8 TRAFFIC AND TRANSPORTATION

8.1 INTRODUCTION AND KEY ISSUES

8.1.1 This chapter describes the likely transport effects of the Richmond Education and Enterprise Campus (REEC) development at Richmond upon Thames College (RuTC) in Twickenham, within the London Borough of Richmond upon Thames (LBRuT). The assessment considers the likely effects on the local highway network and the local public transport network by users of the REEC development and the likely effects on the local highway network by construction traffic related tothe REEC development.

8.1.2 A number of local roads have been identified as key access points or routes to the REEC development and the likely effects of use by pedestrians, cyclists and motor vehicle have been assessed. These roads are:

- A316 Chertsey Road;
- Langhorn Drive;
- B361 Whitton Road;
- Court Way;
- Heathfield North;
- Heathfield South;
- Egerton Road; and
- Craneford Way.

8.1.3 A number of nearby bus stops and Twickenham Rail Station have been identified as key public transport nodes for the REEC development. The likely effects by users of the REEC development have been assessed with regard to routing from each node to the site and on the capacity of the buses and rail services which serve the nodes.

8.1.4 Construction traffic will enter the REEC development via Langhorn Drive and will as far as reasonably possible use Transport for London Road Network (TLRN), which includes the A316 Chertsey Road, to travel to the site. For the development of the College playing fields south of Craneford Way, construction traffic will cross Craneford Way from the existing college access in order to access the playing field. The likely effects of construction traffic on the local road network have been assessed.

8.1.5 The key issues for the assessment are considered to be:

- Likely effects on local roads by pedestrians, cyclists and motor vehicles;
- Likely effects on public transport; and
- Likely effects of construction traffic on the local highway network.

8.2 CONSULTATION

8.2.1 Consultation has been undertaken with the LBRuT and with Transport for London. The key contacts for which consultation was undertaken in respect of transport matters are set out below:

- Mary Toffi – Principal Transport Officer – LBRuT; and
- Lucy Simpson – Principal Planner, Borough Planning (South & West Team), Transport for London Planning.

8.2.2 The scope of the vehicle and pedestrian surveys to establish the baseline use of the existing College and local roads were agreed with LBRuT and Transport for London prior to commissioning. A trip generation note, *D004 – Trip Generation,* setting out the methodology for calculating the trip rates and subsequent trip generation for each land use on the REEC was sent to LBRuT and Transport for London. Through subsequent discussions and amendments to the trip generation methodology LBRuT agreed that the trip rates, as used in the assessment, are acceptable.

8.2.3 The content of this ES chapter has also been reviewed with regard to LBRuT 's EIA Scoping Opinion and the transportation comments from Transport for London.

8.3 LEGISLATION AND PLANNING POLICY

8.3.1 The national, regional and local transport policies relevant to the development proposals have been summarised below. The main policy documents in this regard are:

- National Planning Policy Framework (March 2012);
- The London Plan – The Spatial Development Strategy for London Consolidated with Alterations since 2011 (2015);
- LBRuT Core Strategy (2009);
- LBRuT Development Management Plan (2011);
- LBRuT Planning Brief Richmond upon Thames College (2008); and
- LBRuT Twickenham Area Action Plan (2013).

National

National Planning Policy Framework (2012)

8.3.2 The National Planning Policy Framework (NPPF) was published in March 2012 and focuses on a presumption in favour of sustainable development. One of the core planning principles relates to actively managing patterns of growth to make the fullest possible use of public transport, walking and cycling and focusing significant development in locations which are or can be made sustainable.

8.3.3 Developments should be located and designed where practical to:

- Accommodate the efficient delivery of goods and supplies;
- Give priority to pedestrian and cycle movements, and have access to high quality public transport facilities;
- Create safe and secure layouts which minimise conflicts between traffic and cyclists or pedestrians;
- Incorporate facilities for charging plug-in and other ultra-low emission vehicles; and
- Consider the needs of people with disabilities by all modes of transport.

Regional

The London Plan – The Spatial Development Strategy for London Consolidated with Alterations since 2011 (2015)

8.3.4 The London Plan sets out the spatial development strategy for London, and provides the London wide context within which individual Boroughs set their local planning policies. A key objective of the London Plan is to improve London's accessibility, which amongst other issues, includes tackling traffic congestion. An issue that assists closer integration between transport and spatial development is encouraging patterns and forms of development that reduce the need to travel – especially by car.

8.3.5 With regard to parking, The Mayor, in conjunction with the boroughs, seeks to ensure that on-site parking at new developments is kept to a minimum. Maximum parking standards are set, which can be reduced in areas of good public transport accessibility, and, in the most accessible locations, can lead to car–free developments.

8.3.6 Policies 6.9 and 6.10 aim to increase cycling and walking in London, in particular, to achieve a 5% modal share by 2026 for cycling. New developments should therefore provide secure and accessible cycle parking facilities and ensure there is a high quality pedestrian environment and street space.

Local

8.3.7 The Local Plan (formerly known as the Local Development Framework) sets out the priorities for the development of the borough and will be used for making decisions on planning applications.

LBRuT Core Strategy (2009)

8.3.8 This document sets out the Strategic Planning Framework for the Borough over the next 15 years, it considers other plans and strategies and is the delivery mechanism for the spatial elements of the community. This document outlines the council's

transport objectives and policies.

8.3.9 The following transport policies set out in core policy CP5 – Sustainable Travel which are associated with this development are set out below:

- Policy 5.C – Cycling and Walking. 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;
- Policy 5.F – Car Parking and Travel. Provide car share facilities and car clubs in appropriate new developments and encourage the use of low emission vehicles in order to reduce congestion and pollution; and
- Policy 5.G – Sustainable Travel. Encourage major employers and schools to develop Green Travel Plans and require these where appropriate with planning applications and require all major developments to submit a Transport Assessment based on Transport for London's Best Practice Guidance.

LBRuT Development Management Plan (2011)

8.3.10 The Development Management Plan (DMP) includes the detailed policies which will be used when new developments are considered. The DMP takes forward the strategic objectives in the Core Strategy and is consistent with National and Regional Policies.

8.3.11 Section 5.4 - Transport and Parking takes forward CP5 in the Core Strategy as well as complementing LBRuT Implementation Plan. The relevant policies are set out below.

8.3.12 Policy DM TP 1 – Higher trip generating developments will only be permitted in areas which are, or at the time of implementation are, easily accessible by transport other than the private car, and well located with respect to local services.

8.3.13 Policy DM TP 2 – The impact of new developments 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. Matters to be included are set out in Department for Transport / Transport for London guidance.

8.3.14 Policy DM TP 3 – New developments will be expected to create or improve links with the local and wider transport networks, including links to cycle and pedestrian networks. All new developments must be designed to improve accessibility including:

- Maximise permeability, with safe, convenient accessible and appropriate road, cycle and pedestrian routes within and in the immediate vicinity of the scheme,

as well as accessible walking and cycling links to the wider transport network including to public transport node and key land uses, taking account the need to connect people to jobs, to town centres and to schools.

8.3.15 Policy DM TP 6 – New developments and schemes improve the safety and security of the pedestrian environment where appropriate.

8.3.16 Policy DM TP 7 – To maintain and improve conditions for cyclists, the council will ensure that new developments do not adversely impact on the cycling network or cyclists and provide appropriate cycle access and sufficient, secure cycle parking facilities.

8.3.17 Policy DM TP 8 – Developers may provide fewer car parking spaces if they can show that there would be no adverse impact on amenity, street scene, road safety or emergency access. In general it is expected that in low PTAL areas (1-4) the standards should be met, but in higher PTAL areas (5-6) provision at a lower level may be appropriate in exceptional circumstances. Additionally electric charging points are welcomed where there is demand.

8.3.18 Vehicle and cycle parking standards are set out in **Table 8.1.**

Table 8.1: Parking standards

Land Use	Vehicle Parking Space Required (All floor space referred to is gross)		Cycle parking standard
	Controlled parking zones	The remainder of the Borough	
Schools D1	1 space per 2 staff, Arrangements must also be made for adequate setting down areas and visitor parking spaces. Adequate facilities for the setting down of coaches shall also be considered	1 space per 2 staff	5 spaces per classroom depending on the nature of the school
Residential C3	1-2 bedrooms 1 spaces	1-2 bedrooms 1 spaces	1 space
	3 bedrooms For 1 unit, 2 spaces; for two or more units 1 allocated space plus sufficient unallocated spaces to provide a total of 1.5 spaces overall per unit.	3 bedrooms For 1 unit, 2 spaces; for two or more units 1 allocated space plus sufficient unallocated spaces to provide a total of 1.5 spaces overall per unit.	1 space
	4+ bedrooms 2 spaces	4+ bedrooms 2 spaces (negotiable)	2 spaces
B1	1 space per 300sqm Plus 1 lorry parking space per 250sqm (minimum 1 per unit)	Within 400m of a rail station, 1 space per 200sqm. Elsewhere 1 per 100sqm plus 1 lorry parking space per 2500sqm (minimum 1 per unit)	1 per 200sqm

Planning Brief Richmond upon Thames College (2008)

8.3.19 There are a number of key access and movement principles which the development will be based on. As stated in the Planning Brief these are:

(i) The primary access for vehicular to traffic to the College should continue to be off the A316.

(ii) The primary pedestrian access, where the majority of pedestrian visitors should arrive, is from the Eastern boundary (via Twickenham Station), secondary access for pedestrians and cyclists should be provided around the site as visitors arrive from all directions.

(iii) Any residential development on the site should be accessed off Egerton Road to separate College and residential traffic (subject to size of residential development).

8.3.20 The Planning Brief requires a full Transport Assessment to take account of projected levels and patterns of traffic movements and car parking requirements as a result of the development.

