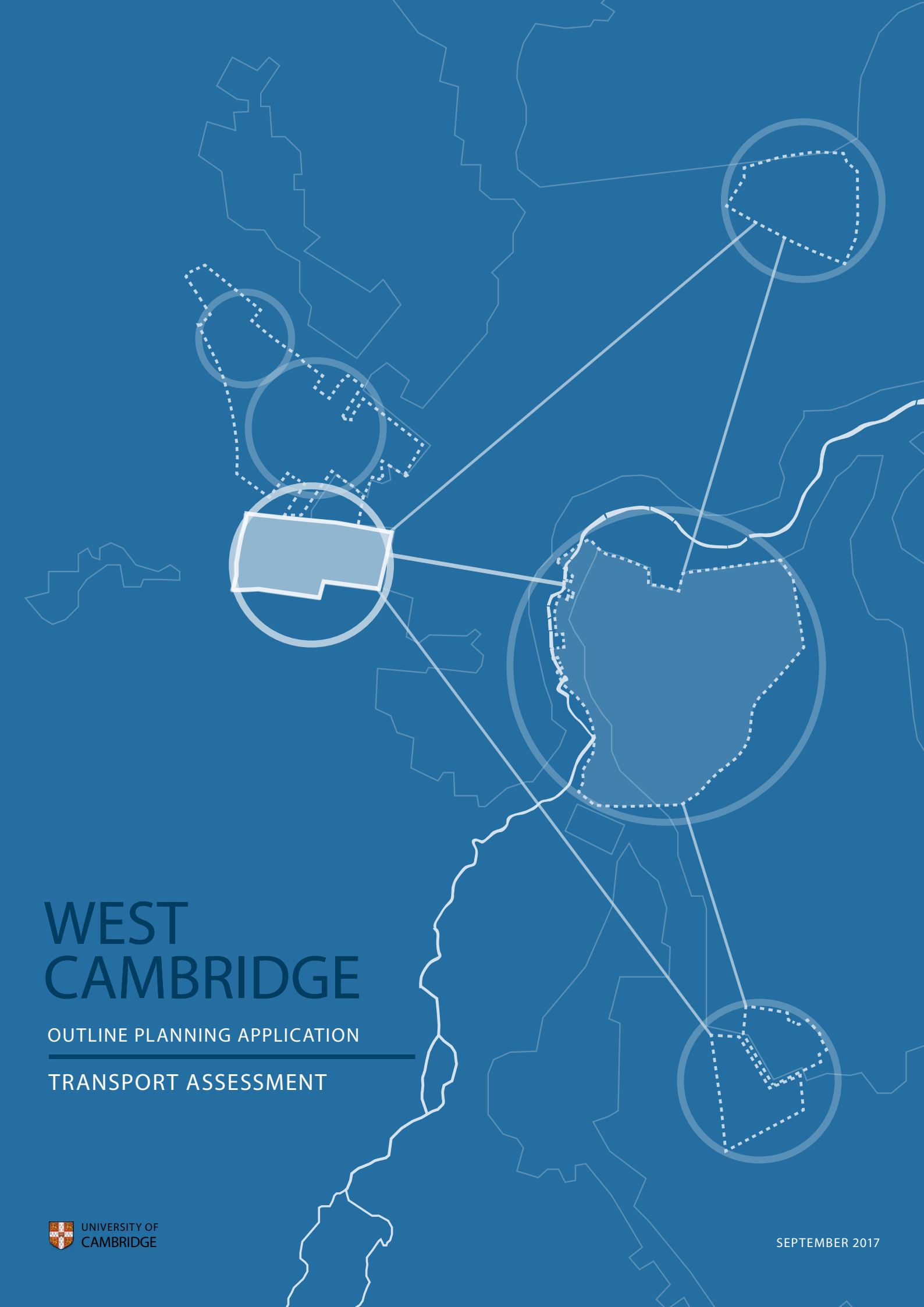

# WEST CAMBRIDGE

## OUTLINE PLANNING APPLICATION

## TRANSPORT ASSESSMENT

UNIVERSITY OF CAMBRIDGE

SEPTEMBER 2017

# Document Control Sheet

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# Contents

## Figures

## Appendices

Appendix 15.1 - Summary and comparisons of 2016, 2031 Do Minimum and 2031 Do Something flows

Appendix 15.2 - 2031 Madingley Road Corridor Junction Capacity Assessment

Appendix 15.3 - 2031 Madingley Mulch Junction Capacity Assessments

Appendix 17.1 - Details of the 2021 Transport Strategy

Appendix 18.1 - Details of the 2031 Transport Strategy

# Executive Summary

## West Cambridge Development proposals

1. This application is submitted for outline planning permission relating to the intensification of development of an extant site at West Cambridge for academic and commercial research, and various associated facilities.

2. The promoter of the Development, the University of Cambridge, is one of the world's leading universities. It is renowned for the excellence of its teaching and research, and it makes a significant contribution to the prosperity of the city of Cambridge and the UK economy. To maintain its reputation as a world leader, the University must continue to develop and grow. The University wishes to support the phenomenal success of the Cambridge area for fostering high technology research and development by ensuring future opportunities may come to fruition within Cambridge.

3. An existing masterplan for West Cambridge that was granted an approval in 1999 - subsequently reviewed in 2004 - forms the basis of the current development on the Site. Together with the pre-existing development on the Site, the 1999 masterplan envisaged just under 275,000m$^2$ of development, of academic, research institute and commercial research, as well as ancillary use shared facilities, sports, and residential uses.

4. Whilst the academic and residential components of this extant consent have been delivered to the anticipated levels, the completed commercial research and shared facilities components are well below the envisaged 1999 masterplan quanta.

5. The Cambridge Local Plan 2014: Proposed Submission Policy 18 promotes the densification of the existing West Cambridge through a revised masterplan subject to a number of conditions. It is within this context that the University of Cambridge is producing a new masterplan for the Site which significantly increases the amount of development to approximately 500,280m$^2$.

6. The University already has a proud reputation throughout the City for promoting its travel demand management strategy, and has always been proactive in delivering improvements to it – indeed the University was founding member of the Travel for Work Partnership established in co-operation with the County Council. This philosophy will be continued at West Cambridge, which will have different travel characteristics to similar research development in the United Kingdom, or indeed to similar developments throughout Cambridge, as a result of the following:

   - the strong travel demand management strategy being promoted;
   - the extensive non-car mode infrastructure proposed as mitigation;
   - all on-site car parking being subjected to the University's motor proctorial control and management; and
   - the land uses within the Development having car parking provision lower than the levels identified in the Cambridge Local Plan for such facilities.

## West Cambridge and transport policy

7. The Development accords well with national transport policy and guidance to deliver sustainable development:

i) its sustainable location within Cambridge, and the incorporation of employment well located adjacent to residential land-uses reducing the need to travel - supporting the stated aspirations and objectives of paragraph 34 of the National Planning Policy Framework; and

ii) by promoting ways to reduce the traffic impact of this development and the University's other activities within Cambridge, and by controlling traffic generation, the Development supports the policy of the Department for Transport's Circular 02/2013.

8. The Development also accords with important local transport and planning policy requirements:

i) of Policy 18 of the Cambridge Local Plan - by including a comprehensive transport strategy for the site, incorporating a sustainable transport plan to minimise reliance on private cars, as well as enhancing links for walking, cycling and public transport (including access for all) to the city centre, railway station(s), other principal educational and employment sites, and other key locations within the city to support sustainable development;

ii) by improving the local footpath and cycleway network as an integral part of a wider transport system – thus improving access to the surrounding countryside – according with the Cambridgeshire Rights of Way Improvement Plan; and

iii) of the measures identified within the Cambridge Long-Term Transport Strategy, the public transport strategy would deliver enhanced public transport services.

## Proposed Assessment Strategy for West Cambridge

9. West Cambridge is being brought forward within the context of wide-reaching planning uncertainty, including:

i) the scale of local residential development identified Cambridge Local Plan - still being the subject of an Inquiry;

ii) the impact of the A14 Huntingdon – Cambridge Improvement Scheme granted a Development Consent Order by the Secretary of State in May 2016, and construction having commenced, to be delivered in a phased manner;

iii) the A428 Black Cat to Caxton Gibbet Enhancement Scheme;

iv) the on-going deliberations and uncertainty surrounding the Greater Cambridge City Deal and Long Term Transport Strategies;

v) Highways England's need to consider measures along the M11; and

vi) the impact of a series of other transport schemes – including - inter alia - the Oxford – Cambridge Expressway, and East-West Rail.

These would have a significant and substantial effect upon the strategic and local movements of vehicles across the region, and influence the future access and movement strategy of West Cambridge – particularly in the mid- to late phases of the Development.

10. As the outline planning application will be submitted prior to the detailed definition of these measures, as discussed with the Joint Authorities (Cambridge City Council – the planning authority, Cambridgeshire County Council – the local highway authority, and Highways England – the strategic highway authority), an Adaptive Phased Approach has been adopted, incorporating:

i) a graduated approach – the assessment process reflecting current transport planning policy where travel demand management measures are introduced first, followed by any necessary highway infrastructure measures to mitigate the residual traffic impact; as well as

ii) an adaptive approach – where, to maintain future flexibility, the proposed mitigation for later phases responds to the quanta of development within the individual phase proposals, the timescales for the delivery, changes in future travel behaviour patterns, emerging transport policy, and the current uncertainty relating to the area-wide transport enhancement proposals delivered by others.

11. As such, this Transport Assessment provides a detailed assessment of the trip generation of an indicative Initial Phase of development only, relating to the 2021 scenario, and the associated mitigation strategy. The vehicular trip generation from West Cambridge is compared against that arising from the Extant Consent for this site, and shown within this Transport Assessment to be lower.

12. Further, less detailed, information relating to the traffic impact, highway capacity assessment and mitigation relating to later phases of West Cambridge (i.e., for 2021 onwards) has been provided to inform the assessment of the Transport Cap to finance the necessary development mitigation, albeit the detail included within this assessment will be reviewed subsequently in the context of the applications for later phases in the context of further clarity being reached.

13. The Development proposals and required transport mitigation identified in this Transport Assessment are independent of the emerging City Deal proposals, and will adequately mitigate the transport impact of the Development. As such, the West Cambridge outline planning application does not rely on the City Deal proposals for mitigation. If the City Deal measures do come forward and supersede any of the mitigation proposed by the University, it is expected that relevant agreed levels of contribution for specific mitigation identified herein could be reallocated (with the University and County's agreement) to support these City Deal measures.

## Transport Strategy for West Cambridge

14. The overall transport strategy for the Development responds to a number of important national regional and local objectives, which may be summarised as follows:

i) delivering employment development within Cambridge, enabling development occupiers to use sustainable modes of travel instead of private cars;

ii) providing development components, development layout and disposition of uses designed from the outset to be inherently sustainable, pedestrian and cyclist friendly, being based upon the provision of an integrated transport system as well as minimising the distance to travel overall;

iii) encouraging the use of sustainable forms of transport such as walking, cycling, and public transport, thus reducing the dependency on the motor vehicle;

iv) minimising the vehicular traffic impact of the Development;

vii) accord with the wider transport strategy for Cambridge, and assisting in their delivery;

vi) assisting in reducing the number and severity of personal injury collisions on the local roads; and

vi) implementing a Travel Plan / Travel Demand Management strategy for the Development.

## Assessment Methodology

15. Initial assessment of the transport impact of West Cambridge was undertaken using Cambridgeshire County Council's land use and transport model, the Cambridge Sub Regional Model (CSRM). Following a review of the model results with the Joint Highway Authorities, it was concluded that the CSRM was not the most appropriate tool in which to assess West Cambridge traffic impact as being an area-wide strategic transport model, it was of insufficient sensitivity to assess impact across the local network accurately.

16. Within the context of an assessment of an Initial Phase of development in 2021 with relatively small development impact, it was agreed that a more local approach to the assessment of impact was appropriate. A methodology was therefore agreed with the Joint Authorities, based upon Peter Brett Associates' first-principles modelling approach.

17. This modelling work has been extended to enable conditions to be considered relating to later phases of West Cambridge (i.e., for 2021 onwards), to inform the assessment of the Transport Cap to finance the necessary development mitigation. The detail included within this assessment will be reviewed subsequently in the context of the applications for later phases in the context of further clarity being reached.

## Assessment of traffic impact from West Cambridge

18. The results from the modelling show:

    i) the West Cambridge vehicle trip generation reported in the original 1997 application - upon which the highway mitigation strategy was derived - is higher than the equivalent Do Minimum assessment derived from Peter Brett Associates' analysis; and

    ii) the travel demand management strategy enshrined within the Framework Travel Plan accompanying this assessment – including inter alia for improved public transport, travel information, improvements to walking and cycling facilities, a range of support for non-car modes of travel, and a reduction in car parking provision - results in a reduced car trip generation from West Cambridge.

19. As such, when compared to the 2016 Base flows, the percentage increases in link flows for the 2021 Do Something Development will be less than for the 2021 Do Minimum scenario.

20. The traffic impact assessment concluded that:

    i) the differences between the 2016 Base Year and 2021 Do Minimum scenarios (i.e., With the Consented Development only and none of the proposed West Cambridge densification) indicate that the network will experience increases in peak hour flows;

    ii) the differences between the 2021 Do Minimum and 2021 Do Something scenarios (i.e., the impact of the densification of West Cambridge) would be minimal. There are only a limited number of links that experience flow increases across the local highway, mainly due to the proposed changes to the Development access strategy;

    iii) the junction capacity assessment identifies that in 2021 with the Proposed Development and mitigation, the local junctions would operate within capacity;

    iv) the differences between the 2016 Base Year and 2031 Do Minimum scenarios (i.e., With the Consented Development only and none of the proposed West Cambridge densification) indicate that the network will experience substantial increases in peak hour flows;

v) the differences between the 2031 Do Minimum and 2031 Do Something scenarios (i.e., the impact of the full delivery of West Cambridge) would be relatively limited. An appropriate mitigation strategy has been identified that is compatible with the emerging strategic transport solution for Cambridge, as well as being sympathetic with the historical context of the surrounding area.

## Transport Mitigation Measures

21. As there may be a degree of variability in future projections (which can be attributed to a number of factors including fuel prices, Government policy etc), a pragmatic management strategy has been formulated for West Cambridge which is designed to be resilient to change. This strategy would:

i) control vehicular trips across the network;

ii) where necessary, provide measures to preserve and / or enhance conditions on particular links;

iii) manage Development impact on some sensitive strategic links;

iv) improve pedestrian and cyclist movement across the network; and

v) provide flexibility moving forward, to enable the proposed measures to be amended by agreement to respond to identified issues.

## Conclusions

22. Overall, the Transport Assessment concludes that:

i) the Development accords well with national and local transport policy;

ii) the Development also accords with important local transport and planning policy requirements:

iii) as the outline planning application will be submitted in the context of uncertainty relating to local development and infrastructure mitigation, that the adopted Adaptive Phased Approach provides a robust and reasonable manner of assessment, in a flexible manner;

iv) that a detailed assessment of the vehicular trip generation of an Initial Phase of development shows that when compared to the traffic impact of the consented – and mitigated – West Cambridge Development, that the impact of the Development proposals is minimal;

v) as there may be a degree of variability in future projections (which can be attributed to a number of factors including fuel prices, Government policy etc), the traffic management strategy formulated for West Cambridge is pragmatic, designed to be resilient to change;

vi) further assessments of Development impact beyond the Initial Phase have been provided to inform the derivation of a Transport Cap to finance future mitigations. This will be reviewed and supported by additional assessments of the future emerging conditions on the network. Further mitigation strategies will be derived and agreed for these phases;

vii) the overall transport strategy for the Development responds to a number of important national regional and local objectives; and as such

viii) there are no transport-based reasons why outline planning consent should not be granted for the West Cambridge Development.

# 1 Introduction

## 1.1 Background

1.1.1 Peter Brett Associates LLP (referred to from here as Peter Brett Associates or PBA) has been commissioned by The University of Cambridge to prepare a Transport Assessment to accompany an application for planning permission relating to the intensification of development of an extant site at West Cambridge for academic and commercial research, and various associated facilities.

1.1.2 The promoter of the Development, the University of Cambridge, is one of the world's leading universities. It is renowned for the excellence of its teaching and research, and it makes a significant contribution to the prosperity of the city of Cambridge and the UK economy.

1.1.3 To maintain its reputation as a world leader, the University must continue to develop and grow. The University wishes to support the phenomenal success of the Cambridge area for fostering high technology research and development by ensuring future opportunities may come to fruition within Cambridge.

## 1.2 West Cambridge Development

1.2.1 An existing masterplan for West Cambridge that was granted an approval in 1999 (planning application reference C/97/0961/OP) - subsequently reviewed in 2004 - forms the basis of the current development on the Site. Together with the pre-existing development on the Site, the 1999 masterplan envisaged just under 275,000m$^2$ of development, approximately 47% of which would be academic, 15% research institute and 22% commercial research. The remaining 16% would consist of shared facilities, sports, and residential uses. The academic and residential components have been delivered to the anticipated levels, but the completed commercial research and shared facilities components are well below the envisaged 1999 masterplan quanta.

1.2.2 The Cambridge Local Plan 2014: Proposed Submission Policy 18 promotes the densification of the West Cambridge through a revised masterplan subject to a number of conditions. It is within this context that the University of Cambridge is producing a new masterplan for the Site which significantly increases the amount of development to approximately 500,280m$^2$.

1.2.3 The University already has a proud reputation throughout the City for promoting its travel demand management strategy, and has always been proactive in delivering improvements to it – indeed the University was founding member of the Travel for Work Partnership (now called Travel for Cambridgeshire) established in co-operation with the County Council. This philosophy will be continued at West Cambridge, which will have different travel characteristics to similar development in the United Kingdom, or indeed to similar developments throughout Cambridge as a result of the following:

- car parking being subjected to the University's motor proctorial control and management;
- the predominant academic research land uses within the Development having car parking provision lower than the levels identified in the Cambridge Local Plan for research facilities;
- the University-related commercial research facilities - with the nearby residential accommodation provided in North West Cambridge - demonstrably having far lower car trip generation rates than equivalent commercial science park facilities.

## 1.3 Surrounding Transport Context – and the Adaptive Phased Approach

1.3.1 The Transport Assessment addresses the transport–related issues of West Cambridge set within the context of the local planning and transport policy for the local Cambridgeshire area.

1.3.2 West Cambridge is being brought forward within the context of some uncertainty, including:

i) the scale of local residential development identified Cambridge Local Plan - still being the subject of an Inquiry;

ii) the impact of the A14 Huntingdon – Cambridge Improvement Scheme granted a Development Consent Order by the Secretary of State in May 2016, and construction having commenced, to be delivered in a phased manner;

iii) the on-going deliberations and uncertainty surrounding the Greater Cambridge City Deal and Long Term Transport Strategies;

iv) Highways England's need to consider measures along the M11;

v) the A428 Black Cat to Caxton Gibbet Enhancement Scheme; and

vi) the impact of a series of other transport schemes – including - inter alia - the Oxford – Cambridge Expressway, and East-West Rail.

1.3.3 These would have a significant and substantial effect upon the strategic movements of vehicles across the region, and influence the future access and movement strategy of West Cambridge – particularly in the mid- to late phases of the Development.

1.3.4 As the outline planning application will be submitted prior to the detailed definition of these measures, as discussed with the Joint Authorities (Cambridge City Council – the planning authority, Cambridgeshire County Council – the local highway authority, and Highways England – the strategic highway authority), the Adaptive Phased Approach has been adopted:

i) this Adaptive Phased Approach will consider the mitigation strategy to respond to the quanta of development within each subsequent individual phase proposals, the timescales for delivery, changes in future travel behaviour patterns, emerging transport policy, and the current uncertainty identified above relating to the wider transport and planning proposals;

ii) a fund, referred to as the Transport Cap, will be provided to be drawn against to deliver the later transport-related measures. The scale of this fund will be set with reference to the best information available;

iii) this Transport Assessment provides a detailed assessment of the vehicular trip generation and assignment of an indicative Initial Phase of development only, relating to the 2021 scenario;

iv) this vehicular trip generation from West Cambridge is compared against that arising from the Extant Consent for this site;

v) a detailed mitigation strategy is considered to respond to any further impact arising from the indicative Initial Phase of development;

vi) the Transport Assessment also provides a detailed assessment of the vehicular trip generation and assignment of the Full Development, relating to the 2031 scenario. This is contained within this Transport Assessment to inform the assessment of the Transport Cap - to finance the necessary development mitigation. The detail included within this assessment will be reviewed subsequently in the context of the applications for later phases in the context of further clarity being reached; and as such, further information relating to traffic impact, highway capacity assessment and mitigation will be provided subsequently relating to later phases of West Cambridge in the context of further clarity being provided.

Further details are provided later in the Transport Assessment.

## 1.4 Summary of the Transport Assessment

1.4.1 The Transport Assessment addresses the transport – related issues of the Development set within the context of the local planning and transport policy for Cambridge.

1.4.2 The Transport Assessment also identifies a transport strategy and a travel demand strategy for the Development which is designed to:

i) accord with the wider transport strategy for Cambridge;

ii) "manage down" the number of trips made by private car; and

iii) increase the capacity of the existing highway network where necessary.

## 1.5 Structure of the Transport Assessment

1.5.1 The structure of the Transport Assessment was scoped with the Joint Authorities in 2015 and 2016, and contains information subsequently requested following their review of the Outline Planning Application in 2016. It considers national, regional and local planning and transport policy guidance as it relates to the Development, reviews existing travel patterns in the area, and sets out mode-specific strategies and targets, aimed at promoting journeys to and from the Site on foot, by bicycle and public transport. These will be further supported by measures set out in the Framework Travel Plan which has also been submitted to accompany the application for planning permission. Both documents specifically address the following in accordance with the Scoping agreed with the key stakeholders in 2015 and 2016 – this reflects the now-archived - albeit not replaced - Department for Transport's 'Guidance on Transport Assessment' document (dated 2007):

- reducing the need to travel, especially by car;
- sustainable accessibility;
- dealing with residual vehicular trips; and
- mitigation measures for all modes of transport.

1.5.2 Junction and link capacity assessments have been undertaken for the highway network in the vicinity of the proposed development, to enable an assessment of potential impacts of trips generated by the Development on the surrounding local and trunk road network.

1.5.3 The report concludes that the Development is well-located for academic and commercial research development in accordance with national, regional and local policy. The transport strategy defined for the proposed development is set firmly within the context of the excellent location and accessibility characteristics of the Site, based on:

i) the local residential offer provided at North West Cambridge for both key worker and private accommodation - reducing the both distance travelled by the University workers, and the use of private car where non-car modes of travel can be adopted;

ii) maximising the opportunity for non-car travel, particularly by delivering an excellent public transport system; and

iii) delivering strong pedestrian and cycling connectivity with Cambridge.

1.5.4 Overall, therefore, this Transport Assessment identifies a co-ordinated, integrated and sustainable transport strategy for West Cambridge within which development can proceed, within the context of the wider transport and development strategy for the whole of Cambridge.

1.5.5 The scope of this Transport Assessment has been agreed with the highway authorities. It contains five sections split into five parts, as follows:

***Part 1 - Background***

***Section 2 - Background and Development Proposals*** *summarises the rationale and policy background supporting the Development, and provides details of the Development proposals;*

***Section 3 - Existing Conditions*** *summarises the transport network and conditions surrounding the Development for all modes of travel;*

***Section 4 - Summary of Policy Review*** *lists the existing National and Local policy, guidance and emerging strategies included in this review, and provides a summary of how the Development accords with this policy;*

***Part 2 - Development Access and Movement Details***

***Section 5 - Access and Movement Strategy*** *reviews the overall accessibility of the Site for pedestrians, cyclists, public transport users, and cars – then sets out the accessibility strategies for each mode to enhance connectivity and accessibility both on- and off-site to encourage local journeys by more sustainable modes of travel;*

***Section 6 – Pedestrian and Cycle Access Strategy*** *considers the Policy background, Travel Demand Management measures, the On-site infrastructure strategy and the Off-site infrastructure strategy with respect to Pedestrian and Cycle movement;*

***Section 7 - Public Transport Strategy*** *considers the Policy background, Route Identification and Selection, Strategy Principles, Scenario Detail, On-site infrastructure, and Information and Incentives with respect to bus movement;*

***Section 8 – Car Parking Provision, Vehicular Access and Site Layout*** *considers Parking Policy background, the Local Plan car and cycle parking standards, and Site Layout and Vehicular Access issues and proposals;*

***Section 9 - Travel Demand Management Strategy*** *summarises how vehicle trips from the Development will be "managed" down;*

***Section 10 - Construction Access Strategy*** *provides greater detail of the Construction Management Strategy, and the Construction Environmental Management Plan;*

***Part 3 - Future Performance of the network With and Without the Development***

***Section 11- Construction Traffic*** *assesses the potential Construction traffic generation from the Development, and potential effects on the surrounding network;*

***Section 12 – Summary of the Supporting Modelling work*** *reports the transport modelling, and the options tested;*

***Section 13 – Development Trip Generation*** *reports the predicted vehicle trip generation, and compares this to the Consented Development quanta;*

***Section 14 – 2021 Initial Phase – Trip Impact Analysis*** *summarises the link flow impacts as a consequence of background growth due to the local consented development, as well as the Development proposals, and reports the junction capacity assessment;*

***Section 15 – 2031 Full Development – Trip Impact Analysis*** *summarises the link flow impacts as a consequence of background growth due to the local consented development, as well as the Full Development proposals, and reports the junction capacity assessment;*

***Part 4 - Additional Management Measures***

***Section 16 - Further Travel Management Measures*** *summaries the proposed measures to manage any transport effects of the Development;*

***Section 17 – The 2021 Transport Strategy*** *summaries the proposed measures to manage the transport effects of the Development in 2021;*

***Section 18 – The 2031 Transport Strategy*** *summaries the proposed measures to manage the transport effects of the Development in 2031;*

***Part 5 - Conclusions***

***Section 19 – Conclusions*** *completes the Transport Assessment.*

# *PART 1 BACKGROUND*

*Part 1 of the Transport Assessment contains the following sections:*

**Section 2 - Background and Development Proposals**

**Section 3 - Existing Conditions**

**Section 4 - Summary of Policy Review**

# 2 Background and Development Proposals

## 2.1 Introduction

2.1.1 This section summarises the site location and existing land uses on-site. Details of the Development proposals are also outlined.

## 2.2 Site Location

2.2.1 The Development is located to the west of the existing conurbation of Cambridge, as shown in Figures 2.1 and 2.2, and remains within the site boundary of the extant 1999 West Cambridge Development masterplan approval.

2.2.2 The centre of the Site is approximately 2km west of the City Centre of Cambridge – measured from JJ Thomson Avenue to the junction of Sidney Street and St Andrews Street. The strategic location of the Development is shown in Figure 2.1.

2.2.3 The Site is located immediately to the east of the section of the M11 motorway between Junctions 12 and 13. The site is bordered to the north by Madingley Road (the A1307 - which routes between M11 Junction 13 and the centre of Cambridge) and to the east by Clerk Maxwell Road. Immediately to the south, the Coton Path is aligned along the southern boundary – beyond that is agricultural land.

2.2.4 The 290 space University Park-and-Cycle car park is located in the north-eastern corner of the Site, and is subject to permit control and managed with the other Estate car parks. A multi-storey car park will replace this at-grade facility as part of the proposals, and the Park and Cycle spaces would be provided elsewhere within the Development.

2.2.5 The Site lies within the administrative area of Cambridge City Council.

## 2.3 Extant Development Background

### Development Quanta

2.3.1 West Cambridge is currently a mixed-use development with academic and commercial research uses, with associated facilities.

2.3.2 Figure 2.2 highlights the site plan in the context of the surrounding area. It is bordered to the north by Madingley Road, the west by the M11 motorway, the east by the existing residential dwellings along Clerk Maxwell Road and a recreational ground, and to the south by farmland.

2.3.3 Approval to the masterplan was originally granted in 1999 (planning application reference C/97/0961/OP), and subsequently reviewed in 2004. The Development has subsequently progressed with the elements of the original consent being delivered at different rates. The consented and delivered development mix is shown in Table 2.1.

Table 2.1: Development Area Summary

| Land-Use (GFA) | Development pre-1997 | Outline Consent 1999 | Development Completion | Delivery completion (%) | Remaining Development |
|---|---|---|---|---|---|
| Academic Research ($m^2$) | 44,000 | 73,000 | 88,257 | 75.4 | **28,743** |
| Research Institute ($m^2$) | 13,500 | 24,000 | 15,402 | 41.0 | **22,098** |
| Commercial Research ($m^2$) | 13,972 | 41,000 | 24,984 | 45.4 | **29,988** |
| Shared Facilities ($m^2$) | 0 | 18,000 | 1,671 | 9.3 | **16,329** |
| Sports ($m^2$) | 0 | 10,120 | 6,060 | 59.9 | **4,060** |
| Residential ($m^2$) | 680 | 10,000 | 10,680 | 100.0 | **0** |
| **Total ($m^2$)** | **72,152** | **176,120** | **147,054** | **59.2** | **101,218** |
| **Car Parking** | **3,150 spaces** | | **1,571 spaces** | | |

2.3.4 In addition to the formal spaces, further uncontrolled car parking is available locally on-road – including along the Western Access Road (currently being subjected to car parking prohibition), and off-site along Clerk Maxwell Road, where approximately 85 - 90 car parking spaces are provided.

2.3.5 The car parking space provision consented in 1999 reflected the prevailing earlier car-dominated access and movement philosophy, and is considerably in excess of what would be considered appropriate now.

## Transport Assessment Work submitted to Support the Extant Consent

2.3.6 Hannah, Reed and Associates (referred to as "Hannah Reed" from here) prepared the Transportation Study to support the University of Cambridge's original 1997 West Cambridge Development planning application. This was subsequently approved by the Joint Authorities – Cambridge City Council, the local planning authority, Cambridgeshire County Council, the local highway authority, and the strategic highway authority, the Highways Agency (now referred to as Highways England).

2.3.7 The vehicle flows assessed in 1999 as accruing to the consented West Cambridge Development are significantly higher than would be considered appropriate now, reflecting the historic high car parking provision, the previous car-dominated transport strategy, the then-peripheral development location, and the associated higher vehicle trip generations.

## Section 106 Commitments

2.3.8 To mitigate the transport impacts of the West Cambridge Development predicted in 1999, the University of Cambridge completed a Section 106 Agreement.

2.3.9 The series of measures and triggers identified within this Agreement are reported in detail in Appendix 2.1

2.3.10 The majority of the necessary highway mitigation measures to mitigate vehicular impact have been implemented. The relatively minor measures outstanding include:

i) a traffic signal enhancement of the Madingley Road / Northampton Street / Queen's Road Roundabout – was deferred at the specific request of Cambridgeshire County Council; and

ii) a second mitigation of the Madingley Road / JJ Thomson Avenue priority junction – installing a traffic signal enhancement – had not been provided as the stated development trigger quantum has just been reached with the recent occupation of the Chemical Engineering and Biotechnology Building. However, and as discussed and agreed with the Joint Authorities the full signalisation of this junction has been deferred awaiting the conclusions of this West Cambridge Masterplan Review (and indeed, until CCC has determined their City Deal proposals). Notwithstanding, the associated toucan crossing has already been delivered.

2.3.11 Other physical mitigation measures remain outstanding for various reasons - including development triggers not having been reached, or other undelivered measures being linked to the requirement. Some of the undelivered measures were not implementable as they are outside of the University's land ownership and the relevant freeholders were not party to the original Section 106 agreement. Discussions have taken place with neighbouring landowners but commitment to delivery cannot be secured by the University at this time. Notwithstanding, the measures identified in Section 6 would deliver an equivalent facility responding to this requirement.

## 2.4 Development Vision

2.4.1 The University aspires to develop the Site into a high quality academic and research campus, and to review the existing masterplan to deliver a greater density of development to the same high levels of quality.

2.4.2 The University has a vision for the Site that aspires to provide a high quality urban environment that is well integrated to the city centre and surrounding suburbs, as well as emerging developments such as the North West Cambridge development. The vision comprises five themes which collectively provide the purpose of the Proposed Development, to:

1. optimise the amount of development on Site, supporting the City and Region as a world leader in research and development.

2. support the commercialisation of knowledge through entrepreneurship and collaboration with industry.

3. create and sustain a high quality place by transforming the physical and social environment for Site users and neighbours across the City.

4. deliver adaptable and efficient space to support viability and long term value creation.

5. deliver sustainable development, proactively investing in the quality of place and integration within the City.

## 2.5 Aims and Aspirations

2.5.1 As explained above, the University already has a proud reputation throughout the City for promoting its travel demand management strategy, and has always been proactive in delivering improvements to it. This philosophy will be continued at the Development, which will have significantly different travel characteristics to such typical developments elsewhere in the United Kingdom. This will be as a result of the following:

i) controlling parking on-site at the academic sites by using the University's motor Proctorial control;

ii) key workers being able to live in the University's North West Cambridge Key Worker housing in close proximity not only to their place of work but also requisite community and leisure facilities. Indeed, the market housing on North West Cambridge could accommodate commercial research workers;

iii) the University delivering a Framework Travel Plan across West Cambridge, with an appointed Transport Coordinator – a University-appointed person responsible for delivering Travel Planning. This will be supported by Individual Travel Plan Coordinators being appointed by all occupiers of the Development;

iv) the University-related commercial research facilities, with nearby residential accommodation, demonstrably having far lower car trip generation rates than equivalent commercial science park facilities;

v) academic research land uses within the Development having limited car parking and a lower car-based trip generation than commercial research land uses.

2.5.2 An effective travel demand management strategy would form a fundamental part of minimising car impact on the surrounding highway network, and maximising sustainable modes of travel. At the heart of delivering this travel demand management strategy is this Framework Travel Plan and the subsequent Individual Travel Plans.

## 2.6 Development Proposals

2.6.1 An outline planning application, the subject of this Transport Assessment, is to be submitted in 2016 to support the further densification of development at the West Cambridge site, above that already approved under the 1999 outline consent. This is in accordance with the Proposed Submission document of the Cambridge Local Plan 2014.

