File Ref: N06-EC-Transport Note (201210) – 2019-2951
Date: 08 January 2021
Job Title: Belgrove House

Subject: Transport Note on Trip Distribution and London Underground Assessment

1. Introduction

1.1. This note has been produced by TTP Consulting in relation to the proposed redevelopment of Belgrove House. The proposals comprise the demolition of the existing building and the construction of a part 5 part 10 storey building plus 2 basement levels for use as office and research and laboratory floorspace with café and flexible retail and office floorspace (application reference 2020/3881).

1.2. It provides the anticipated distribution of trips associated with the proposed development on the London Underground network. An assessment of the effect of these trips on the operation of Kings Cross St Pancras underground station and the underground services that pass through it has then been undertaken. It has been agreed with Transport for London (TfL) that the assessment of station capacity should consider the operation of the station's gatelines.

2. Trip Generation

2.1. **Table 2.1** presents the multi-modal trip generation for the development that was presented in the Transport Assessment for the development.

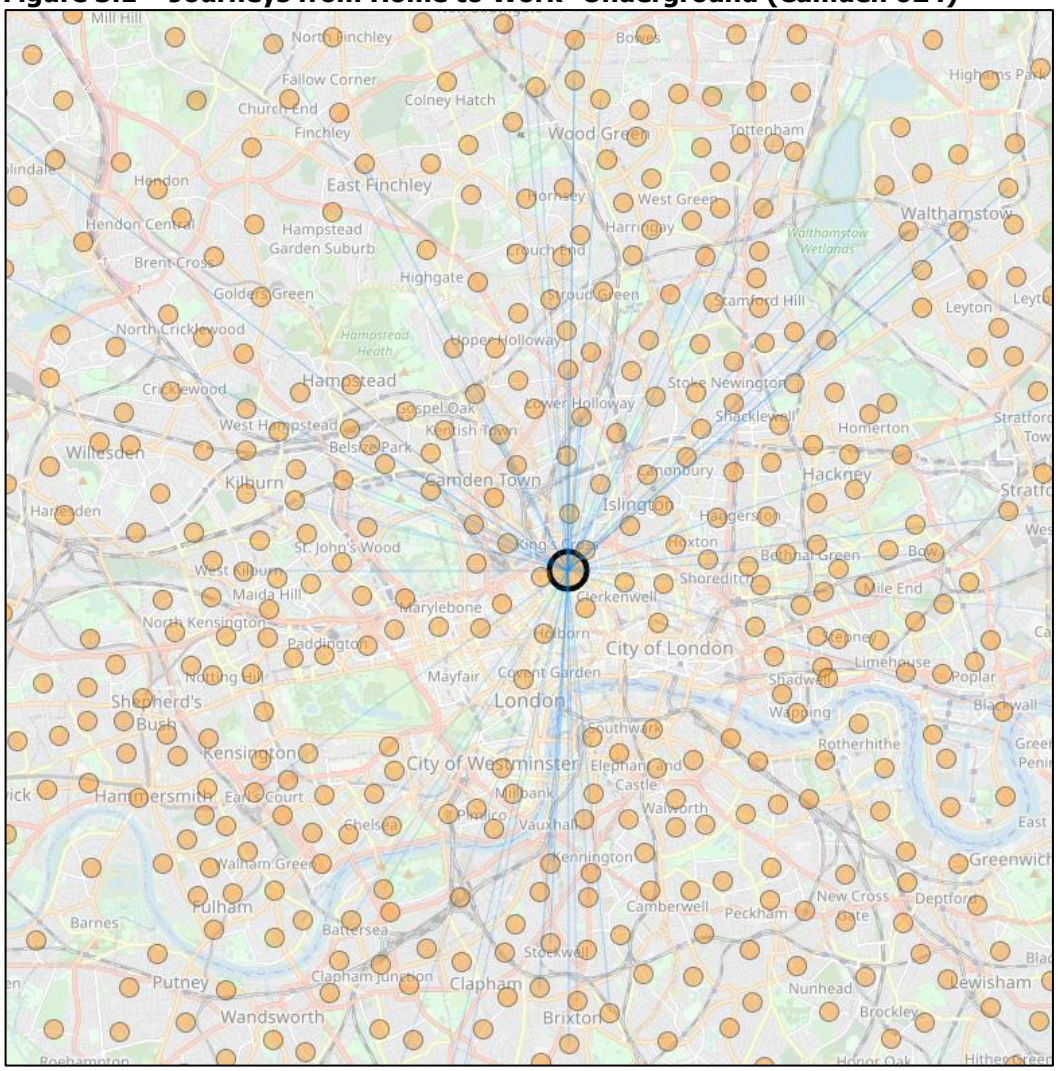
Table 2.1 – Predicted Multi-Modal Trip Generation				
Mode	**AM Peak (8am-9am)**		**PM Peak(5pm-6pm)**	
	In	**Out**	**In**	**Out**
Car Driver	0	0	0	0
Car Passenger	0	0	0	0
Underground	208	18	13	189
Rail	130	11	8	118
Bus	94	8	6	85
Motorcycle	10	1	1	9
Taxi	0	0	0	0
Cycle	42	4	3	38
Walk	36	3	2	33
Total	521	45	33	472

