RUGBY FOOTBALL UNION

Transport Assessment

Twickenham Stadium – East Stand Extension

August 2016

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1. INTRODUCTION

1.1 Background

1.1.1 This Transport Assessment has been prepared by Momentum Transport Planning on behalf on the Rugby Football Union (RFU) to support a planning application for the extension of the east stand of Twickenham Stadium in the London Borough of Richmond upon Thames (LBRuT).

1.1.2 The exterior of the east stand will be modernised while the existing bowl and seating infrastructure will not be affected. The extension will increase the available space in the East Stand, creating an additional 11,011m^2 of room, to help improve existing hospitality facilities within the Stadium.

1.1.3 The site is within the London Borough of Richmond upon Thames. Figure 1.1 shows the location of Twickenham Stadium.

1.1.4 The land use of the proposed extension will be Sui Generis, however for the purpose of servicing and waste assessments it has been assumed as A3 restaurant/café.

1.1.5 It should be noted that this space will be used primarily for Major Event Days, but may also be active for Non-Major Event Days as a conference centre. A Major Event Day refers to any event with a significant number of people attending e.g. a rugby match or concert event. A Non-Major Event Day refers to small-scale event where they would generally only be several hundred or several thousand people attending. This would include conferences and banqueting type events.

1.1.6 For the purposes of this Transport Assessment, the transport impacts of the East Stand extension are based on a Major Event Day scenario of a sporting event. As the increased hospitality offering is not envisaged to be used on a concert event, a sporting event is considered to be the 'worst-case' scenario.

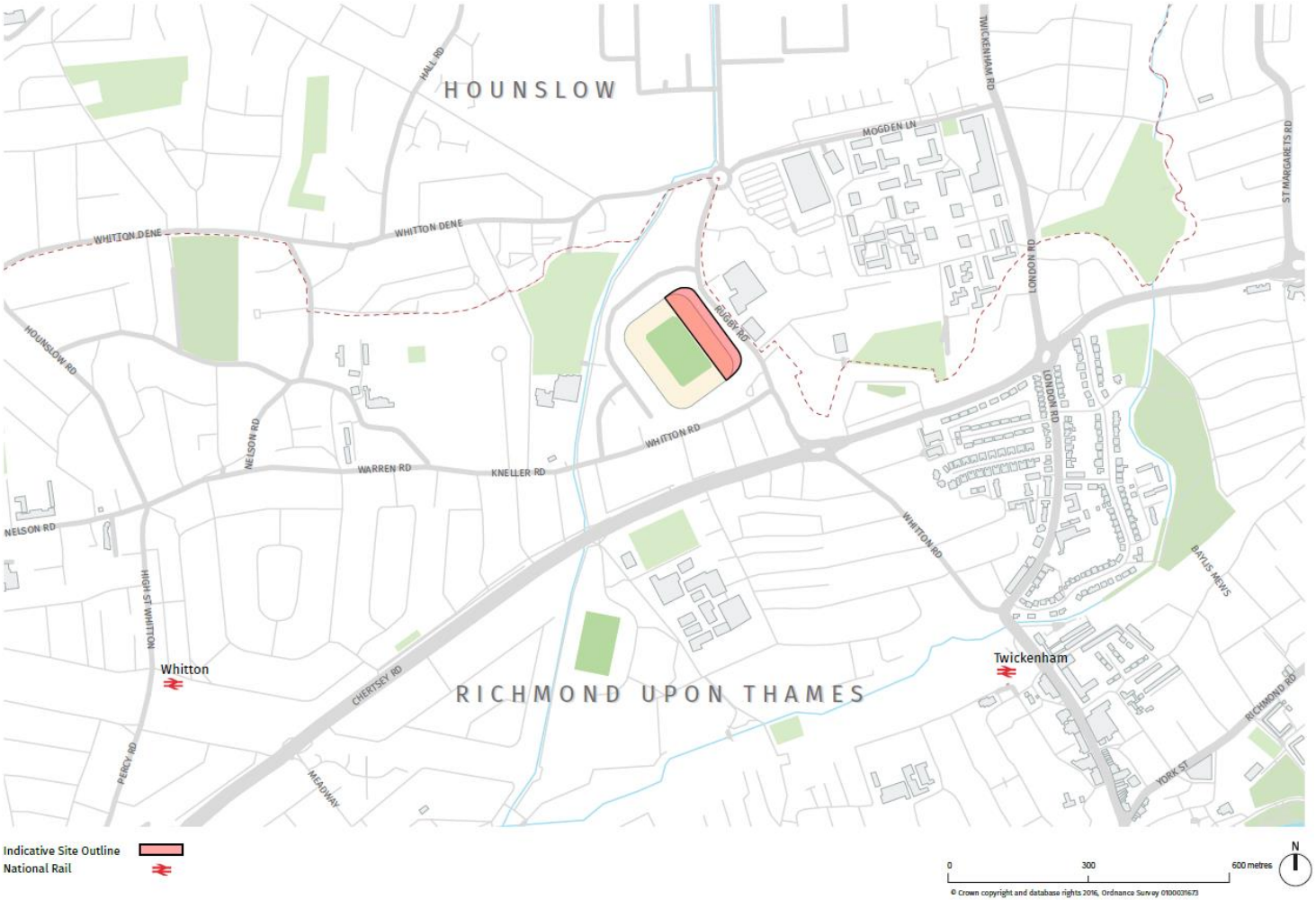
1.2 Report Structure

1.2.1 This chapter of the Transport Assessment forms the introduction. The remaining chapters cover the following:

- Chapter 2 provides relevant national, regional and local planning policy;
- Chapter 3 presents the existing conditions at the site and its surroundings;
- Chapter 4 presents the extension proposals;
- Chapter 5 sets out the trip generation for the proposed extension;
- Chapter 6 assesses the transport impact of the proposed extension;
- Chapter 7 sets out the Delivery and Servicing Plan; and
- Chapter 8 provides a summary and conclusion of this assessment.

Figure 1.1 – Site Location

TWICKENHAM STADIUM SITE LOCATION



2. PLANNING POLICY AND GUIDANCE

2.1 National Planning Policy

National Planning Policy Framework

2.1.1 The National Planning Policy Framework (NPPF), published by the Department for Communities and Local Government (March 2012), sets out the Government's planning policies for England.

2.1.2 The section 4 of the NPPF "Promoting Sustainable Transport" deals with transport policy. This section emphases the need to "favour sustainable transport modes, giving people a real choice about how they travel". Projects should encourage "solutions which support reductions in greenhouse gas emissions and reduce congestion".

2.2 Regional Planning Policy

The London Plan

2.2.1 The Mayor states the London Plan will have a new focus on quality of life and transport provision will play a part in this; '*ensuring Londoners in all parts of the city have adequate efficient transport networks and services, and the support for cycling and walking to enable them to access job, social and other life opportunities while minimising any adverse impacts on the environment or quality of life*', (para 1.44).

2.3 Local Planning Policy

Core Strategy

2.3.1 The Core Strategy was produced in 2009 to supersede the Unitary Development Plan (2005). CP5 details the policies in place to encourage sustainable travel.

2.3.2 It states that to promote safe, sustainable and accessible transport modes the Council will seek to:

- Give priority to pedestrians, including those with disabilities;
- Provide and promote a well-designed bicycle and walking network across the Borough and improve conditions for cyclists and pedestrians elsewhere; and
- Prioritise the needs of pedestrians and cyclists in the design of new developments including links to existing networks and requiring the provision of adequate cycle parking.

2.3.3 This policy also states that it will:

- Encourage major employers and schools to develop Green Travel Plans and require these where appropriate with planning applications;
- Encourage efficient, safe and sustainable freight transport.

Development Management Plan

2.3.4 The 2011 Development Management Plan takes forward the themes of the Core Strategy and provides more detail to each policy in order to control development.

Policy DMTP 2

2.3.5 The impact of new development on the transport network will be assessed against other plan policies and transport standards. All planning applications for major developments should be accompanied by a Transport Assessment and for smaller developments should be accompanied by a Transport Statement. Matters to be included are set out in DofT/TfL guidance.

Policy DMTP 6

2.3.6 To protect, maintain and improve the pedestrian environment, the Council will ensure that:

- New development and schemes protect, maintain and, where appropriate, improve the existing pedestrian infrastructure, including the Rights of Way network.
- New development does not adversely impact on the pedestrian environment and provides appropriate pedestrian access.
- New development and schemes improve the safety and security of the pedestrian environment where appropriate.

3. EXISTING CONDITIONS

3.1 Introduction

3.1.1 This section of the Transport Assessment summarises the existing conditions at the site, including its current uses; existing trip generation; public transport accessibility; cycle facilities; and servicing and waste management arrangements.

3.2 Existing Site

3.2.1 Twickenham Stadium is bound by Rugby Road to the east and Whitton Road to the south. On the north and west sides of the stadium is the access road that connects Rugby Road and Whitton Road.

3.2.2 To the north, Rugby Road joins the Whitton Dene / Mogden Lane roundabout. To the south, Rugby Road joins the A316 Chertsey Road.

3.2.3 The existing east stand comprises of six levels of predominantly concourse area with hospitality on levels 1 and 3.

Major Event Day

3.2.4 East stand on-site hospitality areas currently have a small offering for hospitality and debenture holders. Approximately 500 debenture holders are catered for in addition to a small number of hospitality spectators.

3.2.5 Off-site ticketed hospitality sites are provided that cater for approximately 4,200 spectators on a Major Event Day. These are all within 10 minutes walking distance to the stadium.

Non-Major Event Day

3.2.6 An average Non-Major Event Day event within the South Stand will have 130 visitors. The maximum Non-Major Event Day event will have approximately 900 visitors. This will occur approximately six times per year.

3.2.7 In 2015 Twickenham Experience Hosted 379 events over 196 days. Table 3.1 presents a breakdown of when events take place and average attendance.

Table 3.1 – 2015 Non Major Event Day Events

Month	No. of Events	% of Event	Average Event Attendance
January	22	5.8%	222
February	26	6.9%	103
March	43	11.3%	172
April	27	7.1%	117
May	33	8.7%	154
June	59	15.6%	113
July	41	10.8%	194
August	22	5.8%	137
September	32	8.4%	109
October	0	0.0%	0
November	32	8.4%	160
December	42	11.1%	152
TOTALS	379	100.0%	147

3.2.8 Table 3.1 shows most Non Major Event Day events take place in June, although maximum number of persons attending in July. It should be noted that in 2015 Twickenham Stadium was host to the 2015 Rugby World Cup team, which increased the number on Non Major Event Day events. Please refer to Appendix E for more details on Non Major Event Day events.

3.3 Existing Employee Trip Generation

Major Event Day

3.3.1 Approximately 3,000 members of staff work within the stadium on a Major Event Day.

3.3.2 Workforce are encouraged to use public transport wherever possible. However, some workforce parking will be required for operational reasons. It is expected that the majority of operational staff will be parked four hours before the Event until four hours after the Event. Workforce are allocated to the Rosebine Car Park.

3.3.3 Stadium Staff are also encouraged to use public transport wherever possible. Those unable to use public transport are parked in Bulls Field.

Non Major Event Day Staff

3.3.4 The Stadium employs approximately 300 staff on Non- Major Event Day. Table 3.2 presents the 2016 Staff Travel Survey results. This table refers to 'everyday' staff working at the stadium, not specific event staff.

Table 3.2 – 2016 Staff Travel Survey

Mode of Travel	Responses	% Responses
Car Driver (alone)	92	50%
Car Driver (with passenger)	8	4%
Car (passenger)	2	1%
Motorcycle	4	2%
Bus	6	3%
Tube	1	1%
Rail	36	20%
Bike & Rail	2	1%
Bicycle	6	3%
Foot	28	15%
TOTALS	185	100%

3.3.5 From Table 3.2 it can be seen that approximately 54% of staff drive their car to the Stadium on a Non Major Event Day. This is a 6% decrease when compared to the 2003 Staff Travel Survey. The most popular non-car modes are rail (20%) and travel by foot (15%) which account for 35% of all travel.

3.4 Existing Visitor Trip Generation

Historical Major Event Day Trips

3.4.1 The east stand extension proposes no increase in stadium capacity or tickets to be sold. Therefore, there will be no increase in spectator trips to the stadium.

3.4.2 For reference, Table 3.3 shows the spectator mode share for four different historical major events.

Table 3.3 – Mode Share for Historical Major Events

Mode	England vs Wales (2014)	Rihanna (2013)	Lady Gaga (2012)	England vs Italy (2009)
Car (Parked)	27.2%	30%	25.2%	33%
Car (Drop-off)	7.8%		9.9%	
Taxi	7.3%	4%	8.5%	1%
Motorcycle	0.4%	N/A	0.1%	N/A
Train	41.8%	56%	44.8%	57%
Underground	2.1%		N/A	
London Bus	4.7%	9%	5.7%	5%
Shuttle Bus	1.5%		1.3%	
Coach	2.6%		1.7%	
Walk	4.3%	1%	2.6%	4%
Cycle	0.3%		0.1%	
Other	0.0%		0.1%	

3.4.3 Table 3.4 shows the trips generated at each of these events based on the above mode share. It should be noted that the car (parked) category includes passengers and so is not an accurate reflection of the actual number of vehicles parked at an event. It is likely that vehicle numbers are closer to half of this value. This mode also accounts for those who park at the offsite hospitality and walk to the stadium.

Table 3.4 – Trips Generated by Mode for Historical Events

Mode	England vs Wales (2014)	Rihanna (2013)	Lady Gaga (2012)	England vs Italy (2009)
Car (Parked)	22,304	28,791	25,515	27,060
Car (Drop-off)	6,396		10,024	
Taxi	5,986	3,839	8,606	820
Motorcycle	328	NA	101	NA
Train	34,276	53,744	45,360	46,740
Underground	1,722		NA	
London Bus	3,854	8,637	5,771	4,100
Shuttle Bus	1,230		1,316	
Coach	2,132		1,721	
Walk	3,526	960	2,633	3,280
Cycle	246		101	
Other	0		101	
Total	**82,000**	**95,971**	**101,250**	**82,000**

3.4.4 Turnstile data has been recorded for the England vs Wales RBS 6 Nations match in March 2016. This shows when spectators cross the secure perimeter around the site (turnstile line).