2.6.2 The new application will seek permission for additional floorspace, comprising commercial research floorspace, along with Academic research providing a mix of teaching and research space.

2.6.3 The new proposals seek to densify the existing site beyond the previous outline consent, as highlighted within Policy 18: West Cambridge Area of Major Change, in the Proposed Submission document of the Cambridge Local Plan 2014.

2.6.4 The Proposed Development will achieve the Development Vision through a series of parameter plans and a broadly defined description. This will allow flexibility in the description of the Development. This reflects a key aim of the Proposed Development, to build in flexibility into the planning consent, so that the University can respond to changes in academic and commercial demand over the next twenty years or so, without needing to revisit the outline planning permission.

2.6.5 The Proposed Development comprises five parameter plans as follows:

- Land use;
- Building zones;
- Building heights;
- Access and movement; and
- Open space and landscape.

2.6.6 The Access Parameter Plan is appended in Appendix 2.2

## Full Development (2031)

2.6.7 The Development incorporates both additional D1 academic research, and B1 commercial research, among other land uses, selected to respond to the needs of the University, and to densify the use of the Development. The University is seeking the assessment as a worst case of the following quanta of each land-use for the Development at West Cambridge specified in Table 2.2. This additional development increases the total floor area from 248,272m$^2$ to 500,280m$^2$.

Table 2.2: Total Existing and Proposed Full Development - Land Use Mix

| Land-Use (GFA) | Existing Implemented Development (m$^2$) [1] [2] | 1999 Consent Not Implemented [3] (m$^2$) | Existing Devt to be Demolished (m$^2$) | Proposed Additional Development to 2031 (m$^2$) | TOTAL FULL DEVT (2031) (m$^2$) |
|---|---|---|---|---|---|
| Academic Research (m$^2$) | 102,259 | -27,576 | -44,350 | 200,000 | **257,909** |
| Commercial Research and Research Institute (m$^2$) | 40,386 | 52,086 | | 170,000 | **210,386** |
| Nursery (m$^2$) | 650 | | | 2,500 | **3,150** |
| Shop, Café Restaurant, Pub - A1-A5 (m$^2$) | | | | 1,000 | **1,000** |
| Assembly and Leisure | 6,060 | -4,060 | | 4,100 | **10,160** |
| Residential (m$^2$) | 10,680 | | -680 | | **10,000 (206 units)** |
| Ancillary Infrastructure (data centre, energy centre) | 4,515 | | -2,540 | 5,700 | **7,675** |
| **Total (m$^2$)** | **164,550** | **83,722** | **-47,570** | **383,300** | **500,280** |
| **Car Parking (spaces)** | **3,150** | | | **4,390** | |

1. This includes pre-1999 development plus 1999 consent implemented floorspace (as of September 2015)

2. Do Something Floorspace totals are the sum of Existing (column 1), Demolished (column 3) and Proposed (column 5)

3. Existing Development column plus the 1999 Consent Not Implemented column equates to the 'Do Minimum' scenario (i.e. total floorspace on site 248,272m$^2$).

4. The "Academic Research" total of 102,259m$^2$ includes some Shared Facilities areas

2.6.8 The Retail proposal is ancillary use, perceived to be formed by small University-shop type outlets vending immediate necessities – stationery, snacks, drinks etc – to reduce the need for off-site travel to respond to these needs. As no retail car parking would be provided, within the context of the immediately adjacent retail offer at North West Cambridge, there would be minimal, if any, off-site vehicle trip attraction.

2.6.9 Similarly, the Nursery use is also considered to be ancillary, predominantly catering for the identified daytime child-care needs of on-site occupiers, and to reduce the need to travel off-site during the working day.

2.6.10 The Proposed Development would be constructed in phases depending on market demand and would likely occur over a 15-year period. The assumed opening date for all construction to be complete and the Proposed Development to be fully built-out is 2031.

## Initial Phase of Development (2021)

2.6.11 As an Initial Phase, the University is seeking agreement to following additional quanta of each land-use at West Cambridge specified in Table 2.5. When considered in the context of existing areas to be demolished, this approximately equates to a further 40,000m$^2$ of academic and commercial development to that already consented.

2.6.12 As part of this Initial Phase, the University is seeking consent to a total of 2,571 car parking spaces. This provision is 579 spaces lower than the 1999 Consented level of car parking spaces.

Table 2.3: Total Existing and Proposed Initial Phase of Development - Land Use Mix

| **Land-Use (GFA)** | **(m$^2$)** |
|---|---|
| Academic Research (m$^2$) | 168,259<br>(+ 66,000) |
| Commercial Research and Research Institute (m$^2$) | 92,386<br>(+52,000) |
| Nursery (m$^2$) | 1,900 |
| Shop, Café Restaurant, Pub - A1-A5 (m$^2$) | 350 |
| Assembly and Leisure | 6,060 |
| Residential (m$^2$) | 10,680 |
| Ancillary Infrastructure (data centre, energy centre) | 7,675<br>(+ 3,160) |
| **Total (m$^2$)** | 287,310 |
| **Car Parking (spaces)** | **2,571** |

(Numbers in parenthesis reflect the proposed changes to the existing land uses on West Cambridge)

## Design principles

2.6.13 The Development has been formulated to ensure future flexibility in delivering the transport strategy throughout the implementation process, and reflects the following key principles for access and movement:

i) good permeability and accessibility for non-motorised users, particularly pedestrians and cyclists – refer to Section 6 for more details;

ii) enhanced connectivity for pedestrians to surrounding existing areas, including to local recreational footpaths – refer to Section 6 for more details;

iii) excellent accessibility to public transport through the provision of bus routes through the Site – refer to Sections 6 and 7 for more details;

iv) non-primary vehicular routes – the ability to design these as shared surface with speeds controlled to 20mph or less as set out in the "Manual for Streets" would be established with reference to the bus strategy – refer to Section 8 for more details; and

v) good access for academic and commercial research to bus routes and transport nodes to increase potential patronage – refer to Sections 6 and 7 for more details.

2.6.14 The Transport Assessment includes further details of the Development proposals and transport implications.

## 2.7 Site Access

### Vehicular Access

2.7.1 Vehicular access to the West Cambridge site is from Madingley Road. There are currently two main vehicular access points to the site:

- at JJ Thomson Avenue, by a ghost island priority junction; and
- at High Cross – the previous priority junction has been upgraded to a traffic light controlled junction as part of the North West Cambridge site infrastructure.

2.7.2 To the east of the site, a further priority junction is formed at Clerk Maxwell Road. Clerk Maxwell Road provides vehicle access to the existing 290 space Park and Cycle facility located to the north-east of the Site, and several pedestrian and cycle accesses to the site.

2.7.3 There is a requirement within the Section 106 Agreement of the Extant West Cambridge Section outline permission of 1999 to upgrade the existing JJ Thomson Avenue access to a traffic signal controlled junction with a controlled pedestrian and cyclist toucan crossing. Whilst this requirement has been triggered in 2016 with the occupation of the Chemical Engineering and Biotechnology Building, as discussed and agreed with the Joint Authorities the full signalisation of this junction has been deferred awaiting the conclusions of this West Cambridge Masterplan Review (and indeed, until CCC has determined their City Deal proposals which may affect Madingley Road). Notwithstanding, the toucan crossing associated with this signalisation scheme has been delivered.

2.7.4 As shown on Figure 2.3, there are four main roads on site:

- JJ Thomson Avenue;
- Charles Babbage Road;
- High Cross Road; and
- the Western Access Road.

2.7.5 These would all be retained and used as the principal means for movement to and across the Site. Additional secondary roads would be constructed to increase connectivity across the Site. All existing and new vehicle routes and accesses would also allow for pedestrian and cycle movements.

2.7.6 As detailed further in Section 8, vehicle access will be provided to the Development by a series of existing, enhanced and new vehicular access points off Madingley Road as shown on Figure 2.3. These will be delivered through the duration of the Development, to a programme to be determined. These access points are:

i) the existing traffic signal controlled High Cross junction - which could be subjected during development to an enhancement to include bans on the right turns associated with the High Cross arm to and from Madingley Road, with these trips reassigned to JJ Thomson Avenue;

ii) the existing JJ Thomson Avenue priority junction – which could be subjected during later Post - Phase 1 phases to a traffic signal controlled upgrade;

iii) the existing Clerk Maxwell Road priority junction could be used to access a potential enhanced car park facility at the location of the park and cycle car park (forming one possible access solution for this future car park). This junction could be subject to a potential traffic signal control enhancement; and

iv) a new traffic signal controlled, restricted movement (right in / left out), access junction onto Madingley Road at the western end of the site, which would connect to the Western Access Road. This would be delivered during later - Post-Phase 1 - phases. This junction would intercept strategic traffic movements between the site and the west, including from the M11. This early vehicle interception would help to maintain conditions at other local junctions further east – such as High Cross.

2.7.7 In addition, a further existing priority junction between JJ Thomson Avenue and High Cross, currently closed, would provide limited movement service access-only to the future occupiers immediately adjacent to Madingley Road.

## Pedestrian and Cyclist Access

2.7.8 As detailed further in Section 6, pedestrian / cyclist access to the Development and the surrounding area will be by a series of connections to the local area via:

i) the existing traffic signal controlled Madingley Road / High Cross junction, assisted by the existing toucan crossing provision;

ii) the existing Madingley Road / JJ Thomson Avenue priority junction, assisted by the toucan crossing;

iii) Clerk Maxwell Road, assisted by the proposed informal crossing adjacent to the Madingley Road;

iv) the existing access to the Vet School site from Madingley Road (to be enhanced to provide service-only access);

v) by regular connections to the existing Coton path to the south – connecting to the west - across the M11 by the existing footbridge, providing a connection towards Coton and Madingley – and the east – to Clerk Maxwell Road, Wilberforce Road and towards Adams Road and the City; and

vi) a second east-west pedestrian and cycle route would be formed, accessing from the existing entrance approximately halfway along Clerk Maxwell Road, continuing westwards across JJ Thomson Avenue and through a new open space corridor linking up with High Cross Road.

2.7.9 The Access is summarised on the Access Parameter Plan, contained in Appendix 2.2.

## 2.8 Surrounding Development

2.8.1 There are other major consented developments in the vicinity of the Development which are planned to be implemented simultaneously. These are shown on Figure 2.2.

### Darwin Green

2.8.2 Darwin Green (formerly known as the NIAB Site) is an area located to the north-east of Huntingdon Road between Girton Road and Oxford Road, and is generally referred to by the name of the current occupant (the National Institute of Agricultural Botany - NIAB).

2.8.3 Cambridge City Council granted outline planning permission for the Initial Phase of development including an access road and 187 homes on the Darwin Green 'frontage land' adjoining Huntingdon Road in 2004, and construction commenced in 2010.

2.8.4 A further application was submitted for the area between Histon Road and Huntingdon Road for a further 1,593 homes, a new school, community facilities, local shops, roads, footpaths and cycleways. This application was considered by the Joint Development Control Committee and approved in July 2010.

2.8.5 Reserved Matters Applications were submitted in September 2015 for 114 dwellings and local centre, and in February 2016 for first housing phase (known as BDW1) including 173 dwellings with associated internal roads, car parking, landscaping, amenity and public open space. Both these applications were approved in May 2016.

2.8.6 Access to Darwin Green would be gained from Huntingdon Road to the south-west, and from Histon Road to the east. The vehicular accesses to Darwin Green are via new signal controlled junctions to accommodate the forecast increase in demand onto the local highway network, whilst enabling priority for the proposed Guided Bus route and other bus services.

### North West Cambridge Development

2.8.7 North West Cambridge Development is a mixed-use extension to Cambridge, covering an area of 150 hectares, also promoted by the University of Cambridge. It is bounded by the M11, Madingley Road and Huntingdon Road, and is located immediately opposite West Cambridge.

2.8.8 North West Cambridge is The University of Cambridge's response to the increasing need to provide affordable housing for both staff and graduates, and also the growing demand for more research facilities within Cambridge. The Development will consist of 1,500 University Key Worker homes, accommodation for 2,000 post-graduates, and the construction of 1,500 private dwellings. In addition to the planned residential development, North West Cambridge will also provide up to 100,000m$^2$ of academic / commercial research space, as well as general community and leisure facilities - including a hotel, primary school, and care home.

2.8.9 A resolution to grant Planning Permission was passed in August 2012, and formalised in February 2013 with the signing of a Section 106 agreement. Construction of Phase 1 commenced in August 2014, and is expected to continue through to 2017. The primary school on North West Cambridge opened in September 2015, occupation of the Phase 1 residential development will commence in 2017.

2.8.10 Vehicular access is provided at three locations: two are situated to the north of the site, to Huntingdon Road; the other access is to the south of the site via Madingley Road – forming the northern arm of the proposed Madingley Road / West Cambridge / High Cross Access. The Development will further provide new, quality, strategic cyclepath links aligned east-west and north-south through the Development, as well as new bus services to link to West Cambridge, Darwin Green, and the proposed Cambridgeshire Science Park Rail station.

## West Cambourne Development

2.8.11 The West Cambourne Development was consented by South Cambridgeshire District Council in January 2017 for 2,350 dwellings, and other limited uses including retail, employment, community and leisure facilities and education. Contributions were offered to fund enhancements to public transport facilities between Cambourne and the M1 Junction 13 to reduce bus transit times.

## Other Strategic Developments

2.8.12 Discussions with the Highways England and Cambridgeshire County Council have identified the strategic residential developments that need to be considered as part of this assessment. The Developments below have been consented, or are likely to be in the future. Prospective sites have not been included. These sites are summarised in Table 2.4, with further details contained in Appendix 2.3.

Table 2.4: Strategic Development - Residential

| Development | Growth 2011 – 2031 |
|---|---|
| Clifton Road Industrial Estate | 550 |
| Clay Farm and Showground | 2,165 |
| North West Cambridge (within SCDC area) | 1,155 |
| North West Cambridge (within City Council area) | 1,850 |
| NIAB/Darwin Green Main | 1,593 |
| NIAB Frontage | 187 |
| Eastern Gateway, Soham | 600 |
| Land between Huntingdon Road and A14 (NIAB1 or Darwin Green 2 and NIAB) | 1,000 |
| North Ely, Ely | 2,960 |
| Cambridge East (North of Newmarket Road) | 1,300 |
| Cambridge East (North of Cherry Hinton within SCDC area) | 420 |
| Cambridge East (North of Cherry Hinton within City Council area) | 780 |
| Trumpington Meadows (Cambridge Southern Fringe – within SCDC area) | 615 |
| Trumpington Meadows (Cambridge Southern Fringe - within City Council area) | 558 |
| Cambourne | 499 |
| Northstowe Phase 1 | 1,500 |

| Development | Growth 2011 – 2031 |
|---|---|
| Northstowe Phase 2 | 1,945 |
| Waterbeach New Town | 2,050 |
| Born Airfield New Village | 1,360 |
| Cambourne West | 1,200 |
| Alconbury Weald | 3,485 |
| Eastern Expansion, St Neots | 2,570 |
| Eastern Expansion, St Neots (Loves Farm East) | 1,092 |
| Wyton Airfield and Wyton on the Hill | 2,540 |
| Bearscroft Farm | 753 |
| Small Scale Development - various (within City Council area) | 4,760 |
| Small Scale Development - various (within SCDC area) | 3,916 |
| Windfall Development – not determined (within SCDC area) | 4,152 |
| Windfall Development – not determined (within City Council area) | 2,258 |
| **Total** | **49,813** |

2.8.13 These discussions have further identified other strategic employment developments. These sites are summarised in Table 2.5:

Table 2.5: Strategic Development – Employment (Jobs)

| Development | Growth 2011 - 2031 |
|---|---|
| Wider City Centre Area | 5,786 |
| Station Area | 1,558 |
| Sainsbury Laboratory | 150 |
| Addenbrooke's | 5,210 |
| New Museums | 232 |
| City House | 299 |

| Development | Growth 2011 - 2031 |
|---|---|
| The Edinburgh Building, Shaftsbury Road | 2,411 |
| Northstowe | 5,817 |
| Cambourne | 2,304 |
| Granta Park | 2,592 |
| Hinxton Hall | 831 |
| Babraham | 831 |
| Landbeach | 1,473 |
| West Cambridge and North West Cambridge (City Council area) | 3,873 |
| West Cambridge and North West Cambridge (SCDC area) | 2,234 |
| Northern Fringe (City Council area) | 2,411 |
| Northern Fringe (SCDC area) | 1,136 |
| ARM / Capita Park (City) | 396 |
| Others (SCDC) | 1,767 |
| Waterbeach New Town | 1,367 |
| Bourn Airfield | 2,153 |
| Small Scale Employment (<150 jobs) | 349 |
| **Total** | **45,180** |

2.8.14 Further details of each of the Development quanta assessed within this Report are contained in Sections 12 onwards.

## 2.9 Area-Wide Travel Demand Management Strategy context

2.9.1 Developer-funded infrastructure throughout the Cambridge area will continue to complement existing and proposed walking, cycling and public transport facilities which, in addition to LTP-funded schemes, will help to make more complete networks.

2.9.2 The proposed Development is also considered within the context of a series of transport infrastructure schemes and travel demand management measures being promoted through this region. These are considered in greater detail below.

## Long Term Transport Strategy

2.9.3 The Long Term Transport Strategy (LTTS) was consulted upon in 2014. It forms part of the Cambridgeshire Local Transport Plan, and identifies major infrastructure requirements needed to address the existing capacity constraints of Cambridgeshire's transport network, and the further infrastructure that is required to accommodate the transport demands associated with the planned growth.

2.9.4 The eight objectives of the Long Term Transport Strategy are:

- to ensure that the transport network supports sustainable growth and continued economic prosperity;
- to improve accessibility to employment and key services;
- to encourage sustainable alternatives to the private car, including rail, bus, guided bus, walking and cycling, car sharing and low emission vehicles;
- to encourage healthy and active travel, supporting improved well-being;
- to make the most efficient use of the transport network;
- to reduce the need to travel;
- to minimise the impact of transport on the environment; and
- to prioritise investment where it can have the greatest impact;

2.9.5 The LTTS proposals identified measures that are promoted within the City Deal - of interest local to West Cambridge:

- to provide direct, segregated, high-quality pedestrian / cycle links to the west of Cambridge potentially aligned alongside the bus route identified within the City Deal;
- a more comprehensive network of cycling and walking links to and from key destinations around the county from Cambridge;
- bus priority measures on the A1307, A428 and A1303 and proposals for additional park and ride capacity;
- the LTTS further supports the provision of additional capacity provided by the A14 Huntingdon – Cambridge, and identifies that capacity enhancements along the M11 should be considered – including enhanced junction capacity, and a Smart Motorway (hard shoulder running) scheme.

## Greater Cambridge City Deal

2.9.6 The Greater Cambridge City Deal was promoted by Central Government, the local councils, businesses and the University of Cambridge, and aims to secure hundreds of millions of pounds of investment in the transport infrastructure, housing and skills needed to see future economic growth for the areas surrounding Cambridge City and South Cambridgeshire District Councils. The transport proposals are shown indicatively on the plan included in Appendix 2.4.

2.9.7 The delivery of the City Deal has been separated across 3 tranches. 'Tranche 1' will deliver transport improvements in the five years from April 2015, and aims to be completed by 2020. 'Tranche 2' and 'Tranche 3'' focus more on providing mitigation measures and long-term initiatives which will result from the increased pressure on the transport network. These are expected to be delivered after 2025.

2.9.8 Of direct relevance to West Cambridge - albeit the route around West Cambridge has not been confirmed yet:

i) a segregated Orbital bus route will be delivered in the five years from April 2015. This segregated Orbital bus route will follow between the employment in the north and north-west of the city, the new residential communities to the west of Cambridge, and the Addenbrooke's Biomedical Campus to the south, avoiding the congested city centre. This scheme will deliver significant capacity for public transport; and

ii) improvements to west to east movements along Madingley Road are proposed. This includes the provision of a new segregated busway between the west – via Madingley Mulch Roundabout – and the east – to Grange Road.

2.9.9 Associated with these new route proposals are further proposals that are currently being considered for travel demand management measures to assist changes in travel patterns away from the car. These include:

i) investment by bus operators in new routes and services, taking advantage of the proposed peak-time congestion points to remove traffic from key bus routes (see below);

ii) enhanced pedestrian and cyclist infrastructure improving links in, across and to Cambridge;

iii) peak time congestion control points to create a low-traffic zone for only buses, cyclists, local taxis and emergency vehicles;

iv) a workplace parking levy, charging employers for the provision of commuter car parking spaces;

v) on-street car parking controls, introducing residents' parking zones to ensure workplace car parking is not displaced;

vi) Smart transport technology to assist travellers making smart travel choices – including 'digital way finding', real-time traffic alerts and intelligent traffic signals at junctions to provide priority for buses and cyclists;

vii) expand on the existing travel planning service to assist businesses, schools and individuals to adapt to the changing travel options; and

viii) improvements to public space, and by reducing congestion, improvements to air quality.

## Cambridgeshire Guided Busway

2.9.10 The Cambridgeshire Guided Busway scheme running from Huntingdon to Cambridge, linking the strategic development areas at Longstanton / Oakington (Northstowe) is an important element in the sustainable growth strategy. Since the opening of this scheme in 2011, it has achieved its predicted passenger levels. This scheme has the ability to continue to assist further in reducing congestion by extracting City-destined car-borne trips from the network, and re-moding these trips to the Cambridgeshire Guided Busway - some of the future proposals concerning the busway involve extending the existing service to the new Cambridgeshire Science Park Rail station and further afield to Peterborough.

### A14 Cambridge - Huntingdon Improvement Scheme

2.9.11 As an essential part of a strategy to accommodate the large numbers of vehicle movements associated with strategic development across the region, Highways England published their proposals for the A14 between Huntingdon and Cambridge. This planned upgrade will relieve congestion and help to connect communities along the A14 corridor. As shown on the summary plan in Appendix 2.5, this scheme consists of:

- widening a section of the A1 trunk road between Brampton and Alconbury;
- removing the road viaduct over the railway at Huntingdon;
- Huntingdon Town Centre Improvements;
- a new bypass to the south of Huntingdon;
- detrunking the A14 between Ellington and Swavesey;
- widening the carriageway on the A14 between Swavesey and Girton;
- a new local access road;
- improvements to the Cambridge Northern Bypass; and
- junction improvements.

2.9.12 These proposals were the subject of examination through the Development Consent Order process in 2015, the Secretary of State published a positive decision in May 2016.

2.9.13 Construction commenced in 2017, and will be completed in 2021.

### Other measures

2.9.14 Other schemes and measures being developed include:

i) extension of demand management measures in Cambridge; and

ii) the upgrade of the Felixstowe to Nuneaton via Ely rail line for freight connections to extract heavy goods vehicle movements from the highway network.

2.9.15 Further details are provided within the Policy Section (Section 4) of this Transport Assessment.

## 2.10 Pre-application Consultation and Scoping

2.10.1 Peter Brett Associates has worked in close co-operation with Cambridge City Council, Cambridgeshire County Council and Highways England through the Local Plan Inquiry process, and through the development of these proposals.

2.10.2 In addition to meeting the planning and highway authorities, the University, supported by Peter Brett Associates, has attended a series of meetings and presentations to various groups and organisations including:

i) the West and North West Cambridge Cycling Group;

ii) the West Cambridge Community Group; and

iii) various residents' associations and groups.

2.10.3 Initial discussions have also been held with the Traffic Managers of both of the main local bus operators – Stagecoach Cambridge and Go Whippet, to discuss the potential public transport strategy for the Site, as set out in Section 7. These discussions further involved the County Council's Public Transport Engineers.

### Scoping

2.10.4 As agreed with Highways England and Cambridgeshire County Council, this Transport Assessment considers the following aspects:

- Introduction
- Background and Development Proposals;
- Existing Conditions and Future Baseline Conditions;
- Summary of Policy Review;
- Development Access and Movement Strategy broken down into the following elements:
  - Access and Movement Strategy;
  - Pedestrian and Cycle Access Strategy;
  - Public Transport Strategy;
  - Site Layout, Vehicular Access and Parking Provision;
  - Travel Demand Management Strategy;
- Future Person Trip Rate, Distribution, Assignment and Mode Share
- Construction Access Strategy;
- Traffic and Junction Impact Analysis;
- Mitigation Strategy; and
- Conclusions.

2.10.5 In addition to Scoping, Transport Review Meetings have been and continue to be held with representatives from the County and City Councils and Highways England on a regular basis. These discussions have helped to inform the derivation of this document.

## 2.11 Assessment Methodology and Adaptive Phased Approach to Mitigation

2.11.1 The principles of the proposed strategy to address transport issues associated with West Cambridge have been discussed and agreed with the Joint Authorities. This is set out below, and is summarised as incorporating:

i) a graduated approach – the assessment process reflecting current transport planning policy where travel demand management measures are introduced first, followed by any necessary highway infrastructure measures to mitigate the residual traffic impact; as well as

ii) as an adaptive approach – where, to maintain future flexibility, the proposed mitigation for later phases responds to the quanta of development within the individual phase proposals, the timescales for the delivery, changes in future travel behaviour patterns, emerging transport policy, and the current uncertainty relating to the area-wide transport enhancement proposals delivered by others.

2.11.2 An outline planning consent is being sought by the University to allow development to be implemented incrementally over a number of years, set within the context of the allocated status for this Site.

2.11.3 The transport strategy for West Cambridge is therefore being brought forward against a background of uncertainty in relation to the area-wide transport enhancement proposals. Further assessment work will be provided to support later phases of the Proposed Development once further details of these transport improvement proposals have been confirmed.

2.11.4 As the outline planning application will be submitted prior to the definition of these wider improvements schemes – e.g., for the A14, for the M11, and for City Deal - as discussed and agreed with the Joint Authorities (Cambridge City Council - the local planning authority, Cambridgeshire County Council - the local highway authority, and Highways England, the strategic highway authority):

i) this Transport Assessment provides a detailed assessment of the impact of an indicative Initial Phase of development, relating to the 2021 scenario;

ii) a detailed mitigation strategy is developed to respond to this indicative Initial Phase of development in the context of the previously consented development;

iii) reflecting current transport policy, an Adaptive Phased Approach will be adopted relating to the provision of mitigation measures to allow the mitigation strategy to respond to the quanta of development within the individual phase proposals, the timescales for delivery, changes in future travel behaviour patterns, emerging transport policy, and the current uncertainty relating to the transport enhancement proposals;

iv) to support this, further, less detailed, information relating to the traffic impact, highway capacity assessment and mitigation relating to the later 2031 phase of West Cambridge has been provided to inform the assessment of the Transport Cap to finance the necessary development mitigation; as such, further information relating to traffic impact, highway capacity assessment and mitigation will be provided subsequently relating to later phases of Development in the context of further clarity relating to these proposals.

## 2.12 Summary of the Methodology

### Initial assessment work

2.12.1 Initial assessment of the transport impact of West Cambridge was undertaken using Cambridgeshire County Council's land use and transport model, the Cambridge Sub Regional Model (CSRM).

2.12.2 Following a review of the model results with the Joint Highway Authorities, it was concluded that the CSRM was not the most appropriate manner in which to assess West Cambridge traffic impact as being an area-wide strategic transport model, it was of insufficient sensitivity to assess impact across the local network accurately.

2.12.3 Within the context of an assessment of an Initial Phase of development in 2021 with relatively small development impact, it was agreed that a more local approach to the assessment of impact was appropriate – and would provide a robust assessment due to the absence of assessment of the reassignment effects.

2.12.4 This modelling work has been extended to enable conditions to be considered relating to later phases of West Cambridge (i.e., for 2021 onwards), to inform the assessment of the Transport Cap to finance the necessary development mitigation. The detail included within this assessment will be reviewed subsequently in the context of the applications for later phases in the context of further clarity being reached.

2.12.5 The following methodology was therefore agreed with the Joint Authorities, based upon Peter Brett Associates' Transport Modelling.

## 2016 Base Year Methodology

2.12.6 The 2016 Base Year Scenario is being prepared for the purposes of the Environmental Impact Assessment, and to advise the existing conditions across the network.

2.12.7 The 2016 vehicle flows will be derived across the network from traffic count surveys, from a series of sources, including inter alia:

i) traffic count surveys undertaken along Madingley Road in October 2016 as part of the West Cambridge Development Annual Monitoring (commissioned by the University);

ii) the traffic count survey - including automatic traffic counts and manual part-classified junction turning counts - undertaken across the area in October 2016 as part of this West Cambridge Development (commissioned by the University following completion of the roadworks along Madingley Road);

iii) traffic count survey data provided by Cambridgeshire County Council; and

iv) traffic count survey data from Highways England's TRADS database.

2.12.8 The flows from West Cambridge are assessed with reference to observations at two typical departmental buildings at West Cambridge:

i) the first, at the 4,464m$^2$ CAPE Building in March 2010, was used in the earlier approved assessment of movements to the adjacent North West Cambridge;

ii) the second was taken at the 10,705m$^2$ Department of Materials Science and Metallurgy in October 2016, and was commissioned to confirm that the observations were reasonably consistent across the Estate.

2.12.9 Only where necessary, growth factors from the Department for Transport's TEMPRO model will be used to convert traffic survey data older than 2016 to the necessary common year.

## 2021 Initial Phase Assessment Methodology

2.12.10 The 2021 Assessment considers both the Do Minimum and Do Something scenarios.

2.12.11 Two Do Minimum assessments are considered for each scenario:

i) for the Transport Assessment - considering the Future Year flow scenario assuming the delivery of consented development across Cambridge Sub-Region – including that consented at West Cambridge; and

ii) for the Environmental Impact Assessment - considering the flow scenario assuming the existing development at West Cambridge (i.e., with no further development within the terms of the Extant Consent).

2.12.12 The Do Something assessment in each scenario is identical for both the Transport Assessment and Environmental Impact Assessment.

2.12.13 Both the Consented (Do Minimum) and Initial (Do Something) Phase of West Cambridge Development - identified in Tables 2.1 and 2.3 - are assumed to be completed by 2021.

2.12.14 The 2016 network traffic flows will be inflated by the vehicle trips identified by Peter Brett Associates' Spreadsheet Model arising from the consented strategic development delivered by 2021 assigning along each link.

2.12.15 The methodology used to evaluate the transport impact of the forecast movements generated by the Initial Phase of Development for the Transport Assessment is influenced by the Consented Development detailed in Table 2.1. The University has already provided full mitigation for the vehicle trip generation from the Consented Development.

2.12.16 These 2021 flows, being based in part on observation from the surveys in 2016, would already include movements associated with West Cambridge. For the purposes of assessing the 2021 Do Minimum scenario for the Transport Assessment, to avoid double counting the existing West Cambridge development-generated vehicle trips:

i) the Observed 2016 West Cambridge vehicle movements are deducted by link;

ii) these Observed 2016 West Cambridge vehicle movements are replaced with the predicted Consented West Cambridge flows identified by the Spreadsheet Model.

2.12.17 When the link flows obtained from this first-principles approach are compared to the equivalent link flows from the CSRM, it shows that the CSRM flows are lower. As this first-principles approach does not account for reassignment or redistribution effects, the adopted methodology is shown to provide a robust assessment of future conditions.

### 2031 Full Development Assessment Methodology

2.12.18 The 2031 Assessment considers the Do Minimum and Do Something scenarios. As per the 2021 assessment, two Do Minimum assessments are considered.

2.12.19 The Full Development scenario for West Cambridge Development identified in Table 2.2 is assumed to be completed by 2031.

2.12.20 The 2016 network traffic flows will be inflated by the vehicle trips identified by Peter Brett Associates' Spreadsheet Model arising from the consented strategic development delivered by 2031 assigning along each link.

2.12.21 The methodology used to evaluate the transport impact of the forecast movements generated by the Full West Cambridge Development is influenced by the Consented Development detailed in Table 2.1 for which the University has already provided full mitigation for.

2.12.22 These 2031 flows, being based in part on observation from the surveys in 2016, would already include movements associated with West Cambridge. For the purposes of assessing the 2031 Do Minimum scenario for the Transport Assessment, to avoid double counting the existing West Cambridge development-generated vehicle trips:

i) the Observed 2016 West Cambridge vehicle movements are deducted by link;

ii) these Observed 2016 West Cambridge vehicle movements are replaced with the predicted Consented West Cambridge flows identified by the Spreadsheet Model.

2.12.23 Further details are provided in Section 12 onwards.

# 3 Existing Conditions

## 3.1 Introduction

3.1.1 This section presents detail of the current and permitted land-uses; the pedestrian and cycle infrastructure; public transport provision; highway network and emerging development proposals from the local authority and local developers.

3.1.2 This section identifies that:

i) the Development is well-located with respect to existing pedestrian and cycle infrastructure to accommodate non-motorised movement, and that the existing bus services already connect to a series of popular destinations;

ii) existing journey to work trips by Cambridge residents and University employees involve a much lower car driver mode share than the United Kingdom average; and

iii) that there are no significant existing road safety issues in the vicinity of the Site.

## 3.2 Site Location and Existing Use

3.2.1 The proposed Development is shown in Figures 2.1 and 2.2, being located to the north-west of the existing urban conurbation of Cambridge, approximately 3km north-west of the centre of the city.

3.2.2 The Site is located immediately to the east of the section of the M11 motorway between Junctions 13 and 14, is bordered to the north by the Class A Madingley Road (A1303) which routes between the Madingley Mulch junction on the A428, through M11 Junction 13 and on to the centre of Cambridge. Clerk Maxwell Road, a residential distributor road, is located to the east. Agricultural land occupies the land between the Site and Barton Road to the south.

3.2.3 West Cambridge is a mixed-use development, with the predominantly academic and commercial research elements and ancillary land-uses. Outline planning consent was originally granted in 1999, and subsequently the Development has progressed with the elements of the original consent being delivered at different rates. The consented and delivered development mix is shown in Table 2.1.

## 3.3 Existing Pedestrian and Cycle Facilities

### Pedestrian and Cycle Access Points to West Cambridge

3.3.1 As shown on the Access Parameter Plan in Appendix 2.2, the existing walking and cycling access points to West Cambridge from the north are:

- at the Madingley Road junctions with JJ Thomson Avenue;
- at High Cross;
- adjacent to the British Antarctic Survey building at the Western Access – a pedestrian-only access;
- at the Veterinary School access road; and
- from the Park and Cycle facility.