8.3.21 Car parking provision within the development scheme is an important consideration. Car parking should be provided on site and integrated into the design of the campus

and sports facilities.

8.3.22 A Transport Assessment will set out a reduction in the existing car parking provision in conjunction with the Green Travel Plan. Any residential development should seek to reduce car usage and include limited car parking provision.

Twickenham Area Action Plan (2013)

8.3.23 The Twickenham Area Action Plan places great focus on improving walking routes to create an accessible pedestrian environment. In turn this will encourage residents to make greater use of facilities within the town centre and so reduce their need to travel.

8.3.24 New developments should provide sufficient parking to avoid adverse impact on on-street parking, in line with the parking standards set out in the Development Management Plan DM TP8.

8.3.25 Any new developments should have adequate, convenient and safe servicing arrangements in line with the Council's SPD on Transport Standards. Further, servicing hours will be controlled where necessary for safety or amenity reasons.

8.4 ASSESSMENT METHODOLOGY

Evaluation of Effects

8.4.1 Transport for London's *Transport assessment best practice, Guidance document, April 2010*, guidance set out on Transport for London's website and the Guidelines for the Environmental Assessment of Road Traffic (GEART) have been used for this assessment. Reference has also been made to the Institution of Highways & Transportation's (IHT) document Transport In The Urban Environment.

8.4.2 The assessment periods for the likely effects of the proposed development on the local highway network and the local public transport network are based on the weekday AM and PM peak periods of 07:00 to 10:00 and 16:00 to 19:00 respectively.

8.4.3 A fully classified turning count survey was undertaken at the A316 Chertsey Road / Langhorn Way junction on Friday 17 October 2014 when Harlequins FC were playing a home match at Twickenham Stoop. The survey data showed that the peak arrival times for pedestrians and traffic associated with the event at Twickenham Stoop did not coincide with the PM peak hour.

8.4.4 A parking stress survey was undertaken on 14 October 2014. The study area was based on a 400m walking distance, which was considered reasonable as it was deemed that people would walk further than the standard 200m, usually used for residential parking stress surveys as set out in the Lambeth Parking Survey

Methodology, if they were able to park near a destination.

8.4.5 A quantitative assessment of pedestrian and cycle use of the local roads used to directly or indirectly access the site has been undertaken. The route each land use takes has been based on location of local public transport nodes in relation to the site. Therefore, any rail trips will be routed towards Twickenham Railway Station to the south east. Bus stops are located to the south east next to Twickenham Railway Station, to the east on Whitton Road and the north on Whitton Road (i.e. north of the A316). Therefore, bus trips have been split evenly to be routed to these three directions. The nearest London Underground Line stations are Hounslow Central and Hounslow East on the Piccadilly Line and are located to the north. Therefore, any Underground trips would be routed to the north. All pedestrian, cycle and other trips have been split evenly to be routed to the north, east, south and west.

8.4.6 The development is served by 30 bus services in the AM peak of 08:00 – 09:00 and the 29 bus services in the PM peak of 17:00 – 18:00. Based on the assumption that a typical London bus has on average 70 seats, there are 2,100 and 2,030 seats on local buses in the AM and PM peak hours respectively. In order to assess the likely effects of proposed development on the local bus network, the total number of bus trips the proposed development could generate has been assessed against the available seating capacity on local buses.

8.4.7 The development is within walking distance of Twickenham Station which is served by 22 rail services in the AM peak of 08:00 – 09:00 and the 18 rail services in the PM peak of 17:00 – 18:00. Based on the assumption that the type of rolling stock serving Twickenham Station has on average 256 seats, there are 5,632 and 4,608 seats on the trains in the AM and PM peak hours respectively. In order to assess the likely effects of proposed development on the local rail network, the total number of rail trips the proposed development could generate has been assessed against the available seating capacity on local trains.

8.4.8 A new signal controlled left in and left out – right out junction will be provided at the junction of the A316 Chertsey Road / Langhorn Drive for the proposed scheme. The junction will also incorporate at-grade pedestrian crossings on the A316 and Langhorn Drive, with an all red pedestrian phase. The effects of this new junction have been assessed using LinSig 3 signal controlled junction capacity software. The priority junctions of the A316 Chertsey Road and Egerton Road, and the B361 Whitton Road and Court Way have been assessed using PICADY 5 junction capacity software.

College

8.4.9 Fully classified turning count surveys were undertaken on a weekday at all access and

egress points of the existing College site. The surveys picked up pedestrians, cyclists, motorcyclists, cars, taxis, light goods vehicles, heavy goods vehicles and buses/coaches arriving and departing the site during AM and PM peak periods of 07:00 to 10:00 and 16:00 to 19:00 respectively.

8.4.10 There are a number of College staff who park within Twickenham Stoop car park. Therefore, the number of light vehicles arriving on the existing College site at staff only accesses has been uplifted by a factor of 1.5. This factor is based on the pro-rata number of parking spaces available for College staff on the Harlequin FC's site to the number of staff parking spaces available on the College site itself.

8.4.11 The College management has confirmed that the day on which the surveys were undertaken was a typical teaching day i.e. no exams or trips / excursions were taking place. These surveys provide the baseline data for the use of the existing College site.

8.4.12 The use of the Replacement College with regard to student numbers and staff will change from 291 staff and 3,150 students to 300 staff and 3,000 students. The changes will be negligible when compared to the daily variation in the number of staff and students arriving at and departing the Replacement College and therefore using the existing College trip generation is a suitable comparator for the Replacement College. Operational times for the Replacement College will not alter from the existing College. Therefore, the Replacement College trip generation has been based on the arrival and departure trips recorded during the surveys. The mode split of the Replacement College has been based on the existing College Travel Plan dated 20 August 2010. The mode split for students has been modified to take into account that parking for students will not be provided in the Replacement College scheme.

8.4.13 The Replacement College will be directly accessed by motor vehicles from Langhorn Drive and indirectly via the A316 Chertsey Road and Whitton Road. Therefore, a junction capacity assessment of the new A316 Chertsey Road and Langhorn Drive signal controlled junction has been undertaken.

8.4.14 The Replacement College will be directly accessed by non-motorised modes from Langhorn Drive and the upgraded Marsh Farm Lane and indirectly via the proposed Twickenham Rough footpath, A316 Chertsey Road, Whitton Road, Court Way, Heathfield North, Heathfield South, Egerton Road and Craneford Way. A quantitative assessment of these routes by pedestrians and cyclists has been undertaken.

8.4.15 An assessment of the Replacement College's likely effects on the local bus and rail network has also been undertaken.

Tech Hub

8.4.16 The trip generation for the Tech Hub has been based on a first principles approach using the total number of staff for the Tech Hub, 20, and using trip distribution obtained from TRICS (Trip Rate Information Computer System).

8.4.17 TRICS is the UK and Ireland's national system of trip generation analysis, containing approximately 7,000 transport surveys at over 110 types of development. TRICS was founded and is owned by six County Councils in the south of England, collectively the TRICS Consortium. However, its annual collection programme covers the whole of the UK and Ireland.

8.4.18 The comparator site chosen from TRICS for the Tech Hub were based on identifying a site that had large laboratory areas with a low number of employees. The site chosen was the only site within TRICS which provided a suitable comparator. Other parameters included:

- Employment use class B1,
- Greater London and the south east for regions and areas;
- Weekday surveys; and
- Suburban areas.

8.4.19 The Tech Hub will have ten car parking spaces. Therefore, it has been assumed that ten of the 20 staff will drive to the site with the remaining staff travelling by other more sustainable modes. It has been assumed that 40% of the staff will arrive during what is generally regarded as the AM peak hour of 08:00 to 09:00 with 30% arriving in the hour before and 30% arriving in the hour after. It has been assumed that no staff will depart during the AM peak period. Similarly, in the PM peak period, 40% of the staff will depart the site during what is generally regarded as the PM peak hour of 17:00 to 18:00 with 30% departing in the hour before and 30% departing in the hour after. It has been assumed that no staff will arrive during the PM peak period.

8.4.20 The mode split of the remaining ten staff has been based on 2001 Census data Method of travel to Work – daytime population for the ward of St Margaret's and North Twickenham.

8.4.21 The Tech Hub will be directly accessed by motor vehicles from Langhorn Drive via the A316 Chertsey Road. Therefore, a junction capacity assessment of the new A316 Chertsey Road and Langhorn Drive signal controlled junction has been undertaken.

8.4.22 The Tech Hub will be directly accessed by non-motorised modes from Langhorn Drive and the upgraded Marsh Farm Lane and indirectly via the proposed Twickenham Rough footpath, A316 Chertsey Road, Whitton Road, Court Way, Heathfield North, Heathfield South, Egerton Road and Craneford Way. A

quantitative assessment of these routes by pedestrians and cyclists has been undertaken.

8.4.23 An assessment of the Tech Hub's likely effects on the local bus and rail network has also been undertaken.

Secondary School

8.4.24 The Secondary School trip generation has been calculated using trip rates obtained from the TRICS database and the 750 students. The comparator sites chosen from TRICS were based on the trip rate selection parameters of:

- Education, land use class D1;
- Greater London and the south east for regions and areas;
- Between 610 and 1200 students;
- Weekday surveys; and
- Suburban areas and edge of town.

8.4.25 The mode split of the Secondary School has been based on mode split data obtained from the Travel Plan's of local schools. These are Orleans Park School, Grey Court School and Twickenham Academy.

8.4.26 The staff vehicle trips have been based on the provision of 40 staff parking spaces. Therefore, all other car trips are drop off and pick trips of students. Adjustments to the vehicle trip generation to account for the arrival and departure of parents or guardians dropping off and picking students has been made.

