

## Northern Line Extension

### C10: Static station Assessment: Battersea Park - PM Peak

Report

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## 1 Introduction

- 1.1 Steer Davies Gleave has been commissioned by Transport for London (TfL) to consider passenger movements through Battersea Park Station (Network Rail). This station may be affected by additional passenger flows at the station due to the Northern Line Extension (NLE) and associated developments.
- 1.2 For the purpose of this assessment, three scenarios have been considered for the PM peak period:
- 2012 without NLE;
  - 2031 without NLE; and
  - 2031 with NLE (also includes impacts from the associated development).

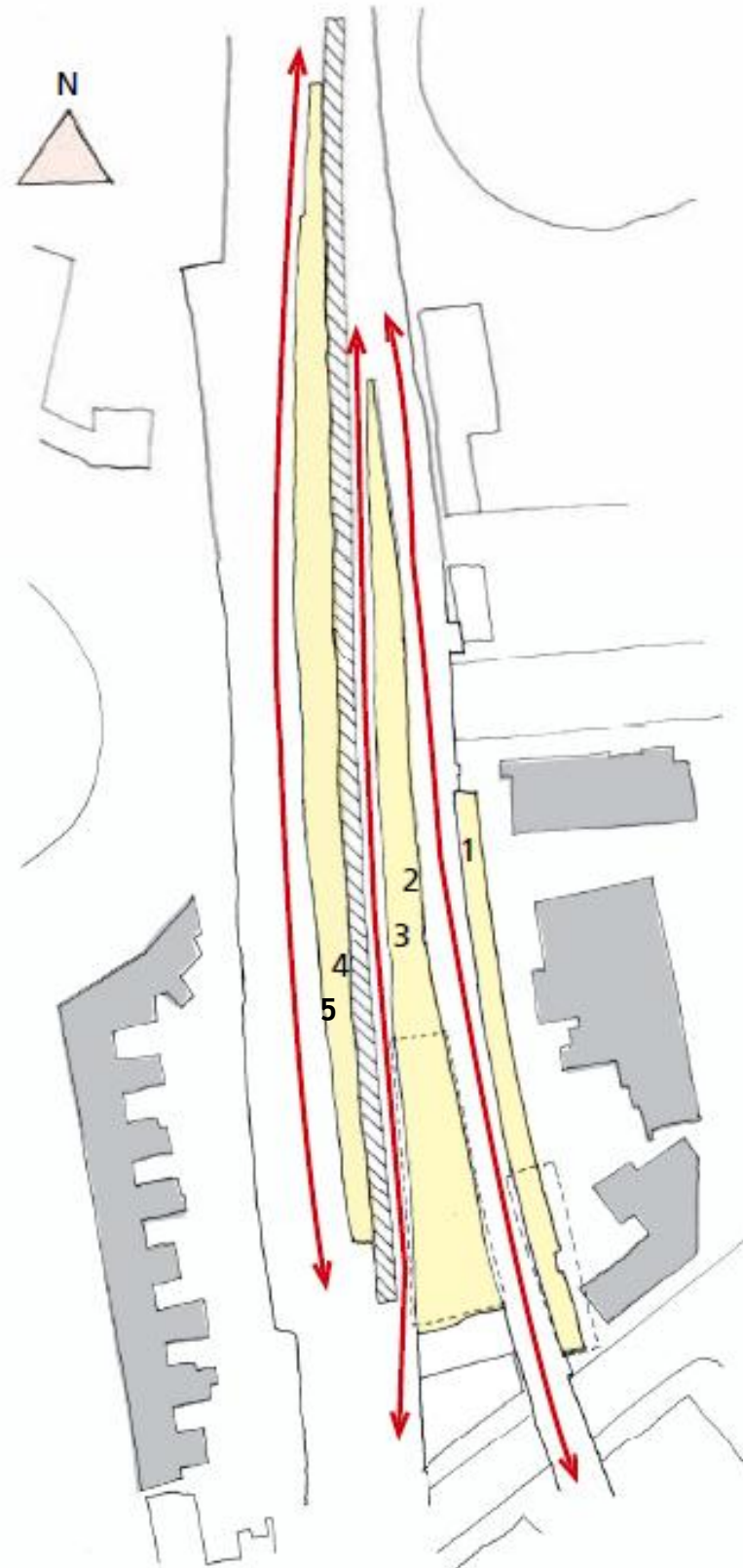
### Key

- 1.3 For the purpose of this assessment, the following symbols have been used:
-  This symbol has been used to identify where station infrastructure does not meet minimum design standards for new stations regardless of the impacts of the NLE.
- The following symbols indicate whether the additional passenger flows brought by the NLE and associated developments will have an impact on the station:
-  This symbol signifies the NLE scheme and associated development **will not** have an effect on the station (compared to the 2031 without NLE scenario)
  -  This symbol signifies the NLE scheme and associated development **will** have an effect on the station (compared to the 2031 without NLE scenario)

## 2 Battersea Park Station

- 2.1 This technical note considers the impact of the Northern Line Extension (NLE) and associated development on pedestrian movements at Battersea Park Station, a Network Rail (NR) station (see Figure 2.1).
- 2.2 This is a static assessment of the station, which comprises spreadsheet-based modelling, providing a direct comparison to the ratios and guidelines presented in station design guidelines.
- 2.3 Following discussions with TfL it has been agreed that the station operation is more similar to a metro service than a typical national rail station. Passengers are likely to be regular users, with knowledge of the station environment. The high frequency service will also result in boarding passengers entering and going straight to their platform, rather than waiting on the concourse for a given service. For the purpose of this assessment, London Underground Limited's (LUL) 'Station Planning Standards and Guidelines' (SPSG) has been used to assess the station.