3.3.2 From the south, the Coton Path, a pedestrian and cycle route, connects West Cambridge to the city centre via Adams Road and Burrell's Walk.

3.3.3 From the east, there is a pedestrian and cycle shared use path from Clerk Maxwell Road to JJ Thomson Avenue.

## Public Rights of Way

3.3.4 Public Rights of Way form part of an integral part of the highway network, could contribute towards enhancing the connectivity of the network and of the scheme as a whole, and provide additional opportunities for sustainable transport modes between communities in the vicinity. The Public Rights of Way in the vicinity of the Development are shown on Figure 3.1. In summary:

i) Footpath 31a routes on a west to east along the southern periphery of the Site, commencing from the western corner of the site (adjacent to the M11). Extending to the east, this footpath connects with Wilberforce Road where it terminates;

ii) Footpath 9 commences at the same point as Footpath 31a, but routes to a south-east direction where it terminates at an area of agricultural land.

iii) Footpath 6 routes on a south-west to south east access linking from Barton Road to nearby Coton (extending over the M11) where it terminates.

iv) Bridleway 5 is located to the south of Madingley Road between the M11 southbound on-slip and the West Cambridge Development, and runs on a north-south axis.

3.3.5 There are currently no dedicated equestrian facilities within the Development, albeit Bridleway 5 links between the M11 Coton Path foot/cycle bridge to Madingley Road along the western boundary. There is no clear continuation of this bridleway from its termination at Madingley Road.

## Pedestrian Facilities

**Walking Route Network**

3.3.6 The existing pedestrian facilities are shown on Figure 3.2.

3.3.7 There are two good pedestrian connections between West Cambridge and the city centre:

- using the existing pedestrian facilities along Madingley Road; and
- via the Coton Path Corridor - a much quieter route that connects to Adams Road (a residential street) and Burrell's Walk (a dedicated pedestrian and cycle path).

3.3.8 In the vicinity of West Cambridge, Madingley Road has footways along both sides of the carriageway. The footway along the south terminates at the West Cambridge High Cross junction, opposite the North West Cambridge Development High Cross access. The footway along the south varies from between 1.5m and 2m wide, and generally has no median strip. The footway on the north varies between 1.5m and 2m wide and has a median strip along the majority of Madingley Road. The footways are illuminated by the carriageway lighting system.

3.3.9 There are five controlled crossings along Madingley Road:

i) a pelican crossing to the west of the Madingley Road / Northampton Street Roundabout;

ii) a pelican crossing to the east of the Madingley Road / Grange Road traffic signal controlled junction;

iii) a toucan crossing to the east of the Storey's Lane / Madingley Road junction – a footpath leads from here to the south eventually to join Clarkson Road;

iv) a toucan crossing between the Madingley Rise and JJ Thomson Avenue junctions; and

iv) a toucan crossing of the Madingley Road park and ride site entrance.

3.3.10 There is some severance between West Cambridge and the north due to Madingley Road, but this has been reduced recently with the traffic signal controlled junction enhancement of the Madingley Road / North West Cambridge / High Cross Site Access, and the recent delivery of the toucan signal controlled crossing between the Madingley Road / JJ Thomson Avenue / Madingley Rise junctions.

**On-site facilities**

3.3.11 Within the West Cambridge Development, JJ Thomson Avenue, Charles Babbage Road and High Cross have footways with generous widths on both sides of the carriageway – a typical arrangement is shown on Plate 3.1.

Plate 3 1: Existing Footway arrangement along High Cross

3.3.12 Within the Development, Charles Babbage Road has been subject to an urban realm scheme and traffic calming, resulting in it forming an attractive link for pedestrians – this is shown on Plate 3.2.

Plate 3 2: Charles Babbage Road

3.3.13 There is a footway on the western side of the Western Access connecting from Charles Babbage Road to Madingley Road.

## Cycling Facilities

### Cycling Route Network

3.3.14 The local cycling network in the vicinity of the Development is shown on Figure 3.2, compiled using information from Cambridgeshire County Council website and to other attractors to the south and west of the City. As shown on this figure, Cambridge is exceptionally well provided with cycling facilities.

3.3.15 An off-road cycle path routes eastwards from the western bend of Storey's Way, continues around the Observatory, then southwards along an access road to Madingley Road. This route was provided as part of the Section 106 Agreement for the West Cambridge Development.

3.3.16 Across the wider Cambridge area, there are National Cycle Network routes 1, 11, 12, 51, 53, and 63. National Cycle Route 51 passes close to the Development, as shown on Figure 3.2. This connects Huntingdon to the west and Newmarket to the east. A section of this route runs south-east to north-west adjacent to the Site along Huntingdon Road (A1307) from Cambridge Road towards Cambridge City Centre. The cycle route is formed with on-road cycle lanes along both sides of Huntingdon Road. It is signed throughout as National Cycle Route 51, and forms a high quality route. The path stretches across East Side Common and provides improved cycle links for the local villages into Huntingdon.

3.3.17 Cambridgeshire County Council delivered the Madingley Road Phase 1 Combined Cycleway / Footway proposals in 2012, a quality cycleway along the northern verge, significantly enhancing the cycling and walking infrastructure along this route. These works are shown in Appendix 3.1, and consisted of:

i) upgrading the existing combined footway / cycleway within the northern verge to 3m wide between the east of Madingley Rise and Lady Margaret Road;

ii) enhancing the cycleway crossings of minor roads such as Storey's Way and Madingley Rise;

iii) the advisory on-road cycle lane from Queen's Road to the Park and Ride site on the southern side of Madingley Road shown on these plans will be provided as part of later phases.

3.3.18 At the junctions on Madingley Road with Lady Margaret Road and Grange Road there are cycle advance stop lines with pens.

3.3.19 The Coton Path runs along the southern boundary of the Development and connects Coton, one kilometre to the west, with the city centre via Adams Road and Burrell's Walk with limited motorised traffic. Plate 3.3 shows the path between Adams Road and the Development (left) and along the south of the Development boundary (right).

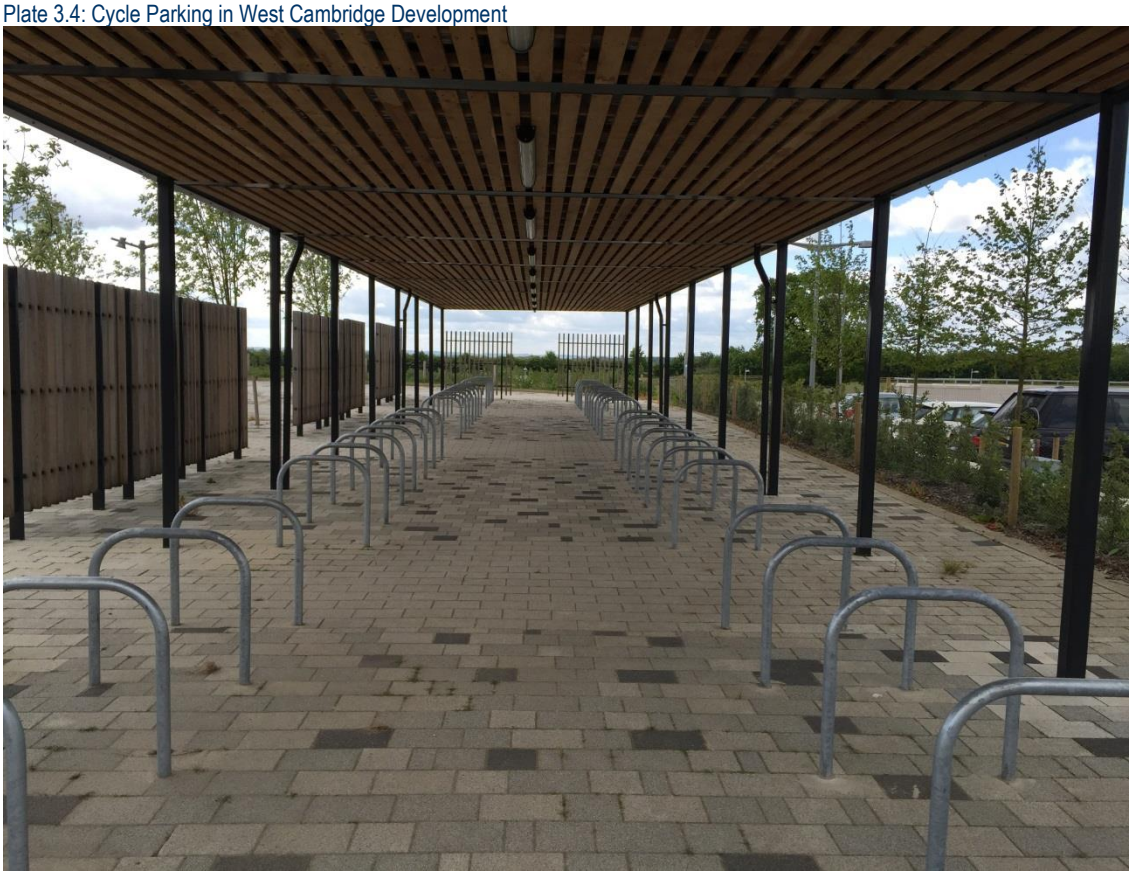
Plate 3.3: Coton Path linking the south of West Cambridge with Adams Road

**On-site facilities**

3.3.20 Along JJ Thomson Avenue, High Cross and Charles Babbage Road, there are substantial shared cycle and footways on either side of the carriageway, with those of the former two roads separated by tree-lined grass verges.

3.3.21 Across the Development, there are a number of covered, secure cycle parking areas with Sheffield stands and lighting such as that shown in Plate 3.4. There is also parking provided within development plots, generally in the form of Sheffield stands.

Plate 3.4: Cycle Parking in West Cambridge Development



3.3.22 There is also an existing park and cycle facility located in the north-eastern corner of the Site, off Clerk Maxwell Road. This car park too is subject to permit control and managed with the other Estate car parks, and intended to intercept car trips from the west and from the M11 bound for the City Centre. Its close location to Clerk Maxwell Road provides a safe cycle access onto the Adams Road / Burrell's Walk route. The site provides 290 parking spaces. This facility will be removed as part of the proposals, the spaces provided elsewhere within the Development.

**Associated Off-site Cycle Parking**

3.3.23 Within the City Centre, there are various cycle parking locations that would encourage and promote the use of cycling into Cambridge for trips by occupiers during the day:

i) the Grand Arcade Cycle Park is located off Corn Exchange Street and provides space for approximately 500 cycles that includes free parking for 200 spaces (the other 300 spaces are charged parking). Pedestrians can access the cycle park via the lifts or stairs inside Grand Arcade or from Fisher Square. Cyclists can access the cycle park from Corn Exchange Street. From the centre of the Development, the approximate distance to the Grand Arcade Cycle Park is 3.5km, a 14 minute cycle time, a relatively easy cycle. The distance between the Grand Arcade Cycle Park and Cambridge Rail Station is approximately 1.7km, a further 6 minute cycle time. The cycle park closes at 11:30pm each day;

ii) Park Street Cycle Park is located on the ground floor of Park Street Car Park and provides covered space for 285 cycles. Cyclist and pedestrian access is provided from Park Street, and there is a pedestrian-only access from Bridge Street. The cycle park is currently open 7 days a week, 24 hours a day. From the centre of the Development, the approximate distance to the Grand Arcade Cycle Park is 3.5km, a 14 minute cycle time, a relatively easy cycle. The distance between the Grand Arcade Cycle Park and Cambridge Rail Station is approximately 1.7km, a further 6 minute cycle time;

3.3.24 Other cycle parks exist around Cambridge, such as bicycle stands located on East Road, Downing Site at the University, and at the Addenbrooke's Hospital. Further cycle parking located close to the Site is along Madingley Rise, but this cycle parking is for the use of the university alone.

3.3.25 Whilst the only currently proposed amendments to the University's cycle parking provision are related to specific development proposals, it is part of the University's approach to sustainable transportation to keep cycle parking provision in their facilities throughout the city under review as part of the University's regular City Wide Travel Plan obligations.

## Other Development-related cycle and pedestrian infrastructure enhancement proposals

3.3.26 A series of pedestrian and cycle infrastructure proposals have been promoted by others within the area.

3.3.27 The Long Term Transport Strategy (LTTS) to in Section 2.9 forms part of the Cambridgeshire Local Transport Plan, and identifies major infrastructure requirements needed to address the existing capacity constraints of Cambridgeshire's transport network, as part of this Strategy, a third city centre cycle park will be provided, although no timescale has been given at this stage.

3.3.28 A new 2,900 space cycle park has been provided at Cambridge Rail Station as part of the planned station improvements.

3.3.29 As further referred to in Section 2.9, the Cambridge City Deal includes cycling proposals within the Greater Cambridge area. Should the City Deal Bus Priority scheme be provided along Madingley Road, it is understood that there will an improvement of the existing cycle infrastructure along this road.

3.3.30 As part of the North West Cambridge development proposals, the following cycle infrastructure improvements were agreed along Madingley Road;

i) a traffic signal controlled pedestrian and cyclist crossing incorporated into the Madingley Road – High Cross - North West Cambridge Development access junction; and

ii) a new toucan crossing on Madingley Road adjacent to JJ Thomson Avenue / Madingley Rise – this was completed in Autumn 2015.

## Existing Cycle Movements

3.3.31 A travel pattern survey was undertaken in May 2015, seeking information about staff and students' travel habits over the course of two weeks.

3.3.32 The post code data for the existing cycle user occupants of West Cambridge has been analysed along broad travel corridors, the output is reported in Appendix 3.2 and summarised in Table 3.1 along the broad movement corridors:

Table 3.1: Observed Cycle to Work Movements to West Cambridge (2015)

| | Cyclists | | | | Total | | | |
|---|---|---|---|---|---|---|---|---|
| **Corridor** | **Staff** | **Students** | **Total** | **%** | **Staff** | **Students** | **Total** | **%** |
| North, beyond Girton | 11 | 2 | 13 | 3% | 37 | 2 | 39 | 6% |
| North of City | 64 | 61 | 125 | 26% | 82 | 61 | 143 | 21% |
| North-east, beyond Milton | 2 | 0 | 2 | 0% | 11 | 0 | 11 | 2% |
| North-east area of City | 8 | 33 | 41 | 9% | 9 | 34 | 43 | 6% |
| South-east area of City | 44 | 30 | 74 | 16% | 54 | 33 | 87 | 13% |
| South-east, towards Balsham | 2 | 2 | 4 | 1% | 7 | 2 | 9 | 1% |
| South area of City | 11 | 55 | 66 | 14% | 21 | 60 | 81 | 12% |
| Towards Great Shelford | 4 | 0 | 4 | 1% | 19 | 0 | 19 | 3% |
| South-west, beyond Barton | 2 | 0 | 2 | 0% | 6 | 0 | 6 | 1% |
| West Cambridge, North-west of City and Girton | 36 | 92 | 128 | 27% | 49 | 116 | 165 | 25% |
| West along the A1303 Corridor, beyond Coton | 13 | 2 | 15 | 3% | 51 | 5 | 56 | 8% |
| North-west, towards St Ives | 1 | 0 | 1 | 0% | 7 | 0 | 7 | 1% |
| Other | 0 | 0 | 0 | 0% | 0 | 0 | 0 | 0% |
| Total | 198 | 277 | 475 | 100% | 353 | 313 | 666 | 100% |

Source: SDG – University of Cambridge – Travel Survey and Segmentation Study – October 2015
Response rates of 34% Staff and 10% Students were reported.

3.3.33 This information will inform the derivation of the Development Cycle Strategy, with:

i) around 30% of movement to the north, across Madingley Road;

ii) around 25% of movement to the east, along the existing facilities along Madingley Road;

iii) around 40% of movement passing to the east, along the Coton Path, continuing along towards the City; but

iv) with a limited number, only around 3% of existing cycle movements, assigning to the west across the motorway. This is considered to reflect the limited numbers resident in communities to the west.

## 3.4 Existing Bus Services

3.4.1 Whilst walking and cycling offer an attractive alternative to the private car for many short- and medium- distance trips, bus travel can also be an effective option. In particular, quality bus services offer the potential to replace car travel locally (such as to adjacent developments), to other destinations across Cambridge, and further afield. In conjunction with rail, it is a realistic option to the car for longer distance trips.

3.4.2 In this section, details of existing bus services are set out. These comprise existing local and long distance services on Madingley Road, the park & ride service from a site north of Madingley Road, and the guided busway that serves northern areas of Cambridge. Each of these is described in turn below.

### Existing Bus Services on Madingley Road

3.4.3 The development is well located on an existing public transport corridor served by well-established services that connect to the city centre, railway station and a range of destinations in Cambridge itself and, more widely, in West Cambridgeshire and beyond. These services operate on Madingley Road and are provided by two operators: Stagecoach and Whippet. Stagecoach operates services Citi 4 and X5, Whippet provides the 2, 3, 8, X3, and Universal ('U') Services. Places served by these routes are Cambridge city centre, Cambourne, Huntingdon, Papworth, St Ives, St Neots and further afield to Bedford, Milton Keynes and Oxford. Table 3.2 shows details of the services provided, as at June 2017, these are also shown on Figure 3.3.

Table 3.2: Bus Routes and Daytime Frequencies

| Service (Operator) | Route | Frequency (minutes) | |
|---|---|---|---|
| | | Mon – Sat | Sunday |
| 2 (Whippet) | Cambridge, Coton, Madingley, Dry Drayton, Hardwick, Toft, Caldecote, Knapwell, Elsworth, Conington, Boxworth | M-F peaks only 1 journey | No service |
| 3 (Whippet) | Cambridge, West Cambridge, Cambourne, Lower Cambourne, Papworth, Hilton, Godmanchester, Huntingdon | Peaks only 1-2 journeys | No service |
| X3 (Whippet) | Cambridge, West Cambridge, Cambourne, Lower Cambourne, Papworth, Godmanchester, Huntingdon | 60 | No service |
| 8 (Whippet) | Cambridge, Coton, Madingley, Dry Drayton, Bar Hill, Boxworth, Conington, Knapwell, Elsworth, Papworth | Off peak only 2 or 3 journeys | No service |
| Citi 4 (Stagecoach) | Cambridge, Great Cambourne, Upper Cambourne, Lower Cambourne | 20 | 60 |
| Universal ('U') (Whippet) | Addenbrooke's, Cambridge Railway Station, City Centre, West Cambridge, Madingley Road Park & Ride | 15 | No service |
| X5 (Stagecoach) | Cambridge, St Neots, Bedford, Milton Keynes, Buckingham, Bicester, Oxford | 30 | 30 |

June 2017 - this information may change as bus operators review their services

3.4.4 The two more frequent services are the Citi 4, operated by Stagecoach, and the Universal, operated by Whippet. Service Citi4 is one of a network of seven "Citi" branded routes serving the Cambridge urban area and surrounding area, and provides a 20 minute frequency service from Cambourne via Madingley Road to the city centre. In the evenings and on Sundays there is an hourly service on the route.

3.4.5 The Universal service provides a link between the Madingley Road Park and Ride site, the University's West Cambridge campus, the south of the city centre, the Cambridge Biomedical Campus, and Addenbrooke's Hospital – it does not serve the main city centre area – and operates every 15 minutes during Monday to Friday daytimes only. This route is supported financially by the University of Cambridge.

3.4.6 Longer distance links are provided by:

i) Stagecoach service X5 - every 30 minutes to St Neots, continuing to Bedford, Milton Keynes and Oxford; and

ii) Whippet with service X3 - operating hourly to Papworth and Huntingdon.

3.4.7 Further lower frequency services provide key commuter links from outlying areas.

3.4.8 Figure 3.3 includes an extract from the County Council website showing the location of bus stops within and adjacent to West Cambridge:

Madingley Road

i) two outside the Western Access Road – both stops are formed by bus stop flags and timetables. The westbound stop is located in a bus layby;

ii) two located 210m to the west of the JJ Thomson Avenue junction – both stops are formed by a bus stop flags and timetables. The westbound stop is located in a bus layby;

JJ Thomson Avenue

iii) two sets of bus stops are located at two locations along JJ Thomson Avenue. All four stops are formed by bus stop flags and poles, the two bus stops for services exiting the site are further supported by bus shelters and timetable information;

Charles Babbage Road

iv) the bus stops located outside the Institute for Manufacturing building are formed by stop bus flags and poles for both directions;

v) the bus stops located outside the Department for Materials Science and Metallurgy building are formed by bus flags and poles for both directions.

## Park & Ride

3.4.9 Cambridge has a well-established park & ride system. The nearest park & ride site to the Development is located to the north of Madingley Road, the car parking facility is open 24 hours a day including bank holidays. There are other park & ride sites around Cambridge relevant to this Development.

3.4.10 The 'Red' park & ride service operates from Madingley Road to the city centre, terminating at St Andrews Street. Services operate every 10 minutes from 0700 to 1820 and then every 20 minutes until 2020 on Monday to Friday; every 10 minutes from 0800 to 1820 and then every 20 minutes until 2020 on Saturday; and every 15 minutes from 0900 to 1815 on Sunday.

3.4.11 The main role of this Madingley Road park & ride facility is to intercept car trips from the west and from the M11 inbound to the City Centre. Whilst this facility may not be directly relevant to improving accessibility to West Cambridge, it does decrease the traffic volumes along Madingley Road.

### Guided Busway

3.4.12 The northern area of Cambridge is also served by the Cambridge Guided Busway, a strategic bus-based rapid transit scheme connecting the communities of Cambridge, St Ives and Huntingdon, along with, in future, the new Northstowe Community. Whilst the Guided Busway does not directly serve the Development, the high quality characteristics of the service, which are more akin to a tram than a conventional bus, make it an attractive mode of transport in its own right and an integral part of the Cambridge public transport network. Through interchange to other bus services, it provides an alternative to the car for trips to and from the Development.

## 3.5 Existing Rail Services

3.5.1 Rail travel, in conjunction with bus, offers an attractive alternative to the private car for many longer distance trips to West Cambridge.

3.5.2 The nearest rail station is Cambridge Rail Station, which is approximately 4 kilometres to the south-east of the West Cambridge development. This is also shown on Figure 2.1.

3.5.3 Table 3.3 provides detail of rail services which can be accessed from the station.

Table 3.3: Rail Services at Cambridge Rail station

| Operator | Destination | Journey Time (minutes) | Frequency (per hour) | |
|---|---|---|---|---|
| | | | Mon – Sat | Sunday |
| CrossCounty | Birmingham New Street | 157 | 1 | 1 |
| | Ely (via a combination of Cross Country, Abellio and Great Northern) | 13 | 3 | 3 |
| | Peterborough | 49 | 1 | 1 |
| | Stansted Airport | 30 | 2 | 2 |
| Abellio Greater Anglia | Ipswich | 78 | 1 | 1 |
| | London Liverpool Street | 70 | 2 | 2 |
| | Norwich | 80 | 1 | 1 |
| | Tottenham Hale | 69 | 2 | 2 |
| Great Northern | King's Lynn | 46 | 1 | No direct service |
| | London King's Cross | 45 | 4 | 3 |
| | Stevenage | 35 | 2 | 1 |

3.5.4 There are two fast trains per hour that run non-stop between Cambridge and London, branded the ‘Cambridge Express’ and operated by Great Northern. Journey time to Kings Cross is around 50 minutes. In addition, there are hourly semi-fast and stopping services to each of Kings Cross and Liverpool Street, operating via Stevenage and Bishops Stortford respectively. Other services operate to key destinations in East Anglia and the Midlands.

3.5.5 As currently proposed, the completion of the Thameslink programme will result in the semi-fast and stopping Great Northern services to Kings Cross being transferred to Thameslink and each increased to half-hourly. These services will operate through the Thameslink "core" between London St Pancras and London Bridge, then continue to either Gatwick Airport and Brighton (semi-fast services) or Maidstone East (stopping services).

3.5.6 Following the introduction of the 'Universal' bus service, there is now a regular 15 minute frequency direct bus service between the Development and the railway station on Monday to Friday.

3.5.7 The rail station and city centre are also linked by around eighteen buses per hour on the main Citi 1, 3, 7 and 8 services, which also provides regular direct links to Addenbrooke's Hospital, Cherry Hinton, Fulbourn, Fen Ditton, Arbury, Saffron Walden and a number of villages south of Cambridge. Journey time from the city centre to the rail station is under 10 minutes and Plusbus tickets are available for integrated rail and bus travel.

## 3.6 Existing Road Network

3.6.1 As shown on Figure 2.1, the Site is located to the south of a radial route leading between the M11 and the centre of Cambridge – the A1303 Madingley Road.

### Vehicle access to the Site

3.6.2 Highway access to the site is exclusively from Madingley Road. Madingley Road borders the north of the Development, and is a single lane carriageway which fluctuates in width from approximately 7.5m to approximately 15m at the junction with JJ Thomson Avenue. In the vicinity of the Development there is a speed limit of 40mph, albeit this reduces to 30mph towards the centre of Cambridge near JJ Thomson Avenue. Madingley Road leads from the A428 Madingley Mulch Roundabout to the inner Cambridge Ring Road, and is the main arterial route into the city from the west.

3.6.3 As shown on Figure 2.3, there are two junctions from Madingley Road which provide vehicular access to the site:

i) Madingley Road / High Cross / North West Cambridge Access - a four armed traffic signal controlled crossroads located some 100 metres to the east of the Madingley Road / Park and Ride access junction, recently implemented to provide access to the new North West Cambridge Development to the north. The West Cambridge High Cross access road is a single carriageway road with a width of approximately 7.3 metres, which flares on the approach to the junction to provide two exit lanes. The inbound Madingley Road movements have dedicated both left- and right-turn lanes;

ii) Madingley Road / JJ Thomson Avenue / Madingley Rise – a staggered priority junction with single lane dualling providing right-turning lane facilities. Madingley Rise, to the north, forms the access road to the Earth Science Facility, and is used by University employees, students and visitors. The JJ Thomson Avenue junction to the south forms the main vehicular access to the West Cambridge Development. JJ Thomson Avenue is also a single carriageway road with a width of approximately 7.5 metres but which widens to two lanes on the approach to the junction providing a left-turn flare of approximately 29 metres.

3.6.4 A further priority junction between JJ Thomson Avenue and High Cross, currently closed, provides limited cyclist and pedestrian access to an area of the Site occupied by the Vet School only.

3.6.5 In addition to these junctions, Clerk Maxwell Road is a local access road and forms the eastern boundary to the site. Currently, this road provides access to a small number of residential homes and the Park and Cycle site which is located at the north-east corner of the

Development. On-street parking is not controlled, and approximately 85 - 90 car parking spaces are available reducing the environmental quality of this road. There is no direct vehicular access from Clerk Maxwell Road to the Development, albeit three pedestrian and cyclist accesses into the Development are served from this road. The junction of Clerk Maxwell Road with Madingley Road is formed by a ghost island priority junction.

## Local Highway Network

3.6.6 As shown on Figure 2.1, the local highway network provides direct access between the Development and the M11 strategic highway network – Madingley Road intersects with the M11 at Junction 13. An indirect link is also provided to the A14 by Huntingdon Road to M11 Junction 14 (A14 Junction 31).

3.6.7 The M11 is located to the west of the Site, and routes in a north / south axis. It links between the North Circular Road in London, passes Bishop's Stortford, Harlow, and Stansted Airport before passing to the immediate west of the Site at the merger with the A14 at Junction 14.

3.6.8 The A14 East also connects to the A428, a strategic road that links Coventry to Cambridge via Bedford and Northampton.

3.6.9 To the north of the Site lies the A14 on an east / west axis from Cambridge. To the east, the A14 connects to Newmarket, Bury St Edmunds, and Ipswich, terminating at the sea port of Felixstowe. To the west the A14 passes Huntingdon, crossing the A1 before continuing around Kettering and terminating at Junction 19 of the M1, the start of the M6.

3.6.10 Only limited movement access is possible at the two closest junctions to the M11, the A428 and the A14:

i) the A14 is accessed via Huntingdon Road at A14 Junction 31, however westbound movements only are provided for – eastbound access to the A14 and southbound access to the M11 are not possible. The nearest A14 eastbound access from the Development is via Histon Road, the A14 Junction 32;

ii) the M11 is accessed via Madingley Road, but only southbound movements are accommodated towards London; and

iii) the A428 cannot be directly accessed from the M11. A route to this link is formed along Madingley Road to the west.

## Summary

3.6.11 Madingley Road provides convenient access to West Cambridge from the south (via the M11), from the west (from Madingley Road and the A428), and from the east (towards the City centre).

3.6.12 Whilst these movements are well-catered for, access to / from the north is poor as M11 Junction 13 has no north-facing diverge and or merge lanes. Approaching the site by car from the north or north-west - including areas to the north of the City centre, and from the A14 / A11 corridor - must use one of:

i) the M11 and U-turn at M11 Junction 12;

ii) drive through the City and enter via Madingley Road; or

iii) drive along Huntingdon Road and through either North West Cambridge or Storey's Way / Madingley Road.

3.6.13 Both the Huntingdon Road and Madingley Road Corridors are subject to levels congestion during the AM and PM peak hours, the congestion being more pronounced during the AM peak in the eastbound direction towards the city centre.

## 3.7 Observed Existing Journey mode share

3.7.1 To understand current travel patterns and existing mode share in the vicinity of the Development, existing travel patterns have been reviewed with reference to the readily available sources of data for the proposed land-uses including:

i) the existing Census 2011 Journey to Work data for the urban area of Cambridge;

ii) the existing Census 2011 Journey to Work data for England;

iii) Cambridgeshire County Council's Travel for Work Partnership from the 2016 surveys for the University of Cambridge – reflecting more closely the mode share of the academic research area staff; and

iv) Cambridgeshire County Council's Travel for Work Partnership from the 2014 surveys for the Cambridge Science Park – reflecting more closely the mode share of the commercial research area staff.

These data sources are considered individually below.

### 2011 Census

3.7.2 Information relating to the journey to work mode, and home and work locations is available in the 2011 Census. Two data sets have been reviewed:

i) the Site is located in the Super Output Area referenced E02003725 covering the Cambridge urban area - as shown in Appendix 3.3. The mode shares from the 2011 Census for journeys to work in this area for workers employed within this area are shown in Table 3.4:

Table 3.4: Census 2011 Mode Share for journey to work within Cambridge

| PT passenger | | Car Driver | Car Passenger | Motor Cycle | Bicycle | Pedestrian | Other - (Taxi, Metro, U'ground) | Single Occupancy Car Driver |
|---|---|---|---|---|---|---|---|---|
| Bus | Rail | | | | | | | |
| 8.3% | 4.5% | 50.0% | 4.0% | 1.1% | 21.6% | 10.0% | 0.3% | 46.0% |

Source – Census 2011 – Nomis Super Output Areas referenced E002319, E02003720, E02003721, E02003722, E02003723, E02003724, E02003725, E02003726, E02003727, E02003728, E02003729, E02003730, E02003731– excluding Work from Home trips

ii) the mode shares from the 2011 Census for journeys to work for workers employed within England is shown in Table 3.5:

Table 3.5: Census 2011 Mode Share for England - journey to work

| PT passenger | | Car Driver | Car Passenger | Motor Cycle | Bicycle | Pedestrian | Other - (Taxi, Metro, U'ground) | Single Occupancy Car Driver |
|---|---|---|---|---|---|---|---|---|
| Bus | Rail | | | | | | | |
| 7.9% | 5.6% | 60.2% | 5.3% | 0.9% | 3.1% | 11.3% | 5.6% | 54.9% |

Source – Census 2011 - Nomis

## Travel to Work Partnership – University of Cambridge

3.7.3 Reference is made to the Travel for Cambridgeshire survey of the travel patterns of the University employees at the West Cambridge Development – this is considered to represent reasonably the mode share of the Academic Research staff. The responses from the 350 respondents are shown in Appendix 3.4; the results are summarised in Table 3.6:

Table 3.6: Base Total External Trip Generation – West Cambridge

| PT passenger | | Car Driver | Car Passenger | Motor Cycle | Bicycle | Pedestrian | Single Occupancy Car Driver |
|---|---|---|---|---|---|---|---|
| Bus | Rail | | | | | | |
| 3.7% | 3.7% | 42.0% | 2.0% | 0.9% | 42.9% | 4.9% | 40.0% |

Source – Travel to Work Survey 2016 produced for University of Cambridge (Travel for Cambridgeshire for West Cambridge)

## Travel to Work Partnership – Cambridge Science Park

3.7.4 Further reference is made to the Travel Plan Plus Area Report produced by Travel for Cambridgeshire of the travel patterns of the employees at the Cambridge Science Park – this is considered to represent reasonably the mode share of the Commercial Research staff. The results are summarised in Appendix 3.4; the results are summarised in Table 3.7:

Table 3.7: Base Total External Trip Generation – Commercial Research

| PT passenger | | Car Driver | Car Passenger | Motor Cycle | Bicycle | Pedestrian | Worked at home, or at other location | Single Occupancy Car Driver |
|---|---|---|---|---|---|---|---|---|
| Bus | Rail | | | | | | | |
| 5.0% | 1.4% | 62.8% | 8.8% | 0.8% | 21.6% | 4.7% | 3.7% | 54.0% |

Source – Travel to Work Survey 2014 produced for The Travel Plan Plus Area (Travel for Cambridgeshire for the Cambridge Science Park area)

## Commentary

3.7.5 This mode share data supports anecdotal evidence relating to general movement both in Cambridge, as well specifically by the University's employees:

i) the Single Occupancy Car Driver mode share for Cambridge is lower than across England, with all the non-car modes corresponding higher;

ii) the Single Occupancy Car Driver mode share for University employees at West Cambridge is lower than reported in the Census for Cambridge – supporting evidence of the tradition of non-car mode choice by University employees;

iii) the non-car share for University employees (car share, cycling, bus) observed at West Cambridge is significantly higher than for employees at the Science Park;

iv) that the restrictions on parking at the University's facilities may reduce the Single Occupancy Car Driver share.