8.4.27 The Secondary School will be directly accessed by light motor vehicles from Egerton Road via A316 Chertsey Road and indirectly via Whitton Road. All HGV vehicles for the school will access site's service area via Langhorn Drive and Chertsey Road. It has also been assumed that two thirds of student drop off and pick up will occur on Egerton Road accessed from Heathfield North, Heathfield South and Court Way, with the remaining third accessing Egerton Road via the A316 Chertsey Road. Junction capacity assessments of the A316 Chertsey Road / Egerton Road and the B361 Whitton Road / Court Way priority junctions, and the new Langhorn Drive / A316 Chertsey Road signal controlled junction have been undertaken.

8.4.28 The Secondary School will be directly accessed by non-motorised modes from Egerton Road and indirectly via the upgraded Marsh Farm Lane, proposed Twickenham Rough footpath, A316 Chertsey Road, Whitton Road, Court Way, Heathfield North, Heathfield South and Craneford Way. A quantitative assessment of these routes by pedestrians and cyclists has been undertaken.

8.4.29 An assessment of the Secondary School's likely effects on the local bus and rail

network has also been undertaken.

Clarendon School

8.4.30 As there are no suitable comparator sites within TRICS for the type of development which the Clarendon School will be, the trip generation for the school has been calculated using the travel mode split data obtained from a 'Hands Up' survey at the existing Clarendon School undertaken on 4 March 2015. This data has been uplifted pro-rata based on the proposed 115 students and 60 staff The 'Hands Up' survey has also been used to determine the proposed travel mode split.This methodology and the assumptions below have been agreed with the proposed operators of the Clarendon School.

8.4.31 It has been assumed that 50% of the staff arrives between 08:00-09:00 with 25% arriving in the hour before and after. Similarly, it has been assumed that 50% of staff will depart between 17:00-18:00 with 25% departing in the hour before and after.

8.4.32 Assumptions for students are that all car trips are drop off and pick up and that the school provides transport for a large proportion of its pupils in the form of minibuses, with a capacity to seat 17 passengers. It has been assumed that 100% of students arrive between 08:00-09:00. Similarly, it has been assumed that 75% of students will depart between 15:00-16:00 with 25% departing in the hour after.

8.4.33 The school transport minibuses will depart the site in the morning between 07:00 – 08:00 and arrive back at the school between 08:00 – 09:00. In the afternoon, 75% of the school minibuses will depart the site with pupils on board with 25% departing in the hour after. The minibuses will arrive back at the school the following hours respectively.

8.4.34 The Clarendon School will be directly accessed by light motor vehicles from Egerton Road via the residential roads to the east and Whitton Road. All HGV vehicles for the school will access the Site's service area via Langhorn Drive and Chertsey Road. Therefore, a junction capacity assessment of the Court Way / Whitton Road priority junction and the new Langhorn Drive / A316 Chertsey Road signal controlled junction has been undertaken.

8.4.35 The Clarendon School will be directly accessed by non-motorised modes from Egerton Road and indirectly via the upgraded Marsh Farm Lane, proposed Twickenham Rough footpath, A316 Chertsey Road, Whitton Road, Court Way, Heathfield North, Heathfield South and Craneford Way. A quantitative assessment of these routes by pedestrians and cyclists has been undertaken.

8.4.36 An assessment of the Clarendon School's likely effects on the local bus and rail

network has also been undertaken.

Residential

8.4.37 The proposed residential development will have a maximum of 180 units, consisting of a mix of houses and apartments. However, the likely effects of the proposed development assessment has been based on 200 units for robustness.

8.4.38 The residential trip generation has been calculated using trip rates obtained from the TRICS database. The comparator sites chosen from TRICS were based on the trip rate selection parameters of:

- Residential use class C3, mixed private houses (flats and houses);
- Greater London and the south east for regions and areas;
- Range of units between 50 and 300;
- Weekday surveys; and
- Suburban areas.

8.4.39 The mode split of the residential site has been based on 2011 Census data Method of Travel to Work for the ward of St Margaret's and North Twickenham. The residential site will be directly accessed by motor vehicles from Langhorn Drive via the A316 Chertsey Road. Therefore, a junction capacity assessment of the new A316 Chertsey Road and Langhorn Drive signal controlled junction has been undertaken.

8.4.40 The residential site will be directly accessed by non-motorised modes directly from Egerton Road and the upgraded Marsh Farm Lane and indirectly via the proposed Twickenham Rough footpath, A316 Chertsey Road, Whitton Road, Court Way, Heathfield North, Heathfield South, Craneford Way and Langhorn Drive. A quantitative assessment of these routes by pedestrians and cyclists has been undertaken.

8.4.41 An assessment of the residential site's likely effects on the local bus and rail network has also been undertaken.

Sports Centre

8.4.42 The sports centre will replace the existing College sports facilities and will serve the Replacement College, the Secondary School, the Clarendon School, and the wider community. The sports centre will comprise sports space made up of both the Replacement College's and Secondary School's sports facilities.

8.4.43 The proposed sports centre will continue to offer similar services to the community as the current one on the College site, but using either new or improved facilities and equipment. The likely effects of the sports centre are incorporated into the

Replacement College's assessment, as the existing sports centre trip generation for the assessment periods will have been picked up by the surveys of the existing College.

College playing fields south of Craneford Way

8.4.44 The College playing fields will be upgraded by the laying out of a new all-weather surface and the re-alignment of the existing grass pitch to provide improved facilities for the College and the local community.

8.4.45 The playing field will be used by the educational uses of the REEC development throughout the day Monday to Friday and by the community and local teams during the evenings Monday to Friday and throughout the day at weekends. The use of the sports centre and playing fields by the community are expected to be managed by the same organisation.

Construction Phases

8.4.46 The likely construction phases of the REEC development are set out in **Table 6.2** in Chapter 6. In order to assess which of the three construction phases presents the most adverse effects on the local transport network, the multi-modal trip generation including construction traffic for each construction phase has been calculated. The worst case phase has then been assessed.

Significance of Effects

Pedestrian Footway Movement and Capacity

8.4.47 The significance of the change likely to be introduced by the proposed development was assessed by means of professional judgement.

Pedestrian Severance

8.4.48 Severance can be described as the perceived divisions that can occur within a community when it becomes separated by a traffic route. Thresholds for assessing severance are based on changes in traffic flows as set out in the Design Manual for Roads and Bridges (DRMB) (Volume 11, Section 3, Part 8).

8.4.49 This document suggests changes in traffic flow of 30%, 60% and 90% are considered as equivalent to 'minor', 'moderate' and 'major' changes in severance respectively.

Pedestrian Delay

8.4.50 Increases in traffic flows can lead to greater increases in delay to pedestrians seeking to cross roads. The Institute of Environmental Management (IEMA) Guidelines do

not prescribe any quantitative significance criteria for the assessment of pedestrian delay. Instead, professional judgement has been used to determine whether pedestrian delays on the local footpaths, if any, would be significant.

Pedestrian Amenity

8.4.51 The IEMA Guidelines describe pedestrian amenity as the relative pleasantness of a journey. It is affected by traffic flow, traffic composition, footway width and separation from traffic. The guidelines suggest that the threshold for judging the significance of changes in pedestrian amenity would be where the traffic flow is doubled.

Pedestrian Fear and Intimidation

8.4.52 Pedestrian fear and intimidation is caused by a number of factors, including a combination of volume of traffic, its HGV composition, its proximity to people and the lack of protection caused by such factors as narrow footway widths. The IEMA Guidelines' suggested criteria for assessing fear and intimidation are presented in **Table 8.2.**

Table 8.2: IEMA Thresholds for Fear and Intimidation

Degree of Hazard	Average Traffic Flow over 18 Hour Day (vehicles/hour)	Total 18 Hour Goods Vehicle Flow	Average Speed over 18 Hour Day (miles / hour)
Extreme	1,800+	3,000+	20+
Great	1,200 – 1,800	2,000 – 3,000	15 – 20
Moderate	600 – 1,200	1,000 – 2,000	10 – 15

Operational Trips by Mode

8.4.53 Guidance provided by IEMA and Department for Transport has been consulted in order to identify significance criteria applicable to the assessment of walking, cycling, public transport and vehicle trips. For a number of impacts there are no readily available thresholds of significance, in which case interpretation and judgement has been applied based on knowledge of the development site or quantitative data where available.

8.4.54 After taking into consideration mitigation, residual effects have been characterised as either:

- **Beneficial**: meaning that the changes produce benefits in terms of transportation and access (such as reduction of traffic, travel time or patronage, or provision of a new service, access or facility);
- **Negligible**: meaning that their bearing is too small to measure meaningfully; or
- **Adverse**: meaning that changes produce adverse impacts in terms of transportation and access (such as increase of traffic, travel time, patronage or loss of service or facility).

8.4.55 Beneficial and adverse impacts have been further characterised as:

- **Minor**: slight, very short or highly localised impact of no significant consequence (10% to 30% change);
- **Moderate**: limited impact (by extent, duration or magnitude) which may be considered significant, (30% to 60% change); or
- **Major**: considerable impact (by extent, duration or magnitude) of more than local significance or in breach of recognised acceptability, legislation, policy or standards, (greater than 60% change).

Limitations of Assessment

8.4.56 The number of construction vehicles accessing the site and the number of construction workers on site have been based on the estimates set out in Chapter 6. However, the construction period has been assessed on the worst case i.e. combined development traffic and construction traffic.

8.4.57 Pedestrian flows on Marsh Farm Lane have been determined by observations on a number of site visits to the College site and surrounding area. Observations indicate that the footpath is underused.

8.5 BASELINE

Introduction

8.5.1 The extent of the study area has been derived from a number of factors. For roads, the study area is based on roads which are used to directly or indirectly access the site and the junctions on them which are likely to be affected by the proposed development. The extent of the study area for roads and junctions has been agreed with LBRuT and Transport for London.