- 2.4 It should be noted that this report does not assess the infrastructure of the existing station against LUL's guidelines; it assesses the impact of additional passenger demand as a result of the NLE and associated developments enabled by the NLE on design elements which are dependent on passenger flows.
- 2.5 All assessments are based on the PM peak hour flows extracted from the Regional Railplan Model factored using 2012 survey data according to the LUL combination forecasting methodology.

FIGURE 2.1 BATTERSEA PARK STATION



### Assumptions

- 2.6 The following assumptions have been used to determine the performance of the station.
- 2.7 Passenger flows are based on the PM peak hour flows from the Regional Railplan Model and then factored using 2012 survey data according to LUL combination forecasting methodology.
- 2.8 Forecast passenger volumes at Battersea Park are forecast to decrease slightly between 2012 and 2031 without the NLE in the PM peak. This reflects London's population and employment growth as well as the proposed transport network improvements in the local area, such as increases to bus service frequencies and new routes to serve the Vauxhall Nine Elms Battersea area, as well as wider network improvements such as Underground and National Rail service enhancements. These changes will increase the relative attractiveness of these routes and services compared to 2012.
- 2.9 With the NLE (2031), demand increases over the without NLE scenario, reflecting the increased demand to and from the Battersea Power Station development.
- 2.10 Measurements from within the station have been obtained from a site visit undertaken on Saturday 30<sup>th</sup> March 2013 and from available mapping.
- 2.11 Historic and/or observed information was not available for this assessment. In order to obtain peak minute flows, London Underground Limited's (LUL) 'Station Planning Standards and Guidelines' (SPSG) peak 3 hour conversion factors have been applied where necessary.
- 2.12 Passenger flows for the following three scenarios are provided in Table 1 to Table 9.

- 2012 - without NLE
- 2031 - without NLE
- 2031 - with NLE

**2012 PM Peak Passenger Flows - without NLE**

**TABLE 1 2012 3 HOUR PASSENGER FLOWS - WITHOUT NLE**

	Station Inbound	Station Outbound	TOTAL
Northbound Service	245	321	566
Southbound Service	706	367	1,073
TOTALS	951	688	1,639

Source: TfL

**TABLE 2 2012 AVERAGE PEAK FLOWS PER MINUTE (15 MIN PEAK) - WITHOUT NLE**

	Station Inbound	Station Outbound	TOTAL
Northbound Service	1.8	2.4	4.2
Southbound Service	5.2	2.7	7.9
TOTALS	7.0	5.1	12.1