3.7.6 The Car Driver and Single Occupancy Car Driver mode shares for the Cambridge Science Park commercial research areas are significantly higher than that reported for the West Cambridge Development - which itself includes the sort of commercial research and development facilities (e.g. Microsoft and Schlumberger) expected to operate from the Development. This reflects the nature of the Cambridge Science Park Development - having been car-orientated from the outset, having greater on-site parking provision, no on-site worker accommodation, no on-site community and general absence of a non-car mode travel culture.

3.7.7 The University is confident that West Cambridge Development - being set up from the outset to be sustainable, bicycle and pedestrian friendly, to include a sustainable mix of uses reducing the need to travel and with a non-car travel culture form the outset, combined with an effective Site-Wide Travel Plan - will result in sustainable development, and in transport terms out-perform the Cambridge Science Park.

## 3.8 Initial Traffic Data Review

3.8.1 This Section summarises the traffic data collection strategy on the surrounding highway network.

3.8.2 Both Automatic Traffic Count Surveys and Manual Turning Count surveys were undertaken to collect observed traffic flow data at local junctions in the vicinity of the Site. In addition, data was extracted from the TRADS database, and also from Cambridgeshire County Council's Cordon Survey, which provides data from the County's Annual Traffic Monitoring Report. This sub-section summarises:

i) the junctions considered around West Cambridge;

ii) reviews the results of the Automatic Traffic Count Surveys (including the Automatic Traffic Count Survey data obtained from the TRADS database and the Cambridgeshire County Council's Cordon surveys).

3.8.3 Manual Classified Turning Counts were commissioned by the University in June 2015 at the following junctions:

- A428 / A1303 Madingley Mulch Roundabout;
- M11 Junction 13 West traffic signal controlled junction;
- M11 Junction 13 East priority junction;
- Madingley Road / Northampton Street/ Queen's Road Roundabout;
- A1303 Cambridge Road Crossroads;
- Huntingdon Road / Girton Road Priority Junction;
- Madingley Road / Madingley Rise / JJ Thomson Avenue Crossroads;
- Storey's Way / Huntingdon Road Priority Junction; and
- Storey's Way / Madingley Road Priority Junction.

3.8.4 Further manual classified turning counts were commissioned by the University in October 2016 at the following junctions:

- A428 / A1303 Madingley Mulch Roundabout;
- A1303 Cambridge Road Crossroads;
- M11 Junction 13 East traffic signal controlled junction;
- M11 Junction 13 West priority junction;
- Madingley Road / Park and Ride traffic signal controlled junction;

- Madingley Road / High Cross / Eddington Avenue traffic signal controlled junction;
- Madingley Road / Madingley Rise / JJ Thomson Avenue Crossroads; and
- Madingley Road / Clerk Maxwell Road priority junction.

3.8.5 Automatic Traffic Count Surveys were also commissioned by the University in June 2015 over a 24-hour period for 14 days at the following locations;

- Barton Road – 15m west of junction with Grantchester Road
- JJ Thomson Avenue – 70m south of Junction with Madingley Road
- Grange Road – 50m north of Clarkson Road
- Madingley Road – 150m west of M11 Junction 13

3.8.6 Traffic Count Survey data were provided by Cambridgeshire County Council from the Annual Cordon Survey. These were conducted on 30th September 2015 for a 12-hour period between 07:00-19:00 at Histon Road – immediately south of the A14 Junction 32.

3.8.7 Traffic data were also obtained from Highways England's Traffic Flow Data System (TRADS) for sites on the strategic trunk road network on the following links:

- M11 Junction 12 – 13 (2015 – by combining TRADS link data and the slip road flow observations)
- M11 Junction 13 – Junction 14 (2014)
- M11 between A14 / Huntingdon Road
- A14 Junction 29 – Junction 30
- A14 – north east of M11 Junction 14
- A14 – west of Junction 32
- A428 – west of M11 Junction 14

3.8.8 The 2016 Base flows are shown figuratively in Appendix 3.5.

## 3.9 Road Safety

3.9.1 To understand road safety issues in the vicinity of the Site, an assessment was undertaken at key local links and junctions within 1km of the Development site boundary, and along a 4.7km section of Madingley Road.

3.9.2 Road traffic collision personal injury summary data was obtained from Cambridgeshire County Council for the last available full five year period between September 2011 and August 2016. The collision data for the assessment area are included in Appendix 3.6, along with a plot showing the location of these personal injury collisions.

3.9.3 The study area covered the length of Madingley Road commencing at Madingley Mulch Roundabout to the west of the site, and terminating at Grange Road to the east of the site. This is an approximate 4.7km stretch of Madingley Road. The data for the West Cambridge Development area, and the Coton Path were also considered.

3.9.4 The observed number of combined link and minor junction personal injury collisions (PICs – formerly known as personal injury accidents), and major junction personal injury collisions are reported on each link and junction in Table 3.8. The comparable number that could be anticipated on these was also calculated with reference to the Department for Transport's Design Manual for Roads and Bridges, Volume 13 - these calculations are also contained in Appendix 3.6 and the results are summarised and compared with the observed level of personal injury collisions in Table 3.8.

Table 3.8: Summary of Observed and Anticipated Personal Injury Collisions (5 Years)

| | **Observed PICs** | **Anticipated PICs** |
|---|---|---|
| **Links** | **Number (Rate – PICs per million vehicle km)** | **Number (Rate – PICs per million vehicle km)** |
| 1) Madingley Road<br>- Madingley Mulch Roundabout to Cambridge Road junction. | 11 | 17 |
| 2) Madingley Road<br>-Cambridge Road and M11 off-slip | 6 | 7 |
| 3) Madingley Road<br>-M11 off-slip to west of JJ Thomson Avenue | 4 | 8 |
| 4) Madingley Road<br>-West of JJ Thomson Avenue to east of Grange Road | 5 | 7 |
| **Junctions** | **Observed PICs** | **Anticipated PICs** |
| 1) Madingley Mulch Roundabout | 8 | 8 |
| 2) Madingley Road – Cambridge Road crossroad junction | 6 | 6 |
| 3) Madingley Road – M11 off-slip signalised junction | 0 | 6 |
| 4) Madingley Road – M11 on-slip signalised junction | 1 | 7 |
| 5) Madingley Road – Park & Ride signalised junction | 3 | 7 |
| 6) Madingley Road – High Cross priority junction | 1 | 4 |
| 7) Madingley Road - JJ Thomson Avenue priority junction | 1 | 4 |
| 8) Madingley Road – Clerk Maxwell priority junction | 2 | 2 |
| 9) Madingley Road – Wilberforce Road priority junction | 1 | 2 |
| 10) Madingley Road – Storey's Way priority junction | 8 | 5 |
| 11) Madingley Road - Grange Road signalised junction | 4 | 6 |

Notes: Link only rates have also been calculated for roads where there are no adjoining junctions along its length.
Collisions within 20m of the major junctions identified in this table have been allocated to the junctions. Any other collision occurring at minor unspecified junctions are allocated to the link in question. The link rates have therefore been calculated as a combined link and minor junction personal injury collision rate apart from those identified separately in the table above.

3.9.5 A total of 61 collisions were observed along Madingley Road within the study area. Of the observed incidents:

- 1 was classified as a fatal injury collision
- 14 were classified as a serious injury collision, and
- 46 were classified as slight in severity.

3.9.6 The Assessment has specifically commented upon vulnerable road users, of which there are a high number of collisions - albeit it is acknowledged that:

i) motorcycle usage in Cambridge is generally 25% higher than the rest of the UK; and

ii) Cambridge City is recognised as having a high number of cycle movements.

3.9.7 This Road Safety Assessment has identified four existing road safety issues:

i) whilst the Madingley Road link between Madingley Mulch Roundabout and Cambridge Road junction has a lower incident rate than would be anticipated, there is a collection of incidents on a 250m section of sinuously aligned carriageway;

ii) Madingley Road / Storey's Way priority junction has a higher incident rate than would be anticipated, with a high number of vulnerable road users;

iii) although the Madingley Road / Grange Road signalised junction has a lower incident rate than would be anticipated, two of the incidents involve cyclists making the same manoeuvre;

iv) although the Madingley Road / Cambridge Road crossroads has an equivalent incident rate to that anticipated, most of the incidents appear to reflect ignorance of the existence of the junction and inappropriate speeds

3.9.8 Whilst the Proposed Development will not result in any detriment to the existing highway safety conditions within the site vicinity, as part of the West Cambridge Development Transport Mitigation Strategy remedial measures are proposed at these locations - further details of these proposed measures are discussed in either Sections 6.6 or 15.

3.9.9 In addition to the Road Safety Analysis in the agreed Study Area along Madingley Road, two slight personal injury collisions were recorded on Clerk Maxwell Road adjacent the Park and Cycle Access. Both instances involved a cyclist travelling from the South of Clerk Maxwell Road to the North:

i) one slight collision involved a pedal cyclist overtaking a stationary vehicle on the offside, resulting in the cyclist colliding with the vehicle.

ii) one slight collision involved two pedal cyclists near the Park + Cycle site, with one cyclist going ahead from South to North and one turning right from West to South.

With the Transport Mitigation measures promoting the removal of the existing car parking and cycle lane creation along Clerk Maxwell Road, visibility on this road will be improved: the likelihood of this type of collisions is anticipated to decrease.

3.9.10 Personal injury collision data were also sought for the Coton Path - albeit no PICs were reported for the same five-year Study Period.

# 4 Summary of Policy Review

## 4.1 Introduction

4.1.1 This section summarises existing national and local policy, guidance and emerging strategies and provides an assessment of the performance of the proposed development against these policies. A detailed summary is included in Appendix 4.1.

4.1.2 This section identifies that the Development accords well with national and regional transport policy and guidance to deliver sustainable development, as well as with the key local transport and planning policy objectives. It shows that, overall, the proposals for the Development, and the transport strategy evolving to support it, will make a substantial and significant contribution to sustainable development objectives and policies for the Cambridge area.

## 4.2 Policy, guidance and emerging strategy documents reviewed

4.2.1 The following documents were reviewed:

**National Policy Guidance**

- National Planning Policy Framework (NPPF);
- Planning Practice Guidance;
- Circular 02/2013 'Strategic Road Network and the Delivery of Sustainable Transport';

**Local Policy and Guidance**

- Cambridge Local Plan 2014;
- Greater Cambridge City Deal;

**Local Transport Policy and Guidance**

- Cambridgeshire Local Transport Plan 2011-2026; and
- Transport Strategy for Cambridge / South Cambridgeshire

## 4.3 Analysis and application of current policy, guidance and emerging strategies

4.3.1 It is concluded that the Development accords well with national transport policy and guidance to deliver sustainable development:

i) its sustainable location within Cambridge, and the incorporation of employment well located adjacent to residential land-uses reducing the need to travel - supporting the stated aspirations and objectives of paragraph 34 of the National Planning Policy Framework; and

ii) by promoting ways to reduce the traffic impact of this development and the University's other activities within Cambridge, and by "managing down" traffic generation, the Development supports the policy of the Department for Transport's Circular 02/2013.

4.3.2 The Development also accords with important local transport and planning policy requirements:

i) of Policy 18 of the Cambridge Local Plan - by including a comprehensive transport strategy for the site, incorporating a sustainable transport plan to minimise reliance on private cars – including an assessment of the level, form and type of car parking on the site, as well as enhancing links for walking, cycling and public transport links (including access for all) to the city centre, railway station(s), other principal educational and employment sites, and other key locations within the city to support sustainable development;

ii) by improving the local footpath and cycleway network as an integral part of a wider transport system – thus improving access to the surrounding countryside – according with the Cambridgeshire Rights of Way Improvement Plan; and

iii) of the measures identified within the Cambridge Long-Term Transport Strategy, the public transport strategy would deliver enhanced public transport services.

4.3.3 West Cambridge could also assist in the delivery of the Greater Cambridge City Deal. The University has met regularly with the CCC's City Deal consultants to understand the latest position with the City Deal design, to incorporate potential options seamlessly into the emerging masterplan by potentially accommodating the following potential sections of the Arc and East-West City Deal routes within West Cambridge – albeit that details have not been confirmed yet. Notwithstanding, the Development proposals and required transport mitigation identified in this Transport Assessment are independent of the emerging City Deal proposals, and will adequately mitigate the transport impact of the Development. As such, the West Cambridge outline planning application does not rely on the City Deal proposals for mitigation. If the City Deal measures do come forward and supersede any of the mitigation proposed by the University, it is expected that relevant agreed levels of contribution for specific mitigation identified herein could be reallocated (with the University and County's agreement) to support these City Deal measures.

4.3.4 This Transport Assessment identifies the transport strategy and travel demand management measures to ensure that the Site will be developed in accordance with national and local policy, as well as the broad long-term strategy for the development of Cambridge as set out in the local planning documentation

4.3.5 Overall, the proposals for the Development, and the transport strategy evolving to support it, will make a substantial and significant contribution to the achievement of sustainable development objectives and policies for the Cambridge area.

# *PART 2 DEVELOPMENT ACCESS AND MOVEMENT DETAILS*

*Part 2 of the Transport Assessment contains the following sections:*

**Section 5 - Access and Movement Strategy**

**Section 6 - Pedestrian and Cycle Strategy**

**Section 7 - Public Transport Strategy**

**Section 8 - Car Parking Provision, Vehicular Access and Site Layout**

**Section 9 - Travel Demand Management Strategy**

**Section 10 - Construction Access Strategy**

# 5 Access and Movement Strategy

## 5.1 Introduction and Policy background

5.1.1 As summarised in Section 4, both national and local planning / transport policy have a series of objectives to integrate planning and transport at all levels, through the promotion of development uses located to enable good accessibility by non-car modes of transport.

5.1.2 This policy context for sustainable travel is established within the National Planning Policy Framework. This Framework emphasises that development and transport systems should be planned in order to reduce the need to travel and increase the use of sustainable transport modes to encourage people to move about by foot, cycle and bus.

## 5.2 Transport Objectives

5.2.1 The overall transport strategy for the Development responds to a number of important national regional and local objectives, which may be summarised as follows:

i) providing development components, development layout and disposition of uses designed from the outset to be inherently sustainable, pedestrian and cyclist friendly, being based upon the provision of an integrated transport system as well as minimising the distance to travel overall;

ii) encouraging the use of sustainable forms of transport such as walking, cycling, and public transport, thus reducing the dependency on the motor vehicle;

iii) minimising the traffic impact of the Development;

iv) assisting in reducing the number and severity of personal injury collisions on the local roads;

v) integrating the Development proposals with the wider existing and proposed transport network;

vi) reducing “greenhouse gas “vehicle emissions; and

vii) implementing a Travel Plan / Travel Demand Management strategy for the Development.

## 5.3 Summary of the Development Access and Movement Strategy

5.3.1 The Access and Movement Strategy set out in the following five sections reviews the overall accessibility of the Site for pedestrians, cyclists and public transport users, which enable the mode use targets stated in Section 10 to be set. It also sets out the accessibility strategies for each mode to enhance connectivity and accessibility both on- and off-site to encourage local journeys by sustainable modes of travel.

5.3.2 The basis for the access and movement strategy for the Development is set out on the Access Parameters Plan for the Development prepared by Aecom, reproduced in Appendix 2.2.

5.3.3 This strategy provides public transport connections for the major residential and employment areas along a high density development public transport priority route.

5.3.4 The elements of this Development Access and Movement Strategy are considered individually in the following sections:

- Section 6 – Pedestrian and Cycle Strategy;
- Section 7 – Public Transport Strategy;
- Section 8 – Site Layout, Vehicular Access and Parking Provision;
- Section 9 – Travel Demand Management Strategy;
- Section 10 – Construction Access Strategy.

# 6 Pedestrian and Cycle Strategy

## 6.1 Introduction

6.1.1 It is widely acknowledged that Walking forms the most important mode of travel for local trips, and across the UK offers the greatest potential to replace short distance car trips of less than 2km (as set out in previous Government Policy such as PPG13). Similarly, and also across the UK, Cycling offers the greatest potential to replace short- and medium-distance car trips up to 5km. Local evidence referred to by the Highway Authorities suggests that people within Cambridge Walk and Cycle further distances than the national average. As such, Walking and Cycling form essential elements of the Access and Movement Strategy for the Development.

6.1.2 This Section considers further the following aspects of Pedestrian and Cycle movement:

i) Summary of the Policy background;

ii) Travel Demand Management measures to promote Walking and Cycling usage;

iii) On-site infrastructure strategy;

iv) Off-site infrastructure strategy – considered by the three individual major corridor routes.

6.1.3 This Section identifies that the Development is well-located for Walking and Cycling with respect to existing Pedestrian and Cycle facilities, and to connect to other emerging developments and infrastructure proposals in the area. The Development will deliver safe, high-quality infrastructure in the area further to support and encourage Walking and Cycling. As such, it is concluded that Walking and Cycling will form a significant percentage of the mode share for local trips, reflecting and responding positively to local and national policy guidance and strategies.

6.1.4 The proposed strategy outlined in this section was derived following:

i) a series of workshops with the West and North West Cambridge Cycling Group, a community group set up to seek local information relating to existing operational issues;

ii) an initial response from the Cambridge Cycling Campaign;

iii) a review of existing Cycle movement data – including the Strava Heatmap, and an analysis of home postcode information for existing occupants of West Cambridge, as provided by the University; and

iv) further meetings with the Highway and Cycling Officers of Cambridge City and Cambridgeshire County Councils.

6.1.5 As agreed with the Joint Authorities, as equestrian movements will not contribute in any measurable degree towards the stated objectives of reducing car-based journeys to work, the provision of new equestrian facilities across the Site to support the existing bridleway will not form a part of the strategy.

## 6.2 Policy background

6.2.1 The National Planning Policy Framework states that:

- a core land-use planning principle is that development should "make the fullest possible use of … Walking and Cycling, and focus significant development in locations which are or can be made sustainable"; and

- "developments should be located and designed …. to create safe and secure layouts which minimise conflicts between traffic and cyclists or pedestrians".

6.2.2 This policy context is supported by the objectives of the Cambridgeshire Rights of Way Improvement Plan, i.e., an emphasis of the need to improve and promote the public rights of way network in the area, give priority to Walkers and Cyclists throughout the Site, and to provide quality links to the surrounding Walking and Cycling network.

6.2.3 The proposed Development Walking and Cycling strategy further reflects fully the policy identified within the NPPF and the Transport Strategy for Cambridge and South Cambridgeshire by:

i) implementing travel demand management strategy techniques to enhance the status of Pedestrian and Cycling modes;

ii) providing enhanced infrastructure where necessary to assist Pedestrian and Cyclist movements.

## 6.3 Likely Future Cycle Movements

6.3.1 Using the Peter Brett Associates' Spreadsheet Model, an assessment has been undertaken of the likely future AM cyclist movements to West Cambridge in 2021 (i.e., including for the existing occupiers, and those potentially relocating to West Cambridge). The output is reported in Appendix 6.1 and summarised in Table 6.1.

6.3.2 This assessment supports the commentary to the existing Development Cycle movements reported in Section 3, with:

i) around 30% of movement to the north, across Madingley Road;

ii) around 65% of movement to the east, along the existing facilities along Madingley Road and Coton Path towards the City; but

iv) with a very limited number, only around 6% of existing cycle movements, assigning to the west across the motorway.

Table 6.1: Likely Cycle to West Cambridge Movements (2021)

| Corridor | Total | % |
|---|---|---|
| Eddington Avenue (North) | 148 | 15% |
| Madingley Rise (North) | 152 | 15% |
| Storey's Way (North-East) | 28 | 3% |
| Madingley Road (East) | 574 | 47% |
| Burrell's Walk (East) | 29 | 3% |
| West Road (east) | 72 | 7% |
| Grange Road (South) | 47 | 5% |
| Coton Path (West) | 37 | 4% |
| Madingley Road (West) | 19 | 2% |

Source: PBA Spreadsheet Model.

## 6.4 Measures to promote Walking and Cycling usage

6.4.1 This section presents a Walking and Cycle Strategy to be brought forward with the proposals for West Cambridge, in the context of the new development at the North West Cambridge and the surrounding existing Cycling infrastructure.

6.4.2 Reflecting the post code data in Table 6.1, the West Cambridge Development Strategy proposes changes to the wider network of routes to:

- ensure good permeability through West Cambridge;
- strengthen links between West Cambridge and the adjacent North West Cambridge;
- improve access to the surrounding area, including to the City Centre.

6.4.3 This Strategy is based on:

- a review of the existing Walking and Cycling network;
- Walking and Cycling infrastructure improvements already proposed or under construction by others; and
- an initial assessment of Walking and Cycle demand forecasts to identify further improvements that may be required to ensure future levels can be safely and efficiently accommodated.

6.4.4 The measures that are to be implemented at the Development to encourage Walking and Cycling include:

6.4.5 ***Design concept*** – a principal objective is to deliver a compact mixed-use development that would encourage sustainable travel choices, particularly Walking and Cycling – as emphasised in the Department for Transport's Manual for Streets (2007);

6.4.6 ***Site Design and Layout*** – the following principles have been incorporated in the Development design to reduce the number of car trips to and from the Site by encouraging Walking and Cycling:

- in terms of cycle link capacity, reference has been made to the guidance for potential peak hour flows reported in the London Cycling Design Standards (2014 - Transport for London) to ensure that the cycling facility is fit for purpose. These width guidance standards and flow categories are summarised in Table 6.2 and Table 6.3 respectively:

Table 6.2: Summary of guidance on widths

| Facility | Recommended minima | | |
|---|---|---|---|
| **Cycle Lanes** | **2.0 metres** | | |
| | Lanes of 1.5 to 2 metres may be acceptable provided that the adjacent traffic lane does not have fast-moving traffic and a high proportion of HGVs and is not less than 3.2 metres wide.) | | |
| **Near-side lead-in lanes to ASLs** | **1.5 metres** | | |
| | This should be for short lead-ins only, allowing space for cyclists to pass waiting traffic and access the ASL. Site-specific physical and traffic conditions may dictate that a 1.2- to 1.5 metre lead-in is preferable to no lead-in. | | |
| **Bus / Cycle lanes** | **4.5 metres** | | |
| | A narrow bus lane for 3.0 to 3.2 metres may be provided in constrained scenarios but this does not allow for overtaking. Bus lanes of 4.0 to 4.5 metres can be acceptable, depending on-site specific conditions with the risk associated with bus or cycles crossing into the adjacent lane when overtaking. | | |
| **Cycle tracks** | | **one-way** | **two-way** |
| Including segregated lanes | very low / low flow<br>medium flow<br>high / very high flow | 1.5 metres<br>2.2 metres<br>2.5 metres + | 2.0 metres<br>3.0 metres<br>4.0 metres + |

Source: Figure 4.11, LCDS Summary of guidance on widths on carriageway

6.4.7 With respect to near-side lead-in lanes to ASLs further guidance states that in more free flowing conditions it may be safer to remove any nearside lane as this may encourage cyclists to take a position on the road that could increase their risk of left turn collisions.

Table 6.3: Flow categories for Cyclists

| | Peak hour categories for Cyclists on lane / track | | Daily flow categories for Cyclists on carriageway | | | |
|---|---|---|---|---|---|---|
| | Peak Hour | | Peak Hour | | 24-hour | |
| | one-way | two-way | one-way | two-way | one-way | two-way |
| Very Low | <100 | <100 | <600 | <600 | <800 | <800 |
| Low | 100-200 | 100-300 | 600-1,000 | 600-2,000 | 800-1,600 | 800-2,000 |
| Medium | 200-800 | 300-1,000 | 1,000-4,000 | 2,000-6,000 | 1,600-5,500 | 2,000-8,000 |
| High | 800-1,200 | 1,000-1,500 | 4,000-5,000 | 6,000-8,000 | 5,500-6,000 | 8,000-10,00 |
| Very High | 1,200+ | 1,500+ | 50,0+ | 8,000+ | 6,000+ | 10,00+ |

Source: Figures 4.12a and b, LCDS - Peak hour flow categories for cyclists

- to ensure that the focus of the accessibility strategy for the Site remains strongly in favour of sustainable modes of transport, the Site has been provided with permeable footways and low speed streets throughout the Development, with Pedestrian crossings delivered on the site access roads along the desire lines;

- as shown on Figure 6.1, for the on-site provision the following is proposed:

- **North - South connections** - between Madingley Road and Coton Path using the Western Access / Ada Lovelace Road, High Cross, JJ Thomson Avenue and Clerk Maxwell Road. These links will be supported with improved crossings on Madingley Road;

- **East - West Shared Space Link** – In addition to a traffic-calmed Charles Babbage Road, new shared used paths will be provided to the north and south:

  - the route to the south of Charles Babbage Road will provide a more direct link than Coton Path, through the Development to the motorway bridge;

  - the route to the north will connect High Cross with Clerk Maxwell Avenue with a slight diagonal alignment. This will assist in providing a more direct link from North West Cambridge to the City Centre;

- as with North West Cambridge, all vehicle routes will be designed for a 20mph speed limit using passive speed management measures - such as constrained widths and the use of shared surface areas. This low-speed environment is primarily to control vehicle speeds, but in so doing will create a safe and attractive environment for Pedestrians and Cyclists;

- key footways within the Development will be defined as shared use to ensure good connections between the main on-road routes and the network of traffic free routes and local links to areas of cycle parking.

6.4.8 ***Services and Facilities*** – a series of measures will be implemented within the Development to encourage Walking and Cycling, including:

- footways would be provided on both sides of the on-site streets and at the Site Access locations. Controlled crossing points would be provided, and traffic calming measures would be present to reduce traffic speed and to ease Pedestrian movement;

- high levels of quality Cycle parking - at least to the adopted Cambridge Local Plan 2014 minimum Cycle parking standards - will be provided within private covered, secure, lit and well-located areas at the destinations, as well as further provision through the Development. The intention is to reflect the existing quality cycle parking provided on site, such as outside the Sports Centre (which, indeed, was complimented by the Cambridge Cycle Campaign in correspondence);

- all major employers would be required to provide associated shower and changing room facilities to support more active journeys such as those wishing to undertake longer distance cycling or to run or jog to and from the Development; and

- application of a Cycle Parking Provision and Management Strategy – see Section 8. Cycle parking will be provided as near as possible to the main entrance of the buildings, and will be covered by natural surveillance and CCTV.

## 6.5 On-site Infrastructure

6.5.1 The Pedestrian and Cycle infrastructure strategy within the Development, shown on Figure 6.1, has been determined to respond to the following three aspirations:

i) to provide fully permeable and safe routes throughout the Development;

ii) to provide connectivity between the Development and the surrounding area; and

iii) to enhance existing connectivity between surrounding areas using routes through the Development.

6.5.2 The on-site infrastructure strategy within West Cambridge responds to the following issues raised by Cambridge Cycling Campaign of:

i) lack of attractive cycle routes through the Development and connectivity to the wider network;

ii) two-tier provision – concerns over mixing with motor vehicles or pedestrians; and

iii) lack of route continuity, and the priority afforded to motor vehicles.

6.5.3 Whilst wide junctions formed with large radii are not generally approved by cyclists, the on-site road infrastructure has to reflect the likely range of users. Notwithstanding, all routes within the Development will be designed in accordance with the principles of the suite of Manual for Streets design guidance to contain vehicle speeds and flows, and to provide a quality streetscape.

6.5.4 These Pedestrian and Cycle connections through the Development will ensure safe, attractive connectivity to surrounding areas. They will also significantly enhance and improve the linkages between existing developments – such as Madingley and Coton and the City Centre, and Girton and North West Cambridge and the south of Cambridge – by providing direct quality links on desire lines through the Development.

6.5.5 As shown in Appendix 3.1, Cambridgeshire County Council has delivered a combined cycleway / footway along much of Madingley Road, albeit that this is not contiguous between the City and the Park and Ride Site – a gap is formed in the provision to the west of Madingley Rise. Whilst comments have been received from the City Council suggesting that the University provide infrastructure to complete this link, this gap would not have affected the movements to West Cambridge as the on-site facilities would provide a quality alternative, negating the need for this.

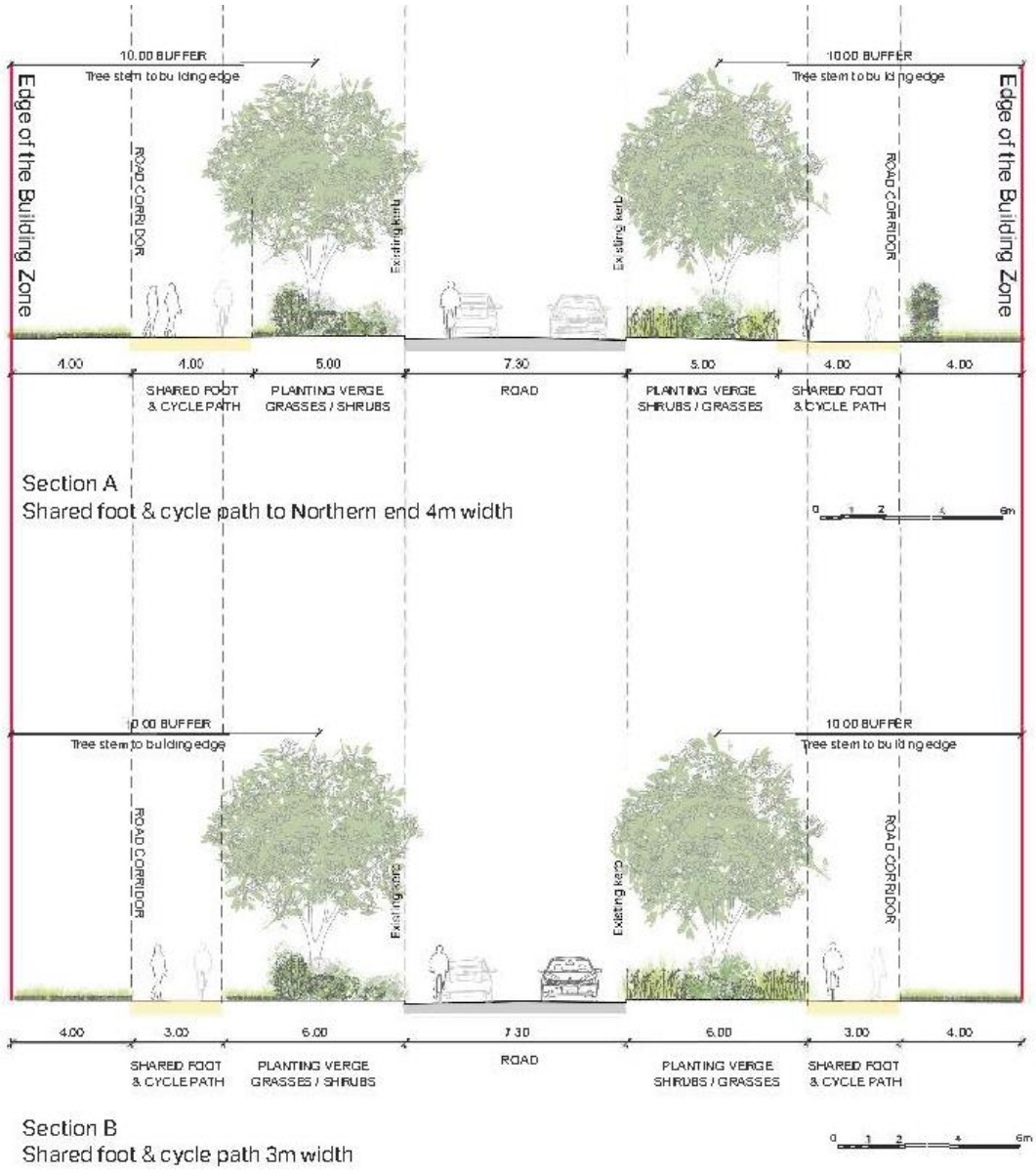
6.5.6 The proposed cross-sections for the main roads within the Development are detailed.

## JJ Thomson Avenue and High Cross

6.5.7 JJ Thomson Avenue, High Cross and the Western Access Road will deliver North - South connectivity through the Development.

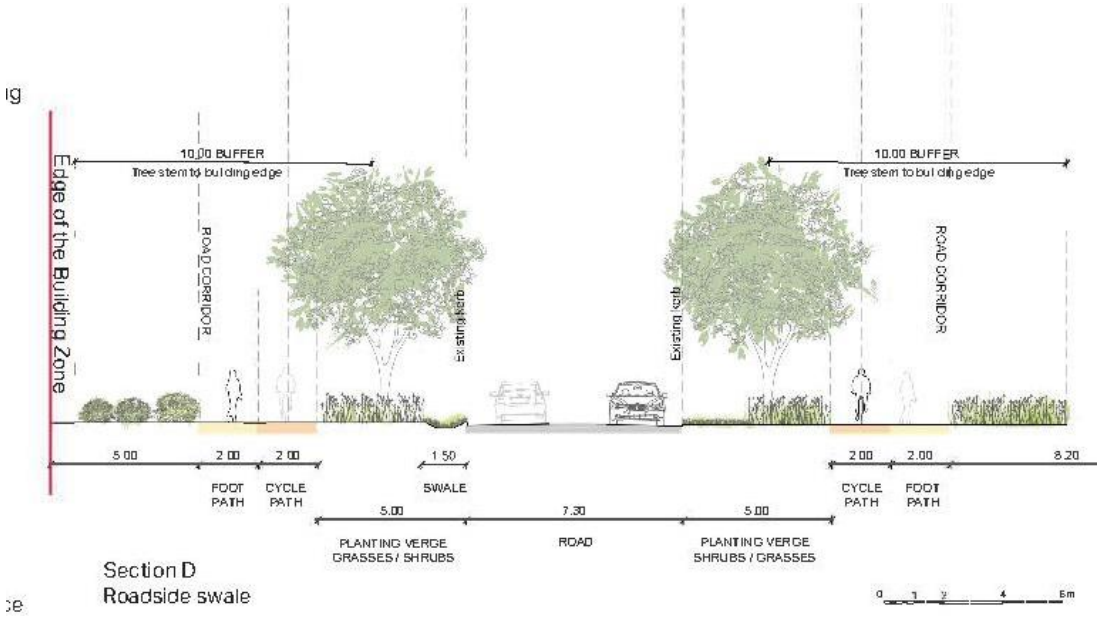
6.5.8 JJ Thomson Avenue and High Cross will cater for the majority of the through-development north – south Pedestrian and Cycling activity and so will be designed to accommodate higher volumes of movement. The proposed road layouts are designed to accommodate the majority of cyclists being on-road but within a low speed trafficked environment. Typical proposed cross sections for each of these 7.3 metre wide carriageways are shown in Figures 6.2 and 6.3 respectively:

Figure 6.2: JJ Thomson Avenue Proposed Range of Road Cross Sections




(Source: AECOM)

Figure 6.3: High Cross Proposed Road Cross-Section




(Source: AECOM)

## Western Access Road

6.5.9 As the level of Walking and Cycling movement along the Western Access Road will be lower than JJ Thomson Avenue or High Cross, the infrastructure provision would therefore be correspondingly less.