2.2. The table identifies that there will be 226 trips by underground in the morning peak hour and 202 in the evening peak hour. In the same periods, there will be 141 and 126 rail trips respectively. Some of these rail passengers will use services from Kings Cross or St Pancras, but some may use underground services to access other train stations, i.e., the Metropolitan Line to reach London Liverpool Street Station or the Victoria Line to reach Victoria Station.

3. Distribution of Trips onto the Underground Network

3.1. Development trips that use London Underground as their main mode have been distributed onto the network based on analysis of the 2011 Census Location of Usual Residence and Place of Work for the Camden 024 Mid-level Super Output Area (MSOA). An extract from DataShine (datashine.org.uk) showing the 2011 Census journey to work direction of travel on the London Underground network is shown in **Figure 3.1.**

Figure 3.1 – Journeys from Home to Work- Underground (Camden 024)



3.2. **Table 3.1** shows the split of development trips that use underground for the main leg of the journey to work.

Table 3.1 – Distribution of Underground main mode trips on the Network							
Line	**Arrive**	**Depart**	**%**	**AM**		**PM**	
				In	**Out**	**In**	**Out**
Northern	Southbound	Northbound	14%	29	3	2	27
	Northbound	Southbound	5%	10	1	1	9
Victoria	Southbound	Northbound	10%	52	5	3	47
	Northbound	Southbound	25%	21	2	1	19
Metropolitan	Westbound	Eastbound	6%	13	1	1	12
	Eastbound	Westbound	9%	20	2	1	18
Piccadilly	Eastbound	Westbound	9%	18	3	1	17
	Westbound	Eastbound	18%	37	2	2	33
Hammersmith & City & Circle	Eastbound	Westbound	2%	4	1	0	4
	Westbound	Eastbound	2%	4	0	1	4
Total			**100%**	**208**	**18**	**13**	**189**

3.3. A table detailing how the above information was derived is included at **Appendix A.**

3.4. To determine the use of underground services by people who use rail services as their main mode of transport, reference has been made to data from the Office of Rail and Road (https://dataportal.orr.gov.uk/statistics/usage/estimates-of-station-usage/) on the usage of train stations in 2019-20 and trips distributed proportionally amongst the busiest Central London Stations. **Table 3.2** summarises the results of this exercise, whilst a breakdown of how these trips were distributed is provided at **Appendix B**.

Table 3.2 – Distribution of Rail main mode trips on the Network							
Train Station	**Line**	**Arrive**	**Depart**	**AM**		**PM**	
				Arr	**Dep**	**Arr**	**Dep**
Euston/London Bridge	Northern	Southbound	Northbound	13	1	1	12
	Northern	Northbound	Southbound	18	1	1	16
Victoria/Waterloo	Victoria	Northbound	Southbound	48	4	3	44
Liverpool Street	Metropolitan	Westbound	Eastbound	20	2	1	18
Paddington	Hammersmith & City & Circle	Eastbound	Westbound	11	1	1	10
Total				**110**	**9**	**7**	**100**

3.5. The combined increase in underground trips as a result of the development is shown at **Table 3.3**.

Table 3.3 – Distribution of Underground and Rail main mode trips on the Network						
Line	**Arrive**	**Depart**	**AM**		**PM**	
			Arr	**Dep**	**Arr**	**Dep**
Northern	Southbound	Northbound	43	4	3	39
	Northbound	Southbound	28	2	2	25
Victoria	Southbound	Northbound	52	5	3	47
	Northbound	Southbound	69	6	4	63
Metropolitan	Westbound	Eastbound	33	3	2	30
	Eastbound	Westbound	20	2	1	18
Piccadilly	Eastbound	Westbound	18	3	1	17
	Westbound	Eastbound	37	2	2	33
Hammersmith & City & Circle	Eastbound	Westbound	15	2	1	14
	Westbound	Eastbound	4	0	1	4
Total			**319**	**27**	**20**	**290**

