Chapter D
Transport

Milton Keynes East Environmental Statement

Chapter D: Transport

March 2021

WSP
Mountbatten House, Basing View,
Basingstoke, Hampshire RG21 4HJ

www.wsp.com

12491/04/MS/ABe
19588064v1

Contents

D1.0 Introduction

D1.1 This Chapter forms part of the Milton Keynes East Environmental Statement ('ES') which sets out the findings of an Environmental Impact Assessment ('EIA') of the proposed development of a sustainable urban extension ('SUE') to Milton Keynes. It relates to land to the east of the M1 motorway and to the south of Newport Pagnell. A description of the background to the proposal; the relationship of this chapter to the wider ES; and a description of the site and the development is provided at Chapters A to C of this ES.

D1.1 Given the scale and importance of the proposals, it is considered that the Proposed Development could affect the existing transport networks and their users. As such, it is deemed appropriate to include the assessment of the potential effects on transport in the ES.

D1.2 The purpose of this Transport Chapter is to set out the technical details of the assessment of transport and assess the likely significant environmental effects, which could arise as a result of the Proposed Development, during both the construction and operational phases.

D1.3 The chapter is accompanied by the following figures provided at Volume 2 of this ES:-

- Figure D3.1 - Geographical Extent of the Milton Keynes Multi-Modal Model ('MKMMM')
- Figure D3.2 - Study Area
- Figure D3.3 - Sensitive Receptors
- Figure D4.1 - Site Location (Local Context and Highway Network)
- Figure D4.2 - Local Pedestrian & Cycle Network
- Figure D4.3 - Personal Injury Accidents (01/06/2015 – 31/05/2020)
- Figure D5.1 - Assessed Links

D1.4 The chapter is also accompanied by the following technical appendices provided at Volume 2 to this ES:-

- Appendix D1 - Transport Assessment ('TA') which also includes several Transportation Technical Notes ('TTN');
- Appendix D2 - Residential Travel Plan ('RTP');
- Appendix D3 - Workplace Travel Plan ('WTP');
- Appendix D4 - Public Transport Strategy ('PTS');
- Appendix D5 - Construction Logistics Plan ('CLP'); and
- Appendix D6 – Traffic Flow and Differences.

About the Author

D1.5 This Transport Chapter has been prepared by WSP, a company competent and experienced in undertaking EIA relating to transport.

D1.6 This chapter has been prepared by a team of specialist transport consultants from WSP. WSP is a multi-disciplinary engineering consultancy that has numerous experts across a variety of areas. WSP has provided transportation and highways support for the Proposed Development over several years. As such, WSP is well placed to understand the requirements of the Proposed Development, as well as having an in-depth knowledge of the site's locality and traffic conditions.

D1.7 The primary author of this chapter is a Principal Transport Planner with over seven years of experience in transportation planning. The author has an MSc in Transportation Planning and Engineering, is a Chartered Member of the CILT and member of the CIHT and has experience in the preparation of Transport Assessments and transport-related ES chapters.

D1.8 The Transport Chapter review has been undertaken by an Associate Transport Planner with over 10 years of transportation planning experience, who also holds an MSc in Transportation Planning and Engineering and is a member of the CIHT. The reviewer has extensive experience in preparing a broad suite of transport-related documents, including Transport Assessments and ES chapters for various projects of differing scales, locations and uses.

D1.9 The final review and approval have been carried out by an Associate Director with over 14 years of experience in the transportation arena, who holds a BA (Hons) in Town and Country Planning, specialising in Transport Planning and is a member of the CIHT and a Chartered Member of the CILT.

D2.0 Policy Context

D2.1 The assessment of the transport effects of the Proposed Development is based on policy and current best practice exemplified in several policy documents at the national and local level.

D2.2 A review of the relevant law and policies that inform the EIA process is provided in Chapter B: Scope and Methodology of the ES, with a comprehensive review of transport policy relevant to the Proposed Development provided in the TA. However, this Transport Chapter of the ES also provides a review of legislation and policies relevant only to the assessment of the potential effects on the environment generated by the transport aspects of the Proposed Development.

D2.3 In accordance with the above, it should be noted that some national strategies such as Transport Investment Strategy (DfT, 2017) or Single Departmental Plan (DfT, 2019) have been excluded from this review. This is due to these plans representing a commitment towards investing in infrastructure or to reverting traditional travel patterns towards more sustainable modes of transport. Whilst these plans identify how a project may influence transport items, they do not consider or include a reference to the potential effects that transport aspects of developments may have on the environment. Therefore, they are not considered relevant for the purpose of this Transport Chapter.

D2.4 An overview of the legislation and policies directly relevant to the Transport Chapter of this ES is provided below.

National Planning Policy and Guidance

National Planning Policy Framework (NPPF), February 2019[Ref 1]

D2.5 The National Planning Policy Framework (NPPF) sets out the Government's planning policies for England and how these are expected to be applied. It emphasises the importance of the transport policy in facilitating sustainable development.

D2.6 The NPPF was originally published in March 2012 and replaced all Planning Policy Guidance (PPG) and Planning Policy Statements (PPS) related to Transport. The NPPF was then updated in July 2018 and again in February and June 2019.

D2.7 The NPPF retains its overarching presumption in favour of sustainable development and requires all plans and decisions to apply it. The requirement is set out in paragraph 10 of the document.

D2.8 Paragraph 104 states that:-

"Planning Policies should:

- support an appropriate mix of uses across an area and within larger scale sites, to minimise the number and length of journeys needed for employment, shopping, leisure, education and other activities, and;

- provide for high quality walking and cycling networks and supporting facilities such as cycle parking (drawing on Local Cycling and Walking Infrastructure Plans)."

D2.9 Paragraph 108 outlines the requirements for a development that should be considered during the assessment of the proposals stating:

"It should be ensured that:

a) appropriate opportunities to promote sustainable transport modes can be – or have been – taken up, given the type of development and its location;

b) safe and suitable access to the site can be achieved for all users; and

c) any significant impacts from the development on the transport network (in terms of capacity and congestion), or on highway safety, can be cost effectively mitigated to an acceptable degree."

D2.10 Importantly, NPPF states in paragraph 109 that:-

"…Development should only be prevented or refused on highways grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe."

D2.11 Paragraph 110 considers that applications for development should:-

"a) give priority first to pedestrian and cycle movements, both within the scheme and with neighbouring areas; and second – so far as possible – to facilitating access to high-quality public transport, with layouts that maximise the catchment area for bus or other public transport services, and appropriate facilities that encourage public transport use"

and

"e) be designed to enable charging of plug-in and other ultra-low emission vehicles in safe, accessible and convenient locations."

D2.12 Paragraph 111 requires that:-

"…All developments that will generate significant amounts of movement should be required to provide a travel plan, and the application should be supported by a transport statement or transport assessment so that the likely impacts of the proposal can be assessed."

D2.13 The NPPF is consistent with the National Planning Practice Guidance (NPPG) so far as both seek to promote the potential for sustainable transport and reduce car travel.

Oxford- Cambridge Arc Spatial Framework (February 2021)

D2.14 The Government recently set out its ambitions to develop a Spatial Framework for the Oxford-Cambridge Arc to promote an integrated approach to planning and investment, with a target for implementation shortly after Autumn 2022.

D2.15 The arc is defined by the National Infrastructure Commission ("NIC") as stretching: "*around 130 miles from Cambridgeshire, via Bedford and the south east midlands, to Oxfordshire. It forms a broad arc around the north and west of London's green belt…"*

D2.16 Milton Keynes East sits at the heart of the Arc and is strategically well located. It is geographically close to what will become a key east-west artery formed by East-West Rail and the parallel road links of the A422 and A421. It is also on the key north-south artery of the M1 linking the northern and southern extents of the central part of the arc (i.e. Daventry/ Northampton to the north and Luton to the south).

Local Policy and Guidance

Plan:MK 2016-2031, March 2019[Ref 2]

D2.17 Land East of the M1 (referred to as Milton Keynes East or MKE) has been identified in the Milton Keynes Council's ('MKC') adopted local plan, Plan:MK 2016-2031 as a Strategic Site Allocation. It is expected to provide a SUE to Milton Keynes after 2031. The allocation is conditional upon securing Government funding for the enabling road and infrastructure connections.

D2.18 Policy SD1 (Place-Making Principles for Development) requires that proposals for development (including SUEs) should demonstrate that key place-making principles have been considered, including:-

"Development integrates well with the surrounding built and natural environments to enable a high degree of connectivity with them, particularly for pedestrians and cyclists and for access to connected green infrastructure for people and wildlife.

The layout and design enables easy, safe and pleasant access for pedestrians and cyclists of all abilities from residential neighbourhoods to the facilities, including the redway network, open spaces and play areas, public transport nodes, employment areas, schools shops and other public facilities in order to promote recreation walking and cycling."

- Transport solutions maximise the opportunities provided by smart, shared and sustainable mobility solutions to deliver real alternatives to the private car (e.g. connectivity with existing and forthcoming rail services; rapid transit; driverless vehicles; shared vehicle schemes; coaches and buses)."

D2.19 Policy SD9 (General Principles for Strategic Urban Extensions), requires that proposals for SUEs should be prepared in accordance with the principles set out below:-

"i To be supported by an Environmental Impact and Transport Assessment;

iii Design, Land use, transport routes and mobility measures that integrate the SUE with the existing built up area and enable future expansion beyond the SUE where appropriate;

v A green infrastructure and open space strategy to improve biodiversity, provide advanced structural planting, extend the 'forest city' concept, create green road and street scenes, and incorporate public art and leisure and recreational facilities; and

vii Planning obligations relating to the phasing of development and the provision of on-site and off-site infrastructure and facilities, to include land, capital and initial running costs.

D2.20 Policy SD12 (Milton Keynes East Strategic Urban Extension) states proposals for development will be expected to meet the following transport related criteria:

"4.The phased introduction of a comprehensive network of transport infrastructure in line with the Local Investment Plan, to include grid road connections to H4/V11 to the west and improved highway connections to Newport Pagnell and Central Milton Keynes (CMK), including new and/or enhanced vehicular crossings of the M1, involving highway works on and off-site.

5.A corridor of land safeguarded for a fast mass-transit system, and associated infrastructure, enabling connectivity to CMK and other key destinations. The width of the corridor should be sufficient to enable a range of possible transit solutions to come forward whilst also ensuring the efficient use of land for achieving the scale of development proposed within this policy.