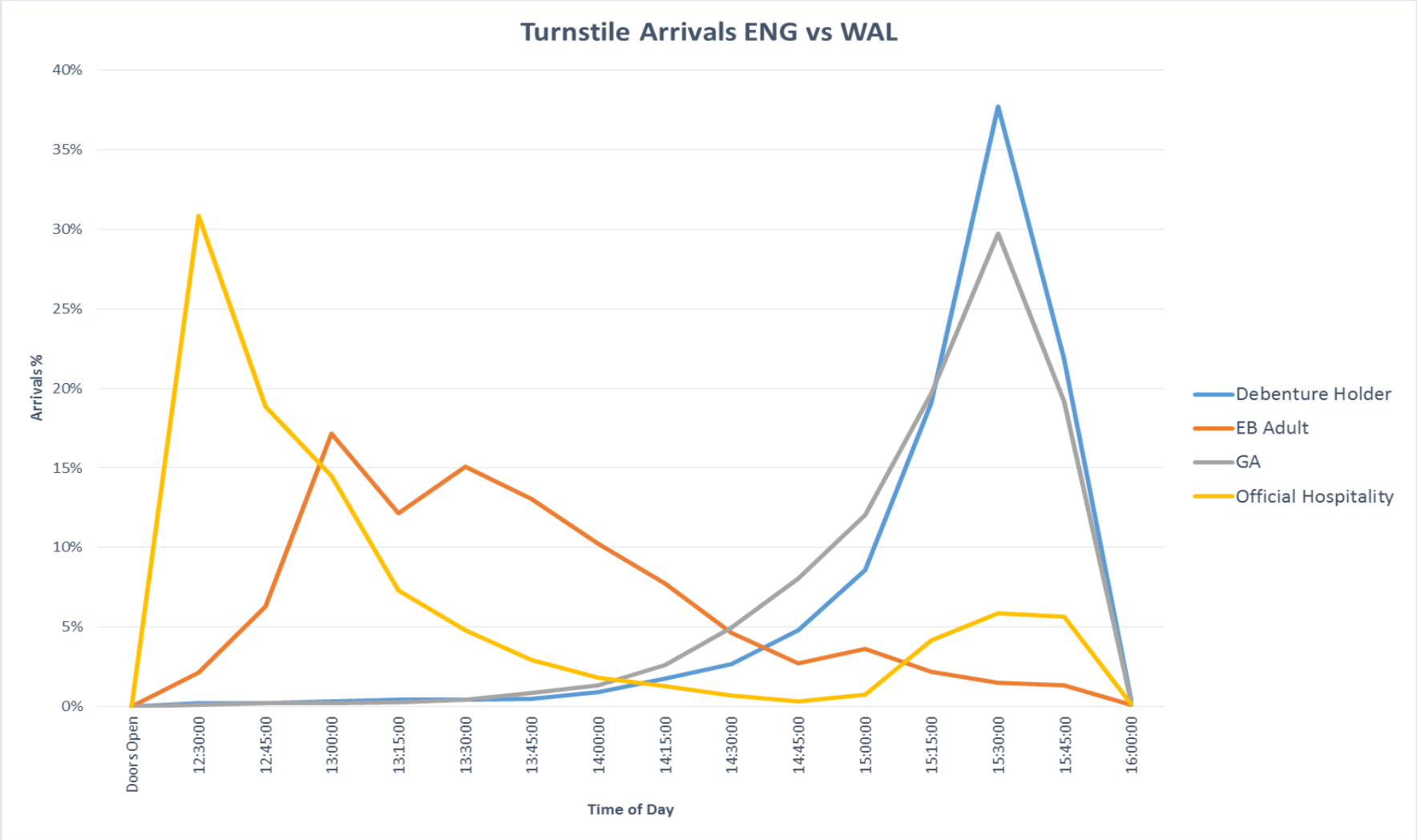
3.4.5 Figure 3.1 shows this turnstile data and is categorised by client type.

3.4.6 Figure 3.1 shows that hospitality spectators crossed the turnstile line approximately three hours and 30 minutes before the start of the match. It should be noted that EB adult refers to those who have tickets within executive boxes.

3.4.7 Observations also show that off-site ticketed hospitality spectators will then arrive at the stadium at approximately the same time as General Admission and debenture holders.

3.4.8 Peak General Admission spectators and debenture holders arrived approximately 15 to 30 minutes before the start of the match. However, this turnstile data does not reflect the reduced peak spectator flow that occurs as a result of the concession stands that are available in the West Village of the stadium.

Figure 3.1 – Turnstile Data from England vs Wales 2016



Non-Major Event Day Trips

3.4.9 A survey conducted of the O2 Conference on Wednesday 18th May 2016 recorded the main mode (longest distance travelled) and final mode of delegates arriving to Twickenham Stadium.

3.4.10 Approximately 900 delegates attended this event, with 386 delegates surveyed. This is a capture rate of 43%.

3.4.11 The mode share recorded is shown in Table 3.5.

Table 3.5 – Mode Share of O2 Conference

Mode	Main Mode Share	Final Mode Share
Car (Driver Alone)	29%	28%
Car (Driver with Passengers)	10%	11%
Car (As Passenger)	8%	14%
Bus/Coach	2%	16%
Underground	4%	2%
Rail	42%	26%
Foot	1%	1%
Other	5%	2%
Total	**100%**	**100%**

N.B. Total numbers may not tally due to rounding

3.4.12 It should be noted that a shuttle bus between Twickenham Station and the stadium was provided for this event.

3.4.13 Table 3.6 shows the trips generated at this event based on the above mode share and approximate attendance of 900 delegates.

Table 3.6 – Trips Generated by Mode for 02 Conference

Mode	Main Mode Share	Final Mode Share
Car (Driver Alone)	263	253
Car (Driver with Passengers)	91	101
Car (As Passenger)	68	124
Bus/Coach	16	140
Underground	33	18
Rail	382	238
Foot	5	8
Other	42	18
Total	**900**	**900**

3.4.14 Table 3.6 shows that up to 354 cars are expected to park at a large conference event. These are all catered for within the north and west stadium car parks.

3.4.15 A private car trip generation of 478 vehicle trips is considered a worst-case scenario as the "Car (As Passenger)" mode does not differentiate between drop-off or taxi trips that add to the number of vehicles on the network and delegates that have travelled with another delegate in the same vehicle and therefore do not add to the number of vehicles on the network.

3.5 Road Network

3.5.1 Rugby Road is a two way street to the east of the stadium. The carriageway is approximately 7.5m in width.

3.5.2 Whitton Road is a two way street to the south of the stadium. The carriageway varies in width due to the placement of bus stops and on street parking. The carriageway is therefore between approximately 6.5m and 11.5m in width. There are on street parking bays on the southern half of the carriageway, recessed from the traffic lane.

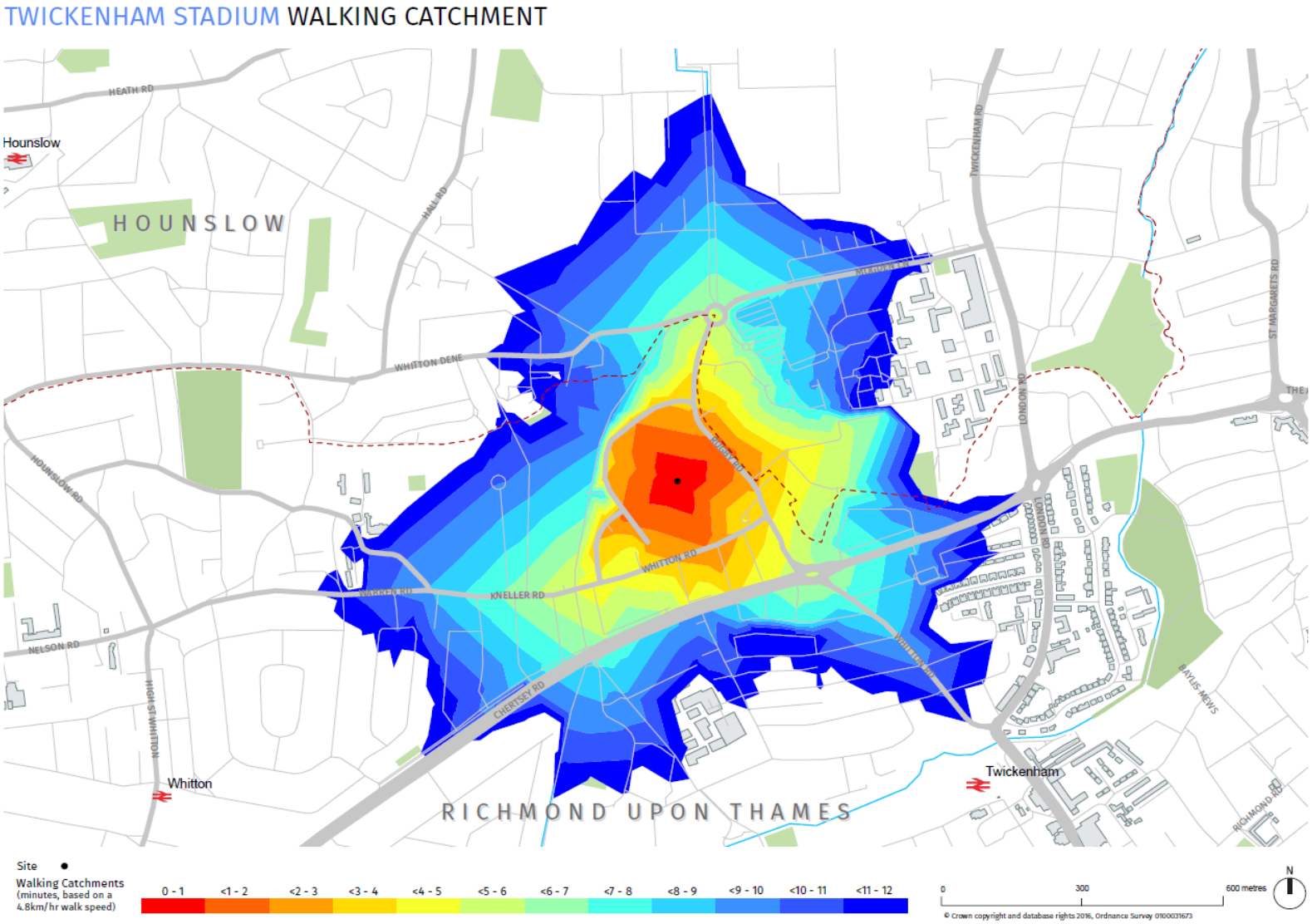
3.6 Pedestrian Facilities

3.6.1 Rugby Road has a footway on both sides of the carriageway. The eastern footway is approximately 4.5m in width. The western footway is approximately 5.5m in width. A Zebra Crossing is located on this road that allows pedestrians to cross from Web Ellis House to the stadium. A signalised crossing is located at the junction of Rugby Road and Whitton Road. This serves spectators who are travelling via train using Twickenham station.

3.6.2 Whitton Road has a footway on both sides of the carriageway. The northern footway caters for stadium pedestrian movement and so is particularly wide, providing at least 10m of width at its narrowest point, while the southern footway is approximately 3.5m wide. There is a pedestrian refuge located directly to the south of the stadium.

3.6.3 Figure 3.2 shows the walking catchments to the site for 400m, 640m and 960m.

Figure 3.2 – Walking Catchments to the Site



3.7 Public Transport Accessibility

3.7.1 The TfL Planning Information Database has been used to calculate the Public Transport Accessibility Level (PTAL) for the site. The point of interest chosen to run a PTAL calculation is the centre of the east stand, as the PTAL at this point reflects what is seen for the majority of the stand.

3.7.2 The site has a PTAL rating of 1b, although it should be noted that the south east corner of the stadium has a PTAL rating of 3 due to falling within the PTAL catchment for Twickenham Station.

3.7.3 It should be noted that the Stadium is located within a short walking distance of Twickenham Rail Station, which is a popular mode of transport for Spectators, Staff and Non Major Event Day visitors.

3.7.4 The summary PTAL report is provided in Appendix A.

3.7.5 Figure 3.3 shows the extent of public transport surrounding the stadium.

3.8 Mainline Rail

3.8.1 Twickenham Station is approximately a 13 minute walk on foot from the stadium.

3.8.2 Twickenham Station is served by South West Trains, which offers services via Twickenham between London Waterloo and destinations including Reading and Windsor.

3.8.3 Table 3.6 presents a summary of the train frequency to key destinations in the AM peak hour.

Table 3.7 – Mainline Rail Services from Twickenham Station

Destination	Peak Hour Frequency
London Waterloo	17
Reading	4
Windsor and Eton Riverside	2
Total	**24**

3.9 Bus

3.9.1 There are two bus stops to the east of the stadium and four to the south of the stadium.

3.9.2 Twickenham Stadium is served by three bus routes; service 281, 481 and 681. These services travel to destinations such as Isleworth, Whitton, Fulwell and Hounslow.

Figure 3.3 – Public Transport

TWICKENHAM STADIUM PUBLIC TRANSPORT

3.10 Cycling

3.10.1 Rugby Road and Twickenham Road are listed as "routes signed or marked for use by cyclists on a mixture of quiet or busier roads."

3.10.2 Chertsey Road has an off-road cycle route that runs alongside the carriageway. This route may be shared with pedestrians.

3.10.3 Twickenham currently provides 56 cycle parking spaces in the south east corner of the stadium next to the ticket office. A further 50 cycle parking spaces are located in the North car park.