Source: TfL

**TABLE 3 2012 AVERAGE PEAK FLOWS PER MINUTE (5 MIN PEAK) - WITHOUT NLE**

	Station Inbound	Station Outbound	TOTAL
Northbound Service	2.2	2.8	5.0
Southbound Service	6.3	3.3	9.6
TOTALS	8.5	6.1	14.6

Source: TfL

**2031 PM Peak Passenger Flows - without NLE**

**TABLE 4 2031 3 HOUR PASSENGER FLOWS - WITHOUT NLE**

	Station Inbound	Station Outbound	TOTAL
Northbound Service	69	393	462
Southbound Service	515	160	675
TOTALS	584	553	1,137

**TABLE 5 2031 AVERAGE PEAK FLOWS PER MINUTE (15 MIN PEAK) - WITHOUT NLE**

	Station Inbound	Station Outbound	TOTAL
Northbound Service	0.5	2.9	3.4
Southbound Service	3.8	1.2	5.0
TOTALS	4.3	4.1	8.4

**TABLE 6 2031 AVERAGE PEAK FLOWS PER MINUTE (5 MIN PEAK) - WITHOUT NLE**

	Station Inbound	Station Outbound	TOTAL
Northbound Service	0.6	3.5	4.1
Southbound Service	4.6	1.4	6.0
TOTALS	5.2	4.9	10.1

**2031 PM Peak Passenger Flows - with NLE**

**TABLE 7 2031 3 HOUR PASSENGER FLOWS - WITH NLE**

	Station Inbound	Station Outbound	TOTAL
Northbound Service	60	462	522
Southbound Service	789	119	908
TOTALS	849	581	1,430

**TABLE 8 2031 AVERAGE PEAK FLOWS PER MINUTE (15 MIN PEAK) - WITH NLE**

	Station Inbound	Station Outbound	TOTAL
Northbound Service	0.4	3.4	3.8
Southbound Service	5.8	0.9	6.7
TOTALS	6.2	4.3	10.5

**TABLE 9 2031 AVERAGE PEAK FLOWS PER MINUTE (5 MIN PEAK) - WITH NLE**

	Station Inbound	Station Outbound	TOTAL
Northbound Service	0.5	4.1	4.6
Southbound Service	7.0	1.1	8.1
TOTALS	7.5	5.2	12.7

**Train Services**

2.13 For the purpose of this assessment, it has been assumed there are 9 northbound services and 10 southbound services during the PM peak. This is based on the existing service provision and, at this time, there are no committed plans to increase services in this corridor before 2031.

**Platform Length**

2.14 For the purpose of this assessment the following usable platform lengths have been assumed:

- Platform 1 - 92 metres;
- Platform 2 - 85 metres (maximum of 150 metres);
- Platform 3 - 154 metres;
- Platform 4 - 158 metres; and
- Platform 5 - 164 metres.

2.15 Platforms 3, 4 and 5 are to be lengthened to accommodate 10 car trains, increasing the platform lengths to at least 200 metres. For the purpose of this assessment, the reduced platform lengths have been assumed. This is considered a worst case scenario, as passengers will be queuing over a shorter platform length.

2.16 For the purpose of these assessments, carriages have been assumed to measure 20 metres in length, with all northbound services using platform 4 and all southbound services using platform 3.

**Provision of Underground Ticketing System (UTS) Gateline**

2.17 Table 10 presents the assessment of the UTS ticket gate requirements for passenger entry and exit during PM peak hour. The existing gatetime is shown in Figure 2.2.

**FIGURE 2.2 UTS GATES AT BATTERSEA PARK STATION**



**TABLE 10 PROVISION OF UTS GATES (PM PEAK)**

		2012	2031 Without NLE	2031 With NLE
Current/Future Planned Provision		3	3	3
Modelled Requirement	Entry Gates	1	1	1
	Exit Gates	1	1	1
Provision Required by SPSG		3	3	3

Source: TfL

2.18 Table 10 shows that the existing layout with three gates complies with LUL standards now and in 2031 with the NLE.

**Concourse Area (Unpaid Side)**

2.19 Table 11 presents the assessment of the concourse area requirements on the unpaid side of the gatetime for the PM peak hour.