6. A network of segregated, and where appropriate grade-separated, new and enhanced footpaths, cycleways and bridleways (including redways) to connect to existing routes beyond the site, including provision of appropriate pedestrian and cyclist crossings of the A422 and suitable safe and attractive crossings of the M1 as appropriate."

Housing Infrastructure Fund

D2.21 MKC – in partnership with St James – has successfully secured from Central Government £94.6 million of infrastructure funding to bring forward the Milton Keynes East development. This follows a joint bidding process by the Council and St James to the Housing Infrastructure Fund ('HIF'); a Government capital grant programme which aimed to unlock new homes by helping fund necessary infrastructure in areas of greatest housing need.

D2.22 This money, announced in March 2020, is ringfenced to part-fund some of the infrastructure required to enable the delivery of MKE, including funding for:

1 Parts of the proposed highway improvements which are part of the detail of this application, including:
   a A new road bridge over the M1 corridor primarily to provide good connectivity between MKE and the existing urban area of Milton Keynes and relieve J14 of local traffic not accessing the motorway;
   b Dualling of the A509 and Tongwell Street; and
   c New on-site dual carriageway links forming an extension to the Grid Road network;
2 A new Health Care facility to alleviate existing GP constraints and serve the new community early in the development; and
3 A three-form entry primary school to alleviate pupil capacity constraints and serve the new development.

D2.23 The allocation of this funding to the MKE development comes with several conditions including the need for utilising all the HIF funding within certain timescales. The need to meet these deadlines has been the primary driver for both the timeline and nature of the planning submission, with a requirement to submit it by 31st March 2021. This is to demonstrate to the Government that sufficient progress has been made towards spending all the funding by the HIF long-stop date of March 2024. This is the reason why the main highways works (funded by HIF) are sought in detail as part of this hybrid application, as it will enable the early commencement of infrastructure delivery and access to HIF funding in line with conditions. The HIF funding is therefore contingent upon and necessarily interlinked with this planning application and its role enabling the delivery of infrastructure-led growth in Milton Keynes.

Mobility Strategy for Milton Keynes 2018-2036 (LTP4): Mobility for All, March 2018[Ref 3]

D2.24 The LTP4 sets out the strategic framework for the Milton Keynes Transport System along with a series of interventions needed to achieve the growth ambitions outlined in Plan:MK and support the longer-term growth planned by MK Futures 2050.

D2.25 The objective 'Maximise travel choices' states the aim of *"Increasing mobility as a service, reducing the need for car ownership."*

D2.26 The objective 'Protect Transport Users and the Environment' revolves around the following aims:

"- Supporting and encouraging the use of use of active modes;

- Supporting and encouraging travel patterns which minimise CO2 and other emissions;

- Ensuring the safety of all travellers."

D2.27 Section 3 of the LTP4 covers the Delivery Plan. The objectives are set out at various terms of completion. The most relevant objectives for the development are outlined below:-

- 'Local highway Infrastructure' – *"Provide additional road capacity at congestion hotspots where required and ensure infrastructure is future proofed."*
- 'Redway network upgrade and extension' – *"The Redway network will be extended into new developments and where possible the old towns, cultural venues and sports centres."*

Mobility Strategy for Milton Keynes 2018-2036 (LTP4): Transport Infrastructure Delivery Plan, October 2019[Ref 4]

D2.28 The Transport Infrastructure Delivery Plan of the LTP4 (TIDP) sets out the objectives and short to medium-term transport infrastructure required to support existing and new communities in Milton Keynes within the Plan:MK period to 2031.

D2.29 One of the objectives of the Strategy is to "*Protect transport users and the environment*".

D2.30 Referring to the transport infrastructure, one of the objectives mentioned in the Strategy is to *"Enhance the natural and built environment"*.

Milton Keynes East Strategic Urban Extension: Development Framework Supplementary Planning Document, March 2020[Ref 5]

D2.31 A Development Framework was adopted as a Supplementary Planning Document (SPD) in March 2020. The DF accords with Plan:MK and the NPPF/NPPG and sets out some key considerations and parameters for bringing development on the site forwards.

D2.32 The proposals for the site follow the over-arching principles as set out in the Development Framework SPD. The principles related to environmental matters include:

"- Active modes;

- Sustainable movement & rapid transit;

- Minimised impact of transport corridors;

- Green and Blue infrastructure; and

- Biodiversity".

MK Sustainability Strategy 2019-2050, December 2018[Ref 6]

D2.33 The MK Sustainability Strategy 2019-2050 sets out MKC's long-term vision to create a world-leading sustainable city, which embraces innovation and creates jobs. The strategy recognises that it has a vital role in tackling the global challenges of climate change.

D2.34 In terms of transport, the strategy builds on sustainable principles that include reducing the level of transport-related emissions by promoting low-carbon vehicles and public transport and ensuring that the energy required for transport originates from sustainable sources.

MK Strategy for 2050 (Engagement Draft), January 2020[Ref 7]

D2.35 The MK Strategy for 2050 (referred to as the Strategy) sets the way forward for Milton Keynes Borough ('MKB') and provides a long-term approach to spatial development.

D2.36 The Strategy sets out how MKC will consider the steady population increase to around 410,000 people in the borough by 2050. Public and stakeholder engagement has been extensive and included a draft strategy published for comment in January 2020 for 18- weeks and a subsequent 5-week long review of the impacts of COVID-19. The Strategy includes a commitment to provide essential infrastructure and services, including transit systems. It also commits to keep and strengthen areas such as – green spaces and trees, ease of movement with grid roads and redways, vibrant economy and diverse communities.

D2.37 The Strategy includes proposals to help achieve MKC's ambition to be carbon neutral by 2030 and support the community's mental and physical health.

D2.38 The document discusses high-level strategies for MKB and will feed into the development of the new Local Plan for MKB. The Strategy is concerned, inter alia, about sustainable growth in the area and emphasises the importance of high-quality environments. Several quality principles are established in the document for any development, including:

- Creating Healthy Neighbourhoods;
- Fully integrated with the natural and historic environment;
- Supporting compact, mixed-use neighbourhoods that work for public transport;
- Designing for active travel – walking and cycling;
- Creating places that support community ownership;
- Strong connections to the public transport network and reducing the reliance on cars;
- Reducing the environmental impact of new developments;
- Sense of place and innovation;
- Providing for a mix of uses within neighbourhoods;
- New development that is sensitive to existing communities;
- Making space for culture; and
- Sharing the opportunities for growth across all communities.

D2.39 The Strategy also states that:-

"Major allocations for new communities will be required to include a significant proportion of the site for green space, ensuring it is delivered as an intrinsic part of the community. Development should result in a net gain to the environment, making positive improvements rather than just mitigating impacts."

D2.40 The Strategy was approved by Cabinet on 15 December 2020. Cabinet also agreed to a review of the Strategy after three years.

D2.41 It was formally agreed by MKC members in Full Council on 20 January 2021 that the 2050 Strategy would become an Annex to the Council Plan, making it a Policy Framework document. This means that it is a formal statement of intent from MKC that they will work towards. The

Strategy for 2050 was prepared and revised using the evidence and feedback collected by MKC over the last three years.

D2.42 The final Strategy for 2050 reflects the best available view of the issues and is intended to form a flexible framework for the future development of Milton Keynes. Whilst the Strategy is now adopted as part of the policy framework, as an annexe to the Council Plan, the Strategy for 2050 is not a formal planning policy document and so has no weight in the planning process and is not a material consideration in the determination of planning applications. Instead, it is to be used to inform the development and delivery of other plans, policies and strategies across the authority and, where appropriate, by partners.

Best Practice Guidance

IEMA Guidelines for Environmental Impact Assessment (2004)[Ref 8]

D2.43 The Guidelines for Environmental Impact Assessment (IEMA, 2004) provide an umbrella for guidelines focused on assessing specific types of impacts (e.g. road traffic).

D2.44 The guidance contained in the document is of a general character, and it is aimed at EIA practice by setting out the requirements and the expectations related to good practice. These guidelines are:-

"...designed to complement other guidelines that focus on the assessment of specific impacts or particular aspects of the EIA process, whether produced by the IEMA or other organisations."

IEMA Guidelines for the Environmental Assessment of Road Traffic, 1993[Ref 9]

D2.45 The Institute of Environmental Management and Assessment's ('IEMA') 'Guidelines for the Environmental Assessment of Road Traffic' were published in 1993. These IEMA Guidelines are still valid and form part of the suite of specific documents overarched by the 2004 Guidelines for Environmental Impact Assessment mentioned above. The guidelines aim to contribute towards the improvement of EIA practice by setting out the requirements and the expectations relating to good practice.

D2.46 The guidelines set out an assessment methodology, so it is possible to identify likely effects which could be considered as potentially significant. This approach informs how travel demand changes (particularly traffic) affect the environment and suggest ways to remove, reduce or mitigate these effects. These guidelines identify requirements to consider the effects on pedestrians, cyclists and other road users, including amenity, delays and severance. It also requires an assessment of the effects on drivers and, ultimately, road safety.

Design Manual for Roads and Bridges (Sustainability & Environment), July 2019 and January 2020

D2.47 Design Manual for Roads and Bridges ('DMRB') - Sustainability & Environment Appraisal provides guidance regarding the aims and objectives of environmental impact assessment, including EIA scoping, the assessment and management of environmental effects and the reporting of environmental assessments.

D2.48 The DMRB guidance considered in this Transport Chapter is contained in the following documents:

- LA 104: Environmental assessment and monitoring (July 2019)[Ref 10]; and
- LA 112: Population and human health (January 2020)[Ref 11].

Transport Analysis Guidance, 2020[Ref 12]

D2.49 Transport Analysis Guidance (TAG) data book, last updated by the Department for Transport in July 2020, provides information and values associated with transport modelling and appraisal. The TAG is primarily aimed at the economic appraisal of transport interventions. However, the databook provides useful information, such as typical accident rates and forecasting methods.

Summary

D2.50 The predominant message from both national and local policy is for developments to support sustainable development, consider their impact upon the highway network and, where required, provide mitigation of that impact.

D3.0 Assessment Methodology & Significance Criteria

Assessment Methodology

Methodological Approach

D3.1 The approach to the assessment and, subsequently, the methodology employed in this Transport Chapter is based on the relevant guidance contained in both IEMA Guidelines for the Environmental Assessment of Road Traffic [Ref 9] (hereafter referred to as 'IEMA Guidelines') and the DMRB - Sustainability & Environment Appraisal (hereafter referred to as 'DMRB guidance') [Refs 10/11].