3.10.4 Figure 3.4 and 3.5 show the cycle catchment and TfL cycle routes around the stadium.

Figure 3.4 – Cycle Catchment Area

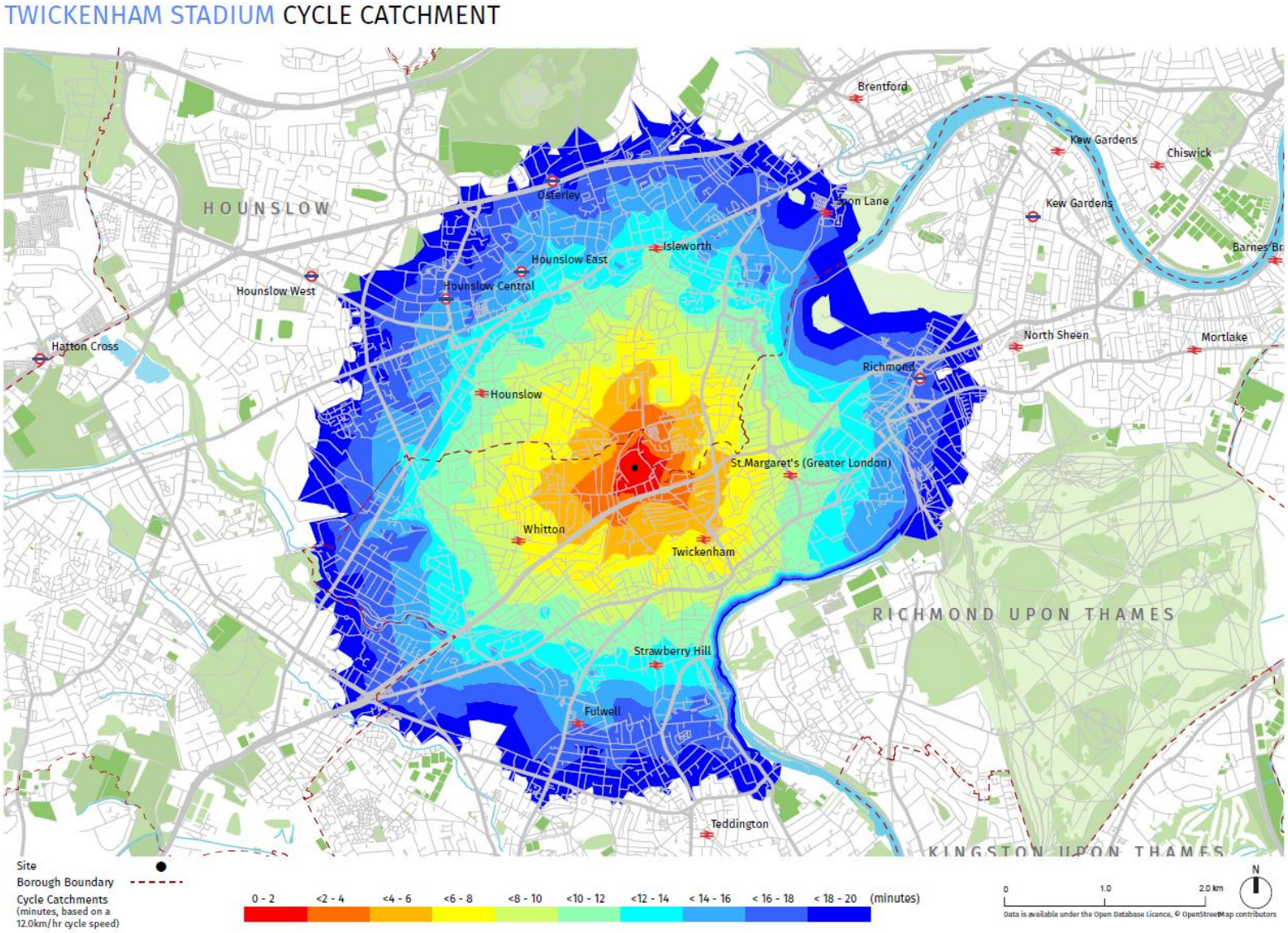
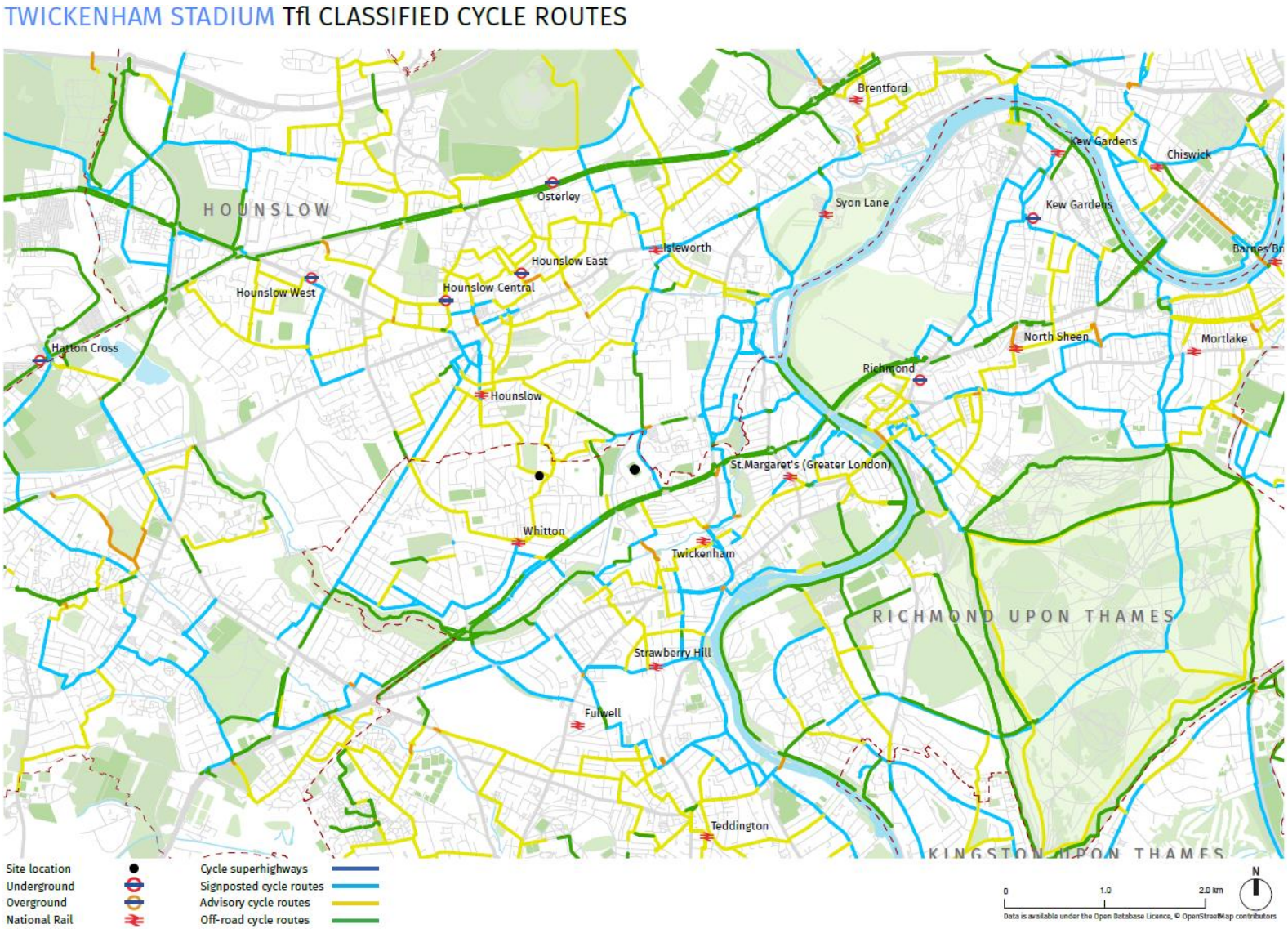


Figure 3.5 – TfL Cycle Routes



3.11 Car Parking

3.11.1 There are up to five car parks that are used by Twickenham Stadium on a Major Event Day. The North and West car parks are located within the stadium grounds. An off-site car park located on Rosebine Avenue is less than a 10 minute walk from the stadium. Tesco car park and the Cardinal Vaughan school playing field are also used when necessary. These are both in close proximity to the stadium.

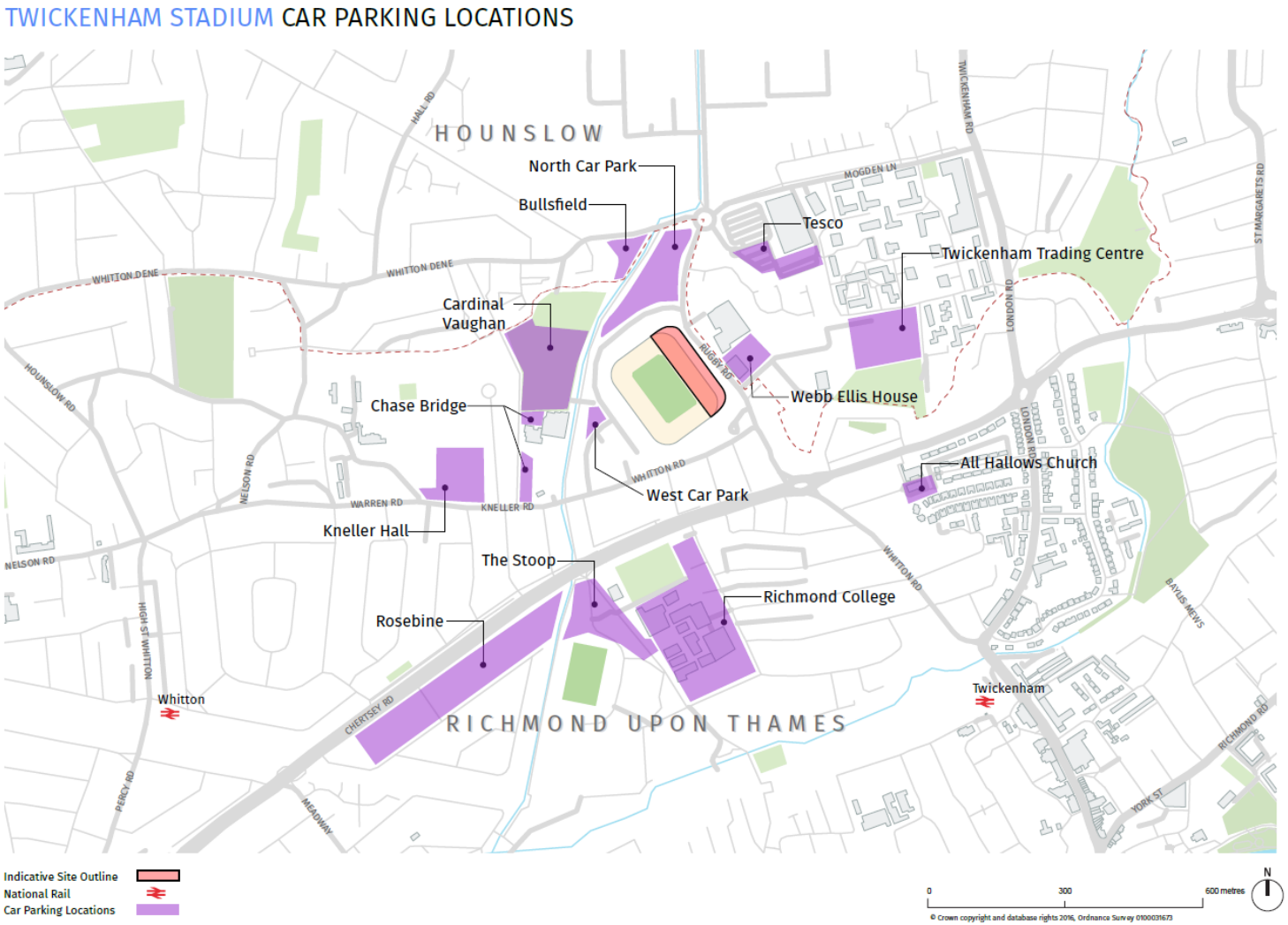
3.11.2 The site is located within LBRuT Controlled Parking Zone (CPZ) R, which is active on any Twickenham Stadium Major Event Day with an expected crowd over 35,000 people. The standard time of restricted parking is between 10am – 6pm, although signs are displayed if this is altered.

3.11.3 On Major Event Days, all staff are encouraged to use public transport for their journey to the stadium. If this is not possible, staff parking is located at Bulls Field car park, approximately 500 metres walk from the stadium. This has a capacity of approximately 200 cars.

3.11.4 Figure 3.6 shows the locations of the car parks that are used on a Major Event Day.

3.11.5 On Non-Major Event Days parking is available in the north (700 spaces) and west car parks (550 spaces), accessible from Rugby Road at the north east corner of the stadium.

Figure 3.6 – Car Parking Locations



3.12 Deliveries, Servicing and Waste Management

Delivery and Servicing

3.12.1 Servicing vehicles currently service the east stand from an external concourse within the stadium boundary.

3.12.2 Vehicles access the external concourse from the perimeter road to the north and west of the stadium, accessed from Whitton Road or Rugby Road. On the build up to a Major Event, it is estimated that the peak arrivals consists of three or four articulated vehicles over a one hour period. Please refer to Appendix D for more details on delivery and servicing trips.

3.12.3 Vehicles park where necessary on the concourse to unload goods that will then be transferred to the required location within the stadium via a service lift.

3.12.4 Due to the large area available on this external concourse, an informal arrangement is in operation without the use of marked-out loading bays.

3.12.5 All existing servicing vehicles are accommodated off-street and within the stadium. There is also spare capacity to readily accommodate more servicing vehicles if needed.

Waste Management

3.12.6 Waste is collected and stored in a number Eurobins located on the ground floor concourse of stadium.

3.12.7 Waste from other floors is taken down to the ground floor via the service lift. Spectator lifts may also be used when outside of stadium ingress and egress times.

3.12.8 When a Eurobin is full, it is transported with the use of a buggy to an external waste store in the north west corner of the stadium. Waste is then emptied into a skip where it will be compacted and stored ready for collection by a waste vehicle.