8.5.2 The extent of the study area for bus and rail services has been based on the Public Transport Accessibility Level (PTAL) criteria which requires bus stops to be within 640m of the site (8 minute walk) and rail stations to be within 960m of the site (12 minute walk).

8.5.3 The walking and cycling routes have been based on local roads and footpaths used to

access the site and which are used to access public transport nodes.

Current Baseline

Existing multi-modal trip generation

8.5.4 The trip generation of the existing College for the AM peak period is shown in **Table 8.3.**

Table 8.3: AM peak period multi-modal trip generation

	0700 - 0800			0800 – 0900			0900 - 1000			0700 - 1000
Mode	**Arr**	**Dep**	**Tot**	**Arr**	**Dep**	**Tot**	**Arr**	**Dep**	**Tot**	**Total**
Walk	4	2	6	107	7	114	59	9	68	188
Cycle	7	1	8	45	3	48	8	3	11	67
Underground	1	1	2	24	2	26	13	2	15	43
Rail	13	9	22	385	27	412	212	35	247	681
Bike/Rail	0	0	0	8	1	9	4	1	5	14
Bus	11	7	18	324	23	347	179	29	208	573
Tram	0	0	0	0	0	0	0	0	0	0
Car Share (Driver)	6	0	6	17	1	18	7	2	9	33
Car Share (Passenger)	3	0	3	18	1	19	9	1	10	32
Car Driver (Alone)	48	4	52	95	9	104	35	14	49	205
Motorcycle	2	0	2	5	0	5	1	0	1	8
Other	1	0	1	10	1	11	5	1	6	18
Total	96	24	120	1,038	75	1113	532	97	629	1,862
HGVs	1	2	3	0	1	1	3	2	5	9
Site Total	97	26	123	1,038	76	1114	535	99	634	1,871

8.5.5 The trip generation of the existing College for the PM peak period is shown in **Table 8.4.**

Table 8.4: PM peak period multi-modal trip generation

	1600 - 1700			1700 – 1800			1800 - 1900			1600 - 1900
Mode	**Arr**	**Dep**	**Tot**	**Arr**	**Dep**	**Tot**	**Arr**	**Dep**	**Tot**	**Total**
Walk	10	58	68	8	26	34	5	12	18	120
Cycle	1	18	19	1	9	10	1	7	8	37
Underground	0	1	2	0	1	1	0	0	0	3
Rail	16	91	107	13	41	54	8	19	28	188
Bike/Rail	0	0	1	0	0	0	0	0	0	1
Bus	5	27	31	4	12	16	2	6	8	55
Tram	0	0	0	0	0	0	0	0	0	0
Car Share (Driver)	3	10	13	1	9	10	2	5	7	30
Car Share (Passenger)	5	7	12	2	5	7	3	2	5	24
Car Driver (Alone)	20	65	85	8	75	83	11	33	44	212
Motorcycle	0	1	1	1	6	7	0	0	0	8
Other	0	2	3	0	1	1	0	1	1	5
Total	61	280	341	38	185	224	34	85	119	683
HGVs	0	1	1	1	1	2	0	0	0	3
Site Total	61	281	342	39	186	226	34	85	119	686

Pedestrian and Cycle Network and Facilities

8.5.6 The surrounding footways are generally satisfactory, with key routes along desire lines being a minimum of 2.0m in width (except on Heathfield North and Heathfield South, where the effective footway width may be reduced due to part of the on-street parking bays being marked on the footway), with dropped kerbs, tactile paving and street lighting. On the A316 Chertsey Road, there is crash barrier on the central reservation preventing pedestrians from crossing the road. There is a signal controlled pedestrian crossing on Chertsey Road approximately 100m east of the site and a pedestrian footbridge directly north of the site. The residential roads to the east of the site have traffic calming by means of speed cushions located at regular

intervals, and there is a fire access gate across Egerton Road which reduces traffic on the residential roads to access only.

8.5.7 The cycle / footpath referred to as Marsh Farm Lane runs along the western boundary of the site between the junction of the A316 Chertsey Road / Langhorn Drive and Craneford Way. From Craneford Way, the cycle / footpath runs through the Craneford Way Playing Fields, across the railway line via a footbridge and onto Marsh Farm Road.

8.5.8 The bus routes on Whitton Road can be accessed via the footbridge or signalised pedestrian crossing on the A316 Chertsey Road. The route has dropped kerbs and tactile paving and has street lighting. The footways leading to Twickenham Station, either via Court Way, Heathfield North or Heathfield South and Whitton Road and London Road have similar characteristics with a zebra crossing on Whitton Road and signal controlled pedestrian crossings at the junction of Whitton Road / London Road and on London Road.

8.5.9 Transport for London's 2013 Local Cycling Guide 9 advises on a number of routes recommended by cyclists within the vicinity of the site and cycle routes that have signing or road markings. The site is well connected by cycle routes providing links to locations including; Twickenham Station, Richmond, Isleworth and Teddington. The A316 Chertsey Road has off-road shared cycle/footway routes adjacent to it providing segregation from cyclists and motorists.

Pedestrian and cycle flows

8.5.10 In order to establish the existing pedestrian and cycle flows generated by the College on local routes, the pedestrian and cycle arrival and departure data obtained from the fully classified turning count surveys undertaken on Thursday 9 October 2014 has been used and distributed using the methodology set out previously.

8.5.11 The weekday AM and PM peak pedestrian and cycle flows are set out in **Table 8.5**.

Table 8.5: Total (arrival and departure) pedestrian and cycle flows AM and PM peak hours

Route	AM 08:00 – 09:00		PM 16:00 – 17:00	
	Pedestrian	Cycle	Pedestrian	Cycle
Marsh Farm Lane (north)	29	10	11	3
A316 Chertsey Road	241	19	74	10
Egerton Road	778	27	188	16
Heathfield South	182	11	45	5
Court Way	546	13	118	8
Talma Gardens	20	5	7	1

8.5.12 Whilst not shown within the table, it is likely that some of the pedestrian trips shown for Court Way and Heathfield South could use Heathfield North. **Figures 8.1** and **8.2** show the existing pedestrian and cycle distribution for the existing College for the AM and PM peak hour respectively. The PM peak hour for pedestrians and cycles is 16:00 to 17:00.

Public Transport Accessibility Level (PTAL)

8.5.13 The industry standard accessibility indicator for London, the PTAL rating, has been used to identify the level of accessibility of the existing College to the local public transport network. This assessment shows that the College is located in an area where the PTAL ranges 2 (described as 'poor') to 1b ('very poor').

Public Transport Services – Bus Services

8.5.14 The site is served by four bus routes which include the 267, 281, 481 and the 681. The bus routes can be accessed by a number of bus stops close to the site. Below is a list of the nearest bus stops surrounding the site including the most direct route and distance to the bus stops from the College pedestrian entrances on Egerton Road and the bus routes they are served by:

- Stops 'C' and 'N' on Whitton Road are reached via Egerton Road, Chertsey Road and Chudleigh Road are 490m away and are served by 281, 481 and 681;
- Stops 'L' and 'S' on Whitton Road are reached via Egerton Road and Court Way are 510m away and are served by 281 and 681;

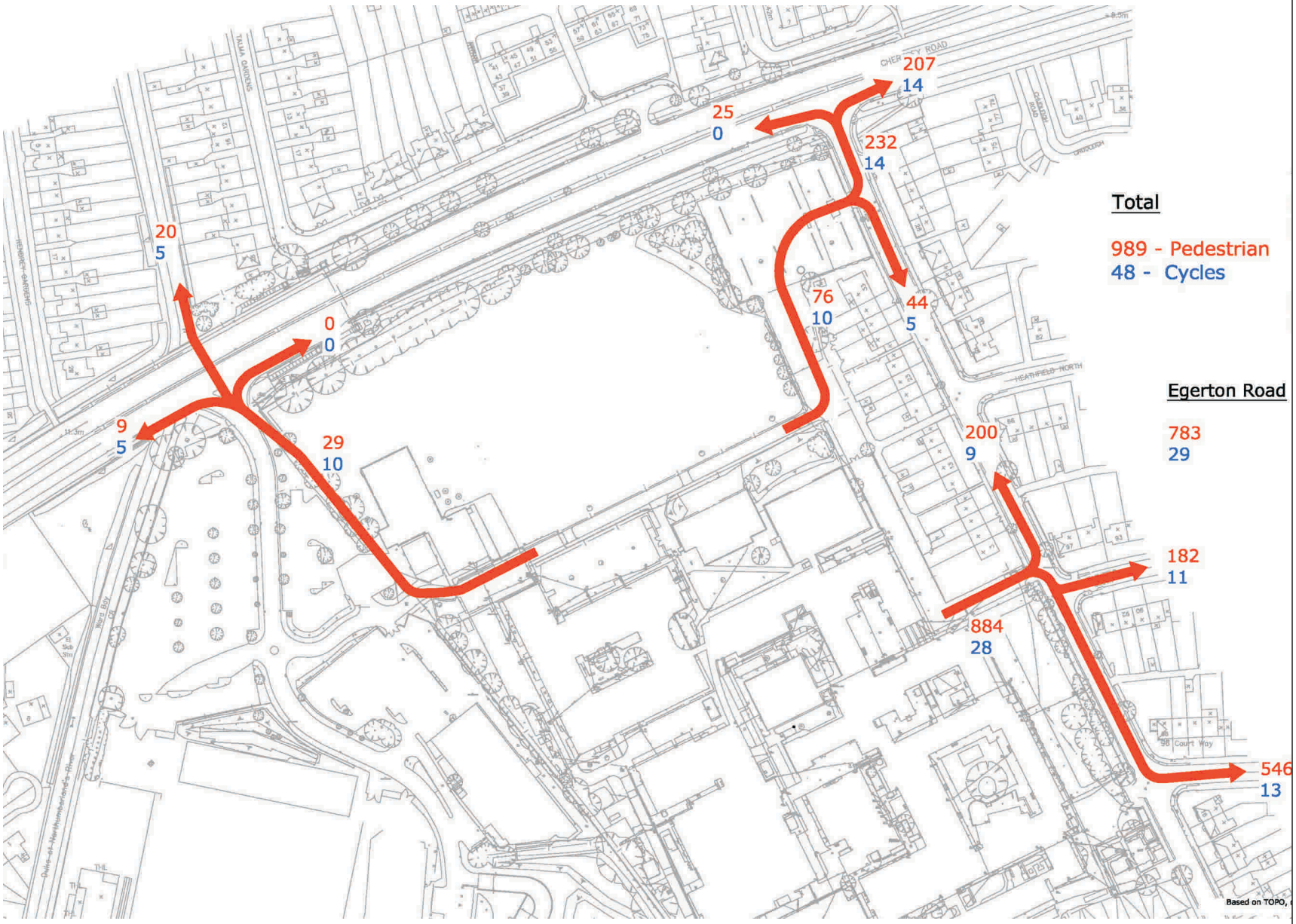
- Stops 'B' and 'P' on Whitton Road are reached via Egerton Road, Chertsey Road and Tayben Avenue are 537m away and are served by 281, 481 and 681;
- Stops 'M' and 'R' on Whitton Road are reached via Egerton Road and Heathfield North are 550m away and are served by 281 and 681; and
- Stops 'B' and 'C' on London Road are reached via Egerton Road, Court Way and Whitton Road; are 460m away; and are served by 267, 481 and 681.