4. Impact on the London Underground Network

Gateline Assessment

4.1. NUMBAT data from 2019 has been provided by TfL. This data shows the number of people entering and exiting the station on average from Monday to Thursday. The busiest one-hour in the morning peak period was identified as 8.15am-9.15am and the busiest one-hour period in the evening peak was recorded as 5.15pm-6.15pm. These peak hour flows are shown in **Table 4.1**.

Table 4.1 – King's Cross St Pancras Entry and Exit Flows 2019						
Scenario	**AM Peak**			**PM Peak**		
	Exit	**Entry**	**Total**	**Exit**	**Entry**	**Total**
Existing Flows	13397	11,579	24,976	14,989	14,571	29,559

4.2. Kings Cross St Pancras has four ticket halls to access underground lines. The ticket halls, the underground lines that they provide access to, number of access gates and the percentage passenger use is detailed in Table 4.2.

Table 4.2 – King Cross St Pancras Gatelines				
Gateline	**Services Accessed**	**Number of Standard Gates**	**Number of Wide Access Gates (WAG)**	**Percentage distribution**
Tube Ticket Hall	Northern, Victoria & Piccadilly	16	2	32%
Western Ticket Hall	Hammersmith & City, Circle and Metropolitan Line	9	2	25%
Northern Ticket Hall	Northern, Victoria & Piccadilly	20	3	41%
Thameslink Ticket Hall	Northern, Victoria & Piccadilly	4	1	3%

4.3. A gateline assessment has been carried out for each ticket hall for the morning and evening peak hour periods. The assessment used 2019 NUMBAT entry and exit counts as requested by TfL and was completed in accordance with the methodology provided within Station Capacity Planning document S1371. This advises that the total number of gates at stations can be calculated using the following formula.

$$\text{Roundup}\left(\frac{\text{5min Entry Flow}}{25 \times 5}\right) + \text{roundup}\left(\frac{\text{Total Number of Exiting Customers}}{25 \times 2}\right) + X$$

4.4. The x value used in this calculation is 1 when the total number gates required is 10 or less, and 2 if more than 10. To convert 15 minute entry flows to 5 minute entry flows, the busiest 15 minute flow within the morning and evening peak hour has been multiplied by 0.4.

4.5. The number of exiting customers has been calculated using the following formula with the number of customers exiting the busiest train service increased by 25% to allow for any gap in service.

$$\text{Number of exiting customers} = \left(\frac{\text{Peak 15 min alighters} - \text{Peak 15 min interchangers}}{15} \right) \times \text{Train service headway}$$

4.6. Train service headway is the time in minutes between trains in the peak hour being considered. **Table 4.3** shows the results of the gateline assessment for each ticket hall based on 2019 exit and entry counts and 2019 counts with development. In the with development scenario, development trips are all allocated to the Tube Ticket Hall and the Western Ticket Hall being the closest gatelines to the development site that provide access to all underground lines. Detailed calculations are provided at **Appendix C**.

Table 4.3 – Gateline Assessment

Ticket Hall	Existing Gateline Requirement		With Development Gateline Requirement		Gateline Capacity (WAG)
	AM Peak	PM Peak	AM Peak	PM Peak	
Tube Ticket Hall	9	9	9	10	16 + (2)
Western Ticket Hall	7	8	8	9	9 + (2)
Northern Ticket Hall	10	11	10	11	20 +(3)
Thameslink Ticket Hall	3	3	3	3	4 + (1)

4.7. The assessment indicates that gatelines in the Western and Tube Ticket halls have sufficient capacity to accommodate the increase in demand associated with the proposed development. The results for the Western ticket hall indicate that the development will result in all 9 standard access gates being needed to accommodate passenger trips in the pm peak hour whilst at present, trips could be accommodated through 8 standard gates.

4.8. The gateline assessment calculation indicates that the increased gate use is required to accommodate entering passengers, with the number passing through the gateline increasing from 370 to 377 in a 5 minute period. TfL's methodology requires the number of gates to be rounded up and without rounding, the assessment indicates that 2.96 gates are required to accommodate 370 customers entering the Western ticket hall and that with development passengers, the requirement increases to 3.02 gates. This shows that whilst another gate would be used to accommodate the increase in passengers, the effect of the development is negligible.