Waste Generation

3.12.9 Waste generation rates for Major Event Days have been calculated for both General Admission and for the hospitality areas. The waste generation rate is higher for hospitality spectators because they will usually have a sit down meal as opposed to using the concession stands. This results in a higher volume of waste being produced.

3.12.10 The waste generation rate for General Admission has been assumed to be 3.1 litres/person/major event day. This is based on guidance available for the Manchester United Old Trafford Football Stadium[1].

3.12.11 The waste generation rate for hospitality and debenture areas has been assumed to be 5.4 litres/person/major event day. This is based on guidance from BS5906:2005[2].

[1] WRAP Resource Management Plan Online Tool for Events – Manchester United Old Trafford Stadium, WRAP, April 2011, available at http://www.wrap.org.uk/sites/files/wrap/Man_Utd_Testimonial_final_version_14.4.11_updated_header.10762.pdf

[2] BS5906:2005 – Waste management in buildings – Code of Practice, British Standards Institute, 2005

3.12.12 It is assumed that the east stand currently caters from 24,600 (30%) spectators on a Major Event Day. 500 of these are catered for in hospitality areas.

3.12.13 The remaining spectators located in the east stand are General Admission spectators.

3.12.14 Table 3.8 shows the existing waste generated within the east stand at a capacity crowd Major Event Day.

Table 3.8 – Existing East Stand Waste Generation

Client	Number of People	Generation Rate	Waste Produced
GA	24,100	3.1 L/person/event	74,710 litres
Hospitality	500	5.4 L/person/event	2,700 litres
Total	**24,600**	**-**	**77,410 litres**

3.12.15 Table 3.8 shows that an estimated 77,410 litres of waste is produced on Major Event Day.

3.12.16 This waste is compacted within the external waste storage area before being collected.

4. EXTENSION PROPOSALS

4.1 Extension Site

4.1.1 The proposal is for a lateral extension of levels 1, 2, 3, 4, 4A and 5 on the east stand of the stadium to provide an additional 11,011m^2 of hospitality floorspace.

4.1.2 On a Major Event Day, the additional ticketed hospitality area will accommodate spectators who currently use the RFU franchised off-site ticketed hospitality facilities.

4.1.3 No additional tickets will be sold for a Major Event and the capacity of the stadium will remain the same.

4.1.4 On a Non-Major Event Day, the additional hospitality area will be marketed as conferencing and banqueting space.

4.1.5 It is anticipated that hospitality space will not be used for concert events.

4.1.6 The proposal includes reducing the size of the dropped kerb to between Rugby Road and the stadium and increasing footway space. The existing and proposed external landscaping plans can be found in Appendix F.

4.1.7 A swept path analysis has been completed to demonstrate that this change does not compromise the access of emergency vehicles to the site. Plans can be found in Appendix G.

4.2 Parking

4.2.1 No additional car parking spaces on-site or off-site are proposed as part of the east stand extension.

4.2.2 On a Major Event Day, no extra event tickets will be sold and so no extra vehicles are expected to be parking at the stadium or at off-site locations.

4.2.3 On a Non-Major Event Day, the existing car park capacities are sufficient to cater for any additional delegates attending an event in the east stand.

4.2.4 If car parking demand does exceed the capacity of the north and west car parks which are currently used for Non-Major Event Day events, Rosebine Car Park will then also be used. This car park has a capacity of 1,000 spaces and is located a 10 minute walk away from the stadium.

4.2.5 During the construction phase of the east stand extension, the contractor appointed will use part of the North Car Park as a construction compound. Table 4.1 summarises the car parking available in the Stadium grounds on a Major Event Day (sporting and concert events) and a Non Major Event Day.

Table 4.1 – Construction Phase Car Parking on Stadium Grounds

Car Park	Major Event Day	Non Major Event Day
North Car Park	300	200
North Car Park Construction Workers	0	100
Western Car Park	550	550
Total	**850**	**850**

4.2.6 During the construction phase, the Major Event Day shuttle service and coach parking operation will not change. Coach Parking will take place in the North Car Park or the Rosebine Car Park. The Shuttle Services will continue to drop off by the Tesco roundabout (during the arrivals period) and continue staging in the 'spine road' in the North Car Park and pick up spectators on Rugby Road when it is safe to do so.

4.2.7 For construction plans and their impact on stadium parking, please refer to the Construction Management Plan and Drawing 33288_TWST_LOG-01-03 Rev 00 in Appendx B of the Construction Management Plan.

4.3 Cycle Parking

4.3.1 No additional cycle parking is proposed as part of the extension. Pedal cycle is not typically a popular transport mode at stadia. Should the Travel Planning initiative see a higher take up of pedal cycle use, the Stadium may look to increase cycle parking spaces.

4.3.2 The small uplift in visitors on Non-Major Event Day events will not require an increase in cycle parking due to the extremely low number of visitors who use this mode to reach the stadium (May 2016 survey recorded 0% cycle mode use).

4.4 Deliveries, Servicing and Waste Management

Delivery and Servicing

4.4.1 The east stand will be serviced from within an internal servicing road that runs parallel to Rugby Road. This servicing road will connect the existing South Stand servicing road with the external concourse at the North Stand.

4.4.2 Servicing vehicles will access the concourse via Gate D and circulate the stadium in an anticlockwise direction.

4.4.3 Vehicles will enter the internal servicing road at the south west corner of the stadium and continue anticlockwise until they reach the east stand.

4.4.4 Vehicles will park on the internal servicing road and unload goods into the proposed service lift at the north east corner of the stadium. Outside of Major Event Day public access times, general lifts will also be used for the transfer of goods through the stadium.

4.4.5 Vehicles will park to one side of the internal road to allow other vehicles to pass by if necessary.

4.4.6 Appendix B presents the servicing route around the stadium and shows that the servicing road has sufficient width to make this passing manoeuvre possible.

4.4.7 Vehicles will then exit the servicing road at Gate D and proceed back onto the highway.

4.4.8 The east stand extension will result in an **increase of 1 articulated vehicle** over a 3 hour period on each one of the days leading up to an Event. Appendix D details the breakdown on delivery and servicing trips to the Stadium.

Waste Management

4.4.9 Waste management will remain consistent with the existing arrangement.

4.4.10 An additional internal waste room is proposed on the ground floor of the east stand to provide additional bin storage space to cater for the increase in hospitality space on Major Event Days.

4.4.11 Waste from this additional waste room will be transported to the external waste store in the north west corner of the stadium before being emptied into a skip ready for collection.

Waste Generation

4.4.12 The movement of hospitality areas from off-site locations to within the east stand will increase the amount of waste produced within the east stand.

4.4.13 Table 4.2 shows the proposed waste generated in the east stand on a capacity crowd Major Event Day. This calculation is based on there being approximately 24,600 (30%) seats associated with the east stand of the stadium.

Table 4.2 – Proposed East Stand Waste Generation

Client	Number of People	Generation Rate	Waste Produced
GA	17,675	3.1 L/person/event	54,793 litres
Hospitality	6,925	5.4 L/person/event	37,395 litres
Total	**24,600**	**-**	**92,188 litres**

4.4.14 Table 4.2 shows that an estimate 92,188 litres of waste will be produced within the proposed east stand on a Major Event Day.

4.4.15 Table 4.3 shows the difference the volume of waste produced between the existing east stand and the proposed east stand.

Table 4.3 – Additional Waste Generated from the Proposed East Stand

Scenario	General Admission	Hospitality	Total
Existing East Stand	74,710 litres	2,700 litres	77,410 litres
Proposed East Stand	54,793 litres	37,395 litres	92,188
Difference	**-19,917 litres**	**+34,695 litres**	**+14,778 litres**

4.4.16 Table 4.3 shows that the east stand extension will generate an additional 14,778 litres of waste on a Major Event Day.

4.4.17 The additional waste that will be produced will be stored in the existing waste storage. If necessary, an additional skip compactor can be located in the external waste storage area. Waste collection will be incorporated to the existing post Event dedicated waste strategy.

4.4.18 To try to offset this increase in the volume of waste produced, the RFU will further engage with their suppliers to consider ways that waste can be reduced at source, for example reducing the amount of material that is used for food and drink packaging and communicating with staff about reducing employee waste.

5. TRIP GENERATION

5.1 Major Event Day

5.1.1 The extension proposal includes an increase in on-site hospitality areas but there is no proposed increase in the capacity of the stadium or the number of tickets sold for a match. Therefore, there will be no increase or change in the trips made by spectators on a Major Event Day.

5.1.2 As Figure 3.1 shows, peak hospitality arrivals occur approximately three and a half hours prior to the start of an event. This can be explained by the provision of food and drink to ticket holding hospitality spectators.

5.1.3 Currently, spectators arrive to on-site or off-site hospitality areas approximately three and a half hours before an event starts. Off-site hospitality spectators will then travel to the stadium just prior to the start of an event. Hospitality spectators will then depart immediately after the event and either return home or return to the hospitality areas.

5.1.4 The consolidation of ticketed hospitality into the east stand will reduce the number of hospitality spectators arriving to the stadium with the peak General Admission spectators immediately prior to the event start and also will extend the departure profile after an event. This is because hospitality spectators will not be travelling to and from the off-site ticketed hospitality areas immediately before an event, they will be on-site up to 3 hours and 30 minutes prior to the event start.

5.1.5 There will be an increase in staff trips due to the increase in the hospitality areas in the east stand. Twickenham Experience use a conversion factor of 1 staff per 10 guests having a sit down meal. This equates to approximately 800 additional food and beverage staff. For a 15:00 kick off, their staff would expect to arrive over a 3 hour period and depart over a 3 hour period (which do not coincide with spectator arrival and departure peaks). No additional car parking will be made available to staff and all staff will be encouraged to use public transport. It should be noted that a large proportion of hospitality staff are likely to be employed from the local area.

5.1.6 Overall, the consolidation of the hospitality offer in the east stand is forecast to reduce the number of person and vehicle trips in the area as hospitality guests travel directly to the Stadium, resulting in the removal of staff, servicing and waste removal trips to the off-site hospitality sites.

Use of Off-Site Hospitality Areas

5.1.7 There is currently planning permission for five off-site hospitality areas on a Major Event Day. Of these, two (Richmond upon Thames College and Access Self Storage) have time limited permissions, with the permitted uses ending by in 2020 and 2017, respectively.

5.1.8 The remaining three (Kneller Hall, Chase Bridge school and Twickenham Stoop) have permanent planning permission for **hospitality** on a set number of days. The RFU will no longer provide corporate hospitality tickets to the third party operators, preventing them from assembling corporate hospitality packages. Planning

permission would be required for alternative uses, such as non-ticketed / publicly accessible facilities such as beer tents or big screens.

5.1.9 All guests currently using the off-site (and Stadium) parking currently need to pre-book their car parking space before the day of the Event. The removal of the off-site area will require hospitality guests pre-book their car parking spaces in other Event Day car parks. This will effectively result in a decrease in the number of car parking spaces available. This is unlikely to cause additional effects on parking beyond the CPZ as all parking is always pre-booked, and hospitality guests are unlikely to drive if they have not pre-booked parking.

5.1.10 If the off-site hospitality areas offer an unofficial hospitality package for ticket holders this will not have an impact on the local highway network. These unofficial events would be catering for existing spectators (no additional trips to the area) and would therefore not create additional demand on the transport network.

5.1.11 Should the off-site hospitality sites look to cater for events for non-ticket holders on a Major Event Day, these would still be located within the CPZ in place for the Major Event Day. This would require attendees to park their vehicles in the private car parks already provided for the off-site areas or find on street parking outside of the CPZ boundary (estimated at a minimum 15 minute walking time). It is therefore envisaged that the majority of these trips would be undertaken by public transport, which has adequate capacity to accommodate anyone travelling to off-site hospitality without a match ticket.

5.1.12 Servicing trips associated with these areas would continue to be undertaken outside of match ingress and egress hours where possible and as they are existing facilities they would have a negligible impact on the local highway network.

5.2 Non-Major Event Day

5.2.1 Twickenham Stadium currently hosts 379 events over 196 days on Non Major Event Days. Of these events:

- 60% are attended by 100 people or less
- 90% are attended by 300 people or less

5.2.2 The east stand extension is primarily a Major Event Day scheme. On Non Major Event Day, it may provide a conferencing and banqueting offer in line with the existing opportunities currently offered by the Stadium.

Non Major Event Daily Trip Generation

5.2.3 A travel survey was undertaken of visitors arriving at a Non Major Event Day activity at the Stadium. Table 5.1 summarises the total mode share for a Non Major Event Day, together with the **total** person trip generation for a 300 guest and a 100 guest event.

Table 5.1- Non Major Event Day Total Trip Generation

Mode	Mode Share	300 Guest Event	100 Guest Event
Car (Driver Alone)	28%	84	28
Car (with pax.)	11%	33	11
Car (pax.)	14%	42	14
Bus/Coach	16%	48	16
Underground	2%	6	2
Rail	26%	78	26
Foot	1%	3	1
Other	2%	6	2
Total	**100%**	**300**	**100**

5.2.4 From Table 5.1 it can be seen that:

- For a 300 guest event 117 guests will require car parking space over a day
- For a 100 guest event 39 guests will require a car parking space over a day

5.2.5 It should be noted that these are overall car parking spaces required over the day.

5.3 Non Major Event Day AM Peak Trip Generation

5.3.1 A survey was undertaken of visitors arriving within the Stadium building line for a Non Major Event Day activity with doors opening between 08:00 and 09:00. Table 5.2 summarises the guest arrival profile together with the total trips by time of day for a 300 guest event and a 100 guest event.

Table 5.2 - Non Major Event Day Arrival by Time of Day

Time	% Arrivals	300 Guest Event	100 Guest Event
08:30	3.4%	10	3
08:40	3.5%	10	4
08:50	2.2%	6	2
09:00	4.0%	12	4
09:10	11.5%	35	12
09:20	8.2%	25	8
09:30	16.9%	51	17
09:40	10.6%	32	11
09:50	14.6%	44	15
10:00	12.4%	37	12
10:10	10.3%	31	10
10:20	2.4%	7	2
TOTALS	**100%**	**300**	**100**

5.3.2 In order to determine the trip generation in the AM peak (08:00 to 09:00), the mode share information in (Table 5.1) has been applied to the arrival profiles surveyed at the Stadium. For the purpose of this assessment, the surveyed arrival at the Stadium period between 08:30 and 09:30 has been used to determine the equivalent AM peak (08:00 to 09:00) on the wider transport network. Table 5.3 presents the trips on the wider transport network for a 300 guest and a 100 guest event between 08:00 and 09:00.