6.5.10 To facilitate these new movements, the existing on-carriageway car parking along this road will be removed as part of the West Cambridge car parking strategy. The resultant carriageway will be maintained at 5.4 metres wide, with a 3.0 metre shared use path on the eastern side of the road and a widened 2.0 metre-wide footway on the western side. This is shown on Figure 6.4:

Figure 6.4: Western Access Road Proposed Road Cross-Section

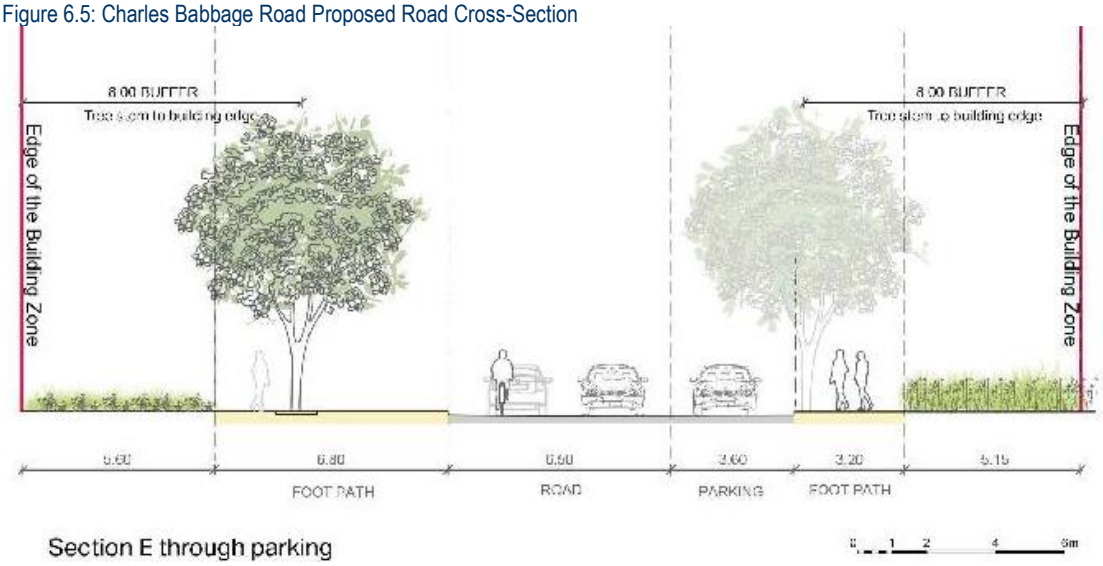

Source: AECOM)

## Charles Babbage Road

6.5.11 Charles Babbage Road will provide direct East – West connectivity through the Development for all movement.

6.5.12 Charles Babbage Road has a 6.5 metre carriageway for vehicles, with each side of the carriageway having a planting and tree buffer with adjacent footways. Given the available widths of these footways they are not considered wide enough for shared use and so the intention is to ensure all cycling can take place safely on-road. While the road width is 6.5 metres no median strip is proposed as it is considered that the 7 courtesy crossings proposed along Charles Babbage will be sufficient to create a low speed trafficked environment. A typical cross section is shown in Figure 6.5:

Figure 6.5: Charles Babbage Road Proposed Road Cross-Section




(Source: AECOM)

### Side Road Junctions

6.5.13 To ensure pedestrians and cyclists maintain an appropriate level of priority at side roads and along desire lines, junction treatments will create areas of shared space in which courtesy crossing activity can take place. These junction treatments will use consistent surface materials, tightened junction radii (where appropriate) and a removal of all road markings to create space where all movements can take place safely.

6.5.14 Inter-visibility between Cyclists and Motorists is essential to provide each with sufficient time to assess the situation on the approach and enhance safety. This means that the proposed landscaping – the tree species and hedgerows - will be designed so these should not inhibit inter-visibility between all road users on approach to all side roads. and accesses to major occupiers.

### Summary

6.5.15 The strategy outlined above has been derived in conjunction with the Joint Authorities, and provides a cycle route network defined by an on-road provision within a low speed and trafficked environment. This is achieved through narrow lanes widths; frequent courtesy crossings at side roads and on pedestrian desire lines; tighter corner radii and the removal of road markings (e.g. centre lines and give-ways).

6.5.16 This on-road provision is supported by a two new east-west shared use paths running through the site to the north and south of Charles Babbage Road. These routes will provide a comfortable route for both pedestrians and cyclists away from vehicular traffic. The final element to the on-site provision is the creation of shared use footways on both sides of High Cross and JJ Thomson Avenue and which ensure good connections between the on-road and off-road routes but also to facilitate local links to areas of cycle parking.

6.5.17 With good signing this strategy meets the criteria that define good cycle routes and by keeping cyclists on-road ensures that the network can adapt to accommodate future increases in cycling across and through the site.

## 6.6 Off-site infrastructure enhancements

6.6.1 The Development is anticipated to generate increased levels of Cycling and Walking trips across the network. To enhance the existing Pedestrian and Cyclist connectivity shown on Figure 6.6 further, the following infrastructure enhancements will be provided by the Development. These proposals are entirely compatible with the proposals of the County Council and other developers in the area referred to previously.

6.6.2 The Off-site Walking and Cycling infrastructure enhancement strategy shown on Figure 6.7, responds to the comments of the North West Cambridge Cycling Group and the Cambridge Cycling Campaign and considers the following elements:

- resolving existing road safety issues;
- to the north – towards North West Cambridge, Girton and Huntingdon Road;
- to the City Centre – along Coton Path, Adams Road and Burrell's Walk;
- towards the City Centre – along Grange Road, West Street, and Silver Street.

6.6.3 Several of the infrastructure enhancements on these routes involve the delivery of a "Cycle Street". A Cycle Street enhances the priority of Cycle movements over those of motor vehicles through a combination of measures including:

- the implementation of road markings emphasising the Cycle route;
- rationalised car parking bays - to achieve good inter-visibility between all road users;
- appropriate waiting and loading restrictions;
- removed centre line road markings;
- narrowed road carriageways and other traffic-calming measures – potentially using sinusoidal speed humps.

6.6.4 The objective of a Cycle Street is to reduce vehicle speeds to those of a typical Cyclist - thereby removing a major potential conflict caused by overtaking manoeuvres.

## 6.7 Resolving existing road safety issues, and environmental improvements

6.7.1 As identified in the Road Safety Review in Section 3, there appear to be two existing road safety issues on the local network disproportionally affecting cyclists:

i) a number of conflicts between cyclists / motor cyclists and motorists both passing from west to east at the Madingley Road / Storey's Way junction; and

ii) a similar number of conflicts at Madingley Road / Grange Road traffic signal controlled junction between left-turning motorists and cyclists travelling straight ahead.

6.7.2 In addition, the University will contribute towards the costs of implementing a reduction in the existing 40mph speed limit on Madingley Road (see below).

6.7.3 These measures are considered further.

### Madingley Road / Storey's Way ghost island priority junction

6.7.4 Three collisions have occurred at this junction between cyclists / motor cyclists and vehicles, all of whom were passing from west to east.

6.7.5 The Madingley Road / Storey's Way junction is a ghost island priority junction, with the extent of the right turning lane defined by two physical islands within the carriageway. A toucan crossing is located approximately 30m to the east of Storey's Way. Whilst a cycleway has recently been delivered by Cambridgeshire County Council in the northern verge along Madingley Road, from on-site observation a significant percentage of cyclists continue to travel on the carriageway of Madingley Road.

6.7.6 Whilst the physical islands provide some protection for vehicles waiting to turn into Storey's Way, as well as some limited protection for pedestrians crossing Madingley Road, they provide a constraint to the available carriageway width. It appears that this reduction in carriageway width results in vehicles drifting towards the channel where cyclists will generally be, and the conflicts occur.

6.7.7 It is suggested that these islands are unnecessary to provide the protection for the turning vehicles – especially within the Cambridge urban context – and that priority is provided for crossing Cyclists and Pedestrians at the toucan crossing immediately adjacent.

6.7.8 To assist in resolving this existing issue, the University will work with Cambridgeshire County Council in promoting scheme to remove the physical islands - to be replaced with at-grade carriageway construction, to extend the advisory cycle lane across the junction up to the dropped kerb to access the toucan to the east. This concept is shown on Figure 6.8.

### Madingley Road / Grange Road junction

6.7.9 Four collisions have occurred at this junction between cyclists and vehicles:

i) two cyclists passing from east to west being struck by left turning vehicles; and

ii) one cyclist passing west to east being struck by a vehicle;

iii) one cyclist changing lane to pass from west to south being struck by a vehicle.

6.7.10 On the eastern approach to this junction, the Advanced Stop Line is connected by a short length – approximately 15m - of feeder cycle lane. Whilst the western approach has an Advanced Stop Line, there is no feeder cycle lane. It is suggested that this feeder lane is encouraging cyclists to increase speeds through the junction, potentially undertaking, leaving them vulnerable to the motorists turning ahead of them.

6.7.11 To assist in resolving this existing issue, the University will work with Cambridgeshire County Council in promoting a scheme to resolve this. The works would include:

i) extending the advanced stop line on both Madingley Road approaches to 7.5m;

ii) review whether cycle “head-start” green times can be included within the traffic sign controls; and

iii) providing a road-side safety mirror on the traffic signal posts – this will both alert motorists of this issue, as well as making approaching cyclists more conspicuous to motorists.

### Environmental Improvements

6.7.12 A 40mph speed limit is in force on Madingley Road adjacent the West Cambridge Development between the M11 Junction 13 and the approaches to the JJ Thomson Avenue junction.

6.7.13 Whilst this speed limit was appropriate when the traffic regulation order was applied - for the suburban Madingley Road link, being on the outskirts of Cambridge - conditions along Madingley Road have changed significantly subsequently. With the implementation of the North West Cambridge Development and the West Cambridge Development proposals, Madingley Road will be increasingly used by pedestrians and cyclists. As such, a speed limit slower than 40mph would be appropriate.

6.7.14 To provide an environmental enhancement in the locality of West Cambridge, the University will provide a contribution towards the costs of the necessary traffic regulation order to implement this reduced speed limit. The lower vehicle speeds will provide safety benefits for existing users of Madingley Road, as well as for the pedestrians and cyclists generated by West Cambridge

## 6.8 Off-site infrastructure enhancements towards the north

6.8.1 As shown on Figure 6.6, movement towards the north on the Existing Cycle Network – along Madingley Road and through North West Cambridge to Girton and along Huntingdon Road – can make use of the extensive Walking and Cycling facilities provided by:

- Cambridgeshire County Council - along both Madingley Road and Huntingdon Road; and
- the University - the facilities provided through North West Cambridge – including the Ridgeway, and via Eddington Avenue, Madingley Rise and Observatory Drive.

6.8.2 To enable the users of West Cambridge Development to utilise these facilities all require quality crossings of Madingley Road. Madingley Road is a major arterial road connecting central Cambridge with the strategic M11 Junction 13. As such, Madingley Road can present a barrier to accessibility; hence there is the need to ensure safe and efficient crossings for Pedestrians and Cyclists.

6.8.3 North West Cambridge and West Cambridge have amended - or propose to amend - the Site Access junctions along Madingley Road to improve vehicular accessibility to these developments. Whilst provision has also been made for controlled crossing of Madingley Road by Pedestrians and Cyclists, these existing facilities would need to be further enhanced to accommodate the expected increased Pedestrian and Cyclist flows. More significant infrastructure would be required.

6.8.4 Whilst high levels of movement of Pedestrians and Cyclists are predicted at the High Cross and JJ Thomson Avenue junctions, to minimise the impact on vehicle movements along Madingley Road the strategy includes for the adoption of a series of crossings to disperse the movements to a series of locations. Indeed, this would also provide a benefit of offering Pedestrians and Cyclists more direct routes to their destinations within West Cambridge. Pedestrian and Cyclist controlled crossings exist or are proposed at the following locations on Madingley Road:

- around the existing Madingley Road / High Cross junction – albeit that this junction would be enhanced during the duration of West Cambridge;
- between Madingley Rise and JJ Thomson Avenue – where a new at-grade toucan crossing has recently been delivered (see Appendix 6.2);
- between Observatory Drive and Clerk Maxwell Road – a new informal crossing with enhanced islands is proposed to improve movements between Observatory Drive / Storey's Way and Clerk Maxwell Road – see below;
- the Storey's Way junction – an existing toucan crossing which provides a link to the segregated path which connects Madingley Road to Clarkson Road; and
- between Lady Margaret Road and Grange Road – working with Cambridgeshire County Council and Cambridge City Council to investigate the need for a shared use pedestrian / cyclist crossing (a "Cycle Zebra" crossing). If shown to be appropriate, to make contributions towards its delivery;
- at a later phase, a new toucan crossing within the Madingley Road / Western Access Road traffic signal controlled junction, providing a connection between the combined facility within the northern verge, to the footway and Western Access Road to the south.

Further details are provided of these potential options.

## Grade separated crossing options at the Madingley Road / High Cross junction

6.8.5 Peter Brett Associates' Spreadsheet Modelling was used to assess the optimum location for crossings between West Cambridge and North West Cambridge Developments across Madingley Road. This work indicated that one ideal location would be at the High Cross junction, as:

- this appears best to reflect a key desire line for Cyclists and Pedestrians between the developments, resulting in the maximum usage; and

- it reduces the demand at the alternative at-grade toucan crossing at Madingley Road / Madingley Rise / JJ Thomson Avenue, thus reducing the impact on the vehicle network capacity.

6.8.6 The Madingley Road / High Cross junction that was delivered as part of the North West Cambridge Development is shown in Figure 6.9. This scheme includes feeder Cycle lanes and Advanced Stop Lines, with at-grade Cyclist and Pedestrian crossing facilities on all arms.

6.8.7 Whilst these facilities are appropriate for the initial phase of development, the predicted use at this junction by Pedestrians and Cyclists following the full delivery of West Cambridge suggests that these at-grade facilities would be unlikely to accommodate the level of movement through this junction without impacting adversely on the vehicle capacity along Madingley Road. A number of options would be considered, including:

- enhanced at-grade facilities - providing wider feeder Cycle lanes, segregated Cycle lanes with separate signal phases for Cyclists, or Cycle crossings running parallel to the Pedestrian crossings – shown indicatively on Figures 6.10 and 6.11. To maintain sufficient vehicle capacity at this junction, this is likely to result in an increase of the size of the junction - which would require further land - potential future schemes at this junction are shown;

- a Bridge (Figure 6.12) or Tunnel (Figure 6.13) grade-separated crossings - given the desire line and constraints of existing infrastructure and land ownership, and noting the difficulties associated with providing better at-grade Cycle facilities, alternative potential Bridge or Tunnel grade-separated crossings were investigated.

6.8.8 Which option would be progressed is also influenced by proposals by Cambridgeshire County Council for the A428 / A1303 Corridor Enhancement. Within the context of the adopted Adaptive Phased Approach for assessing mitigation for West Cambridge, the University will work with the County Council to deliver a quality junction providing a reasonable balance of capacity for all modes – albeit not during the Initial Phase of development, but at the appropriate time within the development delivery.

### Enhanced crossing between Observatory Drive and Clerk Maxwell Road

6.8.9 To enhance direct movement between the Walking and Cycling route on Observatory Drive and Clerk Maxwell Road – accessing the eastern side of West Cambridge – an enhanced uncontrolled crossing of Madingley Road is proposed. This is shown on Figure 6.14.

### Clerk Maxwell Road

6.8.10 Uncontrolled car parking is allowed on-road along Clerk Maxwell Road, where approximately 85 - 90 car parking spaces are currently available. From observation, these spaces are regularly occupied, resulting in a poor quality link for cyclists and local residents, as well as increasing vehicle activity along this link.

6.8.11 The parking on this road would be susceptible to overspill car parking from West Cambridge.

6.8.12 As discussed and agreed with the Joint Authorities, the University would contribute towards the costs of this existing on-road car parking being removed from both sides of the carriageway, and being replaced with two advisory cycle lanes. This would provide significant betterment for residents and cyclists, and improve the quality of the public realm on this link.

### Shared use Pedestrian / Cyclist crossing between Lady Margaret Road and Grange Road

6.8.13 To assist westbound cyclists to cross Madingley Road, to make full use of the existing on- and off-road cycle facilities provided in the northern verges of Madingley Road, a shared use pedestrian / cyclist crossing (a "Cycle Zebra" crossing) located between Lady Margaret Road and Grange Road would assist. The University will work with Cambridgeshire County Council and Cambridge City Council to investigate the demand, and if concluded to be appropriate, to make contributions towards its delivery. The approximate location is shown on Figure 6.7, a plan is shown on Figure 6.15.

### Toucan crossing at the Western Access Road

6.8.14 To enhance direct movement between the combined facility in the northern verge, to the footway and Western Access Road to the south, a new toucan crossing will be provided within the Madingley Road / Western Access Road junction.

## 6.9 Off-site infrastructure enhancements towards the East

6.9.1 Movement between West Cambridge and the East is focused along Coton Path and Adams Road. Whilst this route can make use of the extensive existing Walking and Cycling facilities, it is intended further to enhance this existing infrastructure.

6.9.2 These elements are shown on Figure 6.16 and 6.17, and are considered individually.

### Coton Path

6.9.3 The Coton Path is located along the southern boundary of West Cambridge, and forms part of a quality, direct link between Adams Road (the eastern side, leading to the City) and Coton (to the west) for Pedestrians and Cyclists.

6.9.4 The home post code data summarised in Section 3 identifies that there are only a limited number of users of West Cambridge cycling in from the west, using the western end of this facility: and indeed, the County Council's proposals for the A428 / A1303 Corridor include for quality cycling infrastructure. As such, the proposed infrastructure enhancements for West Cambridge are focussed towards the east, being the greater percentages of existing users are resident – this ensures the maximum benefit from the mitigation.

6.9.5 To enhance Walking and Cycling, the University would make contributions towards the delivery of the following improvements to the existing Coton Path route, reflecting the concerns of the West and North West Cambridge Cycling Group, and the Cambridge Cycling Campaign:

- as shown on Figure 6.1, at the western end of West Cambridge, a new Cycle and Pedestrian route will be provided between the M11 bridge crossing and the Western Access Road within West Cambridge. This will reduce the distance between these two points by approximately 250 metres, providing better access to locations within West Cambridge;

- the Coton Path will be widened within the boundary of the West Cambridge site, where achievable, to improve connections to the east;

- improved connections to Coton Path will be redesigned to improve the layout for pedestrians and cyclists accessing West Cambridge. The key connections to be improved include those that connect Charles Babbage Road to the Southern Ecological Corridor and that at the end of Clark Maxwell Road. The existing link between the Hauser Forum and Broers Building will continue to be pedestrian use only;

- as suggested by the Cambridge Cycle Campaign, maintenance to the existing vegetation that currently reduces the effective width of this route constraining forward visibility;
- the route would be realigned where possible to remove the sharp turns along Coton Path directly to the south of West Cambridge; and
- the eastern terminus of the Coton Path – the junction with Wilberforce Road and Adams Road – will be redesigned providing a more direct and continuous route for Cyclists while also slowing passing vehicles – thus prioritising Cycle movements. Details are shown on Figure 6.18.

### Adams Road

6.9.6 Adams Road is a 7.3m wide single carriageway accessing residential properties, University facilities and a sports field to the north.

6.9.7 Whilst Pedestrians may make use of the existing footways in either verge, the easy movement of Cyclists along Adams Road is obstructed and constrained by the parked vehicles on either side. As the residential properties are provided with off-road car parking, Cambridge City Council has suggested that much of the car parking is commuter parking.

6.9.8 As shown on Figure 6.16, it is proposed that a Cycle Street environment could be created along Adams Road. As part of this, the University will contribute to the necessary traffic regulation orders to rationalise parking to provide more road space for Cycling.

6.9.9 As well as the car parking control, the Cycle Street scheme would require traffic-calming and the implementation of a 20mph speed restriction, to which the University will contribute.

6.9.10 This would deliver a high capacity, two-way on-road Cycle route along Adam Road to enhance movements to the east – and indeed, these proposals reflect the aspirations of the Cambridge Cycling Campaign.

### Grange Road / Adams Road / Burrell's Walk Traffic Signal Controlled Junction

6.9.11 The existing Grange Road / Adams Road / Burrell's Walk junction is a four-arm traffic signal controlled junction. Pedestrian and Cycle movements are assisted by the provision of advanced stop lines on each of the three carriageway approaches, and the provision of Push-to-Walk buttons on each corner.

6.9.12 Following the enhancements to the Pedestrian and Cyclist route to West Cambridge, the junction will be reviewed:

- the junction signal timings will be reset better to accommodate the increased Pedestrian and Cyclist movements along Adams Road;
- consider whether cycle "head-start" green times can be included within the traffic sign controls; and
- to consider the delivery of further Cycle priority, by modifying the advanced stop line to increase Cycle stacking space.

6.9.13 The existing speed table infrastructure at this junction will remain, but the road markings will be renewed.

## 6.10 Off-site infrastructure enhancements towards the City Centre

6.10.1 Existing Pedestrian and Cycle movement to the east - beyond Adams Road towards the City Centre - is currently focussed on the existing Burrell's Walk.

6.10.2 Whilst acknowledging that there are some enhancements that could be made to the Burrell's Walk route – generally focussing these enhancements towards Pedestrian measures - it is intended that further, alternative, parallel Cyclist links be provided to the City Centre both to reduce the demand on Burrell's Walk, and to enhance the available capacity. These would utilise the Grange Road – West Road – Queen's Green - Silver Street route.

6.10.3 This route is considered in greater detail, in addition to the potential measures along Burrell's Walk.

### Grange Road – West Road – Queen's Green - Silver Street

6.10.4 An alternative fast and high-capacity Cycle route parallel to the Burrell's Walk route could be considered between the Grange Road / Adams Road junction and the City Centre along the Grange Road – West Road – Queen's Green - Silver Street corridor.

6.10.5 As shown on Figure 6.16, the proposed route would follow along West Road to Queen's Road, crossing Queen's Road using new toucan crossing infrastructure, and across Queen's Green to Silver Street.

6.10.6 The existing Grange Road / West Road junction is currently a priority junction, with West Road forming the minor arm approach. As part of the enhancements to Pedestrian and Cyclist routes to West Cambridge, an improvement scheme shown on Figure 6.19 has been considered - the speed table at the junction remaining, but the road markings being renewed.

6.10.7 The Extant West Cambridge Development had a Section 106 commitment to provide contributions towards a traffic signal controlled junction scheme at Queen's Road / West Road junction, and an enhanced cyclepath crossing of Queen's Green to Silver Street. This is shown on the Hannah Reed drawing reference 95044/ PC08A included in Appendix 6.3. The University will work with the County and City Councils to understand the issues involved in providing this enhancement to the proposed traffic signal controlled Queen's Road / West Road junction enhancement, the cycle crossing facility of Queen's Road, and the crossing of Queen's Green. If the amended scheme is shown to be feasible, the University would make appropriate contributions to its delivery.

### Burrell's Walk

6.10.8 As the Grange Road / West Road / Queen's Green / Silver Street route is being promoted for cyclists as an alternative higher capacity, quicker route into the City Centre, the importance of the existing single Burrell's Walk / Garret Hostel Lane route will be reduced.

6.10.9 Whilst Cyclists would not be restricted from using Burrell's Walk, new signs would direct Cyclists to access Burrell's Walk via the Pedestrian access 50 metres south along Grange Road, opposite the entrance to Robinson College. This will help reduce the conflict between Cyclists and Pedestrians at the junction of Burrells Walk with Grange Road and so allow an enhanced environment for Pedestrians.

6.10.10 The Extant West Cambridge Development had a reference to providing contributions towards the delivery of a widened bridge and path along Burrell's Walk. This is shown on the Hannah Reed drawing reference 95044/ PC04 included in Appendix 6.4. The University will work with the County and City Councils to understand the issues involved in providing this enhancement.

6.10.11 If a scheme is shown to be feasible, the University would make a contribution to the delivery of the following Burrell's Walk Enhancements as shown on Figure 6.20. These would be alongside the alternative (West Road) cycle route enhancements (see above):

- widening the existing Bins Brook Bridge to provide a 3.0m wide running carriageway;
- widening Burrell's Walk on the approaches to the bridge to provide a 3.5m path;
- removing redundant street furniture; and
- relocating the fencing to maintain the existing area of Cobbett's Corner

6.10.12 Notwithstanding whether these physical measures are progressed, the existing route will be subject to a general maintenance to improve its quality – potentially including:

- the trimming back of the existing vegetation that currently reduces the effective width of this route, restricts daylight permeability, and constrains forward visibility;
- a repainting of the existing road markings;
- enhanced signage – identifying that Burrell's Walk is used by both Pedestrians and Cyclists to seek more considerate cycling.

This would enhance the environment for all users - in particular those with visual impairments - whilst improving the perceived personal security by reducing hiding areas, and increasing capacity.

6.10.13 The reduction in the number of Cyclists on this route would improve conditions for Pedestrians.

## 6.11 Conclusions

6.11.1 The Development is well-located for Walking and Cycling with respect to existing Pedestrian and Cycle facilities.

6.11.2 The infrastructure proposals for West Cambridge would:

i) deliver quality Cycle and Pedestrian connectivity throughout the Development;

ii) enhance Pedestrian and Cyclist safety off-site for both users of West Cambridge, and for all other Walkers and Cyclists;

iii) deliver improved strategic connections to key local destinations - such as the residential, employment and retail offer at North West Cambridge, and the residential development at Girton and at Darwin Green, as well as towards the facilities within the City;

iv) significantly enhance the existing Pedestrian and Cycle provision to the surrounding area by providing and improving direct routes across the Development; and

v) overall, preserve and enhance the attraction of Pedestrian and Cyclist modes of travel.

6.11.3 The Development will deliver direct, high-quality Walking and Cycling routes in the area, to support and encourage travel using these modes. In addition, further infrastructure will be provided to enhance the connectivity to Cambridge City Centre. As such, it is considered that Walking and Cycling will form a significant percentage of the mode share for local off-site trips, reflecting local and national policy guidance and strategies.

# 7 Public Transport Strategy

## 7.1 Introduction

7.1.1 As noted previously, bus travel is an attractive alternative to the private car for many short- and medium- distance trips, offering the potential to replace car travel locally (such as to adjacent developments), to other destinations across Cambridge, and further afield. As such, public transport forms an essential element of the Access and Movement Strategy for the Development.

7.1.2 This section considers in detail the following aspects of a public transport strategy that would support the West Cambridge Development aspirations, would provide benefit to the surrounding area, and would be complementary to the emerging Greater Cambridge City Deal proposals:

i) Policy background;

ii) Public Transport Requirement

iii) Development Services;

iv) Scenario Detail;

v) On-site public transport infrastructure; and

vi) Information and Incentives.

7.1.3 Initial discussions have also been held with various stakeholders to agree the potential public transport strategy for the Site, including with

i) both of the main local bus operators – the Managing Director and senior management team at Stagecoach Cambridge and the Commercial Manager at Whippet; and

ii) the County Council's Public Transport officers.

7.1.4 This section shows that the Development is well-located, being adjacent to well-established and successful existing bus services that connect to a range of destinations in Cambridge itself and more widely through Cambridgeshire. It also identifies that the Development will contribute towards enhanced and additional bus services to increase bus usage, as well as providing quality infrastructure through the Development. It concludes that whilst bus usage will provide a non-car alternative mode share for short, medium, and longer distance trips (reflecting local and national policy guidance and strategies), the Development bus strategy would also reduce car trips between other origins and destinations apart from the Development itself.

## 7.2 Policy background

7.2.1 The policy context for public transport is established within the National Planning Policy Framework, published in March 2012, that states that

- there should be a positive balance in the transport system towards sustainable transport modes, and that this should give people a real choice about the way in which they travel (paragraph 29);

- the development should ensure that the use of sustainable transport modes can be maximised (paragraph 34);

- developments should be located and designed to have access to high quality public transport facilities (paragraph 35).

## 7.3 Bus Service Strategy

7.3.1 The scale of the proposed Development means that there will be both a high quantum of demand for public transport, and a number of locations that will need to be connected to West Cambridge. New and enhanced bus services will be phased in to align with the Development quantum and consequent growth in demand. Ultimately, the links are expected to be as shown on Figure 7.1, derived with reference to the Travel Habit Survey undertaken in May 2015 by the University (see Section 7.8). These are summarised below:

- to the Milton Park and Ride site, to intercept car-based movements from the A10 (north) and A14 (east) of Cambridge;
- to the main local Rail Station – to Cambridge Station;
- to the City Centre;
- to the University / NHS sites in South Cambridge - including Addenbrooke's Hospital and the Cambridge Biomedical Campus;
- to various residential and employment / research sites around northern Cambridge - including North West Cambridge, Darwin Green and the Cambridge Science Park;
- residential areas along the A14 corridor - including St Ives and Huntingdon; and
- residential areas on the A428 corridor - including St Neots and the proposed Bourn Airfield proposals and Cambourne fringe developments.

7.3.2 The Site would need to be well served by local bus routes to deliver mode shift away from the private car for Journey to Work trips. The University's already active travel policy encourages staff and students to use public transport, cycle or walk wherever possible; to date this has been a highly successful measure and the future development of bus services in this corridor would enable bus mode share to be further enhanced.

7.3.3 The Public Transport Strategy has been developed to cater for the demand flows identified earlier, and in the context of existing - and committed - public transport service proposals in the area. The proposals will cater for several user groups, including:

- staff working on various University (and other) employment sites, largely travelling at peak times;
- staff travelling between different University and NHS Trust sites within the city, generally during the working day;
- intercepting staff travelling in to West Cambridge from the north and east by car;
- residents living in the Development sites accessing employment, retail and leisure activities in Cambridge city centre or via one of the rail stations, travelling throughout the day;
- Students travelling to and from the University teaching, research, leisure and accommodation facilities, travelling throughout the day; and
- business visitors to West Cambridge, largely travelling to the city by rail within the working day.

7.3.4 To make the bus network as accessible and simple to use as possible, the University will work with the County Council and operators to be able to offer network ticketing, allowing for passengers from destinations other than Cambridge city centre to make journeys on other services and transfer using the same ticket stored on a smartcard, mobile phone or EMV wave and pay card. Emerging developments in ticketing and payment technology mean that measures such as daily and weekly price capping could also be included within this aspiration in due course.

7.3.5 The Route Strategy is set out below, showing proposed services for 2021 and, potentially longer term, for 2031.

## 7.4 2021 Route Proposals

7.4.1 **Universal**:

i) recently revised to serve Cambridge Rail Station, en-route to and from Addenbrooke's Hospital and to operate on a loop around the Cambridge Biomedical Campus, enhancing access to developments on the site;

ii) increased frequency, potentially to every 10 minutes over the core North West Cambridge to Cambridge Rail Station section, and operation extended to Saturdays between North West Cambridge and the rail station. The section between Cambridge Rail Station and Addenbrooke's would operate every 20 minutes on Monday to Friday only;

7.4.2 **Citi 4:**

i) for the Initial Phase of development, to be revised to divert from a section of Madingley Road via High Cross to JJ Thomson Avenue, to operate within the West Cambridge Development;

i) no changes would be made to the frequency of the Citi 4 service;

7.4.3 **Arc Service**:

i) operation of a new hourly orbital service from West Cambridge via North West Cambridge, Darwin Green and the Science Park to Milton Park and Ride;

ii) service provided initially by high quality minibuses - reflecting the relatively low levels of demand - being upgraded to buses as the patronage increases.

## 7.5 2031 Route Proposals

7.5.1 **Universal**:

i) as per the 2021 enhancement, subject to review of demand over the Silver Street to Addenbrooke's section with the introduction of an enhanced orbital service that extends to Addenbrooke's,

ii) it may no longer be necessary to operate the Universal beyond the rail station (see below). This would require passengers travelling to/from Addenbrooke's to change buses at the rail station.

7.5.2 **Citi 4**:

i) to be revised to divert from a section of Madingley Road to operate via the West Cambridge Development (Stagecoach suggested that they may initially divert alternate journeys through the site);

ii) increased frequency - potentially to every 10 minutes;

iii) Citi 4 will provide links to West Cambridge from the city centre and the A428 corridor; and

iv) whilst Stagecoach agree in-principle with this approach, this would be subject to confirmation with reference to the likely demand.

7.5.3 **Arc Service**:

i) Significant enhancement of the proposed Arc Service with increased frequency and higher quality vehicles;

ii) the service would be extended beyond the currently proposed route to serve West Cambridge, then continue via the M11 motorway to Trumpington Meadows, the Cambridge Biomedical Campus and Addenbrooke's Hospital;

iii) the service would then give links to West Cambridge from North Cambridge through to South Cambridge;

iv) it is likely that the operation will be on a 20 minute frequency on Monday to Friday only.

7.5.4 **Guided Bus**:

i) there is the potential for the introduction of a variation service to the existing Guided Busway Service B, running from Hinchingbrooke– Huntingdon – Cambridge;

ii) the variation would operate from Orchard Park via North West Cambridge and West Cambridge;

iii) this would be in addition to the existing frequency on Service B and would provide direct links from the A14 corridor;

iv) subject to confirmation of demand, operation on a 30 minute frequency.

7.5.5 Other alternatives:

i) as there are interchange facilities between a range of high frequency services available in the City, it is not considered appropriate to operate direct through-services from eastern Cambridge to West Cambridge;

ii) this will be reviewed regularly, and in the event that a critical mass of demand emerges, this could then be served by cross-linking of routes or additional services.