4.9. It is also noted that the wide access gates provide additional capacity and that when operating in a uni-directional mode, the wide access gates provide the same capacity as a standard gate. Given that there are 2 wide access gates in the Western ticket hall, one could operate

in a uni-directional mode to effectively provide 10 standard access gates at the Western Ticket Hall.

Line Loading Assessment

4.10. The 2019 NUMBAT data provided by TfL includes the number of passengers travelling along a link between one station and another and the service frequency and capacity of trains running on each underground line. This data enables the effect of the development on the occupancy of trains passing thorough the station to be considered. **Table 4.4** shows the results of this assessment. Further detail is provided at **Appendix D**.

Table 4.4 Line Loading Assessment

			Utilisation		Utilisation + Dev		Percentage Point change	
From Station (Name)	**Line (Name)**	**Direction (Code)**	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**
King's Cross St. Pancras	H&C and Circle	IR	55%	60%	55%	60%	0.0%	0.1%
King's Cross St. Pancras	H&C and Circle	OR	75%	47%	75%	47%	0.0%	0.0%
King's Cross St. Pancras	Metropolitan	NB	32%	58%	32%	58%	0.0%	0.2%
King's Cross St. Pancras	Metropolitan	SB	73%	31%	73%	31%	0.0%	0.1%
King's Cross St. Pancras	Northern	NB	29%	68%	29%	68%	0.0%	0.2%
King's Cross St. Pancras	Northern	SB	93%	54%	93%	55%	0.0%	0.2%
King's Cross St. Pancras	Piccadilly	EB	13%	65%	14%	65%	0.0%	0.2%
King's Cross St. Pancras	Piccadilly	WB	79%	37%	79%	37%	0.0%	0.1%
King's Cross St. Pancras	Victoria	NB	21%	73%	21%	74%	0.0%	0.2%
King's Cross St. Pancras	Victoria	SB	82%	43%	82%	43%	0.0%	0.2%
Farringdon	H&C and Circle	IR	43%	67%	43%	67%	0.1%	0.0%
Euston Square	H&C and Circle	OR	60%	57%	60%	57%	0.0%	0.0%
Farringdon	Metropolitan	NB	24%	66%	24%	66%	0.2%	0.0%
Euston Square	Metropolitan	SB	63%	36%	63%	36%	0.1%	0.0%
Angel	Northern	NB	38%	84%	38%	84%	0.2%	0.0%
Euston LU	Northern	SB	85%	43%	85%	43%	0.3%	0.0%
Russell Square	Piccadilly	EB	19%	68%	19%	68%	0.1%	0.0%
Caledonian Road	Piccadilly	WB	84%	26%	84%	26%	0.2%	0.0%
Euston LU	Victoria	NB	30%	73%	30%	73%	0.2%	0.0%
Highbury & Islington	Victoria	SB	91%	34%	91%	34%	0.2%	0.0%

4.11. The table shows all underground train services operate within capacity and that the effect of the development on trains during either peak hour period is negligible, no more than a 0.2% passenger increase on any service, which is likely to be within fluctuations that occur on a daily basis in any event.

5. Summary and Conclusion

5.1. This paper provides detail of an assessment of the increase in underground trips at King's Cross St Pancras Station resulting from the proposed redevelopment of Belgrove House. In summary, it is considered that:

- The effect of the development on the station has been considered by way of assessment of gateline capacity of each ticket hall. The assessment indicates that all ticket halls operate within capacity and will continue to do so once increased trips associated with the developer have been taken into account; and
- Services that pass through the station on each underground line have capacity to accommodate any increase associated with the proposed development.

5.2. It is therefore considered that the development will not effect the nature of the operation of the underground station or services that pass through it.