D3.2 IEMA Guidelines published in 1993 provide advice specifically aimed at the environmental effects of changes in transport and traffic as a result of a development. It defines the effects that should be regarded as a material consideration and then considers the weight to which those effects should be defined. The guidelines set out, inter alia, a list of environmental effects, which could be considered as potentially material or significant whenever a new development is likely to give rise to changes in traffic flows.

D3.3 In contrast, DMRB guidance is predominantly aimed at the assessment of major road infrastructure projects rather than developments. However, the Proposed Development includes the provision of substantial highway infrastructure, without which the development itself could not be delivered. As such, it is considered appropriate to combine the DMRB guidance with the IEMA Guidelines in order to tailor the assessment methodology to the proposals.

IEMA requirements

D3.4 As outlined above, the IEMA Guidelines provide a list of environmental effects, which could be considered as part of the EIA process. These effects include:

- Severance;
- Driver delay;
- Pedestrian delay;
- Pedestrian and cyclist amenity;
- Fear and intimidation;
- Accidents and safety;

D3.5 The IEMA Guidelines also suggest considering dangerous or hazardous loads. However, the Proposed Development is not expected to generate any such vehicle movements and therefore, it is deemed appropriate to exclude dangerous or hazardous loads from the assessment.

D3.6 Also excluded from the assessment are effects of dust and dirt as these are unlikely to occur at distances greater than 50m from a construction site access and depend predominantly on the management practices during construction. Practices to minimise these effects are considered in detail in the CLP (Appendix D5), also accompanying the application.

D3.7 In addition to the above, the IEMA Guidelines discuss the assessment of noise and vibration, visual effects, air pollution, ecology and heritage. Although these effects may be related to transport, they are considered in their respective chapters of the ES.

DMRB requirements

D3.8 Similar to the IEMA Guidelines, the DMRB guidance (LA 104) also sets out several factors that must be considered in the EIA, most of which are considered in other chapters of the ES. The only environmental factor directly related to this Transport Chapter is *'Population and human health'*.

D3.9 Guidance on the environmental assessment of population and human health effects with respect to traffic and transport is set out in DMRB LA 112 - Population and Human Health. It should be highlighted that historically, DMRB Volume 11 provided guidance regarding assessment techniques for assessing the environmental impacts of development on various aspects of the environment, including pedestrians, cyclists, equestrians and community effects, and vehicle travellers. However, the guidance contained in the DMRB has been updated with several documents consolidated into more concise guidelines. This is also the case of DMRB Volume 11 with Section 3, Part 8 (Pedestrians, Cyclists, Equestrians and Community Effects) and Volume 11, Section 3, Part 9 (Vehicle Travellers) replaced by DMRB LA 112.

D3.10 The guidance in the documents replaced by DMRB LA 112 was aimed at the transport and traffic-specific effects. In contrast, the reach of the current document (DMRB LA 112) is broader and suggests a more qualitative approach to the assessment than the previous guidance with its thresholds and benchmarks. As a result, reporting on some of the significant environmental effects arising from traffic and transport is reported in the most appropriate ES chapter (e.g. noise, air quality), and some may be considered in combination with others rather than on their own (e.g. community severance).

D3.11 DMRB LA 112 requires the assessment of population and human health effects to report on the following elements:

- Land use and accessibility;
- Human health.

D3.12 The assessment of *'Land use and accessibility'* considers likely changes to accessibility and the risk of severance for private property and housing, community land and assets, development land and businesses and agricultural landholdings.

D3.13 The assessment of changes affecting walkers, cyclists and horse riders (WCH) as a result of the Proposed Development is based on the qualitative assessment of non-motorised users (NMU) amenity.

D3.14 The environmental conditions relevant to *'Human health'* are set out in DMRB LA 112 as follows:

- Air quality;
- Noise;
- Pollution; and
- Landscape.

D3.15 As stated earlier, the above conditions are considered separately in the relevant chapters of the ES. Therefore, the only conditions affecting human health considered relevant as part of this Transport Chapter are the impact on severance/accessibility and the ability of communities to access community land, assets and employment. The assessment of severance/accessibility considers access to open green space/recreational facilities, opportunities for WCH and access to healthcare facilities. Also considered as part of the assessment are Personal Injury Accidents (PIA), with emphasis on those involving NMU.

Other effects

D3.16 It is acknowledged that both the IEMA Guidelines and the DMRB guidance mainly focus on impacts resulting from vehicular movements rather than considering a broader multi-modal view of potential impacts. As such, consideration was also given to public transport services in the area. Therefore, this assessment also considers Bus Passenger Delay and Capacity.

D3.17 Bus passenger delay considers the impact of delays on bus passengers. This effect is difficult to assess quantitively due to several variables involved, such as overall bus route distances, journey times, and journey times/distances to the bus stops for individual users. There is a potential for very localised impacts. For the purposes of this assessment, it is assumed that bus passenger delay may be affected either by the diversion of a route as a result of the Proposed Development (primarily associated with construction) or by bus routes being affected by additional traffic in the locality of the site. Delays are anticipated to be greatest at junctions operating near or at their capacity as a result of the additional traffic associated with the Proposed Development.

D3.18 Bus capacity has also been considered. Generally, changes in demand resulting from any development may have an effect on crowding in buses and on bus stops. However, the Proposed Development is supported by a comprehensive PTS (Appendix D4) that aims to deliver high-quality public transport services to cater not only for the Proposed Development's needs but also for the needs of the local communities. Considering the existing conditions and low public transport use in the area, the Proposed Development will be a long-term benefit for new and existing residents. As such, bus capacity in this assessment is considered to be 'not significant' effect in the EIA terms and not assessed as part of this Transport Chapter.

D3.19 Consideration has also been given to pedestrian/cyclist connectivity that relates to changes in routes as a result of the Proposed Development. This could mean a diversion and/or extension of journeys as a result of barriers to movement, particularly during construction, or improvements as a result of new connections or improved permeability through the Proposed Development.

D3.20 A qualitative assessment of pedestrian/cyclist connectivity is provided as part of the TTN9 – MKE Walking and Cycling Strategy (Appendix A-9 of the TA provided in Appendix D1), with further emphasis on Public Rights of Way (PRoW), included in the TTN10 – MKE PRoW Strategy (Appendix A-10 of the TA provided in Appendix D1). Both these documents consider in detail the existing pedestrian/cyclist provision as well as the connections and facilities delivered as part of the Proposed Development to create a comprehensive network of interconnected routes. As a result, pedestrian/cyclist connectivity is considered to be 'not significant' effect in the EIA terms. Therefore, it is not considered imperative to reiterate and duplicate the assessment as part of this Transport Chapter.

Assessment of effects

D3.21 As set out above, both the IEMA Guidelines and the DMRB guidance require consideration of several environmental effects, some of which are broadly common for both documents, such as severance, pedestrian/cyclist amenity and delay, and accidents and safety. The assessment of these 'common' effects is undertaken, considering both IEMA and DMRB with the most appropriate guidance applied. Where the effects are covered by only one of the documents (e.g. driver delay or fear and intimidation), the appropriate standard is applied. In the case of bus passenger delay, which is not covered by either of the guidance documents, the methodological approach is based on the assessor's experience and professional judgment.

Severance

D3.22 Severance is defined in the IEMA Guidelines as:-

'...perceived division that can occur within a community when it becomes separated by a major traffic artery. The term is used to describe a complex series of factors that separate people from places or other people. Severance may result from the difficulty of crossing a heavily trafficked road or a physical barrier created by the road itself. It can also relate to quite minor traffic flows if they impede pedestrian access to essential facilities.'

Driver Delay

D3.23 The IEMA Guidelines suggest that the traffic delays are generally witnessed at or near junctions and can therefore be determined through the analysis of junction capacity assessment results. Driver Delay is measured in terms of change in delay per vehicle (in seconds) from the baseline situation. These delays are only significant (in EIA terms) when the traffic on the network is already at, or close to, the capacity of the system.

Pedestrian Delay

D3.24 Pedestrian Delay is considered to be affected by the changes in volume, composition, and/or speed of traffic in terms of their respective impacts on people's ability to cross a road.

Pedestrian and Cyclist Amenity

D3.25 Pedestrian and Cyclist Amenity is broadly defined in the IEMA Guidelines as:-

'...the relative pleasantness of a journey, and is considered to be affected by traffic flow, traffic composition and pavement width/separation from traffic'.

Fear and Intimidation

D3.26 According to the IEMA Guidelines, Fear and Intimidation is:-

'...dependent on the volume of traffic, its HGV (Heavy Goods Vehicle) composition, its proximity to people or the lack of protection caused by such factors as narrow pavement widths'.

Accidents and Safety

D3.27 The IEMA Guidelines, as well as the DMRB guidance, provide only limited information on the assessment of Accidents and Safety, suggesting the use of existing accident rates for each link obtained from the highway authorities.

D3.28 Accident data were obtained for the latest five-year period (01/06/2015 – 31/05/2020). Typical accident rates were calculated from the data based on the length of a link, type, and traffic volume as suggested by the DfT's web-based Transport Analysis Guidance (TAG).

Bus Passenger Delay

D3.29 Delays for bus passengers are anticipated to be greatest at locations where junctions are operating near or at their capacity as a result of the additional traffic associated with the Proposed Development. As the IEMA Guidelines suggest for Driver Delay, the traffic delays are generally witnessed at or near junctions and can therefore be determined through the analysis of junction capacity assessment results.