**TABLE 11 PROVISION OF CONCOURSE AREA (UNPAID SIDE) - PM PEAK**

	2012	2031 Without NLE	2031 With NLE
Peak 15 minute station entry and exit (persons)	199.1	138.2	173.7
Provision Required by SPSG (m <sup>2</sup> )	13.3	9.2	11.6
Provision Available (m <sup>2</sup> )	>70	>70	>70

Source: TfL

2.20 Table 11 shows there is sufficient area available for passengers to enter and exit the stations within LUL's target levels for passenger comfort.

**Provision of TIWs and POMs**

2.21 Table 12 presents the assessment of the number of Ticket Issuing Windows (TIW) and Passenger Operated Machines (POM) required, based on LUL guidelines. It should be noted that these have been assessed based on the 'City' category of station, contained within SPSG, rather than actual sales figures at the station. The existing arrangement at the station is shown in Figure 2.3.

**TABLE 12 CALCULATED PROVISION OF TIWS AND POMS (PM PEAK)**

		2012	2031 Without NLE	2031 With NLE
Current/Future Provision	TIW	1	1	1
	POM	2	2	2
Provision required by SPSG	TIW	1	1	1
	POM	1	1	1

Source: TfL

2.22 The current provision of one TIWs and two POMs within the station will be able to accommodate future passenger demand (based on figures provided for 'City' category of station) in SPSG.

2.23 The positioning of any new Gatetime, POMs and TIWs should take into account the required queuing and run-off areas.

FIGURE 2.3 TIWS AND POMS AT BATTERSEA PARK STATION



Provision of Stairs and Corridors within the Station



2.24 Table 13 presents the assessment of minimum stair and corridor widths required within the station for passenger circulation in the PM peak hour.

TABLE 13 CIRCULATION WITHIN THE STATION - STAIR AND CORRIDOR WIDTH (PM PEAK)

		2012	2031 Without NLE	2031 With NLE
Current/Forecast Peak Minute Two Way Flow (pers/min)		13.3	9.2	11.6
Current	Minimum Corridor Width Provided (m)	1.7	1.7	1.7
	Minimum Stair Width Provided (m)	1.4	1.4	1.4
Modelled Requirement	Minimum Corridor Width (m)	0.9	0.8	0.9
	Minimum Stair Width (m)	0.5	0.3	0.4
Required by SPSC	Minimum Corridor Width (m)	2.0	2.0	2.0
	Minimum Stair Width (m)	2.4	2.4	2.4

Source: TfL

2.25 Table 13 shows future passenger demand can be accommodated in the station for both with and without NLE scenario. It should be noted this is an assessment of the minimum widths required based on forecast demand and is not based on LUL's minimum standard required for a station.

2.26 LUL requires a minimum width of 2.0 metres between finishes for a corridor.

2.27 LUL requires a minimum width of 2.4 metres between handrails for a two-way staircase and 2.0 metres for a one-way staircase.

Run-Offs



2.28 SPSC describes the purpose of run-offs as 'to 'pull' passengers away from escalators, UTS gates and staircases to provide a clear landing area for following passengers'. These are clear areas that provide passengers with additional time to make decisions on their follow on journey.

2.29 For the 2012 and 2031 without NLE scenarios, and for 2031 with NLE with associated development, the peak hour entry or exit passenger demand through the station is less than 1,000 passengers. The flow can therefore be described as a 'light flow'.

2.30 Table 14 presents the assessment of minimum run-off distance required between different elements within the station.

**TABLE 14 MINIMUM RUN-OFF LENGTHS WITHIN THE STATION**

	2012	2031 Without NLE	2031 With NLE
Staircase to Gateline (m)	6.0	6.0	6.0
Staircase to Passageway (m)	4.0	4.0	4.0
Gateline to Street (m)	6.0	6.0	6.0

Source: TfL

- 2.31 The existing layout provides sufficient run-off between the staircase and the concourse, and from the gateline to the street.
- 2.32 The existing layout comprises stairs from platforms 2 and 3 leading to a landing/passage. The landing at this level is less than the minimum recommended width of 2.0 metres.
- 2.33 The run off area between the concourse stairs, intermediate landing and stairs to platforms 2 and 3 do not meet LUL standards of a minimum 2.0 metre wide landing.