APPENDIX A

Underground Trip Distribution

Underground				Routes		AM Direction	PM Direction	
Work	No.	%	Location	Arrive From	Initial			
Barnet 007	7	2%	Totteridge	Euston to King's Cross	Northern Line to Euston	Southbound	Northbound	(Edgware Branch)
Barnet 009	6	1%	Southgate	Piccadilly Line to Finsbury Park		Southbound	Northbound	
Barnet 029	10	2%	East Finchley	Northern Line to King's Cross	-	Southbound	Northbound	(High Barnet Services)
Brent 028	6	1%	Kilburn	Metropolitan Line to King's Cross	Jubilee Line to Finchley Road	Westbound	Eastbound	
Camden 003	6	1%	Tufnell Park	Northern Line to King's Cross		Southbound	Northbound	(High Barnet Services)
Camden 008	7	2%	Finchley Road / Belsize Park	Northern Line to King's Cross		Southbound	Northbound	(High Barnet Services)
Camden 010	7	2%	West Hampstead	Metropolitan Line to King's Cross	Jubilee Line to Finchley Road	Westbound	Eastbound	
Camden 011	7	2%	Belsize Park	Northern Line to King's Cross		Southbound	Northbound	(Edgware Services)
Camden 016	6	1%	West Hampstead	Metropolitan Line to King's Cross	Jubilee Line to Finchley Road	Eastbound	Westbound	
Camden 017	8	2%	South Hampstead	Metropolitan Line to King's Cross	Jubilee Line to Baker Street	Eastbound	Westbound	
Camden 020	6	1%	Kilburn High Road	Metropolitan Line to King's Cross	Bakerloo Line to Baker Street	Eastbound	Westbound	
Enfield 020	8	2%	Southgate	Piccadilly Line to Finsbury Park		Southbound	Northbound	
Enfield 036	9	2%	Palmers Green	Piccadilly Line to Finsbury Park		Southbound	Northbound	
Hackney 002	7	2%	Manor House	Victoria Line to King's Cross	London Overground to Blackhorse Road	Southbound	Northbound	
Hammersmith and Fulham 023	6	1%	Imperial Wharf	Piccadilly Line to King's Cross	District Line to Earl's Court	Eastbound	Westbound	
Haringey 001	8	2%	Bowes Ward	Piccadilly Line to Finsbury Park		Southbound	Northbound	
Haringey 004	8	2%	Bounds Green	Piccadilly Line to Finsbury Park		Southbound	Northbound	
Haringey 007	8	2%	Wood Green	Piccadilly Line to Finsbury Park		Southbound	Northbound	
Haringey 012	8	2%	Bruce Grove	Victoria Line to King's Cross		Southbound	Northbound	
Haringey 015	6	1%	Tottenham Hale / Northumberland Park	Victoria Line to King's Cross		Southbound	Northbound	
Haringey 027	8	2%	Harringay Green Lanes	Piccadilly Line to Finsbury Park		Southbound	Northbound	
Haringey 032	7	2%	South Tottenham / Harringay Green Lanes	Piccadilly Line to Finsbury Park		Southbound	Northbound	
Haringey 034	8	2%	Crouch End	Piccadilly Line to Finsbury Park		Southbound	Northbound	
Haringey 036	6	1%	Harringay / Crouch End	Piccadilly Line to Finsbury Park		Southbound	Northbound	
Harrow 002	11	3%	Canons Park / Stanmore	Metropolitan Line to King's Cross	Jubilee Line to Wembley Park	Eastbound	Westbound	
Harrow 033	10	2%	Harrow & Wealdstone / Kenton	Metropolitan Line to King's Cross		Eastbound	Westbound	
Islington 007	10	2%	Arsenal	Piccadilly Line to King's Cross		Eastbound	Westbound	
Islington 009	8	2%	Canonbury	Victoria Line to King's Cross	London Overground to Highbury & Islington	Soutbound	Northbound	
Islington 011	14	3%	Holloway Road	Piccadilly Line to King's Cross		Eastbound	Westbound	
Kensington and Chelsea 015	8	2%	Earl's Court	Piccadilly Line to King's Cross	District Line to Victoria	Eastbound	Westbound	
Lambeth 004	10	2%	Vauxhall	Victoria Line to King's Cross		Northbound	Southbound	
Lambeth 007	6	1%	Oval / Stockwell	Victoria Line to King's Cross	Northern Line to Stockwell	Northbound	Southbound	
Lambeth 010	10	2%	Stockwell	Victoria Line to King's Cross		Northbound	Southbound	
Lambeth 015	11	3%	Clapham North / Brixton	Victoria Line to King's Cross		Northbound	Southbound	
Lambeth 016	8	2%	Brixton	Victoria Line to King's Cross		Northbound	Southbound	
Lambeth 018	9	2%	Herne Hill / Brixton	Victoria Line to King's Cross		Northbound	Southbound	
Lambeth 020	10	2%	Brixton	Victoria Line to King's Cross		Northbound	Southbound	
Merton 005	6	1%	Colliers Wood	Victoria Line to King's Cross	Northern Line to Stockwell	Northbound	Southbound	
Newham 014	9	2%	Upton Park	Hammersmith & City to King's Cross		Westbound	Eastbound	
Newham 030	6	1%	Canning Town	Northern Line to King's Cross	Jubilee Line to London Bridge	Northbound	Southbound	(Bank Branch)
Redbridge 001	7	2%	Woodford	Metropolitan Line to King's Cross	Central Line to Liverpool Street	Westbound	Eastbound	
Tower Hamlets 004	7	2%	Bow Church	Metropolitan Line to King's Cross	Central Line to Liverpool Street and District Line to Mile End	Westbound	Eastbound	
Tower Hamlets 028	8	2%	Blackwall / East India / Crossharbour	Northern Line to King's Cross	DLR to Bank	Northbound	Southbound	(Bank Branch)
Waltham Forest 013	9	2%	Upper Walthamstow	Victoria Line to King's Cross		Southbound	Northbound	
Waltham Forest 014	8	2%	Blackhorse Road	Victoria Line to King's Cross		Southbound	Northbound	
Waltham Forest 016	9	2%	Walthamstow Central	Victoria Line to King's Cross		Southbound	Northbound	
Waltham Forest 017	12	3%	St James Street	Victoria Line to King's Cross		Southbound	Northbound	
Waltham Forest 018	6	1%	Walthamstow Queen's Road	Victoria Line to King's Cross		Southbound	Northbound	
Waltham Forest 028	9	2%	Maryland	Circle Line to King's Cross	TfL Rail to Liverpool Street	Westbound	Eastbound	
Wandsworth 001	7	2%	Battersea Park	Victoria Line to King's Cross	District Line to Victoria	Northbound	Southbound	
Wandsworth 004	6	1%	Battersea Park	Victoria Line to King's Cross	District Line to Victoria	Northbound	Southbound	
Wandsworth 026	8	2%	Balham	Victoria Line to King's Cross	Northern Line to Stockwell	Northbound	Southbound	
Wandsworth 030	8	2%	Tooting Bec	Victoria Line to King's Cross	Northern Line to Stockwell	Northbound	Southbound	
Westminster 005	9	2%	West Kilburn	Victoria Line to King's Cross	Bakerloo Line to Oxford Circus	Northbound	Southbound	
	432	100%						