Traffic Model

Traffic Surveys

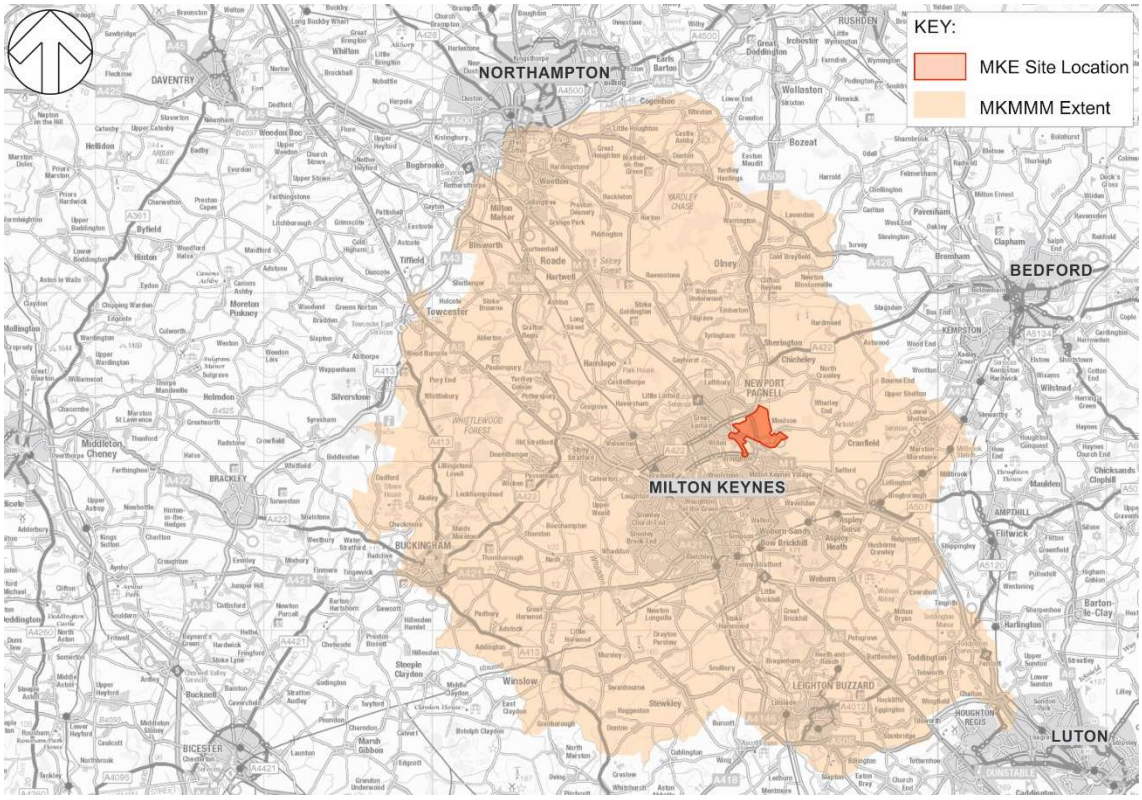
D3.30 Traffic surveys informing the traffic modelling and the assessment in this Chapter of the ES were undertaken in July 2019. These surveys were used to update the strategic model required for the site but also provide data that is reflective of traffic conditions before the Covid-19 pandemic. A detailed description of the traffic surveys undertaken is provided in the TTN1 – Modelling Approach.

Milton Keynes Multi-Modal Model

D3.31 Given the strategic nature of the proposals and the fact that the traffic associated with the construction and operation of the Proposed Development is expected to utilise the Strategic Road Network and Primary Road Network (PRN) as well as the local roads, it is considered appropriate to base the assessment on a strategic transport model to determine the traffic volumes in the area.

D3.32 It was agreed between MKC and Highways England that MKC's existing strategic multi-modal model (Milton Keynes Multi-Modal Model, 'MKMMM') used as part of the evidence base for Plan:MK and the Highway Infrastructure Fund (HIF) application is fit for the purpose of modelling the Proposed Development. The extent of the MKMMM considered in this study is illustrated in Figure D3.1 provided at Volume 2 to this ES and shown below for ease of reference.

Figure D3.1 Geographical Extent of MKMMM



Source: Plan: MK Evidence Base; also provided in Volume 2 to this ES

D3.33 It should also be highlighted that the MKMMM considers the full extent of the land allocated for the MKE SUE, while the Proposed Development forms only part of it.

Existing/Committed Development

D3.34 The MKMMM includes information on developments that have already been constructed and are operational. Therefore, any effects resulting from the assessments based on the modelled values are cumulative. Cumulative effects are multiple effects on the same habitat or site that arise from the Proposed Development together with those from all developments that have been built and are operational.

D3.35 Several committed and/or planned developments were considered as part of the development of the future year reference case scenarios. This includes reference to the East-West Rail improvements which are, in the MKMMM, assumed to be operational by 2024 (and are therefore included in both the 2031 and 2048 assessment years considered in this Chapter). Further information on the East-West Rail is provided in the TA (Appendix D3, Volume 2 of this ES) and in particular Appendix K of that document which provides further information on the anticipated operation of the rail route.

D3.36 It is considered best practice to include the committed development and specific development growth assumptions within the modelled future years. This has utilised information from MKC Planning Officers and represents as accurate a forecast of growth within MKB as is currently practicable. External to MKB, where specific development information is available, this was also included, and where not available, the use of TEMPro (Trip End Model Presentation Program) was applied. TEMPro is designed to allow detailed analysis of pre-processed trip-end, journey mileage, car ownership and population/workforce planning data from the Trip End Model Presentation Program (NTEM). It is the industry-standard tool for estimating traffic growth required for the assessment of the traffic impacts of development on the local highway network.

D3.37 The details of the approach applied are provided in the TTN4 – 2048 Growth and Future Year Modelling Approach for MKE (Appendix A-4of the TA provided in Appendix D1), as well as the subsequent response to Highways England's comments to the TTN4.

D3.38 As a result of the inclusion of specific committed/planned development in the MKMMM, any environmental effects identified in this Transport Chapter of the ES are considered to be also in-combination effects. In-combination effects are those effects that may arise from the Proposed Development in combination with other plans and projects proposed/consented but not yet built and operational (i.e. those developments that are separate from the baseline).

Calibration/Validation

D3.39 It is recognised that for the purposes of the planning application, the MKMMM requires further validation and calibration in the vicinity of the Proposed Development. Details of the modelling adjustments and refinements are discussed in the TTN1 – Modelling Approach (provided as part of the TA in Appendix D1).

D3.40 The MKMMM base year is 2016, whilst the surveys outlined above were undertaken in 2019. The analysis of the data indicated that the 2019 volumes slightly differ from the 2016 values, and further refinement involving a blanket factor was introduced. The exercise is discussed in detail in the TTN2 – 2019 to 2016 Survey Comparison (Appendix A-2 of the TA provided in Appendix D1).

Modelled Scenarios

D3.41 The MKMMM include several scenarios developed explicitly for the purposes of the assessment of the Proposed Development. These scenarios include:

- 2016 Base year (supplemented with traffic flow information from 2019 surveys in the MKE area);
- 2031 Future year reference case - without the Proposed Development (to align with the Local Plan period, also includes MKMMM development growth up to 2031 plus the committed development);
- 2031 Future year with the Proposed Development (2031 reference case scenario plus the interim built out development);
- 2048 Future year reference case – without the Proposed Development (built upon the 2031 reference case with additional growth and committed development up to 2048 applied, including, where possible, relevant strategic sites from other boroughs principally Milton Keynes and Central Bedfordshire); and
- 2048 Future year with the Proposed Development (2048 reference case scenario plus the fully built out development).

D3.42 These tests have been carried out for both the AM and PM Peak periods for an updated 2016 baseline scenario as well as future year scenarios of 2031 (Local Plan period) and 2048 (representing the potential full build-out year of the Proposed Development).

D3.43 Tests for 2048 have been undertaken to provide both Highways England and MKC with information to help identify how future growth beyond the current Local Plan period may impact the operation of the highway network. Due to the uncertainty in forecasting growth over such an extended timeline, the 2048 scenarios should be treated cautiously. Future assumptions (such as accounting for changes in Mobility, e.g. Mass Rapid Transit) have not been included in the modelling.

D3.44 The key planning test on the Strategic Road Network (SRN) (i.e. that for which HE are responsible), in accordance with Circular 02/2013, is to assess the impact of committed development (the Reference Case) alongside the Proposed Development against a period 10-years after the date of the planning application or the end of the Local Plan period, whichever is the greater. For the Proposed Development, these dates coincide with 2031.

D3.45 The SRN test is different from that considered here within this Transport chapter, and the TA in Appendix D1 outlines how the Proposed Development is assessed against the key planning test. For the purposes of this ES chapter, however, whilst it is considered that the key time period for assessment is the 2031 future years, the 2048 future year flows have also been assessed and provided for information to help understand the potential future year impacts of the development and background growth.

D3.46 As further analysis of the development was completed, it was apparent that further MKMMM runs would be required to fully ascertain the potential impacts of the development on the local road network and the strategic road network. These runs are discussed further in Section 6.2 of the TA, (Appendix D1 of this ES). The three main scenarios completed were as follow;

1 **Core:** Core models represent the outputs from the Saturn MKMMM without any adjustments and have been used in the TA and associated micro-simulation work of J14 and Northfields. These represent a partial build in 2031 and a full build-out in 2048. These provide the definitive tests that have been reviewed in detail for local junction operational assessments in the TA and the environmental impacts on the highway links as part of this ES chapter.

2 **Sensitivity:** these outputs represent adjustments to the MKMMM at J14, following capacity review at the A509 approaches. These were used in Paramics microsimulation modelling only.