## 7.6 Bus Specification

7.6.1 Services would be delivered with high-quality, low-emission vehicles with low floor, step-free access.

7.6.2 To increase the potential for bicycle use, the operators would be encouraged to provide cycle carriers on buses on these routes.

7.6.3 Operation on the guided busway would require high specification buses with low-emission engines, luxury leather seats, air conditioning or air chill, power sockets for phones / laptops and free wireless internet. These measures have proved to be attractive to potential users, and the operation of vehicles with similar features on the other non-Guided Busway routes listed above would be encouraged to enhance their appeal, and contribute to a higher take-up.

## 7.7 On-Site Bus Infrastructure

7.7.1 In order to facilitate an attractive bus service with good, safe headway through the Site and hence to users to the service, the following would be provided:

- high quality bus stops;
- bus priority measures - selected vehicle detection for buses through the traffic signal controlled junctions to improve the flow of buses or enable passengers to access facilities (acknowledging that this would cause a decrease in capacity for other movements); and
- information and incentives.

7.7.2 These are considered further in this section.

### Bus Stops

7.7.3 High quality bus stops act as the gateway to the network, and as such are the 'shop window' that are seen by travellers on all modes as they make their journeys. Bus stops would be equipped at this Development with the following:

- a high quality, 3 sided shelter;
- seating and lighting;
- comprehensive timetable information, including network maps and fare details;
- a flag indicating services calling at the stop;
- off-bus ticketing facilities to speed boarding times such as smartcards, renewable online and mobile applications to speed boarding times;
- Real Time Passenger Information (RTPI) screens indicating departure times of the next bus;
- a raised kerb to assist the less mobile or those with pushchairs to access the bus;
- litter bins in close proximity but not obstructing access to and from the bus;
- cycle stands to allow cycle-bus interchange; and
- 'Bus stop' cage markings and an associated clearway order to keep bus stops free of other parked vehicles.

7.7.4 Provision of these facilities, and their prompt maintenance and repair by the bus operator or Development management, would ensure that the point of access to bus services is kept to a high standard, and would act as an attractor to public transport services within the Development.

7.7.5 It is considered that an additional pair of bus stops would be required on the Development site. The provision of these, and a review of the existing provision, would be phased to reflect the progress of the emerging Development.

### Bus priority measures

7.7.6 Bus priority would be provided by the use of Selective Vehicle Detection (SVD) technology at traffic signals controlling the entrances to the Site from Madingley Road – especially to the junctions with High Cross, and with JJ Thomson Avenue. This would detect approaching buses, and alter signal phases accordingly to ensure the minimum of delay to the bus.

### Information and incentives

7.7.7 In addition to the provision of quality physical infrastructure, the provision of tailored information and incentives is now a mainstream method of attracting additional patronage to public transport networks around the UK.

7.7.8 To increase the use of public transport at the Development, journey planning and real time information on the services will be made readily available to residents, visitors, students and employees at the Development, be it at the bus stop, by telephone, SMS text messaging or the Internet. Portals are already available for remote access to bus information, for example through http://www.travelineeastanglia.co.uk which provides details of timetables, or http://www.cambridgeshirebus.info which provides Real Time Passenger Information. Traveline also operate a telephone service.

7.7.9 The management of the Development will ensure the bus stop information will be well-maintained. Any alterations to services will be advertised in advance and correct timetables inserted at stops as close as possible to the change date. This includes alterations to the wider network as shown on timetable panels in the shelters.

## 7.8 Accessibility to Future Bus Routes

7.8.1 An assessment has been undertaken of the current and potential occupiers able to access easily the proposed development bus services.

7.8.2 This assessment uses the Spreadsheet Model undertaken to support this assessment, and considers those existing and future users resident within 400m of the routes traversed by the proposed bus routes (and 800m of the Guided Busway Service) to service West Cambridge. Whilst many responses would be resident within 400m to more than one of these service routes, each response is assumed to use one service only, this service assumed to be the most frequent.

7.8.3 The assessment of the net responses is contained in Appendix 7.1, and summarised in Table 7.1.

Table 7.1: Current and Potential West Cambridge Occupiers resident adjacent to the Development bus service routes

| Service | 2031 |
|---|---|
| Universal | 1,263 |
| Citi 4 | 1,329 |
| Arc | 486 |
| Guided Busway Services (within 800m) | 1,064 |

Source: PBA Spreadsheet Model.

7.8.4 In addition to serving those resident along the routes, these services would be used for other journey purposes, including:

i) linked trips by rail – by serving Cambridge Rail Station, the Universal could be used by the 558 travelling by rail;

ii) linked trips by car to the park and ride sites – the Arc service serving the Milton park and ride site;

iii) trips across Cambridge during the day – such as to the Cambridge Biomedical Campus and Addenbrooke's Hospital.

7.8.5 This analysis of the home post code data of the current and potential occupiers of West Cambridge confirms that the service routes would both provide easy access to public transport, and would assist the commercial viability of these routes.

## 7.9 Summary

7.9.1 This section shows that the Development is well-located, being adjacent to well-established and successful existing bus services that connect to a range of destinations in Cambridge itself and more widely through Cambridgeshire.

7.9.2 It identifies that the West Cambridge Development would contribute towards additional bus services further to:

i) enhance existing services to increase bus usage;

ii) provide quality infrastructure through the Development; and

iii) assist in the delivery of the Greater Cambridge City Deal aspirations.

7.9.3 The provision of a quality bus strategy will encourage the use of bus to form a significant percentage of the mode share for short, medium, and longer distance trips, and would reflect local and national policy guidance and strategies.

7.9.4 The University's already active travel policy has encouraged staff and students to use public transport, cycle or walk wherever possible; to date this has been a highly successful measure and the future development of bus services in this corridor would enable this to be further enhanced.

7.9.5 The assessment of the home post code data of the current and potential occupiers of West Cambridge confirms that the service routes would both provide easy access to public transport, which would assist the commercial viability of these routes.

7.9.6 Initial discussions held with various stakeholders regarding the potential public transport strategy for the Site - including with the Traffic Managers of both of the main local bus operators and the County Council's Public Transport officers – support the proposed strategy in principle.

# 8 Car Parking Provision, Vehicular Access and Site Layout

## 8.1 Introduction

8.1.1 Appropriate levels of car and cycle infrastructure form an essential element of the travel demand management strategy. Providing for the necessary vehicular and cycle trips associated with the Development will help manage travel by car, and reflect the need to promote the use of other sustainable modes of travel.

8.1.2 This section considers in detail the following aspects:

i) Car parking strategy;

ii) Initial and Future car parking maxima;

iii) Area Action Plan cycle parking standards;

iv) Site Layout and Vehicular Access.

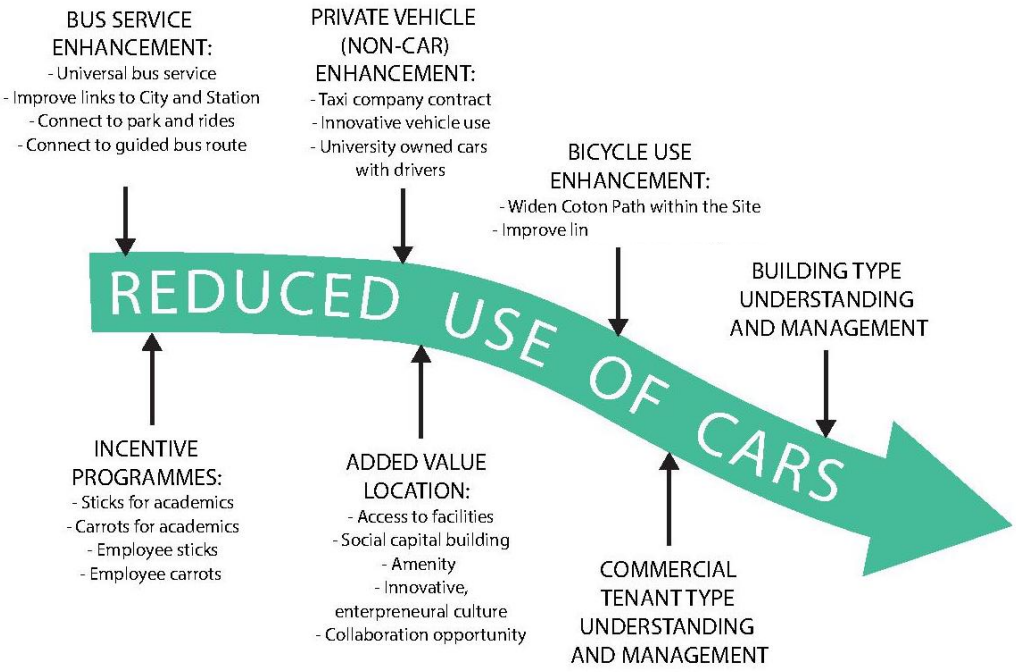
8.1.3 This section identifies the car and cycle parking provision in accordance with the Area Action Plan standards. It shows how the Development access strategy and site layout have been designed to ensure the focus of the accessibility strategy for the Site remains strongly in favour of sustainable modes of transport.

## 8.2 Car Parking strategy

8.2.1 The University is committed to delivering a high quality development. Under-provision of car parking within the Site could be detrimental to the street-scene, with “fly-parking” occurring across the area. Similarly, an over-generous provision would be equally likely to be detrimental to the sustainability credentials of the Development, with excessive numbers of car driver trips attracted by the easy car parking provision.

8.2.2 To reflect that car use demand will decrease as the various transport mitigation measures are implemented as the Development progresses – such as public transport services increasing in frequency and coverage – and that non-car travel becomes easier, a less generous car parking provision will become less essential: it is proposed that the maximum car parking provision decreases towards the later phases of delivery of the West Cambridge Development. Any future reduction in car parking provision over time will need to be carefully managed and timed to follow wider transport improvements, and the University will need to ensure that any loss of provision reflects a demonstrable improvement in accessibility by non-car modes. This reduction in private car usage as the various transport measures are implemented was summarised figuratively by Aecom in Plate 8.1:

Plate 8.1 – Future car parking provision responding to improvements in accessibility




## 8.3 Initial and Future Car Parking Maxima

### Existing Car Parking Provision

8.3.1 The existing numbers of car parking spaces across the West Cambridge Estate were surveyed in August 2016. This area reference plan, and the individual areas are included in Appendix 8.1.

8.3.2 The existing car parking was split into the three different uses, as follows:

i) University Car Parking: car parking for general academic use – both controlled and uncontrolled by barrier;

ii) Private Car Parking: car parking for specific commercial occupiers – again, both controlled and uncontrolled; and

iii) University Park and Cycle: car parking in the Clerk Maxwell Park and Cycle site.

8.3.3 The existing car parking provision is as follows:

Table 8.1 – Existing West Cambridge Car Parking Provision

| Parking Use Type | Car Parking Spaces (No) |
|---|---|
| University Parking | 1,164 |
| Private Parking | 407 |
| University Park and Cycle | 290 |
| **Total** | **1,861** |
| **Total – excluding Park and Cycle** | **1,571** |

8.3.4 Of the existing University car parks identified in Appendix 8.1:

i) Parking Areas 49 and 50 (far east of the Development), and Parking Area 59 (north of the William Gates Building) are controlled by permit;

ii) whilst Parking Area 18 (north of the Chemical Engineering and Biotechnology), and Parking Area 15 (north of the Institute of Material Science and Metallurgy) are controlled by permit, the parking controls are removed at 3.30pm for the Sports Centre members. With reference to the observed occupancy of the car parks reported in Table 8.3, the demand for parking reduces around this time;

iii) Parking Area 41, to the east of the Institute of Manufacturing, provides:

- residents' car parking;
- visitor parking during the day; and
- parking for the Broers building, and are not accessible by permit holders

iv) Temporary Area 14, to the east of Ada Lovelace Road, is controlled by permit. It is used to accommodate event parking on site, and is in use most days. The availability of this will be reviewed as permits holder numbers increase.

## Existing Car Parking Patronage

8.3.5 The existing car parking patronage across the West Cambridge Estate was first surveyed in March 2015 by ATR throughout the day on a one-hour "beat" survey. The surveyors identified:

i) the patronage at each of the on-site car parking areas at each hour;

ii) whether the car was specifically a contractor's vehicle.

8.3.6 A further survey was undertaken by ATR in October 2016 which replicated the earlier 2015 survey. This survey was commissioned to assess the changes in the levels of parking as development and parking provision at West Cambridge has progressed since the 2015 survey was undertaken.

8.3.7 The results for both surveys are contained in Appendix 8.1, and are summarised in Table 8.2:

Table 8.2 – Results of the West Cambridge Car Parking Beat Surveys for March 2015 and October 2016

| Start time of beat | Other Vehicles | | Contractor Vehicles | | Total | | % occupancy | |
|---|---|---|---|---|---|---|---|---|
| | 2015 survey | 2016 survey | 2015 survey | 2016 survey | 2015 survey | 2016 survey | 2015 survey | 2016 survey |
| 08:00 | 528 | 514 | 52 | 32 | **580** | **546** | *31%* | *29%* |
| 09:00 | 1,085 | 1,033 | 62 | 36 | **1,147** | **1,069** | *61%* | *57%* |
| 10:00 | 1,247 | 1,234 | 62 | 39 | **1,309** | **1,273** | *69%* | *68%* |
| 11:00 | 1,287 | 1,278 | 62 | 41 | **1,349** | **1,319** | *71%* | *71%* |
| 12:00 | 1,197 | 1,219 | 55 | 35 | **1,252** | **1,254** | *66%* | *67%* |
| 13:00 | 1,256 | 1,218 | 58 | 33 | **1,314** | **1,251** | *70%* | *67%* |
| 14:00 | 1,250 | 1,220 | 63 | 33 | **1,313** | **1,253** | *70%* | *67%* |
| 15:00 | 1,203 | 1,145 | 75 | 22 | **1,278** | **1,167** | *68%* | *63%* |
| 16:00 | 1,067 | 1,009 | 40 | 15 | **1,107** | **1,024** | *59%* | *55%* |
| 17:00 | 755 | 567 | 21 | 11 | **776** | **578** | *41%* | *31%* |
| 18:00 | 424 | 455 | 14 | 9 | **438** | **464** | *23%* | *25%* |
| 19:00 | 241 | 258 | 12 | 8 | **253** | **266** | *13%* | *14%* |

Source – Advanced Transport Research. The change in percentages reflect the change in total car parking spaces

8.3.8 The patronage of the three component parking users of this survey are summarised below in Table 8.3 for the March 2015 survey, and Table 8.4 for the October 2016 survey:

Table 8.3 – Results of the West Cambridge Car Parking Beat Survey by parking user type (March 2015)

| Start time of beat | University Parking | | Private Parking | | Park and Cycle | | Total (1,893 sps) | | Total excl. P+C (1,607) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Total | % | Total | % | Total | % | Total | % | Total | % |
| 08:00 | 359 | *32%* | 107 | *23%* | 114 | *40%* | 580 | *31%* | 466 | *29%* |
| 09:00 | 682 | *60%* | 293 | *62%* | 172 | *60%* | 1,147 | *61%* | 975 | *61%* |
| 10:00 | 795 | *70%* | 347 | *73%* | 167 | *58%* | 1,309 | *69%* | 1,142 | *71%* |
| 11:00 | 818 | *72%* | 356 | *75%* | 175 | *61%* | 1,349 | *71%* | 1,174 | *73%* |
| 12:00 | 745 | *66%* | 331 | *70%* | 176 | *62%* | 1,252 | *66%* | 1,076 | *67%* |
| 13:00 | 804 | *71%* | 335 | *71%* | 175 | *61%* | 1,314 | *70%* | 1,139 | *71%* |
| 14:00 | 812 | *72%* | 335 | *71%* | 166 | *58%* | 1,313 | *70%* | 1,147 | *71%* |
| 15:00 | 795 | *70%* | 315 | *66%* | 168 | *59%* | 1,278 | *68%* | 1,110 | *69%* |
| 16:00 | 681 | *60%* | 283 | *60%* | 143 | *50%* | 1,107 | *59%* | 964 | *60%* |
| 17:00 | 543 | *48%* | 168 | *35%* | 65 | *23%* | 776 | *41%* | 711 | *44%* |
| 18:00 | 319 | *28%* | 91 | *19%* | 28 | *10%* | 438 | *23%* | 410 | *26%* |
| 19:00 | 201 | *18%* | 34 | *7%* | 18 | *6%* | 253 | *13%* | 235 | *15%* |

Table 8.4 – Results of the West Cambridge Car Parking Beat Survey by parking user type (October 2016) – Excluding Contractor Parking

| Start time of beat | University Parking | | Private Parking | | Park and Cycle | | Total (1,861 sps) | | Total excl. P+C (1,571) | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Total | % | Total | % | Total | % | Total | % | Total | % |
| 08:00 | 272 | *24%* | 140 | *35%* | 102 | *36%* | 514 | *29%* | 412 | *27%* |
| 09:00 | 551 | *49%* | 320 | *79%* | 162 | *57%* | 1,033 | *57%* | 871 | *57%* |
| 10:00 | 653 | *58%* | 397 | *99%* | 184 | *64%* | 1,234 | *68%* | 1,050 | *69%* |
| 11:00 | 698 | *62%* | 380 | *94%* | 200 | *70%* | 1,278 | *71%* | 1,078 | *70%* |
| 12:00 | 655 | *58%* | 361 | *89%* | 203 | *71%* | 1,219 | *67%* | 1,016 | *66%* |
| 13:00 | 654 | *59%* | 359 | *89%* | 205 | *72%* | 1,218 | *67%* | 1,013 | *67%* |
| 14:00 | 674 | *60%* | 343 | *85%* | 203 | *71%* | 1,220 | *67%* | 1,017 | *67%* |
| 15:00 | 649 | *58%* | 297 | *73%* | 199 | *70%* | 1,145 | *63%* | 946 | *62%* |
| 16:00 | 559 | *50%* | 265 | *66%* | 185 | *65%* | 1,009 | *55%* | 824 | *54%* |
| 17:00 | 357 | *32%* | 148 | *37%* | 62 | *22%* | 567 | *31%* | 505 | *33%* |
| 18:00 | 288 | *25%* | 125 | *31%* | 42 | *15%* | 455 | *25%* | 413 | *27%* |
| 19:00 | 176 | *16%* | 51 | *13%* | 31 | *11%* | 258 | *14%* | 227 | *15%* |

8.3.9 Comparison of the 2015 and 2016 information identifies that:

i) the number of available parking spaces available across West Cambridge in 2016 has decreased since the 2015 survey – this appears to reflect the reductions to the on-street parking controls;

ii) peak total car parking occupancy has decreased at West Cambridge by 30 vehicles in spite of further development being occupied generating further need. This reduction could reflect:

- the success of the emerging on-site Travel Plan and travel demand management measures reducing car usage; and

- the increased imposition of the on-site car parking management strategy;

iii) the peak Park and Cycle patronage has increased by 29 since the 2015 survey;

iv) the peak occupancy of the Private car parks has increased by 41 since the 2015 survey. The percentage occupancy of these Private car parks – peaking at 75% - is generally higher throughout the day, than the other University car parks;

v) the occupancy of the University Parking has decreased markedly since 2015 – from 818 to 681. This possibly reflects the increased imposition of the car parking management strategy, and the success of the emerging Travel Plan and travel demand management strategy; and

vi) notwithstanding, there remains around 30% reserve car parking capacity throughout the day across the West Cambridge estate.

## Existing Car Parking Demand

8.3.10 The existing car parking demand across the West Cambridge Estate was estimated with reference to the occupier type. This is summarised in Table 8.5:

Table 8.5 – Existing Car Parking Demand

| Plot Number | Plot Name | Plot Area ($m^2$) | Car Parking Requirements |
|---|---|---|---|
| A03 | Roger Needham | 2,815 | 25 |
| A04 | Electrical Engineering (CAPE) | 3,696 | 30 |
| A06 | Nanotechnology | | 0 |
| A08 | Magnetic | 788 | 2 |
| A09A | William Gates – CS | 6,364 | 59 |
| A10 | PoM and Maxwell Centre | 3,879 | 24 |
| A13 | South Block / Hauser / Broers | 7,984 | 133 |
| A15 | North Block | 4,635 | 20 |
| A20 | IfM | 3,902 | 19 |
| A21 | Chemical EB | 4,846 | 33 |
| A23 | Material Science & Metallurgy | 5,596 | 42 |
| A25 | Sports Centre Existing | 7,768 | 10 |
| B05A | Innes / MIRA | 5,916 | 18 |
| C08 | Schlumberger Existing | 19,485 | 132 |
| D01 | Schoefield | 1,586 | 7 |
| D02 | BAS | 24,295 | 177 |
| D03 | BAS Car Park | 6,725 | 0 |
| D04 | Aveva | 7,250 | 100 |
| D08 | Data Centre | 5,708 | 2 |
| | **TOTAL** | | **833** |

8.3.11 When the predicted car parking demand identified in Table 8.5 - of 833 - is compared to the 2016 observed patronage within Table 8.4 excluding the Park and Cycle - of 1,078 - it is noted that there is a higher demand than anticipated. Whilst there is such an excess in 2016, it is noted that this excess of demand over predicted numbers has reduced since the 2015 survey. It is assumed that this trend of reduced demand will continue:

i) with the continuing success of the on-site Travel Plan and travel demand management measures reducing car usage being implemented to a wider target across West Cambridge;

ii) the increased frequency and range of public transport services; and

iii) the continued imposition of the on-site car parking management strategy.

## Future Car Parking Provision

8.3.12 The proposed maximum car parking standards to be applied at West Cambridge have been derived with initial reference to the maximum car parking standard applied at the adjacent North West Cambridge Development, and the current car parking patronage at West Cambridge. The proposed car parking maximum standards through the life of the West Cambridge Development are summarised in Table 8.6. The University will review this provision, and positively seek to reduce car parking provision if appropriate as West Cambridge progresses.

Table 8.6: Car Parking Maximum Provision Proposals

| Land-Use | Development Phase | Car Parking Provision (Maxima) |
|---|---|---|
| *Commercial and Academic Research – North West Cambridge Area Action Plan Standard* | *B1 Offices, General Industry – applied to Commercial Research* | *1 space per 40m² GFA* |
| | *Non-residential higher education – applied to Academic Research* | *2 spaces for every 3 staff - to be applied as 1 space per 60m² GFA* (The 2 spaces per 3 staff being the University's standard rate of car parking provision) |
| Academic Research | Initial | 1 car parking space per 4 staff |
| | | No provision for students |
| | Later | 1 car parking space per 5 staff |
| | | No provision for students |
| Commercial Research | Initial | 1 car parking space per 40m² GFA |
| | Later | 1 car parking space per 70m² GFA |

8.3.13 Using the above standards, as a worst case, the following car parking will be provided:

Table 8.7: Car Parking Provision

| Development Phase | Car Parking Provision (spaces) |
|---|---|
| Extant Consent Car Parking Provision | 3,150 |
| Initial Phase | 2,570 |
| Full Development | 4,390 |

8.3.14 It is noted that:

i) the Initial Phase car parking provision is 18% lower than the Consented car parking provision, despite a higher total floorspace. This reflects the sustainability objectives of West Cambridge, with the provision of a lower rate of car parking provision;

ii) despite a proposed 102% increase in floorspace as a result of the Full Development proposals, the University is only seeking a 39% increase in the proposed maximum levels of car parking;

iii) whilst not directly proportionate to car parking provision, the West Cambridge trip generation will reflect the car parking provision. This would imply that the Initial Phase of Development would have a lower trip generation than the Consented Development, and that the increase in traffic for the Full Development will be lower than a proportionate increase in floorspace.

## Provision for people with disabilities

8.3.15 At least 5% of the total number of car parking spaces should be reserved for disabled people, rounded up to the nearest whole space. Where parking provision is below the standards the required proportion of spaces reserved for disabled people will therefore be higher than 5%.

8.3.16 Higher ratios than the 5% given above may be required in some cases by the local planning authority, for example at medical facilities, residential care homes, community facilities and any other uses where a higher proportion of disabled users / visitors will be expected. It should be noted that provision at the above levels or any required by the local planning authority does not guarantee that the requirements of the Disability Discrimination Act will be met, which is the responsibility of the building occupier or service provider.

8.3.17 Spaces for disabled people should be located adjacent to entrances, be convenient to use; and have dimensions that conform to Part M of Building Regulations. If it is impossible to accommodate car parking spaces within the site, disabled car parking spaces should not be located at a distance more than 100 metres from the site.

## Off-site car parking

8.3.18 Whilst it appears from on-site observation that many of those parked on Clerk Maxwell Road are not related to West Cambridge, the University would contribute towards measures to provide significant betterment for residents and cyclists, and to improve the quality of the public realm on this section. These measures include for the replacement of the existing on-road car parking along Clerk Maxwell Road with mandatory cycle lanes.

8.3.19 In order to control further the overspill parking from West Cambridge, the University will work with local residents and the Highway Authority to review the potential for on-street parking control on local streets - such as Hedgerley Close, Wilberforce Road and Adams Road – as well as surrounding communities that could be affected such as Madingley. This could include:

i) a Car Parking Zone scheme – similar to the scheme offered by North West Cambridge - reflecting the emerging City Deal proposals; or

ii) a prohibition of on-street car parking.

8.3.20 The University will contribute towards the Highway Authority's costs for implementing any necessary traffic regulation orders to support this off-site car parking strategy.

## Estate Car Parking Strategy Assessment

8.3.21 The University will commit to apply and manage the agreed Parking Strategy on a long-term basis.

8.3.22 Each individual Reserved Matters application will contain a Monitoring Review of the on-site Estate Car Parking Strategy Assessment across West Cambridge. This Review will reflect the Framework included in Appendix 8.2, and would include:

i) existing car park provision

ii) existing car park occupation;

iii) existing car park permit allocations;

iv) short-term changes to the on-site car parking requirements, including:

- building on car parks;
- construction activity on car parks;
- completion of new car parking spaces;
- building floor space closures / occupations;

v) accessibility car parking issues; and

vi) construction car parking.

## 8.4 Cycle parking

8.4.1 The cycle parking strategy is also intended to support the travel demand management strategy for the Development. The Cambridge area already has a strong cycle culture, and the Development is well-located with respect to existing and proposed cycle facilities.

8.4.2 Similarly, cycle parking spaces will be provided as a minimum in accordance with the standards set out in the Draft Cambridge Local Plan (2014). These are summarised in Table 8.8.

Table 8.8: Minimum Cycle Parking Provision Proposals

| Land-Use | Cycle Parking Provision - Minima |
|---|---|
| Offices, general industry | 2 space for every 5 members of staff or 1 per 30 sq. m Gross Floor Area (whichever is greater)<br><br>Some visitor parking on merit |
| Non-residential higher and further education | 2 for every 5 members of staff<br><br>Cycle parking for 70 per cent of students based on anticipated peak number of students on site at any one time |

Source – Cambridge City Council - Cambridge Local Plan 2014: Proposed Submission - Appendix L – Car and Cycle Parking Requirements

8.4.3 To accommodate the likely circa 3,600 students and 7,200 staff within the Initial Phase, the Initial Phase of Development would be provided with around 7,000 cycle parking spaces to reflect these standards.

8.4.4 Reflecting the Cambridge City Council requirements identified in Appendix L of the emerging Cambridge Local Plan 2014 Proposed Submission, to allow for cycles with large baskets, folding bikes and those with additional attachments, etc. a minimum of 20 per cent of the cycle parking spaces required should be of a Sheffield-type design.

## 8.5 Vehicular Access

### Site Access

8.5.1 The local road network surrounding the Development is shown on Figure 2.3.

8.5.2 As shown on the Parameter Plan 02 – Access included in Appendix 2.2, vehicle access will be provided to the Development by a series of existing, enhanced and new vehicular access points off Madingley Road as shown on Figure 2.3. These will be delivered through the duration of the Development, to a programme to be determined. These access points are:

i) the existing traffic signal controlled High Cross junction - which could be subjected during Phase 1 to an enhancement to include a ban on the right turn in to / right turn out from the site from Madingley Road;

ii) the existing JJ Thomson Avenue priority junction – which could be subjected during later Post - Phase 1 phases to a traffic signal controlled upgrade;

iii) the existing Clerk Maxwell Road priority junction, which could be used to access a potential car park (other access options are being considered). The junction could be subject to a potential introduction of traffic signal control; and

iv) a new traffic signal controlled, restricted movement (right in / left out), access junction onto Madingley Road at the western end of the site, which would connect to the Western Access road. This is shown on Figure 15.1, and would be delivered during later - Post Phase 1 phases. This junction would intercept strategic traffic movements between the site and the west, including from the M11 – this early interception would help to maintain conditions at other local junctions – such as High Cross.

8.5.3 The location of these access points to the Development is designed to intercept the maximum number of development-bound trips on the strategic highway network before these trips travel through the residential areas of Cambridge, thus minimising the impact of the Development.

8.5.4 In addition, a further limited-movement priority junction providing cycle and pedestrian access to the Vet School between JJ Thomson Avenue and High Cross, currently closed for vehicles, would provide service access only to the occupiers immediately adjacent to Madingley Road. This is shown indicatively on Figure 8.1.

### Site Access Roads

8.5.5 All routes within the Development will be designed to contain vehicle speeds and flows to a maximum of 20mph, to provide a quality streetscape. This would be achieved primarily through the adoption of the design philosophies of the Department for Transport's 'Manual for Streets' for all roads. The adoption of these principles would not only encourage traffic speeds to reduce on these routes and increase car journey times relative to public transport, but would also help to provide a more desirable environment for pedestrians and cyclists as a result of the lower vehicle speeds and lower overall traffic levels.

8.5.6 The Site layout has been designed to ensure that it strongly favours sustainable modes of transport; the road hierarchy of the Site has been designed to limit the permeability of the Site for vehicles and to enhance accessibility for pedestrians and cyclists.

### Servicing

8.5.7 The service access to individual plots will be provided from suitable development access routes. These service access routes will be identified within the individual reserved matters applications for each plot once further detail is available.

8.5.8 To assist in managing service vehicle exhaust emissions, the University will consider low or zero emission technology for their site-based vehicles.

## 8.6 Summary

8.6.1 This section considers aspects of car and cycle infrastructure associated with the Development.

8.6.2 The maximum car and minimum cycle parking provision on the Development has been calculated with reference to local guidance and from observation of current usage.

8.6.3 The University is committed to delivering a high quality development. Under-provision of car and cycle parking within the Site could be detrimental to the street scene.

8.6.4 The Development Access Strategy and site layout have been designed to ensure the focus of the accessibility strategy for the Site remains strongly in favour of sustainable modes of transport over the private car.

# 9 Travel Demand Management Strategy

## 9.1 Introduction

9.1.1 To support the objectives of the transport strategy to maintain the existing low car-based mode share, and to achieve mode shift away from private car use, a comprehensive travel demand strategy has been developed for the Development to manage the number of vehicular trips generated by the Site. This will be achieved by the promotion of alternative means of travel, and on the locational and accessibility advantages of the Site.

9.1.2 A central element of the travel demand management strategy for the Development is the implementation of a site-wide Framework Travel Plan for the Site. Due to the scale of the Development, an overall Framework Travel Plan has been developed by the University to cover travel demand management issues for the whole Development site. This Transport Assessment is therefore supported by the Framework Travel Plan which should be read in conjunction with this document. The Framework Travel Plan sets out the overall travel demand management strategy and framework for the Development. The purpose of the Framework Travel Plan is to reduce the quantum of single occupancy private car trips associated with all activities at the Development.

## 9.2 Objectives

9.2.1 The main objective is to reduce the reliance on the private car and reduce the quantum of private car trips. In order to assess whether this objective is being met, the Framework Travel Plan reflects a target maximum 40% Single Occupancy Car Driver mode share for journey to work trips.

9.2.2 The overall broad objectives of the travel demand management strategy for the Development are:

- to reduce reliance on the private car with a long-term strategy of mode shift away from single occupancy car use;
- to build upon good urban design principles that improve the permeability of the Development for promoting walking, cycling and public transport use;
- to provide more appropriate levels of parking;
- to promote the use of car sharing where appropriate;
- to minimise costly road traffic congestion and further damage to the environment in the context of sustainable development which is consistent with Government policy; and
- to encourage a high level of community involvement in travel behaviour change initiatives.

## 9.3 Summary of the Framework Travel Plan

9.3.1 The Framework Travel Plan, also submitted in support of the Outline Planning Application, also provides the over-arching framework within which the individual commercial Workplace Travel Plans will operate.

9.3.2 To ensure effective implementation and management of the Framework Travel Plan and transport strategy, the University will provide and support the following:

- sufficient staff resource be allocated to provide a Development Transport Coordinator – supported in this role by:
  - individual Sustainable Travel Behaviour Champions identified from within the community to assist in delivering sustainable travel proposals; and
  - individual workplace Travel Plan Coordinators to implement and manage their own measures and strategies;
- the establishment and running of the Transport Stakeholders' Group consisting of key stakeholders - including the University, planning and highway authorities, public transport operators, and representatives of the Development;
- a one-off fall-back Fund for the implementation, management, monitoring and review of the Framework Travel Plan and funding necessary measures in the event of significant variation from the forecast traffic impact for a sustained period of time.

9.3.3 The Framework Travel Plan has the following structure:

- a summary of the Development proposals for the Development;
- a review of the local and national policy context for travel planning;
- a review of the current transport-related context for the Development;
- a summary of the overall travel demand management strategy for the Development;
- details of the management structure, mode shift targets and monitoring arrangement of the Development Framework Travel Plan strategy;
- details of the individual developer / occupier Travel Plan obligations;
- a preliminary implementation and programme for the strategy.

9.3.4 The Framework Travel Plan has been prepared in accordance with current national guidance and best practice on travel planning, in particular, the Department for Transport's 'Good Practice Guidelines: Delivering Travel Plans through the Planning Process' (April 2009), and 'Making Residential Travel Plans Work: Good Practice Guidelines for New Development' (September 2005).