SUMMARY					AM		PM	
Line	Route	Arrive	Depart	%	In	Out	In	Out
Northern	(Edgware Branch)	Southbound	Northbound	9%	18	2	1	17
Northern	(High Barnet)	Southbound	Northbound	5%	11	1	1	10
Northern	(Bank Branch)	Northbound	Southbound	5%	10	1	1	9
Victoria		Southbound	Northbound	10%	21	2	1	19
Victoria		Northbound	Southbound	25%	52	5	3	47
Metropolitan		Westbound	Eastbound	6%	13	1	1	12
Metropolitan		Eastbound	Westbound	9%	20	2	1	18
Piccadilly		Eastbound	Westbound	9%	18	2	1	17
Piccadilly		Westbound	Eastbound	18%	37	3	2	33
Hammersmith & City		Westbound	Eastbound	2%	4	0	0	4
Circle		Westbbound	Eastbound	2%	4	0	0	4
				100%	209	18	13	190

		AM	PM
Northern	Southbound	13	27
	Northbound	30	11
Victoria	Southbound	26	49
	Northbound	54	23
Metropolitan	Eastbound	21	13
	Westbound	15	19
Piccadilly	Eastbound	21	34
	Westbound	38	19
Hammersmith & City	Westbound	4	0
	Eastbound	0	4
Circle	Westbound	4	0
	Eastbound	0	4
		227	203

APPENDIX B

Underground to Rail Trip Distribution

Station	Entry/Exit	Interchange	Entry/Exit	Interchange
Waterloo	94195690	6505658	21%	17%
Victoria	74715808	5800177	16%	15%
Liverpool St	69482532	3946313	15%	10%
London Bridge	61308364	9506040	13%	24%
Euston	46146456	3775724	10%	10%
Paddington	38181588	2291135	8%	6%
St Pancras	35984204	4517641	8%	12%
King's Cross	34645924	2711284	8%	7%
Total	454660566	39053972	100%	100%