8.5.15 **Table 8.6** below shows a summary of the bus services serving the site. The AM peak is 08:00 to 09:00, the Inter-peak is 09:00 to 17:00 and the PM peak is 17:00 to 18:00.

Table 8.6: Summary of existing bus services

Bus Route	Direction (towards)	Monday - Friday			Sat	Sun
		AM peak	Inter-peak	PM peak		
267	Hammersmith Bus Station	7	6	6	5	4
	Fulwell Rail Station	5	6	6	5	4
281	Hounslow Bus Station	8	8	8	8	5
	Tolworth (Ewell Road)	8	8	7	7	5
481	West Middlesex University Hospital	1	1	1	1	0
	Kingston (Cromwell Road Bus Station)	1	1	1	1	0
Total		30	30	29	27	18

8.5.16 **Table 8.6** shows that the site is served by 30 buses in the morning peak and inter-peak hour and 29 buses in the evening peak hour in both directions. On weekends, the frequency is reduced to 27 buses per hour on Saturday and 18 buses per hour on Sunday.



Legend

783 Pedestrians
29 Cycles

N

CASCADE

Note: Not to Scale

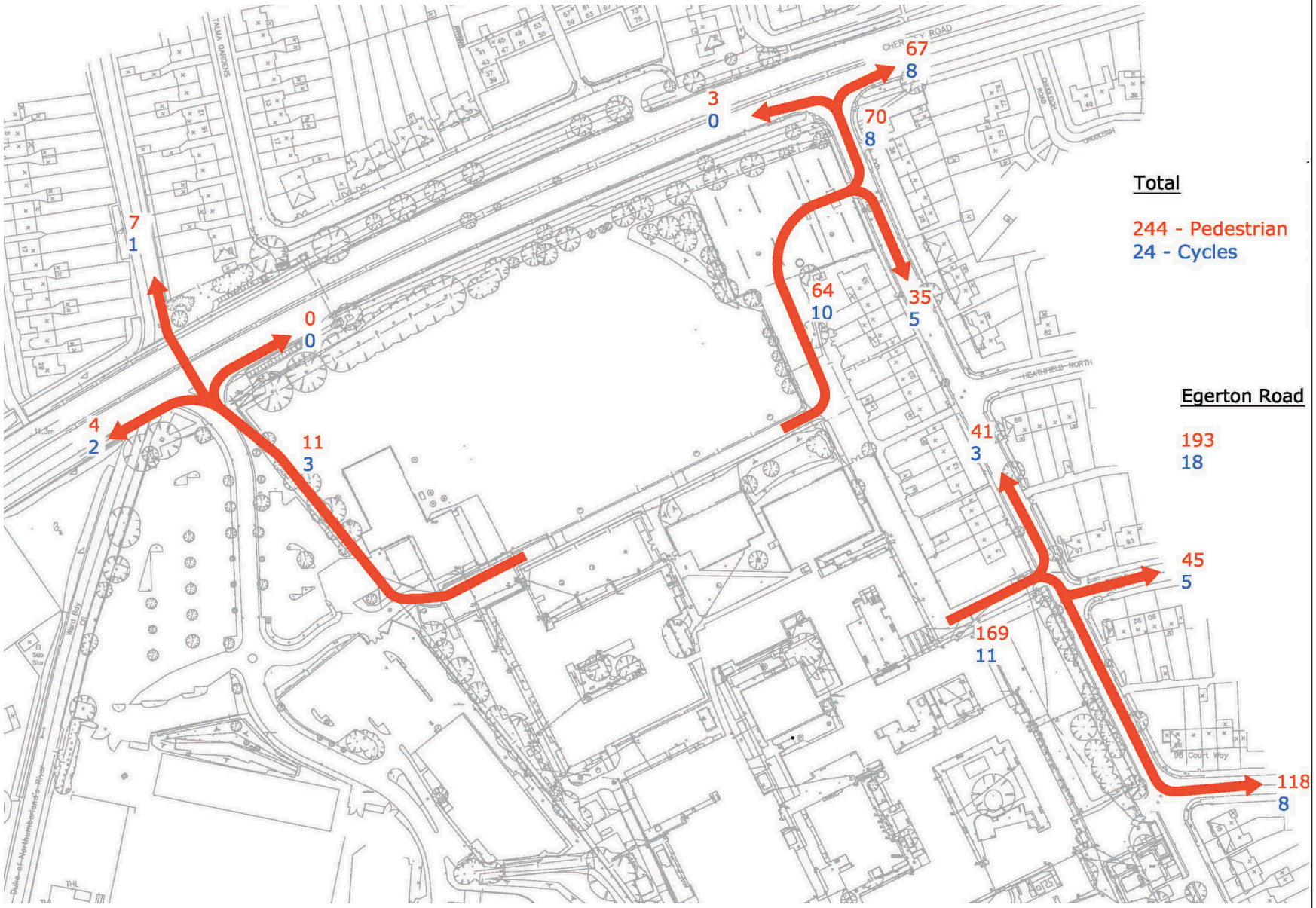
Project Title:
Richmond Education and Enterprise Campus Development

Figure Title:
Existing College - Two Way all uses Pedestrian and Cycle movements AM 08:00-09:00

For Information Only

Figure Number:
Figure 8.1

Date:
June 2015



Legend

193 Pedestrians
18 Cycles

N

CASCADE

Note: Not to Scale

Project Title:
Richmond Education and Enterprise Campus Development

Figure Title:
Existing College - Two Way all uses Pedestrian and Cycle movements PM 16:00-17:00

For Information Only

Figure Number:
Figure 8.2

Date:
June 2015

Public Transport Services – Rail Services

8.5.17 Twickenham National Rail Station is located to the south east from the site (a 7 to 9 minute walk). The station and all trains serving it are operated by South West Trains. The station provides key links to Richmond, Waterloo, Reading, Kingston and Hounslow. **Table 8.7** shows the directional frequency in the Monday to Friday AM and PM peak hours.

Table 8.7: Summary of existing rail services

Station	Westbound		Eastbound	
	AM Peak	PM Peak	AM Peak	PM Peak
Twickenham	11	10	11	8

Local highway network

8.5.18 The A316 Chertsey Road, which is part of the Transport for London Road Network (TLRN), is a dual carriageway and runs in northeast-southwest direction along the northern boundary of the site. The road links the site to central London to the east and the M3 Motorway and wider national strategic road network to the west and has a speed limit of 40mph near the site. Locally, the road is intersected by the B538 Hospital Bridge Road to the west and the B361 Whitton Road to the east with semi signalised roundabout junctions.

8.5.19 The A316 Chertsey Road, has shared cycle / footways along both sides of the carriageways. There is a signal controlled pedestrian crossing over the A316 near Chudleigh Road and a pedestrian footbridge near Talma Gardens and Langhorn Drive. There are two other pedestrian bridges over the A316 further to the west.

8.5.20 The site is accessed from two locations off of the A316 Chertsey Road. The first is from Egerton Road into the student car park and the second is from Langhorn Drive which provides access to the northern part of the site and some of the staff parking areas.

8.5.21 Egerton Road has footways on both sides of the carriageway, street lighting and has a 30mph speed limit. There is a vehicle restriction immediately south of the student car park access which is controlled with a fire gate. The vehicle restriction is in place to prevent rat-running by vehicles travelling from Whitton Road to Chertsey Road (westbound), thereby avoiding the semi signal controlled roundabout.

8.5.22 Langhorn Drive is a private road owned by Harlequin FC, which has a speed limit of 20mph and provides access into the site, as well as other sites / land uses. To the west of Langhorn Drive is a separate footpath, Marsh Farm Lane, which can be used

by pedestrians and cyclists to access the site. The path has street lighting and runs between Chertsey Road and Craneford Way.

8.5.23 The B361 Whitton Road, which has a speed limit of 30mph, runs in a northwest-southeast direction to the east of the residential area of Heatham and is connected to the site via the residential roads of roads of Court Way, Heathfield North and Heathfield South. Adjacent to the Court Way/Whitton Road junction is a zebra crossing. Heathfield North is one-way in a westerly direction and Heathfield South is one-way in an easterly direction. Each of these residential roads provides access to Egerton Road which in turn provides access to Craneford Way.