Table 5.3 - Non Major Event Day AM Peak (08:00 – 09:00)

Mode	300 Guest Event	100 Guest Event
Car (Driver Alone)	28	9
Car (with pax.)	11	4
Car (pax.)	14	5
Bus/Coach	16	5
Underground	2	1
Rail	26	9
Foot	1	0
Other	2	1
Total	**99**	**33**

5.3.3 A review of Table 5.3 shows that in the AM Peak (08:00 – 09:00):

- A 300 guest event generates between 38 vehicles and 52 vehicles (if all car passengers are additional trips)
- A 100 guest event generates between 13 vehicles and 17 vehicles (if all car passengers are additional trips)

5.3.4 It should be noted that this is in line with existing Non Major Event Day activities at Twickenham Stadium and will therefore have a negligible impact on the wider transport network.

5.4 Non Major Event Day PM Peak Trip Generation

5.4.1 A review of 2015 events held on Non Major Event Days at Twickenham Stadium, shows that the majority of events for 300 guest would not finish during the PM Peak (17:00 – 18:00). Only 4% of events were shown to be finish during the PM Peak. Please refer to Appendix E for a fuller breakdown of Non Major Event Day finish times.

5.4.2 90% of events are shown to finish before 16:00 or after 19:00. Given the nature of the events taking place on Non Major Event Days (conferences and banqueting) spectator departures will be spread over a period of time.

5.4.3 This is in line with existing activities held at Twickenham Stadium on Non Major Event Days, which have a negligible impact on the wider transport network.

5.5 Non Major Event Day Parking

5.5.1 Twickenham Stadium offers a number of car parking opportunities. Table 5.4 summarises car parking available to guests attending Twickenham Stadium on Non Major Event Day.

Table 5.4 - Twickenham Stadium Non Major Event Day Car Parking

Car Park	Car Parking Spaces	Cumulative Spaces
Northern Car Park	700 (200)*	700 (200)*
Western Car Park	550	1,250 (750)*
Rosebine	1,000	2,250 (1,750)*
Total	**2,250**	**-**

*() denotes car parking capacity during the construction phase

5.5.2 Twickenham Stadium has 1,250 car parking spaces available on the Stadium grounds (Northern Car Park and Western Car Park) and a further 1,000 car parking spaces within walking distance of the Stadium (Rosebine).

5.5.3 During the construction phase, part of the Northern Car Park will be used for contractor parking on a Non-Major Event Day. Because of this, the number of parking spaces available for delegates and staff within this car park will be reduced to approximately 200 spaces.

Car Parking Requirement for a 300 guest Non Major Event Day Event.

5.5.4 In order to determine the car parking requirements on Non Major Event Days for a 300 person event, the following factors have been considered:

- The RFU currently has approximately 300 employees present at the Stadium. For the purpose of this assessment it has been assumed that 400 employees are present.
- Twickenham Experience typically apply a factor of 1 employee per 10 guests for a sit down meal (1 employee per 25 guests for a buffet meal). For a 300 guest sit down meal event approximately 30 staff would be required. It has been assumed that 50 staff are present.
- It has been assumed that 300 visitors are present at an event at Twickenham Stadium on a Non Major Event Day.

5.5.5 Table 5.5 summarises the number of persons at the Stadium together with the car mode share as obtained from the Non Major Event Day travel survey and the 2016 Staff Travel Survey.

Table 5.5 - Non Major Event Day Car Parking Demand

Client Group	Persons	% Car Mode	Car Spaces	Cumulative
RFU	400	54%	216	216
Activity Staff	50	54%	27	243
Visitors	300	39%	117	360
TOTALS	**750**	**-**	**360**	**-**

5.5.6 From Table 5.5 it can be seen that on a Non Major Event Day with 300 guests, at total of 360 car parking spaces are required to accommodate car parking demand. This can be accommodated in the Northern Car Park or the Western Car Park. There would be an additional 890 spare car parking spaces available in the Stadium grounds (Northern and Western Car Park) and 1,890 spare car parking spaces overall (including Rosebine).

Car Parking Requirement for Non Major Event Day Event – Sensitivity Scenario.

5.5.7 A sensitivity scenario has been undertaken in order to ascertain the impact on car parking of hosting a 300 person event and a 900 person event simultaneously at Twickenham Stadium. This is not a likely occurrence at the Stadium but is considered a robust, worst case scenario.

5.5.8 In order to determine the car parking requirements on Non Major Event Days for this sensitivity scenario, the following factors have been considered:

- The RFU currently has approximately 300 employees present at the Stadium. For the purpose of this assessment it has been assumed that 400 employees are present.

- Twickenham Experience typically apply a factor of 1 employee per 10 guests for a sit down meal (1 employee per 25 guests for a buffet meal). For a 300 guest sit down meal event approximately 30 staff would be required. It has been assumed that 50 staff are present. For a 900 guest sit down meal event approximately 90 staff would be required. It has been assumed 100 staff would be present.

- It has been assumed that 300 and 900 visitors (1,200 visitors in total) are present simultaneously at two events at Twickenham Stadium on a Non Major Event Day.

5.5.9 Table 5.6 summarises the number of persons at the stadium together with the car mode share as obtained from the Non Major Event Day survey and the 2016 Staff Travel Survey.

Table 5.6 - Non Major Event Day Car Parking Demand (Sensitivity Scenario)

Client Group	Persons	% Car Mode	Car Spaces	Cumulative
RFU	400	54%	216	216
Activity Staff	150	54%	81	297
Visitors	1,200	39%	468	765
TOTALS	**1,750**	**-**	**765**	**-**

5.5.10 From Table 5.6 it can be seen that on a Non Major Event Day with 300 and 900 guests (1,200 guests in total), at total of 765 car parking spaces are required to accommodate car parking demand. This can be accommodated in the Northern Car Park and the Western Car Park. There would be an additional 485 spare car parking spaces available in the Stadium grounds (Northern and Western Car Park) and 1,485 spare car parking spaces overall (including Rosebine).

5.5.11 Should the Northern Car Park and/or the Western Car Park not be available, prior to the Non Major Event Day persons driving to the Stadium would be informed of their relocation to the Rosebine Car Park. In first instance, the appropriate proportion of staff parking would be relocated to the Rosebine Car Park. This was the procedure implemented during the 2015 Rugby World Cup.

6. IMPACT ON THE TRANSPORT NETWORK

6.1 Major Event Day

Introduction

6.1.1 On a Major Event Day, it is expected that there will be a small increase in the number of staff trips and delivery and servicing trips to the stadium as a result of the proposed east stand extension.

Impact on the Highway Network

6.1.2 There will be an increase of 1 articulated vehicle in a 3 hour period for servicing and delivery trips that take place on the days building up to an Event Day. Where possible, these will take place outside of peak network hours and peak ingress/egress hours.

6.1.3 Any additional hospitality staff employed by the stadium as a result of the proposed east stand extension will not be able to park at the stadium. There is likely to be a small amount of additional staff who are dropped of near to the stadium outside of the Event peak periods, it is probable that most staff will use public transport, bicycle or foot to get the stadium.

6.1.4 There will be a negligible impact on the local highway network.

Impact on Public Transport

6.1.5 There will be an increase in trips made on public transport by staff who will be working in the additional hospitality areas within the east stand on a Major Event Day.

6.1.6 These trips will occur outside of peak spectator ingress and egress times.

6.1.7 There will be a negligible impact on public transport.

Impact on the Pedestrian Network

6.1.8 There will be an increase in pedestrian trips on the local network made by staff who will be working in the additional hospitality areas on a Major Event Day, but these will occur outside of peak spectator ingress and egress times.

6.1.9 The consolidation of ticketed hospitality into the east stand will reduce the number of hospitality spectators arriving to the stadium with the peak General Admission spectators immediately prior to the event start and also will extend the departure profile after an event.

6.1.10 This will reduce the impact on the pedestrian network in the peak arrival period on a Major Event Day.

6.1.11 There will be a negligible impact on the pedestrian network.

Impact on Cycle Infrastructure

6.1.12 There will be an increase in cycle trips on the local network made by staff who will be working in the additional hospitality areas on a Major Event Day.

6.1.13 The existing cycle parking provision is sufficient to cater for this increase.

6.1.14 These trips will occur outside of peak spectator ingress and egress times.

6.1.15 There will be a negligible impact on cycle infrastructure.

6.2 Non-Major Event Day

Introduction

6.2.1 Up to 300 trips are expected to be generated on the largest Non-Major Event Day in the east stand. However, these larger Non-Major Event Days are unlikely to coincide with larger Non-Major Event Days within the South Stand.

6.2.2 The stadium's likely maximum delegate trip generation on a Non-Major Event Day remains as a 900 delegate conferencing event.

Impact on the Highway Network

6.2.3 An 300 person event will generate 39 to 53 vehicle trips in the AM peak across the road network. There will be a negligible impact on the local highway network.

6.2.4 The existing largest Non-Major Event Day event in the South Stand (900 guests) generates 477 vehicle trips across the road network. This quantity of trips is only likely to occur on the estimated six largest Non-Major Event Days per year.

Impact on Public Transport

6.2.5 An 300 person event will generate 44 public transport trips in the AM peak. There will be a negligible impact on public transport.

6.2.6 The existing largest Non-Major Event Day event in the South Stand (900 guests) generates 396 public transport trips. This quantity of trips is only likely to occur on the estimated six largest Non-Major Event Days per year.

Impact on the Pedestrian Network

6.2.7 A 300 person event will generate 1 trip on the pedestrian network in the AM peak. There will be a negligible impact on the pedestrian network.

6.2.8 The existing largest Non-Major Event Day event in the South Stand (900 guests) generates 8 trips on the pedestrian network. This quantity of trips is only likely to occur on the estimated six largest Non-Major Event Days per year.

Impact on Cycle Infrastructure

6.2.9 No additional cycle trips are forecast on a Non-Major Event Day.

6.2.10 There will be no impact on cycle infrastructure.

7. DELIVERY AND SERVICING PLAN

7.1 Introduction

7.1.1 This Chapter sets out Delivery and Servicing Plan (DSP) for the proposed Twickenham Stadium east stand extension.

7.1.2 This DSP has been prepared following best practice guidance set out in:

- Delivery Servicing Plans: Making Freight Work for You (TfL);
- Managing Freight Effectively: Delivery and Servicing Plans (TfL); and
- The London Freight Plan (TfL, November 2007).

7.1.3 Waste will be managed, and waste storage provided, in line with British Standards (BS 5906:2000).

7.1.4 The east stand extension will comprise of hospitality space on a Major Event Day and conferencing and banqueting space on a Non-Major Event Day.

7.2 Delivery and Servicing Plan Objectives

7.2.1 The objectives of the DSP are to minimise the impact of delivery and servicing vehicle movements through planning, sustainable procurement practices, and a reduction in waste generation. The following benefits are targeted through the DSP:

- Reduce the number of deliveries through planning, or scheduling them to be made outside peak periods;
- Encourage the use of sustainable freight modes or greener vehicles;
- The provision of periodical updates to the DSP;
- Good communication between all parties involved in the process (suppliers, staff, the council and development manager); and
- The efficient usage of available facilities.

7.2.2 In addition, the aim of the DSP is to provide a management strategy to support the proposed design of the servicing area.

7.3 Policy Context

7.3.1 This section of the DSP provides an overview of national, regional and local policy guidance on DSPs.

BREEAM UK New Construction: Non-domestic Buildings - Technical Manual (2014)

7.3.2 The BREEAM document describes an environmental performance standard against which buildings in the UK can be assessed, rated and certified. A key metric BREEAM assesses is operational waste, for non-residential waste only.

7.3.3 The aim of minimum standards regarding waste is to recognise and encourage the provision of dedicated storage facilities for a building's operational-related recyclable waste streams so that this waste is diverted from landfill or incineration.

7.3.4 The key parameters to achieve compliance include the segregation of stored waste; and an adequate and accessible waste storage area for each waste type.

The London Plan (2016)

7.3.5 The Mayor of London is responsible for producing a planning strategy for London. The London Plan sets out an integrated economic, environmental, transport and social framework for the development of London over the next 20-25 years.

7.3.6 Policy 6.3 of the London Plan, '*Assessing effects of development on transport capacity*' states that delivery and servicing plans, and construction logistics plans, should be secured in line with the London Freight Plan and also should be co-ordinated with travel plans.

The Mayor's Transport Strategy (2010)

7.3.7 The Mayor's Transport Strategy proposals highlights the importance of the London Freight Plan, construction logistic plans, and delivery and servicing plans and provides framework for regulation and targeted incentives.

7.3.8 Proposal 98 of the Mayor's Transport Strategy states that through TfL (working with the London boroughs), road freight operators, and other stakeholders, will look to:

- Adopt planning conditions that specify Delivery Service Plans for major developments;
- Aim for 50% of HGVs and vans serving London to be members of Freight operator Recognition Scheme by 2016;
- Encourage and, where appropriate, specify improved freight movement efficiency through, for example, grater consolidation, more off-peak freight movements and greater use of water and rail-based transport; and
- Support the freight industry land requirements for locally focused consolidation and/or break-bulk facilities and access to waterways and railways.

The London Freight Plan – Sustainable Freight Distribution: A Plan for London

7.3.9 The London Freight Plan sets out steps that need to be taken over the next 10 years to address the increase in demand for freight and servicing. The plan contains proposals to deliver real improvements on the ground, alongside others designed to improve understanding of the issues around freight and to contribute to the longer term process of addressing London's transport needs. The four key projects which supports the delivery of the plan are;

- Freight Operator Recognition Scheme (FORS);
- Delivery and Servicing Plans;
- Construction and Logistics Plan; and
- Freight Information Portal (FIP).

