips so railplan outputs will be used (248) as worse case scenario
Albert Embankment North of Vauxhall (EB)	344	70	10	700	637	63				
<b>Albert Embankment North of Vauxhall (EB)</b>				1120	879	241	489	1368	-248	

Source: BODS, Keypoints, Transport Assessments and Railplan

## Appendix D – Detailed cost for each option

Route	Routeing	Frequency Enhancement	Bus type	Annual Gross Cost
77	As per now	- Monday to Saturday daytimes to 9 bph - Sunday daytimes to 8 bph - All evenings to 6 bph	DD	£1,550,000
137	As per now	- Monday to Friday peak times to 14 bph - Monday to Friday Interpeaks and Saturday daytimes to 12 bph - Sunday daytimes to 9 bph and all evenings to 7 bph	DD	£1,450,000
156	As per now	- Monday to Saturday daytimes to 10 bph and two additional return journeys in the peaks - Sunday daytimes to 8 bph - All evenings to 7 bph	DD	£1,350,000
344	As per now	- Monday to Friday peak times to 18 bph - Monday to Friday Interpeaks and Saturday daytimes to 15 bph - Sunday daytimes to 12 bph and all evenings to 10 bph	DD	£2,000,000
<b>Total</b>				<b>£6,350,000</b>

### Option 1

Route	Routeing	Service Enhancement	Bus type	Annual Gross Cost
New route	<b>Sloane Square - Waterloo Station</b> via Chelsea Bridge Rd, Queenstown Rd, Battersea Park Rd, Nine Elms Lane, Albert Embankement. Stamford St	- Monday to Friday peak times at 8 bph - Monday to Friday Interpeaks and Saturday daytimes at 7.5 bph - Sunday daytimes and all evenings at 6 bph	DD	£2,650,000
77	as per now	- Monday to Saturday daytimes to 9 bph - Sunday daytimes to 8 bph - All evenings to 6 bph	DD	£1,540,000
<b>Total</b>				<b>£4,190,000</b>

### Option 2

Route	Routeing	Service Enhancement	Bus type	Annual Gross Cost
137	As per now	- Monday to Friday peak times to 14 bph - Monday to Friday Interpeaks and Saturday daytimes to 12 bph - Sunday daytimes to 9 bph and all evenings to 7 bph	DD	£1,480,000
417	Curtailed at Clapham Common and extended to Waterloo	- Monday to Friday peak times to 8 bph - Monday to Friday Interpeaks and Saturday daytimes to 7.5 bph - Sunday daytimes and all evenings to 5 bph	DD	£2,220,000
452	Extended to Vauxhall	- Monday to Saturday daytimes remain at 7.5 bph - Sunday daytimes and all evenings remain at 5 bph	DD	£320,000
<b>Total</b>				<b>£4,020,000</b>

Option 3