**Platform Width**



- 2.34 Table 15 and Table 16 present the minimum platform width requirements based on the forecast passenger demand in the PM peak hour for both the Northbound and Southbound Platforms.

**TABLE 15 NORTHBOUND PLATFORM - MINIMUM PLATFORM WIDTH (PM PEAK)**

	2012	2031 Without NLE	2031 With NLE
Peak Headway Platform Person Load	30.6	25.0	28.2
Minimum Platform Width Required (m)	1.2	1.2	1.2

Source: TfL

**TABLE 16 SOUTHBOUND PLATFORM - MINIMUM PLATFORM WIDTH (PM PEAK)**

	2012	2031 Without NLE	2031 With NLE
Peak Headway Platform Person Load	52.15	32.8	44.1
Minimum Platform Width Required (m)	1.4	1.2	1.3

Source: TfL

- 2.35 The platform widths provided exceed the minimum width required to enable passenger movement along the platform.
- 2.36 Both the Northbound and Southbound platforms are platform islands. LUL has a minimum standard width of 6.0 metres for these types of platform. Whilst the Northbound platform only has a width of 3.5m, Platform 5 is not used by stopping services, so passengers may also use whole width of the platform for circulation and so the platform width is not considered an issue.

**Platform Exit Width**



- 2.37 Table 17 and Table 18 present the minimum platform exit width requirements based on the forecast passenger demand in the PM peak hour for both the Northbound and Southbound Platforms.

**TABLE 17 NORTHBOUND PLATFORM - MINIMUM EXIT WIDTH REQUIREMENTS (PM PEAK)**

	2012	2031 Without NLE	2031 With NLE
Peak One Minute Platform Person Load	4.6	3.7	4.2
Minimum Platform Stair Exit Width Required (m)	0.2	0.2	0.2

Source: TfL

**TABLE 18 SOUTHBOUND PLATFORM - MINIMUM EXIT WIDTH REQUIREMENTS (PM PEAK)**

	2012	2031 Without NLE	2031 With NLE
Peak One Minute Platform Person Load	8.7	5.5	7.4
Minimum Platform Stair Exit Width Required (m)	0.3	0.2	0.3

Source: TfL

- 2.38 The platform exit widths provided for the Northbound and Southbound demand can accommodate forecast passenger demand in the PM peak period.



### 3 Summary and Conclusion

- 3.1 Forecast passenger volumes at Battersea Park are forecast to decrease slightly without the NLE in the PM peak. This reflects London's population and employment growth as well as the proposed transport network improvements in the local area, such as increases to bus service frequencies and new routes to serve the Vauxhall Nine Elms Battersea area, as well as wider network improvements such as Underground and National Rail service enhancements. These changes will increase the relative attractiveness of these routes and services compared to 2012.
- 3.2 For the with NLE scenario in 2031, demand increases over the without NLE scenario, reflecting the increased demand to and from the Battersea Power Station development enabled by the NLE.
- 3.3 No changes to the infrastructure at the station are required to accommodate the expected changes in demand in the PM peak.
- 3.4 Generally, the existing infrastructure can accommodate the forecast increase in passenger demand. It should be noted that in some instances the station infrastructure may not meet design standards for new stations but the NLE (and associated development) does not have a significant impact on station operation compared with the 2031 without NLE scenario.
- 3.5 A summary of the assessment is provided below for each component of the station infrastructure.

Location	Status	Comment
UTS Gates	☑	Sufficient ticket gates are provided in all scenarios
Concourse Area (Unpaid)	☑	Sufficient concourse area in the unpaid side of the gateline is provided in all scenarios
TIW and POM	☑	Using LUL's 'City' category of station, there is sufficient provision for all scenarios.
Stairs and Corridors within the Station	☑⊙	The existing dimensions can accommodate forecast passenger demand in all scenarios
Run-Offs	☑⊙	2031 with NLE does not have an impact on run off length.
Platform Widths	☑⊙	Platform widths at the existing station can accommodate forecast passenger flows in all scenarios.
Platform Exit Widths	☑⊙	Platform exit widths at the existing station can accommodate forecast passenger flows in all scenarios.

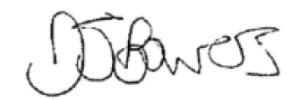
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