3 **Key Planning Test:** these add the full development (assuming full build-out) onto the 2031 DM flows. These have been run with and without the sensitivity tests. These are the outputs from the MKMMM and have been used primarily in the Paramics modelling and TA to review certain junctions on the local network only

Traffic Flows

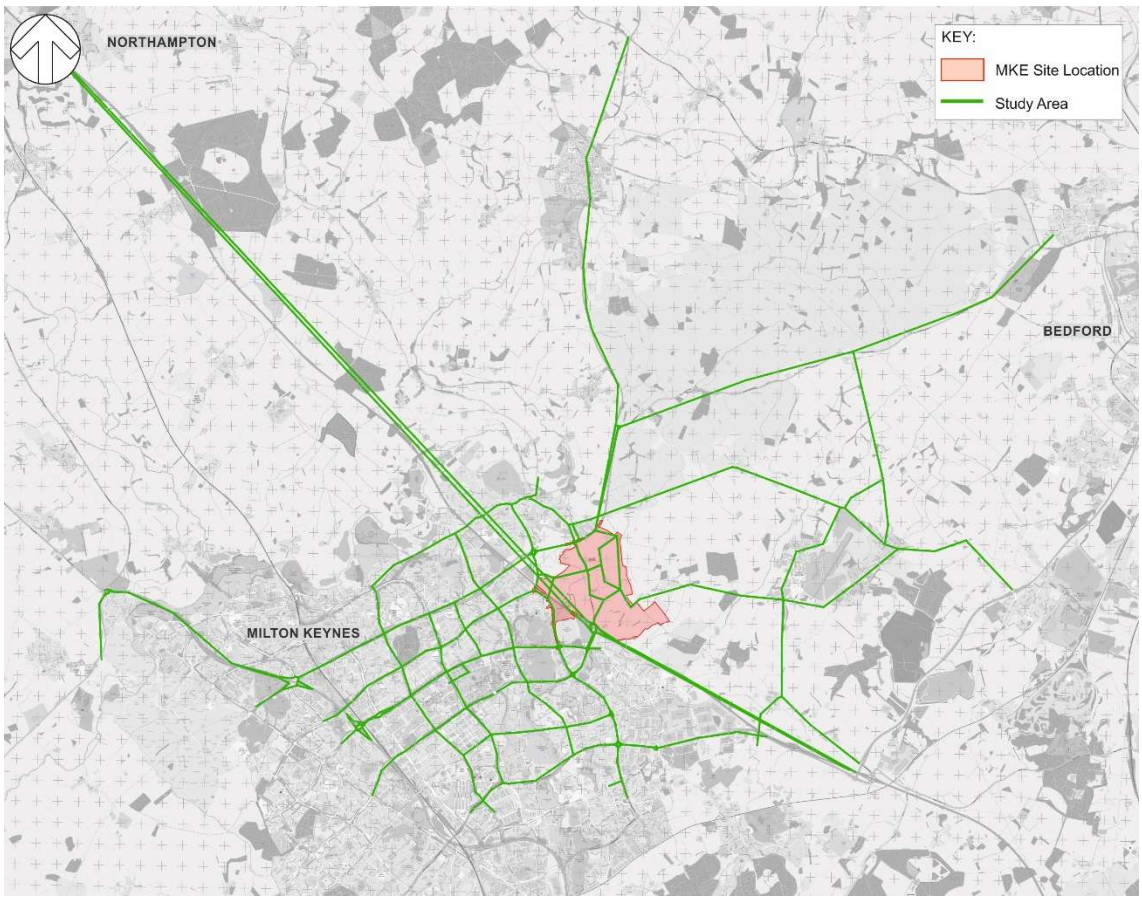
D3.47 The MKMMM predicts flows during the weekday AM peak hour (08:00 – 09:00) and PM peak hour (17:00 – 18:00). However, assessment of some of the effects discussed later in this Transport Chapter requires traffic flows in the form of Average Annual Daily Traffic ('AADT'), a measure of daily traffic volume equivalent to the total annual traffic volume divided by 365. For the purposes of this assessment, the AADT values have been derived using local factors relative to the observed peak-hour flows within the modelled area.

Study Area

D3.48 The extent of the MKMMM (as shown in Diagram D3.1 above) covers a relatively large area formed not only by Milton Keynes Borough (MKB) but also parts of the adjacent counties/districts. Given that the model extends to the proximity of other significant urban centres in the area, such as Northampton, Bedford and Luton, the future traffic changes cannot only be attributed to the Proposed Development. These changes would result from other development, as well as background growth and subsequent redistribution of the traffic in the area.

D3.49 As such, it would not be appropriate for the assessment in this Transport Chapter to cover the whole extent of the MKMMM. Instead, Select Link Analysis (SLA) outputs from the MKMMM have been reviewed to understand the routeing and distribution of the traffic associated with the Proposed Development. Resulting from the review of SLA, the study area, as illustrated in Figure D3.2 provided at Volume 2 to this ES and shown for ease of reference below, has been identified.

Figure D3.2 Study Area



Note: also provided in Volume 2 to this ES

The extent of the Assessment

D3.50 Appendix A1 of this ES includes a plan identifying the development site boundary. However, in transport terms, the extent of assessment is not limited to the red line and/or internal highway links. The extent of the assessment considered for analysis has been determined through a review of the strategic modelling outputs.

D3.51 As suggested by the IEMA Guidelines for the Environmental Assessment of Road Traffic, *"…a screening process to delimit the scale and extent of the assessment"* has been undertaken to identify the appropriate extent of the assessment.

D3.52 An analysis of the model data for the study area has been carried out to identify the relevant links to be assessed in detail in this Transport Chapter. The IEMA Guidelines recommend the application of the following rules to identify the highway links that would form part of the assessment:

- ***Rule 1****: include highway links where traffic flows will increase by more than 30% due to the Proposed Development (or the number of heavy goods vehicles will increase by more than 30%).*
- ***Rule 2****: include any other specifically sensitive areas where traffic flows will increase by 10% or more.*

D3.53 The IEMA Guidelines provide the rationale behind the thresholds specified above. It should be emphasised that these are relevant only to the assessment of environmental impacts as higher

accuracies (i.e. changes <10%) are within daily variations of traffic on the road and create indiscernible environmental impact.

D3.54 It should also be highlighted that non-highway links are considered in other documents accompanying the application, such as the TA, PTS and TTNs.

D3.55 Finally, it is important to note that the TA, as well as other associated documents, consider the modelled highway links differently, and any assessment contained within them is not based upon the thresholds identified above (these are only applicable to the assessment in this ES chapter). The TA is mainly concerned with the capacity of links and junctions and the capacity impacts resulting from traffic volumes changes. The capacity assessments follow different industry-standard methodologies with their thresholds not directly comparable to those required for the EIA. As such, these assessments consider impacts on several links and junctions that may not be part of the assessment in this Transport Chapter.

D3.56 Only those links that meet the IEMA rules outlined above are considered in detail within this Transport Chapter.

Sensitive Areas/Receptors

D3.57 As outlined above, the two rules are applied to all links within the study area. To inform the decision whether to apply Rule 1 or Rule 2 outlined above, an assessment of sensitive areas/receptors has been undertaken.

D3.58 The IEMA guidelines suggest that the majority of impacts are indirect impacts on the level of human amenity (typically as transport network users) at locations where the development impacts may change travel patterns.

D3.59 Locations, which are considered to be sensitive receptors/areas include:

- schools (primary/secondary/college/university);
- health facilities (GP/health centres/hospitals);
- community facilities (leisure/culture/recreation);
- areas with significant pedestrian and/or cyclist movements (town centre/high street).

D3.60 Based on the above description of sensitive receptors, several locations within the study area were identified. These locations are shown in Figure D3.3 provided at Volume 2 to this ES. It should also be highlighted that some of the links within the study area may serve more than one sensitive receptor.

Environmental Value

D3.61 Each of the links identified for a detailed assessment using the rules outlined above is assigned an environmental value (sensitivity) based on their scale/importance using a five-point scale set out in DMRB LA104 - Environmental Assessment and Monitoring. The sensitivity of a link is dependent on the scale/importance of a receptor, which in transport terms refers to users of the given link. Depending on the type of environmental impact, the receptors can be either motorised or non-motorised users.

D3.62 In terms of **Driver Delay**, the impacts of the Proposed Development are assessed at a junction/link level as suggested by the IEMA Guidelines. Although not explicitly specified in the IEMA Guidelines, it is considered that the impacts on **Bus Passenger Delay** are also related to the junction/link capacity. Delays to the passengers are likely to occur at locations with higher levels of congestion. The sensitivity of a receptor (i.e. motorised users/passengers) is expressed in terms of Volume-to-Capacity ratio (V/C) at a junction/link.

D3.63 V/C is the ratio that describes the performance of a road, where V (Volume) is the total number of vehicles on the road in an hourly period, and C (Capacity) is the maximum designed capacity of a road (based on geometrical characteristics such as width, number of lanes etc.) expressed in the number of vehicles per hour.

D3.64 It is generally accepted that a link/junction approaches its theoretical capacity when the V/C is between 90-100, which results in a high level of driver frustration and delay. V/C values of over 100 suggest congested conditions with the highest level of driver frustration and delays. V/C values between 80 and 90 suggest that a link/junction operates satisfactorily with some driver frustration and moderate delay, while values between 70 and 80 result in an acceptable level of driver comfort. Values of V/C below 70 suggest a high driver comfort and little or no delays.

D3.65 The peak hour (AM/PM, whichever is greater) V/C values (as calculated by the MKMMM) are used to determine the level of sensitivity as follows:

- Very high – V/C value over 100;
- High – V/C value between 90 and 100;
- Medium – V/C value between 80 and 90;
- Low – V/C value between 70 and 80; and
- Negligible – V/C value below 70.

D3.66 In terms of **Severance, Pedestrian Delay, Pedestrian/Cyclist Amenity** and **Fear and Intimidation**, which are all related to non-motorised users, the sensitivity assigned to each link is based on a qualitative assessment considering the importance and attractiveness of the routes and the destinations served. The sensitivity criteria are based on a combination of the DMRB guidance and professional judgement and are defined as:

- Very high – Frequently used route in town centre setting, routes used by vulnerable travellers (children, elderly, disabled), and/or roads with >16,000 vpd with at grade crossings;
- High – Main vehicular route in a built-up area with pedestrian/cycle facilities provided, frequently signposted routes used mainly for recreation, and/or roads with >8,000 – 16,000 vpd with at grade crossings;
- Medium – Strategic vehicular route in a rural setting with pedestrian/cycle facilities provided, routes close to communities/PRoW mainly used for recreational purposes, and/or roads with >4,000 – 8,000 vpd with at grade crossings;
- Low – Rural road with no pedestrian and/or cyclist infrastructure, routes scarcely used not offering meaningful route and/or roads with <4,000 vpd with at grade crossings; and
- Negligible – Any other routes not covered by the categories above.

D3.67 In terms of **Accidents and Safety**, neither IEMA Guidelines nor DMRB guidance set out specific sensitivity criteria. Therefore, based on professional judgment and experience, the environmental value of each link is determined based on the actual annual accident numbers compared to the typical annual number of accidents (calculated using TAG methodology). Where the actual number of accidents is lower than the typical, sensitivity is classed as low. Where the values are approximately equal, sensitivity is classed as medium, and where the actual number is higher than the typical, sensitivity is classed as high.

Magnitude of impact

D3.68 Following the assignment of sensitivity to the selected links, a magnitude of impact or change (either adverse or beneficial) is assigned, based on advice contained in both IEMA Guidelines

and DMRB guidance. It should be noted that neither of the guidance documents provides specific thresholds for some of the effects. Where this is the case, the impacts are considered qualitatively. The magnitude of the impact is defined for the purposes of this assessment as:

- Major – Deterioration/improvement in local conditions or circumstances;
- Moderate – Apparent change in conditions;
- Minor – Perceptible change in conditions or circumstances;
- Negligible – Very minor change in conditions or circumstances; and
- No change – no discernible change in conditions.