9.3.5 The Framework Travel Plan is the first issue of a working document that will be consistently monitored, reviewed and revised by the University's Travel Plan Co-ordinator. Given the length of time over which the Development will be implemented, changing transport and planning policies, and the potential for different outcomes to that set out in this Transport Assessment, the Framework Travel Plan and the transport measures need to be flexible and able to adapt to changing circumstances. Mechanisms for periodic review are therefore proposed so that outcomes can be compared with forecast.

9.3.6 In the event of significant variation from forecast values for a sustained period of time, the Development Transport Coordinator, working with the Transport Stakeholders Group, will consider the need for (and if necessary implement) measures designed to help meet the forecast outcomes over time.

# 10 Construction Access Strategy

## 10.1 Introduction

10.1.1 This section summarises the strategy to manage the traffic impact construction activity.

10.1.2 Until Contractors are appointed by the University, the details of the Construction Access Strategy will, perforce, be limited. The strategy will be defined in greater detail upon appointment.

## 10.2 Summary of the Construction Environmental Management Plan

10.2.1 As part of the Construction Access Strategy, a Construction Environmental Management Plan (CEMP) has been prepared, and is submitted in support of the Outline Planning Application. The CEMP will set out the University's aim to reduce the transport impacts of the construction traffic servicing the Site, and the movements associated with construction waste. It will apply to all the individual construction sites within the Development. The strategy consists of the following main elements:

i) design:

- minimising the requirement for material to be imported or exported. For example, the movement of earthworks material off-site will be reduced to a minimum by maximising the use of raised material into the landscaping;

- specifying materials and construction techniques that are resource-friendly;

ii) using locally sourced materials where possible, to reducing haulage lengths;

iii) managing effectively the supply of goods to construction sites - this can significantly reduce both road vehicle mileage and construction costs and wastage;

iv) encouraging the development of sustainable supply chains for construction materials; and

v) managing the movement of workers into the Development - all construction sites within the Development will have comprehensive Construction Travel Plans, detailing how their workforce will travel to the Site.

10.2.2 Construction Environmental Management Plans will be prepared to provide details of all Construction traffic movements during the life of a construction project - i.e. from design to demobilisation. The Construction Environmental Management Plan will consider the following elements:

i) Design;

ii) On-site logistics;

iii) Access Strategy;

iv) Procurement strategy;

v) Operational Efficiency;

vi) Delivery Practice;

vii) Demand Smoothing;

viii) Managing Construction Traffic;

ix) Pedestrian Routing;

x) Targets and Monitoring; and

xi) Waste Management

10.2.3 The developed CEMP will be supported by a Construction Travel Plan.

## 10.3 Further measures

10.3.1 The CEMP will also identify approaches that can be used to improve the efficiency of the logistics management for the Development. It also considers ways to link with and/or exploit construction activity and practices taking place on other parts of Cambridge. These measures would reduce the Site traffic, and the number of movements removing the generated waste.

10.3.2 A Construction Routing Strategy will be defined within the CEMP, specifying:

i) the routes to be used for heavy vehicle construction movements – assumed to be from the M11 Junction 13 and Madingley Road;

ii) identifying routes along which heavy vehicle construction may not pass – assumed to include Madingley Road to the east of Clerk Maxwell Road;

iii) managing the movement of workers into the Development - all construction sites within the Development will have comprehensive Construction Travel Plans, detailing how their workforce will travel to the Site;

iv) the cycle and pedestrian access routes during construction, to ensure that construction-related vehicles do not impact upon these users.

10.3.3 As well as implementing measures to increase the efficiency of the logistics operation and minimising the impact of the construction operation, the University will:

i) require all construction contractors be members of the Construction Logistics and Cycle Safety initiative (CLOCS); and

ii) seek that all construction vehicles are fitted with cycle safety equipment.

# *PART 3 PERFORMANCE OF THE NETWORK IN THE FUTURE YEAR*

*Part 3 of the Transport Assessment contains the following sections:*

**Section 11 - Construction Traffic**

**Section 12 - Summary of the Supporting Modelling Work**

**Section 13 - Development Trip Generation**

**Section 14 - 2021 Initial Phase – Trip Impact Analysis**

# 11 Construction Traffic

## 11.1 Introduction

11.1.1 This section identifies the potential peak movements associated with the construction of the Development, and assesses the effects of these movements on the surrounding highway network.

## 11.2 Assessment of the peak Construction movements

11.2.1 The assessment of the peak construction movements is contained in Appendix 11.1.

11.2.2 The assumed Initial Phase Peak Daily Construction traffic flows are summarised in Table 11.1:

Table 11.1 – Peak Daily Construction Movements

| Activity | Max Light Vehicle Movts / day | | | Max Heavy Vehicle Movts / day | | | Max Total Vehicle Movts / day | | |
|---|---|---|---|---|---|---|---|---|---|
| | In | Out | Tot | In | Out | Tot | In | Out | Tot |
| Earthworks | 10 | 10 | 20 | 82 | 82 | 164 | 92 | 92 | 184 |
| On-Site Drainage | 4 | 4 | 8 | 4 | 4 | 8 | 8 | 8 | 16 |
| Carriageway construction | 6 | 6 | 12 | 60 | 60 | 120 | 66 | 66 | 132 |
| Building construction | 10 | 10 | 20 | 0 | 0 | 0 | 10 | 10 | 20 |
| **Total** | **30** | **30** | **60** | **146** | **146** | **292** | **176** | **176** | **352** |

11.2.3 These flows are used to assess the impact of the Development on the surrounding highway network.

## 11.3 Assessment of the peak Construction impact

11.3.1 Of the Construction flows summarised above, only a limited number of car and HGV movements would typically occur during the peak hours: the working hours of most operatives would not coincide with the network peak, and construction processes would be programmed to avoid reliance on deliveries of concrete and bituminous materials during the more congested periods. As there would be only a limited number of Construction movements in the peak hours, no peak hour assessment has been made.

11.3.2 The following assumptions are made with respect to the assignment of these construction trips:

i) no heavy vehicle will be permitted to access the Development from the east through the City of Cambridge – all movements will be from the M11 or A1303;

ii) the operatives are assumed to be resident locally, and would arrive from the following destinations:

- Madingley Road (East) - 30%
- A14 (North West) - 25% (reassigning via Madingley Road)
- M11 (South) - 10%
- A14 (East) - 25% (reassigning via Madingley Road)
- A1303 / A428 - 10%

iii) reflecting the potential supplier locations, it is assumed that material deliveries will arrive from the following destinations:

- Madingley Road (East) - 0%
- A14 (North West) - 35% (reassigning via M11 Junction 12)
- M11 (South) - 25%
- A14 (East) - 25% (reassigning via M11 Junction 12)
- A1303 / A428 - 15%

11.3.3 On the basis of this worst case assessment of the construction activity trip generation, a worst case assessment of the likely impact on daily flow is shown in Table 11.2 with respect to the 2016 Base Year flows. The flows in this table assume that all access will be from M11 Junction 13 and Madingley Road:

Table 11.2: Construction traffic impacts – Pre Opening

| Link No | Link | Base 2016 Daily Flow (24hr, 7 day 1-way flows) | | Estimated Daily Construction Traffic (1 way) | | Increase | | |
|---|---|---|---|---|---|---|---|---|
| | | All Vehs | Heavy Vehs | Light Vehs | Heavy Vehs | All Vehs | All Vehs | Heavy Vehs |
| 1.0 | M11 - J12 - J13 - Nbd | 43,702 | 6,787 | 3 | 124 | 127 | 0.3% | 1.8% |
| 1.0 | M11 - J12 - J13 - Sbd | 43,702 | 6,787 | 3 | 124 | 127 | 0.3% | 1.8% |
| 1.1 | M11 J13 -J14 - Nbd | 32,329 | 5,021 | 0 | 88 | 88 | 0.3% | 1.7% |
| 1.1 | M11 J13 -J14 - Sbd | 31,812 | 4,940 | 0 | 88 | 88 | 0.3% | 1.8% |
| 1.3 | M11 J13 off-slip - Nbd | 10,033 | 1,558 | 3 | 124 | 127 | 1.3% | 8.0% |
| 1.3 | M11 J13 on-slip - Sbd | 7,232 | 1,123 | 3 | 124 | 127 | 1.8% | 11.0% |
| 2.0 | A14 West of J30 (Bar Hill) - Ebd | 36,872 | 6,757 | 8 | 51 | 59 | 0.2% | 0.8% |
| 2.0 | A14 West of J30 (Bar Hill) - Wbd | 38,330 | 7,024 | 8 | 51 | 59 | 0.2% | 0.7% |
| 2.1 | A14 North East of M11 J14 - Ebd | 36,763 | 6,737 | 8 | 51 | 59 | 0.2% | 0.8% |

| Link No | Link | Base 2016 Daily Flow (24hr, 7 day 1-way flows) | | Estimated Daily Construction Traffic (1 way) | | Increase | | |
|---|---|---|---|---|---|---|---|---|
| | | All Vehs | Heavy Vehs | Light Vehs | Heavy Vehs | All Vehs | All Vehs | Heavy Vehs |
| 2.1 | A14 North East M11 J14 – Wbd | 36,645 | 6,715 | 8 | 51 | 59 | 0.2% | 0.8% |
| 2.2 | A14 West of J32 Interchange - Ebd | 38,462 | 7,048 | 8 | 37 | 44 | 0.1% | 0.5% |
| 2.2 | A14 West of J32 Interchange - Wbd | 38,462 | 7,048 | 8 | 37 | 44 | 0.1% | 0.5% |
| 3.0 | A1303 East of Madingley Mulch Rbt Ebd | 6,608 | 362 | 3 | 22 | 25 | 0.4% | 6.1% |
| 3.0 | A1303 East of Madingley Mulch Rbt Wbd | 11,423 | 625 | 3 | 22 | 25 | 0.2% | 3.5% |
| 3.1 | Madingley Rd - East of Cambridge Rd Crossroads Wbd | 11,369 | 622 | 3 | 22 | 25 | 0.2% | 3.5% |
| 3.1 | Madingley Rd - East of Cambridge Rd Crossroads Ebd | 8,142 | 446 | 3 | 22 | 25 | 0.3% | 4.9% |
| 3.2 | Madingley Rd on Over Bridge M11 Ebd | 10,853 | 594 | 6 | 146 | 152 | 1.4% | 24.6% |
| 3.2 | Madingley Rd on Over Bridge M11 Wbd | 6,146 | 337 | 3 | 22 | 25 | 0.4% | 6.5% |
| 3.3 | Madingley Rd between M11 Sbd On Slip - Proposed Madingley Rd West Access Ebd | 9,976 | 339 | 6 | 146 | 152 | 1.5% | 43.1% |
| 3.3 | Madingley Rd between M11 Sbd On Slip - Proposed Madingley Rd West Access Wbd | 9,335 | 317 | 6 | 146 | 152 | 1.6% | 46.0% |
| 3.4 | Madingley Rd - West of P&R Access Wbd | 9,335 | 317 | 6 | 146 | 152 | 1.6% | 46.0% |
| 3.4 | Madingley Rd - West of P&R Access Ebd | 9,976 | 339 | 6 | 146 | 152 | 1.5% | 43.1% |
| 3.5 | Madingley Rd - East of P&R Access Wbd | 8,451 | 287 | 6 | 146 | 152 | 1.8% | 50.8% |
| 3.5 | Madingley Rd - East of P&R Access Ebd | 9,384 | 319 | 6 | 146 | 152 | 1.6% | 45.8% |
| 3.6 | Madingley Rd - East of Proposed High Cross Access Ebd | 8,256 | 281 | 6 | 146 | 152 | 1.8% | 52.0% |

| Link No | Link | Base 2016 Daily Flow (24hr, 7 day 1-way flows) | | Estimated Daily Construction Traffic (1 way) | | Increase | | |
|---|---|---|---|---|---|---|---|---|
| | | All Vehs | Heavy Vehs | Light Vehs | Heavy Vehs | All Vehs | All Vehs | Heavy Vehs |
| 3.6 | Madingley Rd - East of Proposed High Cross Access Wbd | 7,317 | 249 | 6 | 146 | 152 | 2.1% | 58.7% |
| 3.7 | Madingley Rd - East of JJ Thomson Ave Ebd | 8,988 | 305 | 24 | 0 | 24 | 0.3% | 0.0% |
| 3.7 | Madingley Rd - East of JJ Thomson Ave Wbd | 8,098 | 275 | 24 | 0 | 24 | 0.3% | 0.0% |
| 3.8 | Madingley Rd - East of Clerk Maxwell Rd Ebd | 8,774 | 298 | 24 | 0 | 24 | 0.3% | 0.0% |
| 3.8 | Madingley Rd - East of Clerk Maxwell Rd Wbd | 8,031 | 273 | 24 | 0 | 24 | 0.3% | 0.0% |

(Links with minimal impact have not been reported)

11.3.4 In terms of impact due to the construction of the Development, the largest increase in existing flows would be the increase of heavy vehicles on Madingley Road between the M11 and the Site Access, where there would be a circa 50% increase in existing heavy vehicles. Nevertheless, this would remain well within the overall capacity of the road – and subsumed within the negligible 2% all vehicle increase.

11.3.5 On all other routes, the increase in general traffic resulting from the construction activity is considered to be negligible.

# 12 Summary of the Supporting Modelling work

## 12.1 Introduction

12.1.1 This section summarises the modelling work undertaken to support the West Cambridge outline planning application.

12.1.2 Initial assessment of the transport impact of West Cambridge was undertaken using Cambridgeshire County Council's land use and transport model, the Cambridge Sub Regional Model (CSRM).

12.1.3 Following a review of the model results with the Joint Highway Authorities, it was concluded that the CSRM was not the most appropriate manner in which to assess West Cambridge traffic impact as being an area-wide strategic transport model, it was of insufficient sensitivity to assess impact across the local network accurately.

12.1.4 Within the context of an assessment of an Initial Phase of development in 2021 with relatively small development impact, it was agreed that a more local approach to the assessment of impact was appropriate. The following methodology was therefore agreed with the Joint Authorities.

12.1.5 To understand the potential traffic impact and assignment of the Full Phase of the Proposed Development in 2031, the analysis has been extended – acknowledging that West Cambridge is being brought forward within the context of some considerable uncertainty, including:

i) the scale of local residential development identified Cambridge Local Plan - still being the subject of an Inquiry;

ii) the impact of the A14 Huntingdon – Cambridge Improvement Scheme granted a Development Consent Order by the Secretary of State in May 2016, and construction having commenced, to be delivered in a phased manner;

iii) the A428 Black Cat to Caxton Gibbet Enhancement Scheme;

iv) the on-going deliberations and uncertainty surrounding the Greater Cambridge City Deal and Long Term Transport Strategies;

v) Highways England's need to consider measures along the M11; and

vi) The impact of a series of other transport schemes – including - inter alia – the Oxford – Cambridge Expressway, and East-West Rail.

12.1.6 As such, the information provided within the Transport Assessment is to inform the assessment of the Transport Cap - to finance the necessary development mitigation. The detail included within this assessment will be reviewed subsequently in the context of the applications for later phases in the context of further clarity being reached.

## 12.2 The Transport Model

12.2.1 The Transport Model was originally developed in conjunction with the Highway Authorities – Cambridgeshire County Council and the Highways Agency (now operating as Highways England) - to assess development trips resulting from the adjacent North West Cambridge Development.

12.2.2 The Transport Model has since been subjected to detailed review by Cambridgeshire County Council, and has been expanded to include the West Cambridge site, as well as the additional modelling zones for other Local Plan allocations within in the wider Cambridge area.

12.2.3 The modelling process estimated all trip numbers generated by the West Cambridge Development and other developments in the Cambridge area by combining a series of processes:

- the spreadsheet-based part of the modelling process produced trip matrices for different scenarios, transport modes and time periods;
- these trip matrices are then assigned on the transport network using the transport model software.

12.2.4 The main features of the Transport Model structure, shown in Plate 12.1 are:

i) Spreadsheet Model, comprising of the various elements to assess:

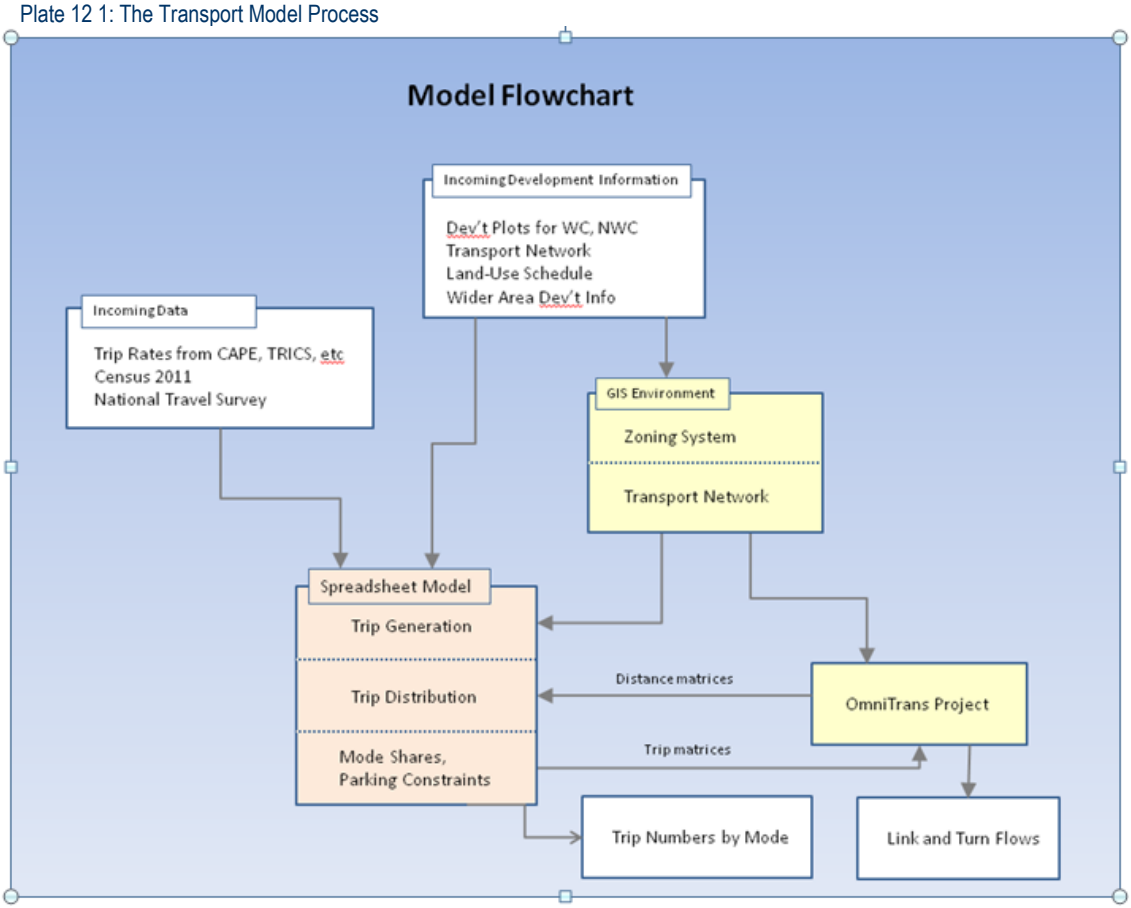
- the Development Land-Use Data - The assembly and calculation of land use data for all the development zones in the model for Housing, and for 'Other Uses' - for non-housing land uses;
- trip generation by land-use types, using a series of agreed data sources – including TRICS data and person trip surveys undertaken at West Cambridge;
- distribution by land-use types, using a Gravity Model, calibrated with reference to available data (such as the Census, and journey-to-work survey data);
- the trip matrices – created by mode, by land-use;
- adjustments to account for deterrence to car travel – such as car parking constraints;

ii) the Network and Zoning System:

- transport network - a detailed road network was developed for the wider Cambridge area, including all of South Cambridgeshire and parts of Essex and Hertfordshire. The existing road network was extracted from a national digital road network (Navteq data) which included measured link speeds from GPS systems for individual links in the network, enabling network distances and travel times to be calculated;
- zoning system – all development is loaded onto the network by a series of zones. These zones were devised in GIS, based on Census single and multiple output areas in and around Cambridge. Outside of Cambridge, these areas broaden to single and multiple wards, with larger zones representing local authorities on the periphery of the zoning system. In addition to the Census-based zones around the periphery of the model, a series of smaller zones were introduced for development areas, with multiple zones used for North West Cambridge and West Cambridge so that relatively short trips can be modelled sufficiently - typically by foot or bicycle;

iii) Post-Processing of Trip Matrices - the matrices of development trips by mode, output from the Spreadsheet Model for each scenario, are imported into OmniTrans, the transport model software, and assigned to the appropriate network.

Plate 12 1: The Transport Model Process




12.2.5 Further details of the Peter Brett Associates' Spreadsheet Model are contained in Technical Note 7A, contained in Appendix 12.1.

## 12.3 Local Model Amendments

12.3.1 The 2021 and 2031 Do Something results from the more strategic Spreadsheet Model have been adjusted locally to reflect more accurately local conditions. Details are provided in this section.

### Reflecting Potential On-site Car Parking Locations

12.3.2 The modelled West Cambridge Development total inbound and outbound flows have been adjusted locally along Madingley Road between the Western Access Road and Clerk Maxwell Road, to:

i) reflect the likely assignment of these trips to the potential on-site car parking availability. The modelled car parking choice reflected:
- the origin / destination of the arriving / departing trips;
- the car parking in each phase considered;
- the likely total number of car parking spaces likely to be accessed via these junctions; and

ii) include for the additional existing Park and Cycle patronage being included within the Estate car parking provision.

### Clerk Maxwell Road

12.3.3 Clerk Maxwell Road could be used to access a potential enhanced car parking facility located at the park and cycle car park (other access options are being considered). Although access may be provided elsewhere, it has been assumed that Clerk Maxwell Road is used to ensure a worst case assessment of this option.

12.3.4 As part of the travel management strategy for West Cambridge reported in Section 6, the University has proposals to remove the existing on-street car parking along Clerk Maxwell Road to improve the environmental conditions: this would affect the vehicle movements along this link.

12.3.5 The changes therefore include:

i) removal of the existing 290 space Park and Cycle car park accessed off Clerk Maxwell Road;

ii) removing the existing 85 - 90 on-road car parking spaces on both sides of the carriageway, and replacing them with two advisory cycle lanes; and

iii) potentially accessing a 540 space multi-storey car park using the old Park and Cycle car park access.

12.3.6 The Base flows on Clerk Maxwell Road have been adjusted to:

i) remove all the trip generation associated with the on-street car parking;

ii) account for the predicted trip generation from the 25 No. residential units located in The Lawns and Perry Court;

iii) remove all the trips associated with the Park and Cycle car park; and

iv) to provide a worst case assessment, to add all the trips assigning to the multi-storey car park – acknowledging that the University is still considering alternative access options to this facility.

## 12.4 Options tested

12.4.1 Reference is made in the Environmental Statement Transport Chapter to the following tests:

i) the effects of the Construction Phase of Development – this is assessed in the context of the 2016 Base flows;

ii) the operational effects of completion of the Initial Phase of Developments in 2021 – cumulative impact assessment; and

iii) the operational effects of the Full Development in 2031 – cumulative impact assessment.

12.4.2 The results from the modelling option tests are reported within this Transport Assessment for 2016, 2021, and 2031. Reflecting the adopted Adaptive Phased Approach (summarised in Section 2), the detailed assessment of effects of the later phases beyond 2021 would be considered in the context of the emerging planning and transport infrastructure proposals for the area.

12.4.3 The following sections summarise the results of the scenarios.

# 13 Development Trip Generation

## 13.1 Introduction

13.1.1 This section summarises the following:

i) the vehicle trip generation for the Consented West Cambridge Development – the Do Minimum scenario - as reported by Hannah Reed in 1997 in support of the outline planning application; and

ii) the revised West Cambridge Development vehicular trip generation arising in the 2021 Do Minimum and 2021 Do Something scenarios;

iii) the revised West Cambridge Development vehicular trip generation arising in the 2031 Do Minimum and 2031 Do Something scenarios.

13.1.2 This section concludes that:

i) the total vehicle trips assessed for the Consented West Cambridge Development reported in 1997 is higher than has been assessed by Peter Brett Associates for the equivalent 2021 or 2031 Do Minimum scenarios; and

ii) the total vehicle trips from the proposed Initial Phase of Development – the 2021 Do Something test - would be less than that assessed for the 2021 Do Minimum scenario. This is concluded to be as a consequence of the reduction in car parking availability and the implementation of the Travel Plan reducing car-based trips.

## 13.2 Vehicle trip generation to support the Consented 1997 Application scenario

13.2.1 As reported in Section 2.3, Hannah Reed prepared the Transportation Study to support the University of Cambridge's original 1997 West Cambridge Development planning application. This was subsequently approved by the Joint Authorities – Cambridge City Council, the local planning authority, Cambridgeshire County Council, the local highway authority, and the strategic highway authority, the Highways Agency (now referred to as Highways England).

13.2.2 The vehicle flows accruing to the consented West Cambridge Development were agreed with the Joint Authorities in 1999. These are summarised in Table 13.1.

13.2.3 The vehicle trip generation for the Consented – Do Minimum scenario - has been reassessed, and is reported below.

## 13.3 Predicted West Cambridge Development vehicular flows

13.3.1 The peak hour vehicle trip generation from West Cambridge has been reassessed, using the Peter Brett Associates Transport Model, and is summarised in Table 13.1 for the following scenarios:

i) 2016 Base Year (contained in Appendix 3.5);

ii) 2021 Do Minimum (i.e., With the 1999 Consented Development – contained in Appendix 13.1);

iii) 2021 Do Something (i.e., With the Proposed Initial Phase of Development – contained in Appendix 13.2);

iv) 2031 Do Minimum (i.e., With the 1999 Consented Development – contained in Appendix 13.3);

v) 2031 Do Something (i.e., With the Proposed Full Development – contained in Appendix 13.4).

Table 13.1: Comparison of the 2016, 2021 and 2031 Peak Hour vehicle flows – Peter Brett Associates (2017) and Hannah Reed (1997)

| Scenarios | | Academic Research Staff | | Commercial and Other land uses | | Total | |
|---|---|---|---|---|---|---|---|
| | | In | Out | In | Out | In | Out |
| ***2025 West Cambridge Consented Devt – Hannah Reed*** | ***AM*** | | | | | ***1,519*** | ***163*** |
| | ***PM*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** | ***-*** |
| 2016 Base | AM | 124 | 16 | 502 | 110 | 626 | 126 |
| | PM | 21 | 168 | 104 | 417 | 125 | 585 |
| 2021 Do Minimum – 1999 Consented Devt | AM | 165 | 20 | 1,253 | 236 | 1,418 | 256 |
| | PM | 28 | 219 | 218 | 1,016 | 246 | 1,235 |
| 2021 Do Something – Proposed Initial Phase of Devt | AM | 190 | 23 | 1,020 | 192 | 1,210 | 215 |
| | PM | 32 | 252 | 172 | 827 | 204 | 1,079 |
| 2031 Do Minimum – 1999 Consented Devt | AM | 165 | 20 | 1,242 | 235 | 1,407 | 255 |
| | PM | 28 | 220 | 217 | 1,007 | 245 | 1,227 |
| 2031 Do Something – Proposed Initial Phase of Devt | AM | 291 | 36 | 1,887 | 351 | 2,178 | 387 |
| | PM | 49 | 389 | 307 | 1,525 | 356 | 1,914 |

13.3.2 In addition to the above flows, an allowance has been made for the additional movements that were made to the Park and Cycle facility, and would be accommodated within the general parking facilities at West Cambridge. Reflecting the peak hour movements and the car parking management regime, a flow of 81 AM In and 71 PM Out movements have been allowed for.

## 13.4 Conclusions

13.4.1 It is noted that:

i) the Hannah Reed inbound vehicle trip generation assessment used to inform the original 1997 application – upon which the highway mitigation strategy was derived - is 7% higher than the equivalent Do Minimum inbound trip generation derived from the Peter Brett Associates analysis;

ii) the future year predicted vehicle trip generation from West Cambridge increases from the 2016 Base in both 2021 scenarios, as further quanta of development would be completed;

iii) the Travel Plan, the improved public transport and the travel demand management measures – in conjunction with a reduction in car parking provision within the 2021 Do Something Initial Phase of Development proposals - results in a reduced trip generation from West Cambridge when compared to the Do Minimum scenario;

iv) the 2031 Do Something scenario results in a further increase in the car movements to West Cambridge.

# 14 2021 Initial Phase – Trip Impact Analysis

## 14.1 Introduction

14.1.1 This section summarises the impact of an Initial Phase of Development in 2021 in terms of link impacts, and the capacity of the local junctions.

14.1.2 This section reports the following:

i) an assessment of the link flow differences between the 2016 and 2021 Do Minimum scenarios;

ii) an assessment of the link flow differences between the 2021 Do Minimum and 2021 Do Something scenarios; and

iii) the capacity assessments of local junctions along Madingley Road.

## 14.2 Differences between 2016 Base and 2021 Do Minimum

14.2.1 The 2016 Base Year and 2021 Do Minimum (i.e., with the 1999 Consented Development) peak hour flows are compared in Table 14.1 in Appendix 14.1. The percentage differences are also reported.

14.2.2 From this comparison between the 2016 and 2021 Do Minimum peak hour flows, it is apparent that:

i) all links experience increases in the peak hour flows, reflecting the additional flow assumed to be generated by surrounding development and the Local Plan allocations;

ii) the links with higher increases reflect the emerging development – including the completion of the Extant West Cambridge Development, and ongoing development – including at North West Cambridge, West Cambourne and Bourn Airfield;

iii) as these additional flows have been assessed without reference to the link and junction capacity of the network, these increases may be considered to be worst case, and not necessarily achievable; and

iv) the highest link flow impact observed on the West Cambridge Development site accesses reflects the relatively low 2016 Base flow.

## 14.3 Differences between 2021 Do Minimum and 2021 Do Something

14.3.1 Whilst acknowledging the above matters regarding the 2021 Do Minimum, this Do Minimum scenario reflects the future year baseline against which the traffic impact from the Proposed Development should be considered.

14.3.2 The 2021 Do Minimum and 2021 Do Something (i.e., with the Initial Phase of the Proposed Development) peak hour flows are compared in Table 14.2 in Appendix 14.1. The percentage differences are also reported.

14.3.3 From this comparison between the 2021 Do Minimum and 2021 Do Something peak hour flows, it is apparent that:

i) the percentage link flow changes across the strategic highway network are zero;

ii) many off-site links experience decreases, reflecting the reductions in trip generation from West Cambridge, as summarised in Table 14.1;

iii) some local links on Madingley Road experience decreases in flow – demonstrating the success of the adopted car parking access strategy intercepting many movements at the first available opportunity;

iv) the highest link flow changes are observed on Clerk Maxwell Road:

- the worst case assessment to the north of Clerk Maxwell Road (between Madingley Road and the car park access), reflecting the increased activity associated with a proposed new car park facility. The scale of these percentage increases further reflects the relatively low 2021 Do Minimum flow rather than the absolute increase in vehicle movements;

- to the south, the decrease reflects the benefit provided by the removal of the on-street car parking and the decreased activity on this section.

## 14.4 2021 Junction Capacity Assessments

### Introduction

14.4.1 This section summarises the impact of an indicative Initial Phase of Development on the capacity of a number of local and strategic junctions.

14.4.2 The junctions considered within this Initial Phase capacity assessment have been determined with reference to discussions with the Joint Authorities, and a review of the relevant link impacts.

14.4.3 The capacity of the junctions surrounding the Site have been assessed assuming the future year flows, and using appropriate modelling software including:

- JCT Consultancy's LINSIG computer program - utilised to model the traffic signal controlled junctions along the Madingley Road Corridor; and

- TRL's PICADY program, the Priority Junction Assessment Module within the Junctions9 computer suite - was used to confirm the degrees of saturation reported in the LINSIG assessment at the Madingley Road / JJ Thomson Avenue / Madingley Rise and Clerk Maxwell Road junctions;

- TRL's ARCADY program, the Roundabout Assessment Module within the Junctions9 computer suite was used to assess the Madingley Mulch Roundabout.

### Madingley Road Corridor

14.4.4 The existing Madingley Road Corridor has been assessed with the 2021 Do Minimum scenario flows for the following existing junctions using the LINSIG computer programme:

i) the M11 Off Slip traffic signal controlled junction;

ii) the M11 On Slip priority junction;

iii) the Park and Ride traffic signal controlled junction;

iv) the High Cross traffic signal controlled junction;

v) Madingley Road / JJ Thomson Avenue / Madingley Rise priority junction; and

vi) Madingley Road / Clerk Maxwell Road priority junction.