8.5.24 The residential roads of Court Way, Heathfield North, Heathfield South, Egerton Road and Craneford Way are accessed via simple priority junctions and have a speed limit of 20mph. Each road has street lighting, footways on both sides of the carriageway, except for Craneford Way which has a footway on its northern side of the carriageway only.

8.5.25 The site is accessed from two locations off of Egerton Road. The first is via the Main College Access and the second is via the Secondary College Access, both of which provide access to the main staff car parking areas. The site is also accessed from Craneford Way, which provides access to the rear of the College (western side) where the servicing area is located.

8.5.26 To the south, the B361 Whitton Road joins the A310 London Road via signal controlled junction which has pedestrian signal phases. The A310 London Road provides access to Twickenham station and Twickenham town centre via the A305 King Street. There is a signalised pedestrian crossing over the A310 London Road directly opposite Twickenham station.

Traffic flows

8.5.27 In order to establish the existing traffic flows on local roads, a number of traffic surveys have been undertaken. A fully classified turning count survey was undertaken at the junctions of the A316 Chertsey Road / Langhorn Drive, the A316 Chertsey Road / Egerton Road and the B361 Whitton Road / Court Way on 9 October 2014. Growth has been applied to the 2014 traffic flows to lift the baseline to 2019 which is the year of opening. **Appendix 8.1** contains the 2019 Baseline traffic flow diagrams.

8.5.28 The AM and PM peak traffic flows for these roads are set out in **Table 8.8** and **Table 8.9.**

Table 8.8: 2019 Baseline AM peak hour (08:00 – 09:00) vehicle flows

Road	Two-way flow
A316 Chertsey Road	3,351
B361 Whitton Road	701
Court Way	116
Langhorn Drive	100

Table 8.9: 2019 Baseline PM peak hour (17:00 – 18:00) vehicle flows

Road	Two-way flow
A316 Chertsey Road	3,663
B361 Whitton Road	707
Court Way	113
Langhorn Drive	110

8.5.29 Growth for traffic to 2034 represents a 7.65% increase in the AM and a 7.38% increase in the PM.

Junction capacities

8.5.30 In order to establish how well the local road junctions which provide access to the College site cope with the existing traffic levels and determine the latent capacity of these junctions, a junction capacity assessment has been undertaken.

8.5.31 The junction capacity assessment has been undertaken using Transport Research Laboratory's software PICADY. In order to allow for daily variation in traffic flows, an 85% Ratio to Flow Capacity (RFC) is generally regarded as the threshold for a junction reaching its operational capacity. Any RFC below 85% is regarded as the junction working within capacity.

8.5.32 The junctions assessed are the:

- A316 Chertsey Road / Langhorn Drive simple priority junction;
- A316 Chertsey Road / Egerton Road simple priority junction; and
- B361 Whitton Road / Court Way simple priority junction.

8.5.33 In order to establish the existing traffic flows at these junctions, the fully classified turning count surveys undertaken on Thursday 9 October 2014 and the traffic flow data from Automatic Traffic Counters (ATCs) laid on the eastbound carriageway of

the A316 Chertsey Road have been used. As the there is a Zebra crossing imeadiately adjacent to the Whitton Road / Court Way junction, a pedestrian crossing survey was also undertaken on 13 January 2015 and the data used in the junction capacity assessment model. Queue length surveys were also undertaken at the junctions on Thursday 9 October 2014 and used to validate the junction capacity assessment models. The traffic growth factor applied to the 2014 traffic flows used in the assessment is slightly higher than that required for 2019 and thus provides a robust assessment in terms of the junction capacity modelling. A summary of the results are set out in **Table 8.10** and **Table 8.11.**

Table 8.10: Summary of junction capacity assessment for 2019 Baseline AM peak hour (08:00 – 09:00) vehicle flows

Junction	Road arm	Ratio of Flow to Capacity (RFC) %	Average vehicles queuing
A316 Chertsey Road / Langhorn Drive	Langhorn Drive	30.3%	1
A316 Chertsey Road / Egerton Road	Egerton Road	1.9%	0
B361 Whitton Road / Court Way	Whitton Road (north)	5.9%	0
	Court Way	13.2%	1

Table 8.11: Summary of junction capacity assessment for 2019 Baseline PM peak hour (17:00 – 18:00) vehicle flows

Junction	Road arm	Ratio of Flow to Capacity (RFC) %	Average vehicles queuing
A316 Chertsey Road / Langhorn Drive	Langhorn Drive	19.7%	1
A316 Chertsey Road / Egerton Road	Egerton Road	3.6%	0
B361 Whitton Road / Court Way	Whitton Road (north)	4.5%	0
	Court Way	18.5%	1

Future Baseline

8.5.34 Traffic growth obtained from the Department for Transport's TEMPro (Trip End Model Presentation Program) and traffic flows from cumulative developments has been applied to the traffic flows on local roads and to the traffic for the junction capacity assessment models. The future assessment years are 2019 and 2034. The

implications of future traffic growth together with development traffic have been therefore been assessed in the EIA.

8.5.35 Transport for London will have completed the provision of a new off-road cycle lane along the both sides of the A316, passing the College site. The works are expected to commence in summer 2016 and when complete it will enhance cycle access to the site to the benefits of its users (pupils, staff and visitors) and residents.

8.5.36 Through Section 106 obligations it is expected that a new 3.0m shared footway / cycleway will be provided between London Road and Marsh Farm Lane routed on the southern side of the River Crane. This will open up a new convenient route between the site and Twickenham Station for pupils, staff, visitors and residents. The route will be unlit and locked at night therefore during winter months its use to access the Site during the morning and evening peak periods will be reduced.

8.6 IMPACT ASSESSMENT

Site Enabling, Demolition and Construction

Introduction

8.6.1 This section considers the likely effects of the three construction phases (see Chapter 6, **Table 6.2**) on the local transport network and considers the likely effect of construction traffic on the local highway network.

8.6.2 In order to assess which of the three construction phases present the most adverse effects on the local transport network, the multi-modal trip generation including construction traffic for each construction phase has been calculated (i.e. this includes all trips generated by the construction activities, as well as the trips associated with any of the completed phases which are occupied and in use at the time of the construction phase being assessed). A summary of the trip generation[1] for each construction phase is shown in **Table 8.12** and **Table 8.13.**

[1] Trip generation is equivalent to movements i.e. one trip equals one movement

Table 8.12: Total proposed development construction phase multi-modal trip generation including construction traffic for AM peak period

	0700 – 0800			0800 - 0900			0900 - 1000			0700 – 1000
Mode	**Arr**	**Dep**	**Tot**	**Arr**	**Dep**	**Tot**	**Arr**	**Dep**	**Tot**	**Total**
Phase 1	224	33	257	1835	127	1962	689	122	811	3030
Phase 2	241	70	311	1860	193	2052	714	155	869	3233
Phase 3	247	70	317	1869	194	2062	720	155	875	3255

Table 8.13: Total proposed development construction phase multi-modal trip generation including construction traffic for PM peak period

	1600 – 1700			1700 - 1800			1800 - 1900			1600 – 1900
Mode	**Arr**	**Dep**	**Tot**	**Arr**	**Dep**	**Tot**	**Arr**	**Dep**	**Tot**	**Total**
Phase 1	78	515	592	48	315	363	39	174	213	1169
Phase 2	120	542	662	91	330	421	80	194	274	1357
Phase 3	120	548	668	91	339	430	80	200	280	1378

8.6.3 **Table 8.12** and **Table 8.13** demonstrate that construction phase 3 represents the most significant likely effect on the local transport network. This includes operational traffic from the Replacement College, School, Clarendon School, Tech Hub, and the first phase of the residential site, plus the construction traffic for the second phase of the residential site. Therefore, construction phase 3 has been assessed, the results of which are set out below.

8.6.4 The outline CMP (**Appendix 6.2**), outline CLP (**Appendix 6.3**) and outline CEMP (**Appendix 6.1**) set out further details on construction vehicles and construction traffic management.

Predicted Effects

Proposed development construction phase 3 including construction traffic total trip generation net effect

8.6.5 The outline CLP (**Appendix 6.3**) states that the site will receive 24 construction HGVs a day, which results in a total of 12 arrivals and 12 departures. Based on a typical ten hour working day i.e. 08:00 to 18:00, this could result in an average of between one and two vehicles an hour. Therefore, it has been assumed that there will be two construction vehicles arriving at the site and two construction vehicles

departing the site in the AM peak hour of 08:00 to 09:00 and one construction vehicle arriving at the site and one construction vehicle departing the site in the PM peak hour of 17:00 to 18:00.

8.6.6 There will also be 9 minibus arrivals and 9 minibus departures throughout the day for the contractors. Construction workers generally start early and leave early, hence a small proportion of the minibuses will arrive and depart in the traditional peak hour periods. Therefore, it has been assumed that three minibuses will arrive in the AM peak hour of 08:00 to 09:00 and three minibuses will depart in the PM peak hour of 17:00 to 18:00.

8.6.7 There will be 150 contractors on site. Therefore, it has been assumed that 50 will arrive each hour throughout the AM peak period and 50 will depart each hour throughout the PM peak period.

8.6.8 The net increase / decrease for the proposed development construction phase 3 total trip generation including construction traffic for the AM peak period is shown in **Table 8.14.** The table shows traffic from occupied parts of the Site, HGVs serving the occupied and operational parts of the site, and then construction traffic associated with construction phase 3.