	AM		PM	
	In	Out	In	Out
Waterloo	27	2	2	24
Victoria	21	2	1	19
Liverpool Street	20	2	1	18
London Bridge	18	1	1	16
Euston	13	1	1	12
Paddington	11	1	1	10
St Pancras	10	1	1	9
King's Cross	10	1	1	9
Total	130	11	8	118

Station	Line	Arrive	Depart
Waterloo	Victoria Line	NB	SB
Victoria	Victoria Line	NB	SB
Liverpool Street	Metropolitan Line	WB	EB
London Bridge	Northern Line (BB)	NB	SB
Euston	Northern Line (BB)	SB	NB
Paddington	H&C, Circle	EB	WB
St Pancras	-		
King's Cross	-		

Source: https://dataportal.orr.gov.uk/statistics/usage/estimates-of-station-usage/

APPENDIX C

Gateline Assessment Calculations

2019 Counts Entry and Exit Counts

	AM (08:45-9:00)	PM (17:45-18:00)
Peak 15 mins in	3,025	3,713
Peak 15 mins out	3,457	3,817

	Peak 15 min Period		5 Minute Entry Flow		Development Trips				5 Minute Entry Flow + Dev	
Entry Counts	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**	**AM Peak Hr**	**PM Peak Hr**	**AM Peak 5 min**	**PM Peak 5 min**	**AM Peak**	**PM Peak**
Met+Cir+H&C // NB	317	434	127	174	3	34	0	4	127	177
Met+Cir+H&C // SB	437	491	175	196	3	32	0	3	175	200
Total	**754**	**925**	**301**	**370**	**6**	**66**	**1**	**7**	**302**	**377**
Northern // NB	105	183	42	73	2	25	0	3	42	76
Northern // SB	505	469	202	188	4	39	0	4	202	192
Piccadilly // EB	50	209	20	84	3	17	0	2	20	85
Piccadilly // WB	596	446	238	178	2	33	0	4	239	182
Victoria // NB	128	520	51	208	6	63	1	7	52	215
Victoria // SB	886	961	355	384	5	47	0	5	355	389
Total	**2271**	**2788**	**908**	**1115**	**21**	**224**	**2**	**24**	911	1139
Total Entry	**3,025**	**3,713**	**1210**	**1485**	**27**	**290**	**3**	**31**	**1213**	**1516**

	Peak 15 min Period		Headway		No. Exiting for Galeline Calculation (existing)		Development Trips		Development Trips		No. Exiting for Galeline Calculation (+ Dev)	
Exit Counts	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**	**AM Peak**	**PM Peak**	**AM Peak Hr**	**PM Peak Hr**	**AM Peak 15**	**PM Peak 15**	**AM Peak**	**PM Peak**
Met+Cir+H&C // NB	429	673	2.31	2.22	66	100	37	3	10	1	68	100
Met+Cir+H&C // SB	540	412	2.31	2.22	83	61	35	2	12	1	85	61
Total	**861**	**951**			**149**	**161**	**72**	**4**	**19**	**1**	**152**	**161**
Northern // NB	413	613	2.40	2.50	66	102	28	2	7	0	67	102
Northern // SB	231	133	2.50	2.50	39	22	43	3	11	1	40	22
Piccadilly // EB	267	665	2.50	2.50	44	111	18	1	5	0	45	111
Piccadilly // WB	287	83	2.61	2.50	50	14	37	2	10	1	52	14
Victoria // NB	988	1415	1.67	1.71	110	162	69	4	23	1	112	162
Victoria // SB	608	240	1.67	1.67	68	27	52	3	14	1	69	27
Total	**2595**	**2866**			**376**	**437**	**247**	**15**	67	4	**386**	**438**
Total Exiting Station	**3,457**	**3,817**			**525**	**598**	**319**	**20**	**86**	**5**	**538**	**599**
					149							
					376							

excludes 25% loading on busiest service
includes 25% loading on busiest service

			Existing Gateline 5 minute Entry Flow		Existing Gateline Exit Flow		Existing Gateline Total Requirement		Proposed Gateline 5 minute Entry Flow		Proposed Gateline Exit Flow		Proposed Gateline Total Requirement	
Ticket Hall	**No of Gates**	**Gate Split**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**	**AM**	**PM**
Tube T H	16 + 2 (WAG)	32%	385	473	167	191	9	9	388	504	181	191	9	10
Western T H	9 + 2 (WAG)	25%	301	370	149	161	7	8	302	377	152	161	8	9
Northern T H	20 + 3 (WAG)	41%	490	602	213	242	10	11	490	602	213	242	10	11
Thameslink T H	4 + 1 (WAG)	3%	33	40	14	16	3	3	33	40	14	16	3	3