7.3.10 The Freight Operator Recognition Scheme employs a tiered set of membership levels to address fleet and freight vehicle operational efficiency, improving all areas of sustainable distribution to reduce CO2 emissions, congestion, collisions and operator costs.

7.3.11 The Scheme recognises legal compliance as the base 'bronze' level and promotes the uptake of best practice covering fuel efficiency, alternative fuels and low carbon vehicles, management of road risk, legal record keeping and reducing penalty charge notices through the higher '*silver*' and '*gold*' levels.

7.3.12 FORS also recognise operator achievements with rewards that encourage operators to raise standards to reduce, CO_2 emissions and to improve vehicle facilities designed to improve HGV safety, primarily through reducing risks to cyclists.

7.3.13 The FIP offers (for London) a single interface for information on freight between London's public authorities and freight operators. It enables the integration of systems and acts as a single point of registration for deliveries in London.

7.3.14 The FIP aims to reduce operators' administrative costs and improve access to freight journey planning in the Capital, to support improved operational efficiency, better driver behaviour and the use of alternative fuels (including bio-fuel) and low-carbon vehicles.

7.4 Delivery and Servicing Trips

7.4.1 It is envisaged that the majority of servicing and deliveries that result from the east stand development will be combined with existing servicing and delivery trips to other stands. However, there is a likelihood of a small increase in servicing and delivery trips. Where possible, these will take place outside of peak network hours and peak ingress/egress hours.

7.4.2 It should also be taken into account that the off-site ticketed hospitality areas are unlikely to continue and so would no longer receive servicing and delivery trips to these sites.

7.4.3 Appendix D provides a detailed breakdown of forecast servicing trips on Major Event Day and Non Major Event Day.

7.4.4 The estimated increase in Non-Major Event Day trips will be negligible over and above the existing situation. Servicing and Delivery for Major Event Days are expected to increase by 1 articulated vehicle over a 3 hour period on the days building up to the Event.

7.4.5 The east stand will be serviced from within an internal servicing road that runs parallel to Rugby Road. This servicing road will connect the existing South Stand servicing road with the external concourse at the North Stand.

7.4.6 Servicing vehicles will access the concourse via Gate D and circulate the stadium in an anticlockwise direction.

7.4.7 Vehicles will enter the internal servicing road at the south west corner of the stadium and continue anticlockwise until they reach the east stand.

7.4.8 Vehicles will park on the internal servicing road and unload goods into the proposed service lift at the north east corner of the stadium. Outside of Major Event Day public access times, general lifts will also be used for the transfer of goods through the stadium.

7.4.9 Vehicles will park to one side of the internal road to allow other vehicles to pass by if necessary.

7.4.10 Appendix B presents the servicing route around the stadium and shows that the servicing road has sufficient width to make this passing manoeuvre possible.

7.4.11 Vehicles will then exit the servicing road at Gate D and proceed back onto the highway.

7.5 Waste Management Strategy

Waste Storage and Collection

7.5.1 Day-to-day waste is collected and stored in a number Eurobins located around the stadium.

7.5.2 Waste from higher floors is taken down to the ground floor via the service lift. Spectator lifts may also be used when outside of stadium ingress and egress times.

7.5.3 When a Eurobin is full, it is transported with the use of a buggy to an external waste store in the north west corner of the stadium. Waste is then emptied into a skip where it will be compacted and stored ready for collection by a waste vehicle.

7.5.4 The movement of hospitality areas from off-site locations to within the east stand will increase the amount of waste produced within the east stand.

7.5.5 The proposed east stand is expected to generate the following quantities of waste:

- General Admission – 54,793 litres
- Hospitality – 37,395 litres
- Total – 92,188 litres

7.5.6 This is approximately 14,778 litres more than what is currently produced within the east stand.

7.5.7 The east stand proposals include an additional waste room on Level 0. This is will help to accommodate the additional waste that will be generated.

7.5.8 Waste collection will be incorporated into the existing post Event waste collection strategy.

Delivery and Servicing Plan Measures

7.5.9 Table 7.1 outlines the DSP measures; the benefits they offer; implementation and time scales; and responsibility to take them forward to encourage sustainable freight. The measures aim to achieve DSP objectives and minimise the impact of the service and delivery vehicles forecast to access the development.

Table 7.1 – Delivery and Servicing Plan Measures

Measure	Description	Benefit	Timescale	Responsibility
Management of DSP				
Adoption of DSP	Involvement of Facilities Manager at the earliest opportunity is important to ensure the DSP is an active and living document	More policies can be implemented and better results delivered	Upon completion	RFU
Assign Responsibility of DSP to the Travel Plan Coordinator	Travel Planning Coordinator to be responsible for managing the on-going development, delivery and promotion of the DSP	To ensure that the DSP is taken forward and results delivered.	Upon completion	Travel plan Co-ordinator
TRAVL compliant travel surveys	Surveys of all servicing and delivery movements occurring throughout a typical weekday	To inform the future development of the DSP and to quantify progress	1 year after completion	Travel plan Co-ordinator
Raise awareness and promote DSP initiatives	Provide site information and promote the DSP to FM and other key stakeholders	To promote the measures and targets of the DSP to a wide audience	Upon completion and on-going	Travel plan Co-ordinator
Training of Staff	All staff associated with the delivery and servicing of the stadium be required to undertake appropriate training	To ensure staff are aware of and understand the measures of the DSP in order to implement them effectively	Upon completion	Travel plan Co-ordinator
Survey servicing vehicles accessing the Stadium	Survey the number of vehicles entering the Stadium grounds by time of day	Understand when articulated vehicles arrive at the Stadium and ascertain if the delivery schedule causes congestion.	Within 1 year of completion and occupation of the East Stand	Travel plan Co-ordinator
Service Vehicle Access				
Access routes for service and deliveries	Provide sufficient space for service vehicles to access and exit the site	To minimise the impact of the extension on the public highway	To be implemented with design measures	Design team

Reducing Service and Delivery Trips				
Use of local resources / suppliers	Encourage the food and beverage suppliers to source items locally or from the same supplier	To reduce the number of delivery vehicle making trips to the stadium	Within 1 year of completion	Travel plan Co-coordinator
Service and Delivery Operations				
Site Information	Produce information booklets showing servicing and delivery facilities and management procedures	No confusion regarding location and process, encourage deliveries to take place outside peak hours	Upon completion	Travel plan Co-coordinator
Freight Operator Recognition Scheme (FORS)	Use of suppliers who are FORS members and encourage non-FORS members to sign up to the scheme	Benefits towards driver behaviour training, fleet management, safety and reduced emissions	Upon completion and on-going	Travel plan Co-coordinator
Vehicle Booking and Management Systems	Produce a delivery and servicing schedule to outline the most appropriate times for servicing vehicle movements	Improve the efficiency of the loading arrangement, reduce the risk of vehicle conflict over capacity	Upon completion	Travel plan Co-coordinator

Management of the DSP

7.5.12 The DSP will be implemented after the completion of the east stand. It will be developed into a full DSP within one year of completion, after the completion of the TRAVL compliant baseline surveys.

7.5.13 The RFU will work with the management team to ensure the DSP is implemented and developed over time. The Travel Plan and DSP are interlinked documents and therefore the Travel Plan Coordinator will be responsible for managing the DSP.

Raising Awareness

7.5.14 The facilities management team should know about the DSP, including:

- What the DSP is;
- Benefits of implementing the DSP;
- What they can do to improve it; and
- The importance of the DSP, service vehicle movements and their impact on the local community and the highways.

7.5.15 In addition, staff and supplier training will assist with reducing vehicle movements to and from the site, and should help to avoid congestion along the servicing road.

7.5.16 Staff will also be required to undertake surveys which will inform the management team about the vehicle movements to and from the site and will help them to provide inputs towards the development of the DSP.

Review and Monitoring

7.5.17 The DSP will be reviewed and monitored at regular intervals to measure performance and identify improvements where possible.

Stage 1- Programme Development

7.5.18 The first stage of this process is to undertake a detailed service and delivery vehicle survey for the site within 6 months from completion.

7.5.19 The surveys will be based on the TfL guidelines and will include questions regarding the frequency of visits; vehicle type; supplier information; type of goods/material delivered; quantity and size; access; and arrival/departure routes.

Stage 2 – Continued Review and Monitoring

7.5.20 After the implementation of the DSP, it should remain a live document and therefore will require continued monitoring and updating.

7.5.21 The monitoring and continued update of the DSP is the responsibility of the stadium's Travel Plan Coordinator. The Travel Plan coordinator will be appointed prior to occupation and funds will be made available for them to develop the DSP and its continued update.

7.5.22 Table 7.2 shows the DSP's continued review and monitoring programme.

Table 7.2 – DSP Continual Review and Monitoring Programme

Action	Timescale
Servicing and Delivery vehicles Survey (TRAVL Complaint format)	Within 3 months from the site's completion
Produce and Implement the DSP	Within 3 months of completion
Future surveys to update the DSP	1st and 2nd year
Strategic review of the DSP	Within 6 months of completion, and after 1st and 2nd year

8. CONCLUSIONS

8.1.1 This Transport Assessment has been prepared by Momentum Transport Planning on behalf of the RFU to support the planning application of the Twickenham Stadium east stand extension in the borough on Richmond upon Thames.

8.1.2 The proposed east stand extension comprises of 11,011m^2 GIA of A3 restaurant/café floorspace to be used for Major and Non-Major Event Days.

8.1.3 The east stand extension will enable the multiple hospitality areas that are currently taking place off-site to be consolidated within the stadium. No additional tickets will be sold to Major Events as a result of this extension.

8.1.4 This Transport Assessment summarises the existing conditions at the Twickenham Stadium including site access; the highway network; public transport accessibility; car parking; and servicing and waste management arrangements. Twickenham Stadium has a PTAL rating of 1b, however the south east corner of the stadium has a PTAL rating of 3 due to falling within the PTAL catchment for Twickenham Station.

8.1.5 No new car parking spaces are proposed in association with the east stand extension on-site or off-site. No additional car parking spaces will be used on a Major Event Day and the current car parks have sufficient capacity to cater for any potential slight increase in parking demand on a Non-Major Event Day.

8.1.6 The proposed east stand extension will generate a slight increase in servicing and delivery trips and staff trips on a Major Event Day. Additional staff will travel using public transport, bicycle or foot. Delivery and servicing trips will take place outside of peak hours where possible. This increase in trips will have a negligible impact on the local highway network.

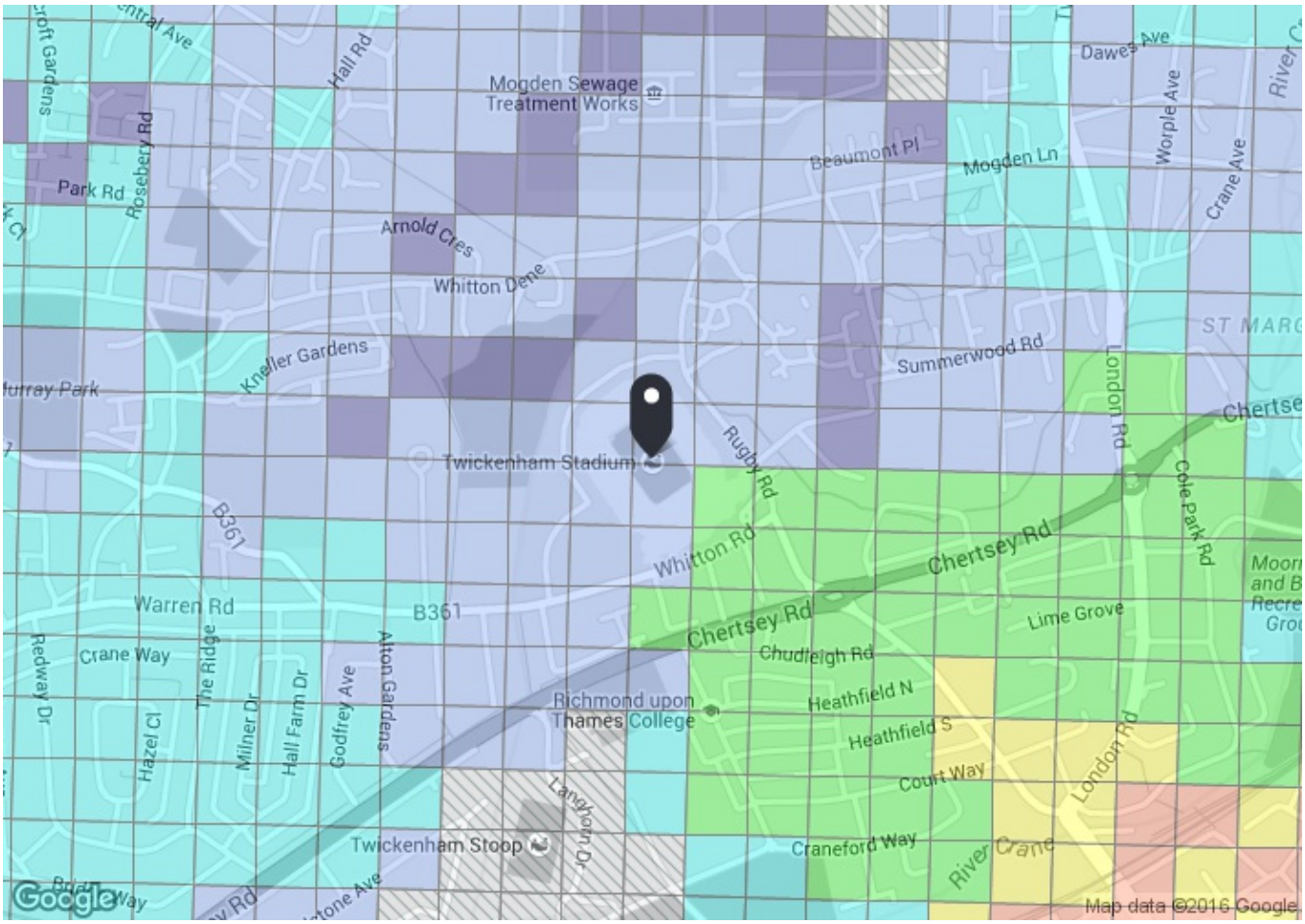
8.1.7 All servicing, delivery and waste collection will take place off-street. The east stand servicing road has a sufficient height and width to cater for and HGV to pass a parked HGV on this internal servicing road. This will ensure that no queuing occurs on the highway network, even in peak delivery hours. An additional waste room is proposed in the ground floor of the east stand to help accommodate the additional waste that will be created on a Major Event Day at the stadium.