Table 8.14: Total proposed development construction phase 3 including construction traffic net increase / decrease AM peak period multi-modal trip generation

	0700 – 0800			0800 - 0900			0900 - 1000			0700 – 1000
Mode	**Arr**	**Dep**	**Tot**	**Arr**	**Dep**	**Tot**	**Arr**	**Dep**	**Tot**	**Total**
Walk	22	3	25	244	11	255	34	7	41	321
Cycle	7	2	8	68	6	74	11	4	15	97
Underground	1	2	3	4	6	10	4	2	6	19
Rail	9	11	20	43	27	70	21	12	34	123
Bike/Rail	0	0	0	0	0	0	1	0	1	1
Bus	22	2	24	255	8	262	43	7	50	336
School Bus	1	0	1	87	0	87	1	0	1	89
Tram	0	0	0	0	0	0	0	0	0	0
Taxi	0	0	0	0	0	0	0	0	0	0
Car Share	0	0	0	-8	0	-8	-7	-1	-8	-16
Car Driver	34	23	57	80	54	134	20	20	40	232
Motorcycle	0	1	1	0	1	1	0	1	1	2
Other	0	0	0	0	1	1	1	0	1	2
Total	95	44	140	773	113	886	129	52	181	1206
HGVs	1	0	1	3	3	6	2	2	4	11
Site Total	**97**	**44**	**141**	**776**	**116**	**891**	**130**	**54**	**184**	**1217**
Const. Peds	50	0	50	50	0	50	50	0	50	150
Const. Lights	3	0	3	3	0	3	3	0	3	9
Const. HGVs	0	0	0	2	2	4	2	2	4	8
Total	**150**	**44**	**194**	**831**	**118**	**948**	**185**	**56**	**241**	**1384**

8.6.9 The proposed construction phase 3 trip generation including construction traffic results in a 43% increase in trips in the AM peak period when compared to the existing College. This provides a **moderate adverse** effect.

8.6.10 The net increase / decrease for the proposed development construction phase 3 total trip generation including construction traffic for the PM peak period is shown in **Table 8.15**.

Table 8.15: Total proposed development construction phase 3 including construction traffic net increase / decrease PM peak period multi-modal trip generation

	1600 – 1700			1700 - 1800			1800 - 1900			1600 - 1900
Mode	**Arr**	**Dep**	**Tot**	**Arr**	**Dep**	**Tot**	**Arr**	**Dep**	**Tot**	**Total**
Walk	9	42	51	5	17	21	5	8	13	85
Cycle	4	13	17	2	8	10	3	4	7	34
Underground	2	3	6	2	1	4	3	2	5	15
Rail	14	22	36	12	10	22	14	8	22	80
Bike/Rail	0	0	1	0	0	0	0	0	0	1
Bus	9	49	58	5	20	25	4	10	14	97
School Bus	0	21	21	0	0	0	0	0	0	21
Tram	0	0	0	0	0	0	0	0	0	0
Taxi	0	0	0	0	0	0	0	0	0	0
Car Share	-4	-3	-7	-1	0	-1	-2	0	-2	-10
Car Driver	23	62	85	26	41	67	19	29	48	200
Motorcycle	1	0	1	1	0	1	1	0	1	2
Other	0	1	1	0	0	0	0	0	0	1
Total	58	211	269	51	98	148	47	62	109	526
HGVs	1	1	1	0	0	0	0	0	0	1
Site Total	59	212	270	51	98	148	47	62	109	527
Const. Peds	0	50	50	0	50	50	0	50	50	150
Const. Lights	0	3	3	0	3	3	0	3	3	9
Const. HGVs	1	1	2	1	1	2	0	0	0	4
Total	60	266	325	52	152	203	47	115	162	690

8.6.11 The proposed construction phase 3 trip generation including construction traffic results in a 49% increase in trips in the PM peak period when compared to the existing College. This provides a **moderate adverse** effect.

Pedestrian and cycle flows net effect

8.6.12 Whilst sustainable travel modes such as walking and cycling are always encouraged, it is likely that the use of these modes by contractors will be low given the need for the carriage of tools and equipment. Therefore, the effect of walking and cycling by contractors will be **negligible**.

8.6.13 Contractors walking and cycling to the site will access and egress the site via separate gates to vehicles to avoid likely conflicts between these modes.

8.6.14 See Section 8.6.54 for further analysis on pedestrian and cycle flows.

Effect on Pedestrian Severance, Delay, Fear and Intimidation, Amenity

8.6.15 Given the low number of construction vehicles associated with the proposed development and the control measures set out within the outline CMP (**Appendix 6.2**), outline CLP (**Appendix 6.3**) and outline CEMP (**Appendix 6.1**) which would be implemented, the likely effects of construction traffic on pedestrian movement and capacity will be **negligible**. Details on the management of walkways, closures and routing would be agreed with LBRuT post planning through the CEMP.

8.6.16 See paragraphs 8.6.58 – 8.6.60 for further analysis on effect on pedestrian severance, delay, fear and intimidation, amenity.

Parking

8.6.17 Due to the lack of parking on-site, contruction workers may opt to park on local roads instead. CPZs to the east of the site would prevent contractors parking on these roads, but to the north of the site, CPZ 'R' is only in operation during events at RFU Twickenham Stadium. Therefore, contractors could park on these roads. There are 1,442 on-street spaces on the roads between 09:00 and 19:00 of which the parking survey showed there 966 cars parked in the spaces during the same times, resulting in a parking stress of 67%. Even if all 150 contractors drove to the site, this would result in 1,116 cars being parked on local roads. Therefore, adding the contractor cars to the 966 cars results in a parking stress of 77%. This results in a 10% increase in stress which is **negligible**.

Public Transport Services effect

8.6.18 There will be an increased number of contractors in the local area who will use the public transport network. However, because construction workers generally start early and leave early, the majority of the contractors will be travelling outside the morning and evening peak hour periods and the likely effect will therefore be **negligible**.

8.6.19 See Section 8.6.2 for further analysis on public transport.

Traffic flows effect

8.6.20 Langhorn Drive will be used as the main construction vehicle access and egress, with some limited access and egress via the northern end of Egerton Road from what is currently the student car park. For the development of the College playing fields, construction traffic will cross Craneford Way from the existing college access in order to access the field. No construction vehicles will use the residential roads of Court Way, Heathfield North, Heathfield South and Egerton Road to the south of the fire access gate. All construction vehicles will as far as reasonably possible use the A316 Chertsey Road as the main strategic route to the site.

8.6.21 The AM and PM peak motor traffic flows for 2019 plus the construction phase 3 proposed development and construction vehicles are set out in **Table 8.16** and **Table 8.17.** This scenario includes background traffic for the year 2019 and traffic from the Replacement College, School, Clarendon School, Tech Hub, the first phase of the residential site and cumulative developments, plus the construction traffic for the second phase of the residential site. **Appendix 8.2** contains the traffic flow diagrams.

Table 8.16: 2019 + construction phase 3 development and construction vehicles AM peak hour (08:00 – 09:00) vehicle flows

Road	Two-way flow	% increase from 2019 Baseline
A316 Chertsey Road	3,583	6.9%
B361 Whitton Road	791	12.8%
Court Way	156	34.5%
Langhorn Drive	244	144%

Table 8.17: 2019 + construction phase 3 development and construction vehicles PM peak hour (17:00 – 18:00) vehicle flows

Road	Two-way flow	% increase from 2019 Baseline
A316 Chertsey Road	3,813	4.1%
B361 Whitton Road	766	8.5%
Court Way	117	3.5%
Langhorn Drive	245	122.7%

A316 Chertsey Road

8.6.22 The effect of increase in traffic on the A316 Chertsey Road for the 2019 + construction phase 3 development and construction vehicles in the AM and PM peak hours is **negligible**.

B361 Whitton Road

8.6.23 The effect of increase in traffic on the B361 Whitton Road for the 2019 + construction phase 3 development and construction vehicles in the AM is **minor adverse** and PM peak hours is **negligible**.

Court Way

8.6.24 The effect of increase in traffic on Court Way for the 2019 + construction phase 3 development and construction vehicles in the AM peak hour is **moderate adverse** and in the PM peak hour is **negligible**. It should be noted that the increase in traffic on Court Way is due to the development traffic of the Clarendon School and two thirds of the drop off and pick up trips for the School, and not construction traffic.

8.6.25 It should be noted that the traffic flow for the 2019 Baseline scenario is increasing from 116 to 156 in 2019 + construction phase 3 development and construction vehicles scenario. Paragraph 32.4 Environmental Capacities of Links and Areas set out in IHT's Transport In The Urban Environment states:

'...the environmental capacity for an access road or local distributor lies, typically, in the range of 300-600 vehicles per hour...'

8.6.26 The highest predicted traffic flow along Court Way in the AM peak hour is 156 vehicles. This is 144 vehicles less than the lower end of the environmental capacity bracket set out in the IHT document. The 2019 Baseline flows are relatively low and therefore, although the percentage increase between the flows equates to a moderate adverse effect, this is misleading in practical terms because the 2019 Baseline flows are so low, the effect will be not be as excessive as the significance criterion portrays, and in practice will not have a significant effect on the environmental capacity of the road.

Langhorn Drive

8.6.27 The effect of increase in traffic on the Langhorn Drive for the 2019 + construction phase 3 development and construction vehicles in the AM and PM peak hours is **major adverse**.

8.6.28 The the use of major adverse to describe the effect of traffic increase on Langhorn

Drive in the 2019 + construction phase 3 development and construction vehicles AM scenario is misleading. The traffic flow for the 2019 Baseline scenario is increasing from 100 to 244 in the 2019 + construction phase 3 Development and construction vehicles scenario.

8.6.29 The flow of 244 vehicles on Langhorn Drive will be 56 vehicles less than the lower end of the environmental capacity bracket set out in the IHT document and 356 less than the higher end of the bracket.