D3.69 The scale set out above is applied to each assessed environmental effect using both quantitative and qualitative approaches. The magnitude of change related to each effect is outlined in the following paragraphs.

Severance

D3.70 The IEMA Guidelines suggest that '*Changes in traffic flow of 30%, 60% and 90% are regarded as producing "slight", "moderate" and "substantial" changes in severance respectively.*'

D3.71 By interpreting the above thresholds to the magnitude of the impact scale set out above, the following thresholds are applied to the peak hour/AADT flows are used in this assessment:

- Major – A change in total traffic flows greater than 90% compared to the forecast baseline traffic flows;
- Moderate – A change in total traffic flows between 60 and 90% compared to the forecast baseline traffic flows;
- Minor – A change in total traffic flows between 30 and 60% compared to the forecast baseline traffic flows;
- Negligible – A change in total traffic flows less than 30% compared to the forecast baseline traffic flows; and
- No change – No change or reduction compared to the forecast baseline traffic flows.

Driver Delay / Bus Passenger Delay

D3.72 The IEMA Guidelines suggest that the traffic delays are generally witnessed at or near junctions and can therefore be determined through the analysis of junction capacity assessment results. However, not all junctions have been assessed in detail (i.e. using the industry-standard modelling package such as Junctions 9 or LinSig software).

D3.73 As discussed earlier, both Driver Delay and Bus Passenger Delay are measured in terms of change in delay per vehicle (in seconds) from the baseline situation. The outputs from the MKMMM provide, *inter alia*, the information on delay per vehicle (in seconds). These delays are only significant (in EIA terms) when the traffic on the network is already at, or close to, the capacity of the system (i.e. V/C value above 90).

D3.74 In the absence of specific thresholds provided by the guidelines, it is considered appropriate to base the assessment on changes in delay per vehicle (in seconds) when compared to the baseline situation. As these delays are related to V/C values at each link/junction, it is considered, based on the professional judgement, that only changes in the delay of 15% or more (in either peak hour) on a link with a V/C value above 90 are significant in the EIA terms.

Pedestrian Delay

D3.75 The IEMA Guidelines state that *'Given the range of local factors and conditions which can influence pedestrian delay, it is not considered wise to set down any thresholds, but instead it is recommended that assessors use their judgement to determine whether the pedestrian delay is a significant impact.'*

D3.76 In contrast, the DMRB guidance suggests that the magnitude of the impact is related to increase (adverse) or decrease (beneficial) in journey length.

D3.77 In general, increases in traffic levels and/or traffic speeds are likely to lead to more significant increases in pedestrian delay. Moreover, any changes to the existing crossing opportunities leading to increases in journey lengths would further enhance pedestrian delay.

D3.78 It is also apparent from the definition of severance provided above that pedestrian delay is closely related to severance. It is therefore considered appropriate, in the absence of any specific thresholds for the pedestrian delay, to apply the same criteria as for severance in combination with the journey length increases:

- Major – A change in total traffic flows greater than 90% compared to the forecast baseline traffic flows, and/or a change in journey length >500m;
- Moderate – A change in total traffic flows between 60 and 90% compared to the forecast baseline traffic flows, and/or a change in journey length >250m – 500m;
- Minor – A change in total traffic flows between 30 and 60% compared to the forecast baseline traffic flows, and/or a change in journey length >50m – 250m;
- Negligible – A change in total traffic flows less than 30% compared to the forecast baseline traffic flows, and/or a change in journey length <50m; and
- No change – No change or reduction compared to the forecast baseline traffic flows, and/or journey length.

Pedestrian and Cyclist Amenity

D3.79 The IEMA Guidelines suggest that *'…a tentative threshold for judging the significance of changes in pedestrian and cycle amenity would be where the traffic flow is halved or doubled.'* However, for consistency with criteria used for other impacts, the same thresholds as for severance are adopted:

- Major – A change in total traffic flows greater than 90% compared to the forecast baseline traffic flows;
- Moderate – A change in total traffic flows between 60 and 90% compared to the forecast baseline traffic flows;
- Minor – A change in total traffic flows between 30 and 60% compared to the forecast baseline traffic flows;
- Negligible – A change in total traffic flows less than 30% compared to the forecast baseline traffic flows; and
- No change – No change c or reduction compared to the forecast baseline traffic flows.

Fear and Intimidation

D3.80 The IEMA Guidelines suggest that an average hourly vehicle flow over an 18-hour period of 600-1,200 vehicles has a moderate magnitude of impact upon fear and intimidation, 1,200-1,800 vehicles a great magnitude of impact and above 1,800 vehicles an extreme magnitude of impact.

Consideration is also given to HGV volumes. As suggested by the IEMA Guidelines, the magnitude of impact where the total HGV flow over an 18-hour period is between 1,000 and 2,000 HGV would be moderate, great between 2,000 and 3,000 HGV, and extreme above 3,000 HGV.

D3.81 The above was adapted for the purposes of this assessment to reflect the five-point scale set out before. The following thresholds are considered appropriate for this assessment:

- Major – An average hourly traffic flow over the 18-hour period above 1,800 vehicles or total HGV flow above 3,000;
- Moderate – An average hourly traffic flow over 18-hour period between 1,200 and 1,800 vehicles or total HGV flow between 2,000 and 3,000;
- Minor – An average hourly traffic flow over the 18-hour period between 600 and 1,200 vehicles or total HGV flow 1,000 and 2,000;
- Negligible – An average hourly traffic flow over 18-hour period below 600 vehicles or total HGV flow below 1,000; and
- No change – No change compared to the forecast baseline traffic flows.

Accidents and Safety

D3.82 As previously discussed, both IEMA Guidelines and DMRB guidance provide only limited information on the assessment of accidents and safety, suggesting the use of existing accident rates for each link obtained from the highway authorities.

D3.83 The TAG guidance indicates that a change in accidents of less than 30% has a slight impact, while a change greater than 30% has a significant impact. For the purposes of this assessment, the change in total traffic flow (AADT) is considered as a proxy for changes in accidents. The magnitude of the impact is defined as:

- Major – A change in total traffic flow above 30% on a link where five or more collisions have occurred on that link in a five-year period;
- Moderate – A change in total traffic flow above 30% on a link where fewer than five collisions have occurred on that link in a five-year period;
- Minor – A change in total traffic flow below 30% on a link where five or more collisions have occurred on that link in a five-year period; and
- Negligible – A change in total traffic flow below 30% on a link where fewer than five collisions have occurred on that link in a five-year period;
- No change – No change or reduction in total traffic flow.

Significance Criteria

D3.84 Finally, the significance of effects is assigned to each of the effects outlined above using a significance matrix provided by DMRB LA 104 and reproduced in

D3.85 Table D3.1 below for illustration.

Table D3.1 Table informing the significance of effects based on receptor value and magnitude of impact

		Magnitude of Impact (Degree of Change)				
		No change	**Negligible**	**Minor**	**Moderate**	**Major**
Environmental Value	**Very High**	Neutral	Slight	Moderate or Large	Large or Very Large	Very Large
	High	Neutral	Slight	Slight or Moderate	Moderate or Large	Large or Very Large
	Medium	Neutral	Neutral or Slight	Slight	Moderate	Moderate or Large
	Low	Neutral	Neutral or Slight	Neutral or Slight	Slight	Slight or Moderate
	Negligible	Neutral	Neutral	Neutral or Slight	Neutral or Slight	Slight

Key **Not significant** **Potentially significant** **Significant**

D3.86 For the purposes of this assessment, any effects with a significance level of slight or neutral are considered to be not significant in EIA terms. In contrast, moderate and above significance of an effect would be considered significant in EIA terms.

D3.87 The resulting significance of an effect will be reported considering its duration (long or short term), permanence (permanent or temporary) and the type of the impact (beneficial or adverse).

Consultation

D3.88 The assessment scope was set out in the EIA Scoping Report submitted to MKC in October 2020. The Scoping Report is included in Appendix B1 to this ES.

D3.89 A formal Scoping Opinion (provided in Appendix B2) was received from MKC in November 2020. In relation to transport, MKC acknowledged in their Scoping Opinion that significant traffic modelling and transport assessment work has been already undertaken and continues to develop.

D3.90 As part of their Scoping Opinion, MKC sought to consult, inter alia, Highways England (due to the proposals' potential impact on Strategic Road Network) and Central Bedfordshire Council (due to the proximity of the Proposed Development to the county boundary). At the time of issuing the Scoping Opinion in November 2020, a formal response from Highways England had not been received.

D3.91 MKC stated in the Scoping Opinion that, subject to the comments from both Highways England and Central Bedfordshire Council ('CBC'), the approach set out in the Scoping Report was broadly accepted. Commentary on the further exchange with Highways England and CBC post issue of the scoping opinion is set out below.

D3.92 CBC provided their response to the Scoping Opinion (provided in Appendix B2 to this ES) in November 2020. CBC considered the transport-related EIA methodology as appropriate and was content with the use of the strategic Milton Keynes Multi-Modal Model for the assessment stating that *"…use of a strategic model such as this for the scale of the Proposed Development would be expected"*.

D3.93 CBC sought clarification on the development quantum assessed. CBC outlined that it was not clear from the Scoping Report whether the EIA would consider the wider allocation and whether the potential further increases of 10-15% resulting from the uncertainty around the future mass

rapid transit scheme would be tested. It should be noted that the assessment in this Transport Chapter is based on the worst-case scenario (i.e. full allocation with the uplift of 15%). The modelling subsection of this Transport Chapter and the supporting documents discuss the modelling scenarios in detail.

D3.94 CBC also acknowledged that the Scoping Report identified Cranfield as an area with large cluster of knowledge intensive business activity and suggested exploring the opportunities to deliver sustainable transport connections to Cranfield. It was also highlighted that the existing staggered priority-controlled junction of Crawley Road/Astwood Road/College Road is known to experience capacity issues, and it would likely require the operational assessment. WSP consider any off-site junctions with any potential significant operational constraints resulting from the Proposed Development as part of the TA.