8.1.8 Overall, the proposed Twickenham Stadium east stand extension will have a negligible impact on the local highway and public transport network.

Appendix A

Summary PTAL Report

TRANSPORT FOR LONDON



PTAL output for 2011 (Base year)

1b

Twickenham Stadium
Whitton Rd, Twickenham TW2 7BA, United Kingdom

Easting: 515328, Northing: 174299

Grid Cell: 50274

Report generated: 15/03/2016

Map key - PTAL

0 (Worst)	1a
1b	2
3	4
5	6a
6b (Best)	

Map layers

PTAL (cell size: 100m)

Calculation Parameters

Day of Week	M-F
Time Period	AM Peak
Walk Speed	4.8 kph
Bus Node Max. Walk Access Time (mins)	8
Bus Reliability Factor	2.0
LU Station Max. Walk Access Time (mins)	12
LU Reliability Factor	0.75
National Rail Station Max. Walk Access Time (mins)	12
National Rail Reliability Factor	0.75

Copyright TfL 2016

Calculation data

Mode	Stop	Route	Distance (metres)	Frequency(vph)	Walk Time (mins)	SWT (mins)	TAT (mins)	EDF	Weight	AI
Bus	TWICKENHAM RUGBY STADIUM	281	351.6	7.5	4.4	6	10.4	2.89	1	2.89
Bus	TWICKENHAM TRADING ESTATE	481	74.4	1	0.93	32	32.93	0.91	0.5	0.46
Bus	MOGDEN LANE TESCO'S	H20	447.07	5	5.59	8	13.59	2.21	0.5	1.1
									Total Grid Cell AI:	**4.45**

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Appendix B

Drawing M000168-TR-004 Rev B – 16m Articulated Vehicle Tracking On-Site

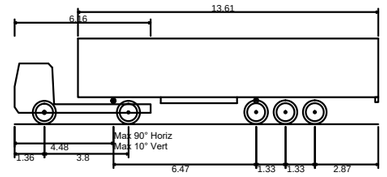
N

Column protection is required for columns within close proximity to vehicle tracking

NOTES

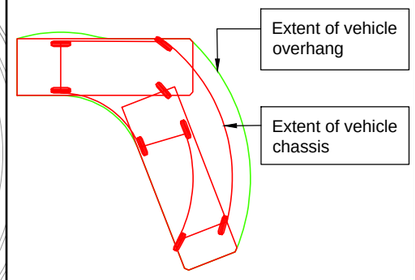
1. Do not scale from this drawing, work to figured dimensions only
2. Dimensions are in Metres unless stated otherwise
3. This drawing should be read in conjunction with all other relevant drawings and specifications

VEHICLE PROFILE



FTA Design Articulated Vehicle (1998)

Overall Length	16.480m
Overall Width	2.550m
Overall Body Height	3.870m
Min Body Ground Clearance	0.515m
Max Track Width	2.470m
Lock to Lock Time	3.00s
Kerb to Kerb Turning Radius	6.550m



Rev	Date	By	Remarks	Chkd	Appd
B	24/05/16	YS	Revised Layout	AMcC	AMcC
A	21/04/16	YS	First Issue	AMcC	AMcC

momentum transport planning

Client

RFU

Job Title

TWICKENHAM STADIUM
EAST STAND

Drawing Title

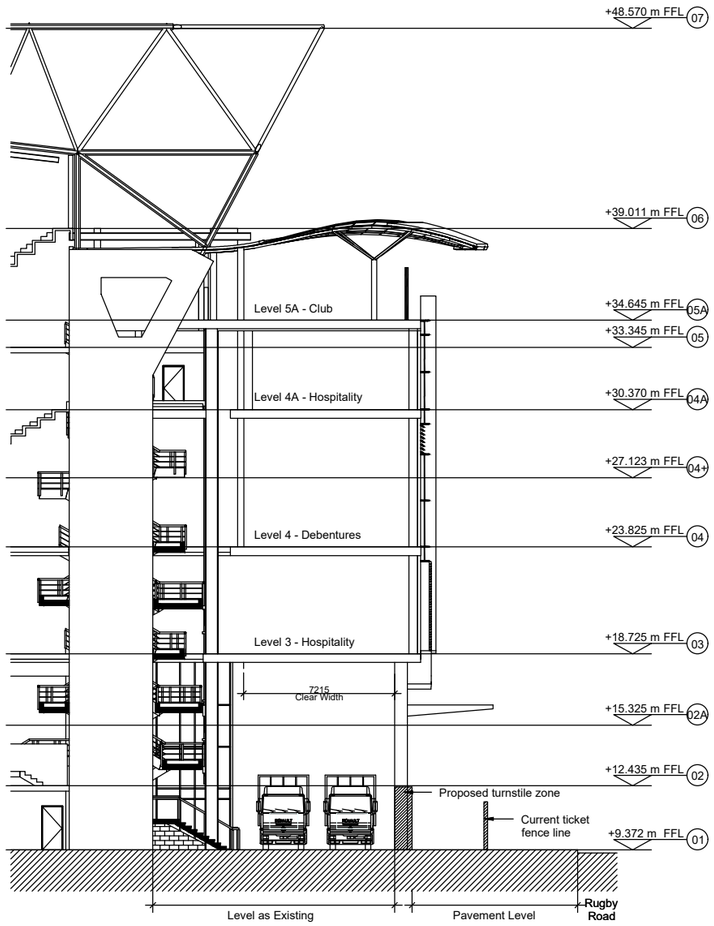
16m ARTICULATED VEHICLE TRACKING ON-SITE

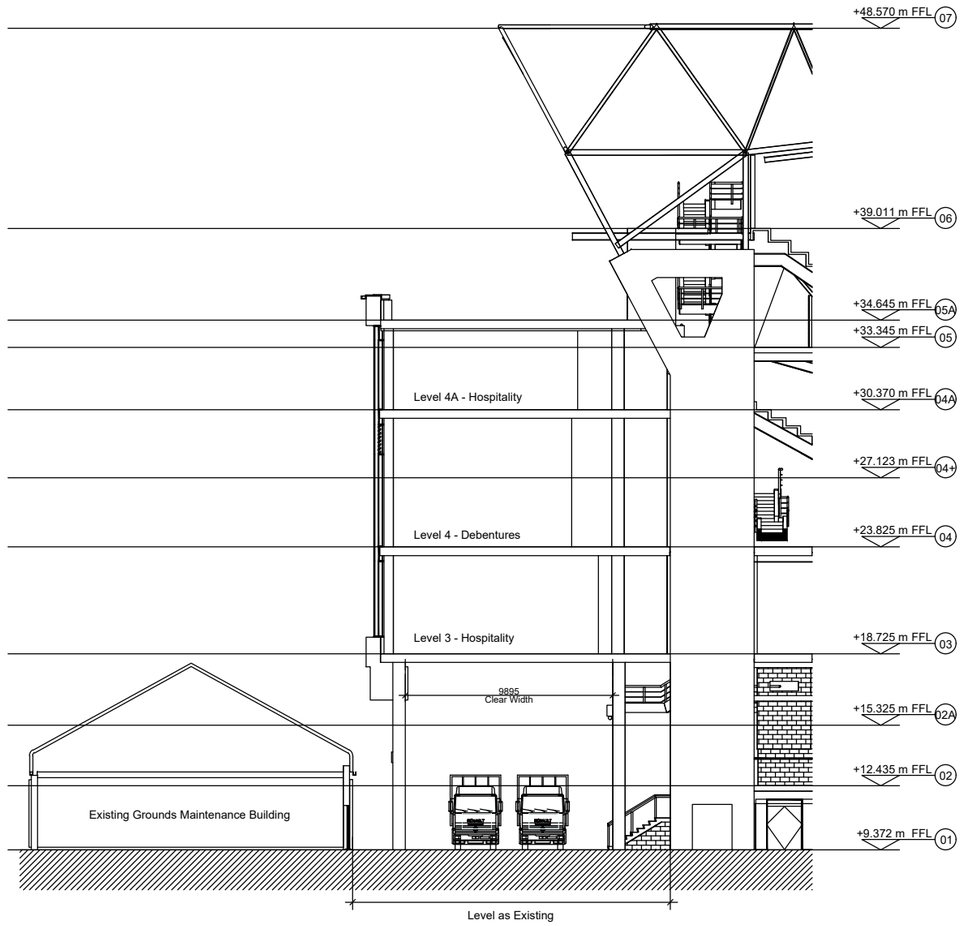
Scale at A3 1:1000

Job No	Drawing No	Issue
M000168	M000168-TR-004	B

Appendix C

Drawing M000168-TR-008 Rev A – Inner Concourse Typical Sections





NOTES

1. Do not scale from this drawing, work to figured dimensions only
2. Dimensions are in Metres unless stated otherwise
3. This drawing should be read in conjunction with all other relevant drawings and specifications

Rev	Date	By	Remarks	Chkd	Appd
A	25/05/16	PW	First Issue	AMcC	AMcC

momentum transport planning

Client

RFU

Job Title

TWICKENHAM STADIUM
EAST STAND

Drawing Title

INNER CONCOURSE
TYPICAL SECTIONS

Scale at A3 N.T.S.

Job No	Drawing No	Issue
M000168	M000168-TR-008	A

Appendix D

Twickenham Stadium Delivery and Servicing

TECHNICAL NOTE

Project	Twickenham Stadium – East Stand Extension
Report Title	Delivery and Servicing Trips
Date	15/06/2016
Prepared by	Momentum Transport Planning
Prepared for	London Borough of Richmond upon Thames

Executive Summary

- A review of the existing delivery and service operation at Twickenham Stadium, Marriott Hotel and Virgin Active (gymnasium) for an England International has been undertaken.

- Twickenham Stadium Major Event Day Food (ambient, chilled and frozen product) and Beverage servicing and delivery is limited by the Stadium's ability to cook and store food and distribute beverage around the stadium. This results in existing articulated vehicles having spare capacity.

- The Stadium (Food) Major Event Day deliveries currently comprise a **peak day of 5 articulated vehicles over a 3 hour period (on the days building up to the Event)**. The **East Stand Extension will increase this to 6 articulated vehicles over a 3 hour period**.

- The Stadium (Beverage) Major Event Day deliveries currently comprise a **peak day of 4 articulated vehicles over a 5 hour period period (on the days building up to the Event)**. The East Stand Extension will not increase these the peak day deliveries.

- The Marriot Hotel and Virgin Active deliveries comprise a **peak day of 2 articulated vehicles** (in total) in an hour (worst case scenario).

- With the East Stand extension, assuming 12 articulated vehicles arrived over a three hour period would equate to 4 articulated vehicles per hour, or one articulated vehicle every 15 minutes during the peak hour in a week.

- The proposed layout can accommodated 3 articulated vehicles outside of the security perimeter without encroaching on the public highway. This would equate to 45 minutes of contingency should the articulated vehicle be unable to enter the Stadium footprint.

On Non Major Event Day, Stadium Food and Beverage departments do not require articulated vehicles for servicing and delivery.

1.1 Introduction

1.1.1 In order to better understand the existing servicing and delivery trips associated with Twickenham Stadium, a review of the build up to an England International has been assessed. This review has focussed on Food, Beverage, Marriott Hotel and Virgin Active (gymnasium) which represent the majority of servicing and delivery trips to the precinct.

1.1.2 For the purpose of this review, articulated vehicle trips for a full attendance England International Event taking place on a Saturday has been assessed. This is considered a robust, worst case scenario.

1.2 Major Event Day – servicing and delivery Trips

1.2.1 Servicing and delivery trips associated with an England International commence approximately five days before the Event. The reasons are:

- Event Day food will require preparation before storage. Size of deliveries are therefore limited to the amount of food that can be prepared prior to storage;

- Event Day beverage requires centralised storage and then distribution to the relevant locations in the Stadium. Size of deliveries are therefore limited to the ability to distribute goods around the Stadium.

1.2.2 Major Event Day activities may take place at the same time as Marriott Hotel and Virgin Active activities. These are discussed in the Non Major Event Day section.

Food

1.2.3 Food deliveries mostly use articulated vehicles and require use of three different vehicle types to transport different types of product:

- Ambient product
- Chilled product
- Frozen product

1.2.4 Given the need to separate different types of food, and the need to manage the rate at which food arrives (in order to cook and store the food), articulated vehicles transporting the goods are not necessarily currently full (i.e. there is spare capacity on the articulated vehicles).

1.2.5 Table 1 present the number of articulated vehicles currently delivering to the Stadium by day of the week, together with the increase forecast with the East Stand extension.

Table -1 Food Articulated Vehicle Delivery Trips - Existing and Future

Day of the Week	Existing Deliveries	East Stand Uplift	Forecast Deliveries
Monday	3	1	4
Tuesday	5	1	6
Wednesday	5	1	6
Thursday	3	1	4
Friday	2	1	3
Saturday	0	0	0
TOTAL	18	5	23

1.2.6 Food deliveries typically arrive between 07:00 and 10:30, in order to provide the kitchen with the remainder of the day for food preparation and subsequent storage. Based on the future peak demand of 6 vehicles over a three hour period, this would equate to **2 articulated vehicles per hour (or 1 vehicle every half an hour)**.

1.2.7 Anecdotally, the Food team have never experienced any issues with vehicle congestion due to deliveries, even for the 2015 Rugby World Cup.