8.6.30 The 2019 Baseline flows on Langhorn Drive are relatively low and therefore, although the percentage increase between the flows equates to a major adverse effect, this is misleading in practical terms because the 2019 Baseline flows are so low, the effect will be not be as excessive as the significance criterion portrays and in practice will not have a significant effect on the environmental capacity of the road.

Summary

8.6.31 Overall, the increases in traffic flows on all of the road links assessed will not have a significant adverse effect on the operational capacity and the environmental capacity of the road links and the increase in vehicle trips will be **negligible**.

Junction capacities

8.6.32 The junction capacity assessment undertaken for the operational phase, shown further on in this document, demonstrates that during the AM and PM peak hours all junctions operate within capacity. The AM and PM peak hours for the 2019 + construction phase 3 development and construction vehicles are 22 and 21 vehicles respectively lower than 2019 + development scenario. Therefore, the 2019 + construction phase 3 development and construction vehicles scenario will have a **negligible** effect on the operational capacity of the junctions which link the site to the local highway network.

Mitigation Measures

8.6.33 The outline CMP (**Appendix 6.2**), outline CLP (**Appendix 6.3**) and outline CEMP (**Appendix 6.1**) set out further details on the measures which will be employed for construction vehicles and construction traffic management, and contractor travel to and from the site. However, the main mitigation measures are set out in the following paragraphs.

8.6.34 Pedestrians formed of the general public, local residents and employees associated with other existing uses across the site will be kept separate from the demolition and construction activities at all times used appropriate hoarding.

8.6.35 During construction works, existing pedestrian routes and footpaths crossing will be maintained at all times. If temporary closures are required, i.e. for the erection of scaffolds or incoming services connections, permissions and licences will be obtained for the rerouting of pedestrian rights of way.

8.6.36 The proposed construction vehicle access routes avoid using the minor roads as far as possible and have specifically avoided residential roads adjoining the site to the east. These measures will ensure that construction vehicles have minimal impact on the residential roads surrounding the site. In addition, waiting vehicles will be avoided through strict management of delivery times by the use of a regulated on-line booking system controlled by the Principal Contractor (see Outline CLP in **Appendix 6.3**). The form of construction vehicle management will be set out at the tender stage and reinforced on-site.

8.6.37 On-site parking for construction workers will be restricted to an absolute minimum as there will be a general policy of not providing any car parking on the site. Parking on local residential roads to the east of the site is prohibited by the existing Controlled Parking Zones (CPZs). The construction workers will be encouraged to use the nearby public transport modes of bus and rail. Provisions will be made within the site for essential on-site parking if required for emergencies and for a minibus set down point.

8.6.38 Section 106 contributions will be provided to fund a study to establish whether residents would like the operation times of CPZ 'R' to the north of the site to be extended from the existing operation times. If the residents deem the extension of the CPZ operation times to be required, sufficient funds commuted through the Section 106 will be used to implement the extended operation times including infrastructure such as signing.

8.6.39 To encourage the use of cycles by contractors, secure cycle parking and changing facilities with showers will be provided.

8.6.40 To minimise the likelihood of congestion during the demolition and construction period, strict monitoring and control of vehicles accessing and egressing, and travelling across the site will be implemented. All on-site construction vehicle trips will be pre-arranged and pre-booked as part of the efficient operation of construction work. The use of a booking system and having the delivery times agreed with each contractor means that vehicles are not caused to wait prior to entering the site.

8.6.41 Delivery schedules will be produced in order to obtain the profiles of future construction vehicle trips to regulate deliveries and eliminate bottle necks. A holding area has been identified close to Sunbury Cross on the A316 which can be used to control the number of construction deliveries coming into close proximity of the site.

Construction vehicles may be held in the off-site holding area until the site is ready to receive the vehicle. The site traffic marshal will communicate by mobile phone call or text with the construction vehicle drivers to inform them when they can proceed to the site. Specific time slots will be allocated to contractors for the use of cranes and hoists to ensure that the main plant will be utilised efficiently. An on-line delivery booking system will be operated whereby suppliers can book delivery slots well in advance. Construction vehicle drivers will be issued with a project route map to prevent unnecessary routing mistake to and from the site and to avoid particular routes.

Residual Effects

8.6.42 Parking by contractors on local roads will be prevented by the local CPZs and the mitigation measures set out previously and the measures set out in the outline CMP, CLP and CEMP (see **Appendices 6.1-6.3**). Therefore, the effect of on street parking capacity on local roads will be **negligible**.

8.6.43 The residual effects for pedestrian and cycle modes, and pedestrian severance, delay, fear and intimidation, amenity will remain **negligible**.

8.6.44 The residual effects on parking will be **negligible.**

8.6.45 The residual effect on traffic flows and junction capacities is **negligible.**

8.6.46 All mode trip generation including construction person and vehicle trips in the AM and PM will be **moderate adverse.** However, the effects of construction vehicles and contractors only, travelling to and from the site will be **negligible** once mitigation through the measures set out in the Outline CMP, CLP and CEMP are implemented.

Monitoring

8.6.47 The effectiveness of the mitigation measures will be monitored through the CEMP for the scheme.

Operation

Introduction

8.6.48 The site is expected to be fully operational by 2019 with the construction of all land uses complete. The future year of +15 years is 2034. The assessment shows the predicted effects for both 2019 and 2034 including the full development proposals trip generation.

Predicted Effects

Proposed development total trip generation net effect

8.6.49 The total trip generation net increase / decrease for the proposed development for the AM peak period is shown in **Table 8.18**.

Table 8.18: Total proposed development net increase/decrease AM peak period multi-modal trip generation

	0700 - 0800			0800 – 0900			0900 - 1000			0700 - 1000
Mode	**Arr**	**Dep**	**Tot**	**Arr**	**Dep**	**Tot**	**Arr**	**Dep**	**Tot**	**Total**
Walk	23	5	28	245	15	260	35	9	44	332
Cycle	7	3	10	69	9	78	12	5	17	105
Underground	2	4	6	5	10	15	5	4	9	30
Rail	12	18	30	47	45	92	27	19	46	168
Bike/Rail	0	0	0	0	0	0	1	0	1	1
Bus	22	3	25	255	10	265	43	8	51	341
School Bus	1	0	1	87	0	87	1	0	1	89
Tram	0	0	0	0	0	0	0	0	0	0
Taxi	0	0	0	0	0	0	0	0	0	0
Car Share	0	0	0	-8	0	-8	-7	-1	-8	-16
Car Driver	40	38	78	91	69	160	30	31	61	299
Motorcycle	0	1	1	0	2	2	0	1	1	4
Other	0	0	0	0	1	1	1	0	1	2
Total	107	72	179	791	161	952	148	76	224	1355
HGVs	2	0	2	3	4	7	2	3	5	14
Site Total	109	72	181	794	165	959	150	79	229	1369

8.6.50 The proposed trip generation results in a 42% increase in trips in the AM peak period when compared to the existing College. This provides a **moderate adverse** effect.

8.6.51 The total trip generation net increase / decrease for the proposed development for the PM peak period is shown in **Table 8.19**.

Table 8.19: Total proposed development net increase / decrease PM peak period multi-modal trip generation

	1600 - 1700			1700 – 1800			1800 - 1900			1600 - 1900
Mode	**Arr**	**Dep**	**Tot**	**Arr**	**Dep**	**Tot**	**Arr**	**Dep**	**Tot**	**Total**
Walk	11	43	54	6	17	23	7	9	16	94
Cycle	6	14	20	3	8	11	5	5	10	40
Underground	4	5	9	4	2	6	5	3	9	24
Rail	22	27	49	19	11	30	23	11	34	113
Bike/Rail	0	0	1	0	0	0	0	0	0	1
Bus	10	50	60	6	20	25	5	10	15	100
School Bus	0	21	21	0	0	0	0	0	0	21
Tram	0	0	0	0	0	0	0	0	0	0
Taxi	0	0	0	0	0	0	0	0	0	0
Car Share	-4	-3	-7	-1	0	-1	-2	0	-2	-9
Car Driver	39	73	112	44	50	94	33	38	71	277
Motorcycle	1	0	1	1	0	1	1	0	1	3
Other	0	1	1	0	0	0	0	0	0	1
Total	90	231	320	83	108	191	77	77	154	666
HGVs	1	1	2	0	0	0	0	0	0	2
Site Total	91	232	322	83	108	191	77	77	154	668

8.6.52 The proposed trip generation results in a 49% increase in trips in the PM peak period when compared to the existing College. This provides a **moderate adverse** effect.

Pedestrian and cycle flows net effect

8.6.53 The total development trip generation has been used to forecast the likely levels of pedestrian and cycle flows along local routes. The pedestrian trips include the walking journeys made to use public transport services. The trips have been distributed using the methodology set out previously and the net effect calculated. **Figures 8.3** and **8.4** show the proposed pedestrian and cycle distribution for the AM and PM peak hours. **Figures 8.5** and **8.6** show the net increase / decrease distribution for the AM and PM peak hours respectively.

Legend

207 Pedestrians
25 Cycles

N

CASCADE

Note: Not to Scale

Project Title:
Richmond Education and Enterprise Campus Development

Figure Title:
Proposed - Two Way All Uses Pedestrian and Cycle Movements AM 08:00-9:00

For Information Only

Figure Number:
Figure 8.3

Date:
June 2015

Legend

425 Pedestrians
42 Cycles

N

CASCADE

Note: Not to scale

Project Title:
Richmond Education and Enterprise Campus Development

Figure Title:
Proposed - Two Way All Uses Pedestrian and Cycle Movements PM 16:00-17:00

For Information Only

Figure Number:
Figure 8.4

Date:
June 2015