D3.95 As outlined in Section 9.2 of the TA (Appendix D1 of this ES), with respect to individual junctions, a review of the Volume over Capacity (VOC) was undertaken to ascertain the junctions that should be included for further assessment. The review of the junction VOC allowed an understanding of the likely impacts to be across the network with and without the proposed development. Any junctions not meeting the criteria, or those not showing significant change in performance under the Do Something scenario compared to the Do Minimum were therefore not included for further analysis. As set out in paragraph D3.52 of this Chapter, a similar approach has been applied with regards to reviewing the relevant links to be assessed in detail within the Transport Chapter. The review has outlined that the junctions referenced by CBC did not trigger the need for further assessment. Some of the links mentioned in the CBC Scoping opinion have been assessed in detail, as identified and discussed further in Table D5.1.

D3.96 Also mentioned in CBC's Scoping Opinion is the Marston Gate Expansion and Marston Vale developments, and that these should be taken into account. The available details of both proposals were reviewed during the development of the future year modelling scenarios. Subsequently, the expected development quanta were included in the transport model further discussed in the modelling subsection of this Transport Chapter. The supporting documents set out the developments included in the modelling scenarios in detail.

D3.97 As set out above, MKC also sought to consult Highways England. However, Highways England has not provided its EIA Scoping Opinion by the time of the submission of this ES. Notwithstanding this, it should be emphasised that the author is continuing to engage with Highways England regarding the delivery of the Proposed Development and its impacts on the Strategic Road Network (SRN).

D3.98 At the HIF stage, Highways England confirmed that they support the principles of a new bridge crossing over the M1 and recognise the benefits this would bring to J14 in freeing up capacity and extending its life in advance of any improvements coming forward sometime in the future. Highways England confirmed at the time that it has no objection to a proposed bridge over the M1 subject to the usual legal agreements and obligations around its delivery and ongoing maintenance. A copy of Highways England's letter confirming this was included within the Stage 1 HIF bid.

D3.99 Following the bid, a further dialogue has taken place with Highways England, particularly with their Smart Motorways team, Planning team, Highways team and Bridges team.

D3.100 To ensure that key stakeholders, such as Highways England, were consulted on relevant Transport matters, WSP submitted the Transport Assessment Scoping Notes alongside further Technical Notes to both MKE and Highways England and has subsequently provided additional information regarding any specific comments or queries raised. The TA (Appendix D1) sets out this additional information and correspondence.

D3.101 Discussions, therefore, have been held with Highways England throughout the progression of the application to determine the scope of assessment for the TA, as well as the supporting modelling assumption underpinning the analysis. Subsequently, Highways England have confirmed that they are happy with the use of future baseline strategic models. A review of the discussions with HE is provided at Appendix C of Appendix D1 of this ES.

D3.102 This Transport Chapter builds on the information supplied as part of the EIA Scoping Report (Appendix B1) and considers MKC's Scoping Opinion (Appendix B2), including the comments from CBC. Other than in the context of the scoping process, no further consultation directly relevant to this Transport Chapter has been undertaken.

Assumptions and Limitations

D3.103 Several general assumptions have been made during the preparation of this Transport Chapter. These are set out below:

- The data used in this assessment is from a strategic model, the MKMMM. As such, there are numerous specific inputs and assumptions, which have been agreed upon with MKC and Highways England. The TA and associated TTNs should be read in conjunction with the ES findings.
- Following the outputs of the strategic modelling, which presents AM, Interpeak and PM peak hour flows - WSP have applied local factors based on 2019 surveys to create appropriate, realistic and robust traffic flows.
- Where existing traffic levels are exceptionally low (e.g. <1,000 'AADT), any increase in traffic flow is likely to trigger a 'substantial' magnitude assessment, according to the criteria outlined above. WSP has based its assessments, where appropriate, on the volumetric increase calculated as a percentage and has included links that exhibit change that fulfils the two assessment rules as set out in Paragraph 3.51.

D3.104 The Transport Chapter has been prepared subject to the following limitations:

- Baseline conditions are accurate at the time of the physical surveys, and any site visits undertaken before Covid-19 restrictions came into force. Due to the dynamic nature of the environment, conditions may change during the construction and on completion and occupation of the Proposed Development; and
- The assessment of cumulative effects is based upon the agreed committed developments (and committed infrastructure) set out within the future year strategic models. These have been agreed with MKC planning officers and represent a robust forecast, optimistic in terms of identified cumulative schemes (whether submitted for planning, consented or under construction).

D3.105 It is not considered that any matter has prevented the accurate assessment of potential transport or transport-related environmental impacts or the identification of appropriate mitigation measures.

D4.0 Baseline Conditions

Existing Conditions

D4.1 This section provides an overview of the existing (baseline) transport and accessibility conditions in the locality of the Proposed Development. Consideration has been given to the operation of the existing highway network, pedestrian and cycling facilities and their accessibility, and accessibility to public transport services.

Site Location

D4.2 The site is strategically located immediately north of Junction 14 of the M1, one of the two main motorway junctions serving Milton Keynes. It is situated approximately 3.5 kilometres north-east of Central Milton Keynes (the central business district of Milton Keynes). While the site is currently open space farmland, some existing roads and highway corridors are within its boundary. The existing area has variable levels of walking, cycling, and highway links to the city centre as there is little existing demand from the site currently.

D4.3 The site is wedged between the M1 motorway forming its southwestern boundary and the A422 and A509 delineating its northern boundary. Open land of predominantly agricultural character then borders the site from the west and east.

D4.4 Figure D4.1, provided at Volume 2 to this ES, illustrates the site location in the context of the local transport networks.

Strategic Road Network (SRN)

M1

D4.5 The M1 motorway is a major road running the length of the country from central London to Leeds. The M1 links Milton Keynes to national urban centres such as Luton, Leicester and Sheffield, as well as links to other major highway routes further afield.

D4.6 In the locality of the Proposed Development, the M1 runs in broadly northwest to southeast direction, with the site situated just north of Junction 14. Junction 14 is a large grade-separated junction acting as the primary national route into Milton Keynes via the A509. The M1 is a dual carriageway major road, with three lanes in either direction along the section bordering the site. The M1 is subject to standard motorway regulations and speed limits.

D4.7 The section of the M1 between Junctions 13 and 16 is currently being upgraded to an All-Lane Running (ALR) smart motorway to support economic growth and ease congestion in the area. The works are currently estimated to be completed in 2022-23.

Primary Road Network (PRN)

A509

D4.8 The A509 provides a connection between the A5 to the west of Milton Keynes and the A14 to the south of Kettering via Milton Keynes, Newport Pagnell and Wellingborough, as well as several villages and settlements. The A509 is formed by a combination of single and dual carriageway sections along its length.

D4.9 In the vicinity of the site, the A509 forms part of the northern site boundary, deviates south from its course at Tickford Roundabout and bisects the site as the A509 London Road until it reaches the M1 Junction 14 to the south. From the M1, the A509 continues south for a short

distance to Northfield Roundabout and then runs west through Central Milton Keynes towards the A5.

D4.10 The section of the A509 traversing the site is a single carriageway road subject to a 60mph speed limit. The A509 provides direct access to several private properties (mainly farms and horse stables) as well as the Holiday Inn Milton Keynes hotel. It forms a major arm of the priority-controlled T-junction with Caldecote Lane immediately south of Tickford Roundabout. The junction with access to the hotel is in the form of a priority-controlled T-junction junction with a ghost island right turn provision. This also the case at the junction with Newport Road immediately to the north of Junction 14 of the M1.

D4.11 There is no street lighting along the length of this section of the A509, except for the streetlights provided at the junctions with Caldecote Lane and Newport Road. No pedestrian or cyclist facilities are provided along the road's length through the site, with only an informal 'trodden' verge available for sections between properties.

D4.12 A bus layby is provided in each direction in the vicinity of the Holiday Inn hotel, with these being served by bus services 24 (northbound) and 25 (southbound). However, the bus stops are not marked by a pole and flag, and the timetable information is also not provided.

D4.13 To the south of the M1 junction 14, as well as for its length through Milton Keynes to the A5, the A509 is in the form of a dual carriageway subject to a variable speed limit between 40 and 70mph depending on the location it passes through.

Local Road Network

A422

D4.14 The A422/A422 H3 Monks Way forms the north-western boundary of the site and sandwiches its western part along with the M1. The A422 runs in a broadly east to west direction from Tickford Roundabout through the centre of Milton Keynes towards the A5 west of the city. The A422/A422 H3 Monks Way is a dual carriageway for its full extent, with two lanes in either direction.

D4.15 The A422/A422 H3 Monks Way forms several priority-controlled roundabouts with other 'grid' roads across the city. The A422 has street lighting for the entirety of its length from the A5 to the petrol stations to the east of its junction with Brickhill Street. From there, the character of A422/A422 H3 Monks Way is more rural, and streetlights are only provided at Marsh End Roundabout and then at Tickford Roundabout.

Willen Road

D4.16 Willen Road forms a southern arm of Marsh End Roundabout. From the roundabout, Willen Road runs with a southern trajectory towards the M1. Willen Road then crosses the M1 over a bridge and subsequently terminates at Tongwell Roundabout. Willen Road borders the site from the west for a short section.

D4.17 Willen Road is a single carriageway road and is subject to the National Speed Limit of 60mph. Street lighting is present along its whole length. There are no pedestrian/cyclist facilities along Willen Road.

D4.18 Along its length, Willen Road provides access to a group of private properties accessed via Glen Fields, direct access to the existing quarry site and a cluster of private residential/industrial properties. A bus stop is provided in each direction in the vicinity of the access to the cluster of private residential/industrial properties, with these stops being served by bus services 1 and

C10. The bus stops in each location are marked by a pole and flag and provided with the timetable information.

Pedestrian / Cycle Network

D4.19 As described in detail in the TTN9 – MKE Walking and Cycling Strategy (Appendix A-9 of the TA provided in Appendix D1), with further emphasis on Public Rights of Way (PRoW), included in the TTN10 – MKE PRoW Strategy (Appendix A-10 of the TA provided in Appendix D1), and shown in Figure D4.2 (provided at Volume 2 to this ES), the site is accessible to several Public Rights of Way (PROW) and designated cycle routes in and around Milton Keynes. Many routes provide more direct connections to the key destinations in the area than the footway network, while other more rural routes are likely to be used for leisure walking and cycling.

D4.20 Several PROW consisting of public footpaths and bridleways run through or in the vicinity of the site and provide connections to the wider area via the existing footway network and/or so-called Redways. The Redways are shared-use traffic-free routes for people on foot or cycles and are popular for leisure and commuting. The traffic-free network covers most of the city with connections to nearby towns, such as Newport Pagnell to the northwest of the site.