Beverage Deliveries

1.2.8 Beverage deliveries for a Major Event take place on Monday to Friday in order to enable the Beverage team to distribute beverage to appropriate section of the Stadium. Table 2 presents the beverage suppliers, the number of vehicles arriving at the Stadium and the forecast uplift with the new East Stand.

Table -2 Beverage Delivery Trips - Existing and Future

Supplier	Existing Deliveries	East Stand Uplift	Forecast Deliveries
Green King	7	1	8
Heineken	1	0	1
Coors	1	0	1
Ecocup	1	0	1
Tato (crips)	1	0	1
Gas*	2	0	2
Wine / Spirits*	3	2	5
Brakes (soft drinks)	3	1	4
Alice of Richmond*	1	1	2
Pastys	1	0	1
Billtong*	1	0	1
Total (all vehicles)	22	5	27
Total (articulated)	15	2	17

*lorries

1.2.9 Table 3 present the number of articulated vehicles currently delivering to the Stadium by day of the week together with the increase forecast with the East Stand extension.

Table -3 Beverage Articulated Delivery Trips - Existing and Future

Day of the Week	Existing Deliveries	East Stand Uplift	Forecast Deliveries
Monday	4	0	4
Tuesday	3	1	4
Wednesday	4	0	4
Thursday	2	1	3
Friday	2	0	2
Saturday	0	0	0
TOTAL	15	2	17

1.2.10 Beverage deliveries typically arrive between 06:00 and 11:00. Based on the peak demand of 4 vehicles over a five hour period, **this would equate to 1 vehicle per hour**.

1.3 Non Major Event Day – servicing and delivery Trips

1.3.1 Servicing and delivery trips associated with Non Major Event Days will be vastly reduced when compared to Event Day.

Food

1.3.2 Food deliveries for Non Major Event Day are done using vans rather than articulated vehicles. As for Major Event Day, these will require product to be separated into ambient, chilled and frozen. There are 10 van deliveries every day between 06:30 and 13:00. That equates to approximately 2 vans per hour, or one van every half an hour. These trips are not expected to increase with the new East Stand extension.

Beverage

1.3.3 Beverage deliveries do not typically take place during Non-Major Event Day. Delivery for Major Event Days typically requires an over provision of beverage, which is then stored on site (i.e. Logistics Compound, Hospitality Zones, Stadium Stands).

1.3.4 For Non Major Event Days beverage is typically sourced from surplus product remaining from Major Event Days.

1.3.5 Should additional beverage be required, this is transported on site using a small van or truck between 06:00 and 11:00.

Marriott Hotel

1.3.6 The Marriot Hotel deliveries mainly comprises linen and kitchen supplies. Table 4 presents the existing and future articulated vehicle deliveries.

Table -4 Marriott Hotel Articulated Delivery Trips - Existing and Future

Day of the Week	Existing Deliveries	East Stand Uplift	Forecast Deliveries
Monday	1	0	1
Tuesday	1	0	1
Wednesday	1	0	1
Thursday	1	0	1
Friday	1	0	1
Saturday	0	0	0
TOTAL	5	0	5

1.3.7 The Marriott Hotel deliveries typically arrive between 07:00 and 09:00. Based on the peak demand of 1 vehicles over a two hour period, this would equate to a **maximum of 1 articulated vehicle per hour**.

1.3.8 It should be noted that outside of the Major Event Season, when the hotel is less busy, these trips may decrease significantly.

Virgin Active (gymnasium)

1.3.9 The Virgin Active deliveries mainly comprises towels. Table 5 presents the existing and future deliveries.

Table -5 Virgin Active Delivery Trips - Existing and Future

Day of the Week	Existing Deliveries	East Stand Uplift	Forecast Deliveries
Monday	1	0	1
Tuesday	1	0	1
Wednesday	1	0	1
Thursday	1	0	1
Friday	1	0	1
Saturday	0	0	0
TOTAL	5	0	5

1.3.10 The Virgin Active deliveries typically arrive between 10:00 and 12:00. Based on the peak demand of 1 vehicles over a two hour period, this would equate to a **maximum of 1 articulated vehicle per hour**.

1.3.11 All other deliveries take place with smaller vehicles (vans) stopping front of house.

1.4 Summary of Servicing and Delivery Trips

1.4.1 Based on the review undertake, a worst case scenario will occur during the preparation for a Major Event Day whilst the Marriot Hotel and Virgin Active developments continue with their normal operation.

1.4.2 Table 6 presents the peak **day** articulated vehicle arrivals on the build up to a Major Event Day.

Table -6 Peak Articulated Vehicle Demand - Existing and Future

Destination	Existing Peak Day	Future Peak Day	Difference
Stadium Food	5	6	+1
Stadium Beverage	4	4	+0
Marriott Hotel	1	1	+0
Virgin Active	1	1	+0
TOTAL	11	12	+1

1.4.3 Based on the information presentation in Table 6, the future peak arrival period will comprise of **12 articulated vehicles arriving over two to five hours**.

1.4.4 Assuming 12 articulated vehicles arrived over a three hour period, there would be 4 articulated vehicles arriving per hour in a peak hour of a week, or one articulated vehicle arriving at the Stadium every 15 minutes.

1.4.5 The proposed layout can accommodated 3 articulated vehicles outside of the security perimeter without encroaching on the public highway. This would equate to 45 minutes of contingency should the first articulated vehicle be unable to enter the Stadium footprint.

1.4.6 Based on the above, the proposed layout can comfortable accommodate future articulated vehicle demand without encroaching in the public highway.

Appendix E

2015 Twickenham Experience Events

TECHNICAL NOTE

Project	Twickenham Stadium – East Stand Extension
Report Title	2015 Non Major Event Day Review
Date	15/06/2016
Prepared by	Momentum Transport Planning
Prepared for	London Borough of Richmond upon Thames

Executive Summary

- In order to better understand the Non Major Event Day activities at Twickenham Stadium, the Twickenham Experience team have provided details of all Non Major Event Day activities in 2015.

- In 2015 Twickenham Experience hosted 379 events over 196 days, with most Non Major Event Day events taking place in June, although maximum number of persons attending in July.

- 60% of Non Major Event Day events are attended by 100 people or less and 90% of events are attended by 300 people or less. Six events were attended by 900 people.

- 20% of all Non Major Event Day events start between 08:00 and 09:00. Approximately 27% of these Events start between 07:00 and 08:00 and 11% of these Events start between 11:00 and 12:00.

- 10% of all Non Major Event Day events finish between 17:00 and 18:00. Approximately 28% of all events finish between 19:00 and 20:00, 11% of these events finish between 15:00 and 16:00, and 11% finish between 23:00 and 00:00.

- For Non Major Event Day events for 200 to 400 guests, 20% of started between 08:00 and 09:00. Approximately 27% of these started between 07:00 and 08:00 and 16% of these Events start between 11:00 and 12:00.

- For Non Major Event Day events for 200 to 400 guests, 4% of finished between 17:00 and 18:00. Approximately 31% of these events finish between 19:00 and 20:00, 20% finished between 22:00 and 23:00 and 11% finished between 15:00 and 16:00.

- Based on the information reviewed, it is envisaged that travel patterns to and from Non Major Event Day activities in the East Stand Extension (up to 300 guests) will not impact peak travel period on the wider transport network.

1.1 Introduction

1.1.1 In order to better understand the Non Major Event Day activities at Twickenham Stadium, the Twickenham Experience team have provided details of all activities in 2015. This information includes:

- Event Date
- Event Guest
- Event Attendance
- Event Start Time
- Event Finish Time

1.1.2 The following should be noted:

- RFU internal events have not been considered, as staff are already on site
- ER2015 hosted a number of events in 2015 as part of the 2015 Rugby World Cup. This increased the Non Major Event Day activity in 2015
- Exhibition type events may have an early start and late finish, but attendee arrivals and departures are spread across the day.

1.2 2015 Non Major Event Day Events

1.2.1 In 2015 Twickenham Experience Hosted 379 events over 196 days. Table 1 presents a breakdown of when events take place and average attendance.

Table -1 2015 Non Major Event Day Events

Month	No. of Events	% of Event	Average Event Attendance
January	22	5.8%	222
February	26	6.9%	103
March	43	11.3%	172
April	27	7.1%	117
May	33	8.7%	154
June	59	15.6%	113
July	41	10.8%	194
August	22	5.8%	137
September	32	8.4%	109
October	0	0.0%	0
November	32	8.4%	160
December	42	11.1%	152
TOTALS	379	100.0%	147

1.2.2 Table 1 shows most Non Major Event Day events take place in June, although maximum number of persons attending in July.

1.3 Non Major Event Day size of event

1.3.1 Table 2 presents a breakdown of the size of the events that take place at the Stadium on Non Major Event Days.

Table -2 2015 Non Major Event Day size of event

Event Size	No. of Events	% of Event
50 or less	119	31.4%
51 to 100	101	26.6%
101 to 200	75	19.8%
201 to 300	43	11.3%
301 to 400	17	4.5%
401 to 500	8	2.1%
501 to 600	7	1.8%
601 to 700	3	0.8%
900	6	1.6%
TOTALS	379	100.0%

1.3.2 Table 2 shows that 60% of these events are attended by 100 people or less and that 90% of these events are attended by 300 people or less.

1.4 Non Major Event Day Start and Finish Times

1.4.1 In order to better understand the travel patterns associated with Non Major Event Day activities, the start and finish times for all Events in 2015 have been reviewed. Table 3 presents event start times and Table 4 presents event finish times.

Table -3 2015 Non Major Event Day Start Times

Event Start Time	No. of Events	% of Event
05:00	1	0.3%
06:00	7	1.8%
07:00	102	26.9%
08:00	82	21.6%
09:00	32	8.4%
10:00	18	4.7%
11:00	44	11.6%
12:00	20	5.3%
13:00	7	1.8%
14:00	5	1.3%
15:00	2	0.5%
16:00	3	0.8%
17:00	8	2.1%
18:00	23	6.1%
19:00	25	6.6%
TOTALS	379	100.0%

Table -4 2015 Non Major Event Day Finish Times

Event Finsih Time	No. of Events	% of Event
10:00	1	0.3%
11:00	4	1.1%
12:00	5	1.3%
13:00	3	0.8%
14:00	10	2.6%
15:00	44	11.6%
16:00	26	6.9%
17:00	37	9.8%
18:00	34	9.0%
19:00	108	28.5%
20:00	17	4.5%
21:00	9	2.4%
22:00	35	9.2%
23:00	40	10.6%
00:00	3	0.8%
01:00	1	0.3%
02:00	1	0.3%
03:00	1	0.3%
TOTALS	379	100.0%

1.4.3 Table 3 shows that 20% of Non Major Event Day events start between 08:00 and 09:00. Approximately 27% of these Events start between 07:00 and 08:00 and 11% of these Events start between 11:00 and 12:00. These account for 60% of all Events.

1.4.4 Table 4 shows that 10% of Non Major Event Day events finish between 17:00 and 18:00. Approximately 28% of these events finish between 19:00 and 20:00, 11% of these events finish between 15:00 and 16:00 and 11% finish between 23:00 and 00:00. These account for 60% of all Events.

1.5 East Stand Extension

1.5.1 The East Stand Extension is forecast to accommodate Non Major Event Day events for up to 300 guests. In order to better understand the travel patterns associated with East Stand, the 2015 Non Major Event Day information has been reviewed specifically for 2015 events hosting 200 to 400 attendees. Tables 5 and 6 present Non Major Event Day start and finish times for 2015 events for 200 to 400 guests.

Table -5 2015 Non Major Event Start Times (200 to 400 guests)

Event Size	No. of Events	% of Event
05:00	1	1.4%
06:00	0	0.0%
07:00	19	27.1%
08:00	14	20.0%
09:00	1	1.4%
10:00	3	4.3%
11:00	11	15.7%
12:00	4	5.7%
13:00	1	1.4%
14:00	2	2.9%
15:00	0	0.0%
16:00	1	1.4%
17:00	4	5.7%
18:00	6	8.6%
19:00	3	4.3%
TOTALS	70	100.0%

Table -6 2015 Non Major Event Finish Times (200 to 400 guests)

Event Size	No. of Events	% of Event
11:00	1	1.4%
12:00	0	0.0%
13:00	0	0.0%
14:00	0	0.0%
15:00	8	11.4%
16:00	4	5.7%
17:00	3	4.3%
18:00	3	4.3%
19:00	22	31.4%
20:00	5	7.1%
21:00	4	5.7%
22:00	14	20.0%
23:00	6	8.6%
TOTALS	70	100.0%

1.5.2 Table 5 shows that in 2015 20% of Non Major Event Day events for 200 to 400 guests started between 08:00 and 09:00. Approximately 27% of these events start between 07:00 and 08:00 and 16% of these events start between 11:00 and 12:00. These account for 63% of all Events.

1.5.3 Table 4 shows that in 2015 4% of Non Major Event Day events for 200 to 400 guests finished between 17:00 and 18:00. Approximately 31% of these events finish between

19:00 and 20:00, 20% finished between 22:00 and 23:00 and 11% finished between 15:00 and 16:00. These account for 67% of all Events.

1.6 Summary

1.6.1 In 2015 there were 379 Non Major Event Day events over 196 days, with the busiest months being June and July.

1.6.2 Most Non Major Event Day events (approximately 60%) accommodate 100 or less guests, with 90% of these events accommodating 300 or less guests.

1.6.3 In general terms, Non Major Event Days most commonly start between 07:00 and 08:00 and finish between 19:00 and 20:00. This trend is also true for Non Major Event Day events hosting 200 to 400 guests.

1.6.4 Based on the information reviewed, it is envisaged that travel patters to and from Non Major Event Day activities in the East Stand Extension (300 guests) will not coincide with peak travel period on the transport network. Start times are likely to be between 07:00 and 08:00 with a spread out delegate arrival (please refer to the Non Major Event Day surveys). Departures are also likely to be spread out and, in addition, will also take place at times when the transport network is not busy with background demand (19:00 to 20:00).