APPENDIX D

Line Loading Assessment

From Station (Name)	Line (Name)	Direction (Code)	AM Peak Hour	PM Peak Hour	Frequency AM Peak	Frequency PM Peak	AM Peak Load/Train	PM Peak Load/Train	ain Capac	Existing % utilisation AM Peak	Existing % utilisation PM Peak	Development Flow AM Peak	Development Flow PM Peak	Existing + Proposed AM	Existing + Proposed PM	Proposed Utilisation AM Peak	Proposed Utilisation PM Peak
King's Cross St. Pancras	*H&C and Circle*	*IR/ WB*	5,862	6,383	12	12	489	532	892	54.8%	59.6%	2	18	5,864	6,401	54.8%	59.8%
King's Cross St. Pancras	*H&C and Circle*	*OR/EB*	8,720	5,038	13	12	671	420	892	75.2%	47.1%	0	0	8,720	5,038	75.2%	47.1%
King's Cross St. Pancras	*Metropolitan*	*NB*	4,496	8,773	14	15	321	585	1004	32.0%	58.3%	21	13	4,517	8,786	32.1%	58.3%
King's Cross St. Pancras	*Metropolitan*	*SB*	10,224	4,669	14	15	730	311	1004	72.7%	31.0%	2	18	10,226	4,687	72.8%	31.1%
King's Cross St. Pancras	*Northern*	*NB*	5,054	11,197	25	24	202	467	689	29.3%	67.7%	2	25	5,056	11,223	29.4%	67.9%
King's Cross St. Pancras	*Northern*	*SB*	15,436	9,006	24	24	643	375	689	93.4%	54.5%	6	63	15,442	9,069	93.4%	54.8%
King's Cross St. Pancras	*Piccadilly*	*EB*	2,215	10,630	24	24	92	443	684	13.5%	64.8%	2	17	2,217	10,647	13.5%	64.9%
King's Cross St. Pancras	*Piccadilly*	*WB*	12,910	6,094	24	24	538	254	684	78.6%	37.1%	3	33	12,913	6,127	78.7%	37.3%
King's Cross St. Pancras	*Victoria*	*NB*	6,487	22,647	36	36	180	629	857	21.0%	73.4%	2	19	6,489	22,666	21.0%	73.5%
King's Cross St. Pancras	*Victoria*	*SB*	24,634	13,269	35	36	704	369	857	82.1%	43.0%	6	67	24,640	13,336	82.1%	43.2%
Farringdon	H&C and Circle	*IR/ WB*	4,592	7,184	12	12	383	599	892	42.9%	67.1%	9	1	4,600	7,184	43.0%	67.1%
Euston Square	H&C and Circle	*OR/EB*	6,425	6,073	12	12	535	506	892	60.0%	56.7%	11	1	6,436	6,074	60.1%	56.7%
Farringdon	Metropolitan	NB	3,351	9,961	14	15	239	664	1004	23.8%	66.1%	20	1	3,371	9,962	24.0%	66.2%
Euston Square	Metropolitan	SB	8,826	5,363	14	15	630	358	1004	62.8%	35.6%	15	19	8,840	5,382	62.9%	35.7%
Angel	Northern	NB	6,481	13,848	25	24	259	577	689	37.6%	83.7%	28	2	6,509	13,850	37.8%	83.8%
Euston LU	Northern	SB	14,009	7,128	24	24	584	297	689	84.7%	43.1%	69	4	14,078	7,133	85.1%	43.1%
Russell Square	Piccadilly	EB	3,096	11,083	24	24	129	462	684	18.9%	67.5%	18	1	3,114	11,084	19.0%	67.5%
Caledonian Road	Piccadilly	WB	13,251	4,273	23	24	576	178	684	84.2%	26.0%	37	2	13,288	4,275	84.5%	26.0%
Euston LU	Victoria	NB	9,336	22,618	36	36	259	628	857	30.3%	73.3%	73	5	9,409	22,623	30.5%	73.3%
Highbury & Islington	Victoria	SB	27,978	10,561	36	36	777	293	857	90.7%	34.2%	21	1	27,999	10,562	90.8%	34.2%