14.4.5 The results are summarised in Table 14.3, the computer output is contained in Appendix 14.2.

Table 14.3 – Madingley Road Corridor - Summary of LINSIG results – 2021 Do Minimum – Existing junction arrangement

| Junction | Approach | AM | | | PM | | |
|---|---|---|---|---|---|---|---|
| | | Degree of Saturation | | Queue (pcu) | Degree of Saturation | | Queue (pcu) |
| M11 Off Slip | Madingley Rd (EB) Ahead | 80.4% | 79.0% | 20 | 72.5% | 28.5% | 6 |
| | Madingley Rd (WB) Ahead | | 29.2% | 5 | | 72.5% | 20 |
| | M11 Slip NB Left | | 35.0% | 7 | | 67.0% | 14 |
| | M11 Slip NB Right | | 80.4% | 23 | | 45.3% | 8 |
| M11 On Slip | Madingley Rd (EB) Right Ahead | 59.0% | 59.0% | 1 | 88.4% | 88.4% | 13 |
| | Madingley Rd (WB) Left | | 14.9% | 0 | | 38.8% | 0 |
| | Madingley Rd (WB) Ahead | | 11.7% | 0 | | 40.5% | 0 |
| Park & Ride | Madingley Rd (EB) Left | 80.7% | 11.3% | 1 | 122.3% | 1.1% | 0 |
| | Madingley Rd (EB) Ahead | | 80.7% | 26 | | 41.2% | 7 |
| | Madingley Rd (WB) Ahead | | 24.6% | 1 | | 57.6% | 10 |
| | Madingley Rd (WB) Right Ahead | | 20.8% | 0 | | 3.9% | 0 |
| | Park & Ride Right Left | | 19.8% | 1 | | 122.3% | 39 |
| High Cross | Madingley Rd (EB) Left Ahead | 124.5% | 123.7% | 134 | 123.6% | 78.6% | 19 |
| | Madingley Rd (EB) Right | | 36.6% | 5 | | 7.7% | 1 |
| | Madingley Rd (WB) Right Left Ahead | | 82.3% | 22 | | 112.0% | 90 |
| | NWC Access Ahead Right Left | | 124.5% | 83 | | 104.6% | 17 |
| | High Cross Ahead Left Right | | 50.6% | 4 | | 123.6% | 107 |
| JJ Thomson | Madingley Rd (EB) Left Ahead | 56.9% | 42.7% | 0 | 123.4% | 33.7% | 0 |
| | Madingley Rd (EB) Right | | 10.1% | 0 | | 1.6% | 0 |
| | Madingley Rd (WB) Left Ahead | | 51.0% | 1 | | 50.2% | 1 |
| | Madingley Rd (WB) Right | | 6.4% | 0 | | 1.1% | 0 |
| | Madingley Rise Ahead Right Left | | 5.8% | 0 | | 21.9% | 0 |
| | JJ Thomson Ave Ahead Left Right | | 56.9% | 3 | | 123.4% | 65 |
| Clerk Maxwell | Madingley Rd (EB) Ahead Right | 57.7% | 54.0% | 1 | 57.3% | 57.3% | 1 |
| | Madingley Rd (WB) Left Ahead | | 57.7% | 1 | | 50.3% | 1 |
| | Clerk Maxwell Right Left | | 1.1% | 0 | | 22.4% | 0 |
| Cycle time (s) | | 120 | | | 120 | | |
| Total Delay Over All Lanes (pcu-Hr) | | 228.26 | | | 286.71 | | |

14.4.6 These results indicate that the Park and Ride Access, High Cross and JJ Thomson Avenue junctions would operate over capacity in the future year without further West Cambridge Development flows.

14.4.7 It is evident that a high percentage of the additional flows along the Madingley Road Corridor will be generated by the Local Plan allocation developments located to the west of Cambridge. These developments will be required to address their development impact, and minimise their traffic impacts along this corridor. As such it is anticipated that much of the additional flows will be mitigated at source – for example, the West Cambourne Development, consented in January 2017, offered contributions to fund enhancements to public transport facilities between Cambourne and the M1 Junction 13 to reduce bus transit times. As such, these results are worst case.

14.4.8 The Madingley Road Corridor has been reassessed for the 2021 Do Something scenario, assuming:

i) the same additional traffic from the other committed developments assumed in the Do Minimum assessment;

ii) the Do Something West Cambridge development generated flows; and

iii) the proposed Initial Phase car park access strategy – including the additional access provided by Clerk Maxwell Road.

14.4.9 The results are summarised in Table 14.4; the computer output is contained in Appendix 14.2.

Table 14.4 – Madingley Road Corridor - Summary of LINSIG results – 2021 Do Something – Existing situation

| Junction | Approach | AM | | | PM | | |
|---|---|---|---|---|---|---|---|
| | | Degree of Saturation | | Queue (pcu) | Degree of Saturation | | Queue (pcu) |
| M11 Off Slip | Madingley Rd (EB) Ahead | 80.9% | 77.9% | 19 | | 28.3% | 6 |
| | Madingley Rd (WB) Ahead | | 28.8% | 5 | | 72.1% | 20 |
| | M11 Slip NB Left | | 34.9% | 7 | | 66.8% | 14 |
| | M11 Slip NB Right | | 80.9% | 23 | | 45.0% | 8 |
| M11 On Slip | Madingley Rd (EB) Right Ahead | 58.8% | 58.8% | 1 | 88.1% | 88.1% | 13 |
| | Madingley Rd (WB) Left | | 14.7% | 0 | | 38.9% | 0 |
| | Madingley Rd (WB) Ahead | | 11.5% | 0 | | 40.3% | 0 |
| Park & Ride | Madingley Rd (EB) Left | 80.3% | 11.3% | 1 | 69.3% | 1.2% | 0 |
| | Madingley Rd (EB) Ahead | | 80.3% | 25 | | 46.5% | 10 |
| | Madingley Rd (WB) Ahead | | 25.0% | 1 | | 69.3% | 13 |
| | Madingley Rd (WB) Right Ahead | | 21.4% | 0 | | 4.7% | 0 |
| | Park & Ride Right Left | | 19.8% | 1 | | 72.1% | 8 |
| High Cross | Madingley Rd (EB) Left Ahead | 106.2% | 106.2% | 69 | 102.3% | 71.2% | 12 |
| | Madingley Rd (EB) Right | | 32.4% | 4 | | 5.8% | 1 |
| | Madingley Rd (WB) Right Left Ahead | | 58.8% | 13 | | 102.3% | 84 |
| | NWC Access Ahead Right Left | | 107.2% | 36 | | 108.3% | 15 |
| | High Cross Ahead Left Right | | 41.0% | 3 | | 108.7% | 48 |
| JJ Thomson | Madingley Rd (EB) Left Ahead | 50.1% | 50.1% | 1 | 46.7% | 34.8% | 0 |
| | Madingley Rd (EB) Right | | 26.7% | 0 | | 2.7% | 0 |
| | Madingley Rd (WB) Left Ahead | | 34.7 | 0 | | 46.7% | 0 |

| Junction | Approach | AM | | | PM | | |
|---|---|---|---|---|---|---|---|
| | | Degree of Saturation | | Queue (pcu) | Degree of Saturation | | Queue (pcu) |
| JJ Thomson | Madingley Rd (WB) Right | | 7.0% | 0 | | 1.1% | 0 |
| | Madingley Rise Ahead Right Left | | 5.7% | 0 | | 21.0% | 0 |
| | JJ Thomson Ave Ahead Left Right | | 24.4% | 0 | | 36.8% | 0 |
| Clerk Maxwell | Madingley Rd (EB) Ahead Right | 50.6% | 50.6% | 1 | 51.6% | 43.9% | 0 |
| | Madingley Rd (WB) Left Ahead | | 47.3% | 0 | | 48.2% | 1 |
| | Clerk Maxwell Right Left | | 12.8% | 0 | | 51.6% | 1 |
| Cycle time (s) | | 120 | | | 120 | | |
| Total Delay Over All Lanes (pcu-Hr) | | 111.59 | | | 150.43 | | |

14.4.10 It is noted that:

i) the lower degrees of saturation reported in the Do Something assessment reflect that the West Cambridge flows are predicted to decrease from the Do Minimum scenario;

ii) the Do Something car parking access strategy has some benefit to the Madingley Road Site Accesses;

iii) the JJ Thomson Avenue is predicted to work with the above changes. Whilst the conditions improve at the High Cross junction, this junction is still predicted to operate at capacity;

iv) the congested conditions in both 2021 Assessments reflect that additional flow has been added to the model from other developments across the area, without reference to the available link and junction capacity of the network;

v) any benefit of mitigation assumed to be provided by other developments has not been included for – for example, whilst additional movement would have been assumed for the consented West Cambourne Development, there has been no accompanying reduction in car-based movements into the City associated with the improved public transport.

14.4.11 As such, these results are worst case, and not necessarily representative.

14.4.12 Acknowledging that the benefit of the mitigation strategy to be delivered by others has not been considered, a further LINSIG test was undertaken to understand the scale of trip reduction necessary in the through-flow necessary to make the junction work. It was concluded that this be achieved by a reduction from the worst case scenario tested of 150 trips, less than 3 a minute. The West Cambourne Development has committed to a transport strategy to manage their increased demand along the A428 / A1303 Corridor – this reduction reflects the predicted benefit of the West Cambourne strategy.

14.4.13 An alternative minor physical measure has been considered that could be delivered to respond to the potential conditions at the Madingley Road / High Cross junction. This is shown on Figure 14.1, and consists of:

i) a two-to-one lane merger on the eastbound exit of the High Cross junction; and

ii) both the right turn movements – the west-to-south right turn inbound and the south-to-east outbound movements - being banned. These movements would be accommodated at the Madingley Road / JJ Thomson Avenue junction.

14.4.14 The Enhanced Madingley Road Corridor has been reassessed with the 2021 Do Something scenario flows. The results are summarised in Table 14.5, the computer output is contained in Appendix 14.2.

Table 14.5 – Madingley Road Corridor - Summary of LINSIG results – 2021 Do Something – Enhanced situation

| Junction | Approach | AM | | | PM | | |
|---|---|---|---|---|---|---|---|
| | | Degree of Saturation | | Queue (pcu) | Degree of Saturation | | Queue (pcu) |
| M11 Off Slip | Madingley Rd (EB) Ahead | 80.9% | 77.9% | 19 | 72.1% | 23.8% | 6 |
| | Madingley Rd (WB) Ahead | | 28.8% | 5 | | 72.1% | 20 |
| | M11 Slip NB Left | | 34.9% | 7 | | 66.8% | 14 |
| | M11 Slip NB Right | | 80.9% | 23 | | 45.0% | 8 |
| M11 On Slip | Madingley Rd (EB) Right Ahead | 58.8% | 58.8% | 1 | 88.1% | 88.1% | 13 |
| | Madingley Rd (WB) Left | | 14.7% | 0 | | 38.9% | 0 |
| | Madingley Rd (WB) Ahead | | 11.5% | 0 | | 40.3% | 0 |
| Park & Ride | Madingley Rd (EB) Left | 80.3% | 11.3% | 1 | 74.8% | 1.2% | 0 |
| | Madingley Rd (EB) Ahead | | 80.3% | 25 | | 46.5% | 10 |
| | Madingley Rd (WB) Ahead | | 25.3% | 1 | | 74.8% | 13 |
| | Madingley Rd (WB) Right Ahead | | 21.7% | 0 | | 5.1% | 0 |
| | Park & Ride Right Left | | 19.8% | 1 | | 72.1% | 8 |
| High Cross | Madingley Rd (EB) Left Ahead | 82.0% | 80.8% | 18 | 95.6% | 26.1% | 12 |
| | Madingley Rd (EB) Right | | 82.0% | 20 | | 46.1% | 1 |
| | Madingley Rd (WB) Right Left Ahead | | 70.3% | 16 | | 94.4% | 84 |
| | NWC Access Ahead Right Left | | 81.4% | 12 | | 93.4% | 15 |
| | High Cross Ahead Left Right | | 19.7% | 1 | | 95.6% | 48 |
| JJ Thomson | Madingley Rd (EB) Left Ahead | 76.1% | 50.9% | 25 | 93.0% | 26.9% | 0 |
| | Madingley Rd (EB) Right | | 76.1% | 17 | | 12.1% | 0 |
| | Madingley Rd (WB) Left Ahead | | 34.7% | 0 | | 46.7% | 0 |
| | Madingley Rd (WB) Right | | 7.1% | 0 | | 1.0% | 0 |
| | Madingley Rise Ahead Right Left | | 7.2% | 0 | | 21.3% | 0 |
| | JJ Thomson Ave Ahead Left Right | | 53.6% | 2 | | 93.0% | 0 |
| Clerk Maxwell | Madingley Rd (EB) Ahead Right | 50.6% | 50.6% | 1 | 51.6% | 43.9% | 0 |
| | Madingley Rd (WB) Left Ahead | | 47.3% | 0 | | 48.2% | 1 |
| | Clerk Maxwell Right Left | | 12.8% | 0 | | 51.6% | 1 |
| Cycle time (s) | | 120 | | | 120 | | |
| Total Delay Over All Lanes (pcu-Hr) | | 59.65 | | | 78.54 | | |

14.4.15 These results show that with the Enhanced Madingley Road Corridor, the High Cross junction would operate with a maximum degree of saturation of 95.6% - acknowledging that within the context of congested network that this level of operation would be acceptable – and the mean maximum vehicle queue would cause some blocking between the Park and Ride junction and High Cross Site Access. Notwithstanding, the following is noted:

i) this junction has previously been designed and assessed to accommodate the future year movements for both the North West and West Cambridge Developments using the CSRM, which would more accurately reflect conditions across the network;

ii) it is considered that the first-principles Transport Modelling assessment adopted for this development would represent a worst case:

- the methodology adopted does not assess likely reassignment effects across the network; and

- no mitigation measures provided by others have been considered within the assessment; and

iii) the existing form of Madingley Road could be the subject of significant change should the City Deal proposals identify this link as the preferred route for the East – West public transport corridor.

14.4.16 Responding to the uncertainty to this assessment identified above, following discussions with the Joint Authorities a strategy is agreed that:

i) this mitigation option not be delivered immediately;

ii) this situation be monitored on a yearly basis, and

iii) if considered desirable by the occupiers of West and North West Cambridge, and the Joint Authorities, the amendments to the High Cross traffic signal scheme be implemented by the University.

## Madingley Road / Madingley Mulch

14.4.17 The existing Madingley Road / Madingley Mulch Roundabout has been assessed with the 2021 Do Minimum and Do Something scenario flows using the JUNCTIONS9 ARCADY computer programme option.

14.4.18 The assessment accounts for the majority of the flow entering the junction by the two-lane A428 Eastbound Off-slip is by a single lane. The results are summarised in Tables 14.6 and14.7, the output is contained in Appendix 14.3:

Table 14.6 – Madingley Mulch Roundabout - Summary of Arcady Results – 2021 Do Minimum

| Arm | AM Peak (0800 – 0900) | | PM Peak (1700 – 1800) | |
|---|---|---|---|---|
| | Max RFC | Mean Max Queue | Max RFC | Mean Max Queue |
| Arm A – Church Lane | 0.08 | 0 | 0.07 | 0 |
| Arm B – A1303 Madingley Road | 0.36 | 1 | 0.79 | 4 |
| Arm C – St Neots Road | 0.07 | 0 | 0.09 | 0 |
| Arm D – A428 W/B On-slip | 0 | 0 | 0 | 0 |
| Arm E - A428 E/B Off-slip | 0.58 | 2 | 0.47 | 1 |
| Junction Delay (seconds) | 4.85 | | 7.71 | |

RFC = Ratio of flow to capacity – an RFC of 0.85 - 0.90 is considered to represent an arm at or approaching capacity.

Table 14.7 – Madingley Mulch Roundabout - Summary of Arcady Results – 2021 Do Something

| Arm | AM Peak (0800 – 0900) | | PM Peak (1700 – 1800) | |
|---|---|---|---|---|
| | Max RFC | Mean Max Queue | Max RFC | Mean Max Queue |
| Arm A – Church Lane | 0.08 | 0 | 0.07 | 0 |
| Arm B – A1303 Madingley Road | 0.36 | 1 | 0.79 | 4 |
| Arm C – St Neots Road | 0.07 | 0 | 0.09 | 0 |
| Arm D – A428 W/B On-slip | 0.00 | 0 | 0.00 | 0 |
| Arm E - A428 E/B Off-slip | 0.58 | 2 | 0.47 | 1 |
| Junction Delay (seconds) | 4.85 | | 7.77 | |

14.4.19 The Madingley Mulch Roundabout would continue to operate within capacity in 2021.

## 14.5 Conclusions

14.5.1 This section considers conditions in 2021, representing the completion of the Initial Phase of Development.

14.5.2 The comparison between the 2016 and 2021 Do Minimum model peak hour flows (i.e., the impact of the background growth on the network without any of the additional trips generated by the Proposed Development) identifies that all links would experience increases in the peak hour flows, reflecting the additional flow assumed to be generated by emerging development – including the completion of the Extant West Cambridge Development, and ongoing development – including at North West Cambridge, West Cambourne and Bourn Airfield. This 2021 Do Minimum scenario reflects the future year baseline against which the traffic impact from the Proposed Development should be considered.

14.5.3 The comparison between the 2021 Do Minimum and 2021 Do Something model peak hour flows (i.e., the direct comparison of the network Without then With Development) indicates that there are no significant increases in traffic as a direct result of the proposed development along the network in the future year of 2021.

14.5.4 Whilst the Madingley Road Corridor is predicted to operate better in the Do Something scenario than the equivalent Do Minimum, it is still operating above capacity. It is considered that the first-principles Transport Modelling assessment adopted for this development would represent a worst case, as the methodology adopted does not assess likely reassignment effects across the network, and mitigation measures provided by others have not been considered within the assessment. It is noted that:

- a limited reduction in the predicted worst-case through-flow would be sufficient for this junction to continue working; and

- a potential solution has been identified that could be delivered should the proposed monitoring strategy identify a need for this.

# 15 2031 Full Development – Trip Impact Analysis

## 15.1 Introduction

15.1.1 This section summarises the impact of the Full Development in 2031 in terms of link impacts, and the capacity of a number of local and strategic junctions.

15.1.2 This section reports the following:

i) an assessment of the link flow differences between the 2016 and 2031 Do Minimum scenarios;

ii) an assessment of the link flow differences between the 2031 Do Minimum and 2031 Do Something scenarios; and

iii) the capacities of a series of junctions in the area.

## 15.2 Differences between 2016 Base and 2031 Do Minimum

15.2.1 The 2016 Base Year and 2031 Do Minimum (i.e., with the 1999 Consented Development) peak hour flows are compared in Table 15.1 in Appendix 15.1. The percentage differences are also reported.

15.2.2 From this comparison between the 2016 and 2031 Do Minimum peak hour flows, it is apparent that:

i) all links experience increases in the peak hour flows, reflecting the additional flow assumed to be generated by surrounding development and the Local Plan allocations;

ii) the links with higher increases reflect the emerging development – including the completion of the Extant West Cambridge Development, and ongoing development – including at North West Cambridge, West Cambourne and Bourn Airfield;

iii) as these additional flows have been assessed without reference to the link and junction capacity of the network, these increases are worst case, and not necessarily achievable – this approach has been adopted to identify the key corridors for movement; and

iv) the highest link flow impact observed on the West Cambridge Development site accesses reflects the relatively low 2016 Base flow.

## 15.3 Differences between 2031 Do Minimum and 2031 Do Something

15.3.1 Whilst acknowledging the above matters regarding the 2021 Do Minimum, this Do Minimum scenario reflects the future year baseline against which the traffic impact from the Proposed Development should be considered.

15.3.2 The 2031 Do Minimum and the 2031 Do Something (i.e., with the Full Development) peak hour flows are compared in Table 15.2 in Appendix 15.1. The percentage differences are also reported.

15.3.3 From this comparison between the 2031 Do Minimum and 2031 Do Something peak hour flows, it is apparent that:

i) the percentage link flow changes across the network reflect the assignment of additional trips generated by West Cambridge;

ii) most off-site links experience minimal increases as a consequence of the Development;

iii) the greatest link flow impact is observed on Clerk Maxwell Road:

- for a short length of the northern end of Clerk Maxwell Road, reflecting the increased activity of the new car park facility. The scale of these percentage increases reflect more the relatively low 2031 Do Minimum flow rather than the increase in vehicle movements;

- to the south, the decrease reflects the benefit provided by the removal of the on-street car parking and the decreased activity on this section.

## 15.4 2031 Junction Capacity Assessments – Full Development

### Introduction

15.4.1 This section summarises the impact of the Full Development on the capacity of a number of local and strategic junctions.

15.4.2 The capacity of the junctions surrounding the Site have been assessed assuming the future year flows, and using appropriate modelling software including:

- JCT Consultancy's LINSIG computer program - utilised to model the traffic signal controlled junctions along the Madingley Road Corridor;

- TRL's PICADY program, the Priority Junction Assessment Module within the Junctions9 computer suite - was used to confirm the degrees of saturation reported in the LINSIG assessment at the Madingley Road / JJ Thomson Avenue / Madingley Rise and Clerk Maxwell Road junctions;

- TRL's ARCADY program, the Roundabout Assessment Module within the Junctions9 computer suite was used to assess the Madingley Mulch Roundabout.

### Madingley Road Corridor

15.4.3 The proposed Madingley Road Corridor has been assessed with the 2031 Do Minimum scenario flows for the following existing junctions using the LINSIG computer programme:

i) the M11 Off Slip traffic signal controlled junction;

ii) the M11 On Slip priority junction;

iii) the Park and Ride traffic signal controlled junction;

iv) the High Cross traffic signal controlled junction;

v) Madingley Road / JJ Thomson Avenue / Madingley Rise priority junction; and

vi) Madingley Road / Clerk Maxwell Road priority junction.

15.4.4 The results are summarised in Table 15.3, the computer output is contained in Appendix 15.2.

Table 15.3 – Madingley Road Corridor - Summary of LINSIG results – 2031 Do Minimum – Existing situation

| Junction | Approach | AM | | | PM | | |
|---|---|---|---|---|---|---|---|
| | | Degree of Saturation | | Queue (pcu) | Degree of Saturation | | Queue (pcu) |
| M11 Off Slip | Madingley Rd (EB) Ahead | 82.9% | 82.6% | 22 | 75.6% | 33.5% | 7 |
| | Madingley Rd (WB) Ahead | | 32.3% | 6 | | 75.6% | 21 |
| | M11 Slip NB Left | | 37.4% | 7 | | 70.5% | 15 |
| | M11 Slip NB Right | | 82.9% | 24 | | 50.8% | 9 |
| M11 On Slip | Madingley Rd (EB) Right Ahead | 73.1% | 73.1% | 32 | 147.1% | 147.1% | 158 |
| | Madingley Rd (WB) Left | | 18.3% | 0 | | 46.3 | 0 |
| | Madingley Rd (WB) Ahead | | 15.0% | 0 | | 51.9 | 1 |
| Park & Ride | Madingley Rd (EB) Left | 75.9% | 11.3% | 1 | 106.2% | 1.4% | 0 |
| | Madingley Rd (EB) Ahead | | 75.9% | 21 | | 106.2% | 71 |
| | Madingley Rd (WB) Ahead | | 44.7% | 4 | | 64.9% | 17 |
| | Madingley Rd (WB) Right Ahead | | 16.9% | 0 | | 11.9% | 0 |
| | Park & Ride Right Left | | 19.8% | 1 | | 44.1% | 6 |
| High Cross | Madingley Rd (EB) Left Ahead | 182.1% | 120.4% | 134 | 125.8% | 182.2% | 278 |
| | Madingley Rd (EB) Right | | 31.2% | 4 | | 9.9% | 2 |
| | Madingley Rd (WB) Right Left Ahead | | 97.2% | 39 | | 125.8% | 154 |
| | NWC Access Ahead Right Left | | 182.1% | 194 | | 48.7% | 6 |
| | High Cross Ahead Left Right | | 38.5% | 3 | | 180.7% | 165 |
| JJ Thomson | Madingley Rd (EB) Left Ahead | 125.7% | 45.9% | 0 | 186.6% | 25.7% | 0 |
| | Madingley Rd (EB) Right | | 14.3% | 0 | | 1.0% | 0 |
| | Madingley Rd (WB) Left Ahead | | 74.7% | 2 | | 54.9% | 1 |
| | Madingley Rd (WB) Right | | 9.2% | 0 | | 1.3% | 0 |
| | Madingley Rise Ahead Right Left | | 11.3% | 0 | | 34.5% | 0 |
| | JJ Thomson Ave Ahead Left Right | | 125.7% | 31 | | 186.6% | 161 |
| Clerk Maxwell | Madingley Rd (EB) Ahead Right | 82.6% | 59.2% | 1 | 77.0% | 77.0% | 2 |
| | Madingley Rd (WB) Left Ahead | | 82.6% | 2 | | 55.4% | 1 |
| | Clerk Maxwell Right Left | | Inf | 3 | | 28.9% | 0 |
| Cycle time (s) | | 120 | | | 120 | | |
| Total Delay Over All Lanes (pcu-Hr) | | 373.35 | | | 912.59 | | |

15.4.5 These results indicate that the Park and Ride Access, High Cross and JJ Thomson Avenue junctions would operate over capacity in the future year without further West Cambridge Development flows.

15.4.6 It is evident that a high percentage of the additional flows along the Madingley Road Corridor will be generated by the Local Plan allocation developments located to the west of Cambridge. These developments will be required to address their development impact, and minimise their traffic impacts along this corridor. As such it is anticipated that much of the additional flows will be mitigated at source – for example, the West Cambourne Development, consented in January 2017, offered contributions to fund enhancements to public transport facilities between Cambourne and the M1 Junction 13 to reduce bus transit times. As such, these results are worst case.

15.4.7 The Madingley Road Corridor has been reassessed for the 2031 Do Something scenario, assuming:

i) the same additional traffic from the other committed developments assumed in the Do Minimum assessment;

ii) the Full West Cambridge Development generated flows;

iii) the existing junction geometrics along Madingley Road;

iv) the proposed Full Development car park access strategy – including the additional access provided by Clerk Maxwell Road, and the new access to the Western Access Road shown on Figure 15.1.

15.4.8 The results are summarised in Table 15.4; the computer output is contained in Appendix 15.2.

Table 15.4 – Madingley Road Corridor - Summary of LINSIG results – 2031 Do Something – Existing situation

| Junction | Approach | AM | | | PM | | |
|---|---|---|---|---|---|---|---|
| | | Degree of Saturation | | Queue (pcu) | Degree of Saturation | | Queue (pcu) |
| M11 Off Slip | Madingley Rd (EB) Ahead | 99.3% | 98.3% | 35 | 82.6% | 33.6% | 7 |
| | Madingley Rd (WB) Ahead | | 34.9% | 0 | | 82.6% | 12 |
| | M11 Slip NB Left | | 35.6% | 7 | | 70.3% | 15 |
| | M11 Slip NB Right | | 99.3% | 46 | | 52.5% | 10 |
| M11 On Slip | Madingley Rd (EB) Right Ahead | 74.2% | 74.2% | 3 | 96.9% | 96.9% | 20 |
| | Madingley Rd (WB) Left | | 17.7% | 3 | | 49.8% | 1 |
| | Madingley Rd (WB) Ahead | | 13.6% | 2 | | 46.1% | 27 |
| Western Access Road | Madingley Rd (EB) Ahead | 57.5% | 33.9% | 6 | 86.5% | 5.4% | 1 |
| | Madingley Rd (EB) Ahead Right | | 57.5% | 8 | | 48.9% | 10 |
| | Madingley Rd (WB) Ahead | | 54.5% | 8 | | 86.5% | 20 |
| | Madingley Rd (WB) Ahead | | 56.7% | 8 | | 86.4% | 21 |
| Park & Ride | Madingley Rd (EB) Left | 63.1% | 11.3% | 0 | 50.3% | 8.5% | 0 |
| | Madingley Rd (EB) Ahead | | 63.1% | 18 | | 50.3% | 10 |
| | Madingley Rd (WB) Ahead | | 19.6% | 1 | | 42.7% | 13 |
| | Madingley Rd (WB) Right Ahead | | 7.4% | 0 | | 4.2% | 0 |
| | Park & Ride Right Left | | 19.8% | 1 | | 62.7% | 8 |
| High Cross | Madingley Rd (EB) Left Ahead | 143.5% | 141.0% | 171 | 136.8% | 133.9% | 116 |
| | Madingley Rd (EB) Right | | 15.0% | 2 | | 1.0% | 0 |

| Junction | Approach | AM | | | PM | | |
|---|---|---|---|---|---|---|---|
| | | Degree of Saturation | | Queue (pcu) | Degree of Saturation | | Queue (pcu) |
| High Cross | Madingley Rd (WB) Right Left Ahead | | 83.9% | 19 | | 136.8% | 211 |
| | NWC Access Ahead Right Left | | 143.5% | 290 | | 135.3% | 51 |
| | High Cross Ahead Left Right | | 66.8% | 5 | | 135.7% | 102 |
| JJ Thomson | Madingley Rd (EB) Left Ahead | 49.9% | 39.2% | 0 | 117.1% | 117.1% | 0 |
| | Madingley Rd (EB) Right | | 24.3% | 0 | | 31.0% | 0 |
| | Madingley Rd (WB) Left Ahead | | 49.9% | 1 | | 3.9% | 1 |
| | Madingley Rd (WB) Right | | 8.5% | 0 | | 51.6% | 0 |
| | Madingley Rise Ahead Right Left | | 7.5% | 0 | | 1.4% | 1 |
| | JJ Thomson Ave Ahead Left Right | | 47.7% | 1 | | 40.5% | 62 |
| Clerk Maxwell | Madingley Rd (EB) Ahead Right | 66.6% | 55.7% | 1 | 120.0% | 60.9% | 1 |
| | Madingley Rd (WB) Left Ahead | | 66.6% | 1 | | 53.65 | 1 |
| | Clerk Maxwell Right Left | | 18.2% | 0 | | 120.0% | 72 |
| Cycle time (s) | | 120 | | | 120 | | |
| Total Delay Over All Lanes (pcu-Hr) | | 401.10 | | | 585.90 | | |

15.4.9 It is noted that:

i) the Do Something car parking access strategy has benefit to the Madingley Road Site Accesses by intercepting trips early, minimising the impact on adjacent junctions;

ii) the proposed Western Access Road would work within capacity with the 2031 Do Something flows;

iii) the existing JJ Thomson Avenue and High Cross junctions are predicted to operate above capacity;

iv) the congested conditions in both 2031 Assessments reflect that additional flow has been added to the model from other developments across the area, without reference to the available link and junction capacity of the network;

v) any benefit of mitigation assumed to be provided by other developments has not been included for – for example, whilst additional movement would have been assumed for the consented West Cambourne Development, there has been no accompanying reduction in car-based movements into the City associated with the improved public transport.

15.4.10 As such, these results are worst case, and not necessarily representative.

15.4.11 Acknowledging that the mitigation strategy to be delivered by others has not been considered, a further LINSIG test was undertaken to understand the scale of trip reduction necessary in the through-flow necessary to make the junction work. It was concluded that this be achieved by a reduction from the worst case scenario tested of 400 trips, a reduction of around 7 a minute. With the proposals outlined for improved movement along the A428 / A1303 Corridor by others, this level of reduction remains quite feasible.

15.4.12 A strategy to manage completely these worst case increased movements along Madingley Road by physical measures has not been developed as:

i) the necessity for it reflects the University responding to a worst case assessment, which is unlike to materialise;

ii) such a scheme requiring significant additional infrastructure would be contrary to policy;

iii) to increase the physical scale of the Madingley Road carriageway to provide sections of three-lanes width to respond to peak hour conditions would be contrary to any enhanced urban design aspirations for this area; and

iv) it would result in a poorer environment for pedestrians and cyclists.

15.4.13 As such, the strategy to respond to these junction capacity issues along Madingley Road Corridor should rely upon strategic solutions, within the context of the existing local transport policy identified within Section 4. This is summarised in Section 17.

## Madingley Road / Madingley Mulch

15.4.14 The existing Madingley Road / Madingley Mulch Roundabout has been assessed with the 2031 Do Minimum and Do Something scenario flows using the JUNCTIONS9 ARCADY computer programme option.

15.4.15 The assessment reflects that the majority of the flow entering the junction at the two-lane A428 Eastbound Off-slip moves within a single lane. The results are summarised in Tables 15.5 and 15.6, the output is contained in Appendix 15.3:

Table 15.5 – Madingley Mulch Roundabout - Summary of Arcady Results – 2031 Do Minimum

| Arm | AM Peak (0800 – 0900) | | PM Peak (1700 – 1800) | |
|---|---|---|---|---|
| | Max RFC | Mean Max Queue | Max RFC | Mean Max Queue |
| Arm A – Church Lane | 0.09 | 0 | 0.08 | 0 |
| Arm B – A1303 Madingley Road | 0.41 | 1 | 0.83 | 5 |
| Arm C – St Neots Road | 0.07 | 0 | 0.09 | 0 |
| Arm D – A428 W/B On-slip | 0 | 0 | 0 | 0 |
| Arm E - A428 E/B Off-slip | 0.80 | 4 | 0.61 | 2 |
| Junction Delay (seconds) | 8.92 | | 9.46 | |

RFC = Ratio of flow to capacity – an RFC of 0.85 - 0.90 is considered to represent an arm at or approaching capacity.

Table 15.6 – Madingley Mulch Roundabout - Summary of Arcady Results – 2031 Do Something

| Arm | AM Peak (0800 – 0900) | | PM Peak (1700 – 1800) | |
|---|---|---|---|---|
| | Max RFC | Mean Max Queue | Max RFC | Mean Max Queue |
| Arm A – Church Lane | 0.09 | 0 | 0.08 | 0 |
| Arm B – A1303 Madingley Road | 0.41 | 1 | 0.87 | 7 |
| Arm C – St Neots Road | 0.07 | 0 | 0.10 | 0 |
| Arm D – A428 W/B On-slip | 0 | 0 | 0 | 0 |
| Arm E - A428 E/B Off-slip | 0.86 | 6 | 0.61 | 2 |
| Junction Delay (seconds) | 12.05 | | 11.69 | |

15.4.16 The Madingley Mulch Roundabout is predicted to operate within capacity in during the 2031 Do Minimum scenario, and marginally above capacity with the addition of the Development traffic.

15.4.17 Notwithstanding, it is concluded that no works be undertaken at this junction:

i) the above assessment represents a worst case in terms of trip generation;

ii) the benefit of the proposed mitigation measures by others has not been included for within the assessment;

iii) there is uncertainty regarding the precise location of a potential park and ride site identified within the Cambridge Long-Term Transport Strategy which may affect the movement of vehicles through this junction;

iv) the ratio of flow to capacity of 0.87 is marginally above the RFC assumed to represent the practical capacity of an approach arm - of 0.85. This would not normally justify a requirement for physical enhancements.

## 15.5 Conclusions

15.5.1 This section considers conditions in 2031, representing the completion of the Full Development.

15.5.2 The comparison between the 2016 and 2031 Do Minimum model peak hour flows (i.e., the impact of the background growth on the network without any of the additional trips generated by the Proposed Development) identifies that all links experience increases in the peak hour flows, reflecting the additional flow assumed to be generated by surrounding development – including the completion of the Extant West Cambridge Development, and ongoing development – including at North West Cambridge, West Cambourne and Bourn Airfield. This 2031 Do Minimum scenario reflects the future year baseline against which the traffic impact from the Proposed Development should be considered.