D4.21 The Redway network is accessible from the site via Willen Road and Tongwell Roundabout, where one of the Super Routes currently terminates. The other can be accessed via Tongwell Street further to the south. Several secondary Redways are accessible from the site, providing connections to the Super Routes.

D4.22 In addition to the Redway network, there are several leisure traffic-free cycle paths across Milton Keynes. These predominantly leisure routes can be found in parks and by rivers and lakes and are accessible from the Redway network.

D4.23 Several waymarked routes utilising predominantly the Redway and leisure infrastructure are also available throughout the city and include the Millennium Route, four Heritage Trails and five Cultural Routes. These routes are circular routes covering a range of distances and difficulty, linking the cultural and heritage sites in the city.

D4.24 In combination with the PROW (public bridleways) and the Redway routes, Milton Keynes and its immediate vicinity (including the Proposed Development) benefit from an extensive network of both on and off-road cycle routes providing both leisure and commuting opportunities in the area.

D4.25 There are two National Cycle Network (NCN) routes running in the proximity of the site. These routes include National Cycle Route (NCR) 6 and 51.

D4.26 NCR 6 is a long-distance route between London and the Lake District via Luton, Milton Keynes, Northampton, Leicester, Sheffield and Manchester, amongst others. Through Milton Keynes, NCR 6 runs in a broadly south to north direction approximately 1.6km from the site, and it is predominantly traffic-free. NCR 6 can be accessed from the Proposed Development via the local cycle routes with a typical journey time of approximately six minutes (based on a typical cycling speed of 16km/h).

D4.27 NCR 51 is also a long-distance route that connects major cities in the south of England. It links Oxford with Cambridge via Milton Keynes and Bedford. Past Cambridge, it continues via Bury St Edmunds and Ipswich to the coast at Felixstowe before continuing to Harwich and Colchester. The route of NCR 51 through Milton Keynes is traffic-free with becoming an on-road route upon its way out of the city towards the M1 motorway and further northeast. NCR 51 runs through Milton Keynes at a distance of approximately 2.5km from the site, and it is

accessible via the local cycle routes and NCR 6 with a typical journey time of approximately nine minutes (based on a typical cycling speed of 16km/h).

Bus Network

Local service provision

D4.28 There is a relatively good bus network surrounding the site and in and around Milton Keynes generally. There are several stops in the vicinity of the site, with two stops on Willen Road, one hail-only stop on London Road and two stops along Newport Road. Several additional services are also available just outside of the site boundary at Tickford End, north of H3 Monks Way, and south-west of the M1 along Fern Street.

D4.29 The following services operate in the vicinity of the site:

- C1/10/11: Bedford – Cranfield University – Milton Keynes
- CX: Cranfield University – Milton Keynes
- 1: Newport Pagnell – Milton Keynes – Bletchley
- 24/25: Bletchley – Milton Keynes – Newport Pagnell

D4.30 The C1, C10, C11 and CX services are run by Uno Bus. The X5 service is provided by Stagecoach UK Bus. Bus route 1 is run by Arriva Beds and Bucks. The 24 and 25 services are operated by Z & S Transport.

D4.31 Due to the current situation with COVID-19, it is important to note that bus timetables and frequencies may change.

D4.32 A summary of the bus services currently serving Milton Keynes (at the time of writing this Transport Chapter) can be seen in Table D4.1 below.

Table D4.1 Bus Services in the vicinity of the site

Service/Route	Frequency			Earliest Departure	Latest Departure
	Weekday	Saturday	Sunday		
C1 Bedford -Cranfield University - Milton Keynes	1 every 2 hours	1 every 2 hours	1 every 2 hours	08:03	23:38
C10 Bedford -Cranfield University - Milton Keynes	1 per hour	-	-	06:33	18:50
C11 Bedford -Cranfield University - Milton Keynes	1 every 2 hours	1 every 2 hours	1 every 2 hours	09:03	20:58
CX Cranfield University - Milton Keynes	4 per day			07:55	18:46
1 Newport Pagnell – Milton Keynes – Bletchley	2 per hour	2 per hour	1 every 2 hours	05:38	23:04
24/25 Bletchley – Milton Keynes – Newport Pagnell	1 per hour	1 per hour		08:03	18:03

Source: Milton-Keynes.gov.uk (up to date as of February 2021, timetables may be temporarily disrupted by COVID-19 at the time of writing)

Wider Milton Keynes service provision

D4.33 Milton Keynes bus station is located at Milton Keynes Central Railway Station. It is situated in the west of Central Milton Keynes, close to the junction between the A5 and the A509. It is located approximately 6km south-west of the Proposed Development. Milton Keynes Central

station can be accessed from the Proposed Development by the C10 bus service (bus stops on Willen Road) in approximately 30 minutes.

D4.34 Milton Keynes Central station acts as an interchange for approximately 50 different bus services serving the wider Milton Keynes area and neighbouring towns and cities. The full list of these services is provided in Table D4.2 below.

Table D4.2 Bus Services from Milton Keynes Central Station

Service	Route
1	Newport Pagnell Renny Lodge – Newton Leys St Helena Avenue
2	Newport Pagnell Renny Lodge – Grange Farm Dunthorne Way
4	Central Milton Keynes – Bletchley Bus Station
5/6	Wolverton Church Street – Water Eaton Buttermere Close
7	Wolverton Church Street – Bletchley Bus Station
8A	Powis Lane – Lichfield Down
11/12	Caldecotte – Open University – Monkston – Central Milton Keynes
11A	Caldecotte – Monkston – Central Milton Keynes
12A	Caldecotte – Open University – Kents Hill– Central Milton Keynes
14	Church Street – Central Milton Keynes Railway Station
18	Woburn Sands – Bletchley – Hospital – Central Milton Keynes
21	Lavendon – Central Milton Keynes Railway Station
23	Wolverton – Great Linford – Central Milton Keynes
24/25	Bletchley – Newport Pagnell – Central Milton Keynes
33/3A	Northampton – Roade – Hanslope – Wolverton – Central Milton Keynes
34	Central Milton Keynes – The Point to Ampthill Heights – Wagstaff Way
50	Newton Longville – Milton Keynes
89	Milton Keynes – Old Stratford – Deanshanger – Potterspury – Yardley Gobion - Cosgrove
99	Milton Keynes – Luton Airport
100/150/X60	Aylesbury - Milton Keynes
300	Westcroft District Centre – The Swan
301	Wolverton Road – Kingston District Centre
310	Wolverton Bus Station – Magna Park Fen Street
602	Central Milton Keynes – Broughton – Kingston – Walnut Tree – Monkston – St Pauls Catholic School
609	Bradville - Central Milton Keynes - Leadenhall
A1	Kempston – Stewartby – Cranfield – Milton Keynes
A2	Kempston – Wood End – Bromham – Cranfield – Milton Keynes
C1/C11	Milton Keynes - Bedford
CX	Cranfield University – Milton Keynes
D	Kempston – Milton Keynes
F70	Luton Station Interchange – Central Milton Keynes Railway Station
FL2	Haynes West End – Houghton Conquest – Lidlington – Milton Keynes
FL3	Hayes – Clophill – Maulden – Ampthill – Milton Keynes
FL4	Silsoe – Flitwick – Milton Keynes
FL11	Harlington – Milton Keynes
VL4	Thurleigh – Milton Keynes
VL6	Clapham – Milton Keynes

Service	Route
VL7	Melchbourne – Riseley – Milton Keynes
VL15	Sharnbrook – Harrold – Newton Blossomville – Milton Keynes
W11	Meppershall – Stondon – Shillington – Gravenhurst – Clophill – Milton Keynes
W13	Meppershall – Shefford – Milton Keynes
X5	Bedford - Oxford
X6	Milton Keynes – Northampton
X91	Silverstone – Milton Keynes

Source: Bustimes.org (February 2021)

D4.35 In addition to the Milton Keynes Central station, the Milton Keynes Coachway is located on the A509, south of M1 Junction 14, less than 1km south of the site. It can be accessed from the Proposed Development by the 24, 25, C1 and C11 bus services.

D4.36 Milton Keynes Coachway provides access to National Express services. These services offer direct routes to many towns and cities across the country. For example, London Victoria can be accessed within 1hr 30 minutes from Milton Keynes Coachway. Whilst timetables are currently disrupted by the COVID 19 pandemic, services before the pandemic were operating morning and night with approximately 10 coaches per day running from Milton Keynes Coachway.

Rail Network

D4.37 The Milton Keynes area is served by a number of railway stations. There are two railway stations in proximity to the Proposed Development – Milton Keynes Central Station and Woburn Sands Station.

Milton Keynes Central Railway Station

D4.38 Milton Keynes Central railway station is located in the west of Central Milton Keynes, close to the junction between the A5 and the A509. The station opened in 1982, has seven platforms and step-free access.

D4.39 The station is situated on the West Coast Main Line and served by Avanti West Coast intercity services, West Midlands Trains and Southern regional services. The ticket office is currently staffed all week (Monday to Friday 04:45-22:00, Saturday 06:00-22:00 and Sunday 06:45-21:30), with passenger-operated ticket machines used at other times.

D4.40 Based on the data available from the Office of Rail and Road (ORR) data (June 2020), Central Milton Keynes railway station attracted about 7million passengers plus other 470,000 interchanges in 2018/2019. This has increased from 6.8million passengers in 2017/2018.

D4.41 A summary of the rail services serving Central Milton Keynes railway station (at the time of writing this ES) can be seen in Table D4.3 below.

Table D4.3 Rail services from Central Milton Keynes Railway Station

Destination	Frequency per hour		First and last services (Monday – Friday)	Last service returning from destination (Monday – Friday)	Approximate duration
	AM Peak (outbound)	PM Peak (return)			
London Euston	5	7	00:25 23:50	23:42	51 mins
Watford Junction	4	4	00:25 23:50	23:38	34 mins
Leighton Buzzard	4	4	03:30 23:50	23:35	11 mins

Destination	Frequency per hour		First and last services (Monday – Friday)	Last service returning from destination (Monday – Friday)	Approximate duration
	AM Peak (outbound)	PM Peak (return)			
Wolverton	3	3	00:17 23:23	23:46	3 mins
Northampton	3	3	00:17 23:23	23:34	21 mins
Birmingham New Street	3	4	00:29 23:29	23:10	1 hr 15 mins

Source: National Rail (up to date as of February 2021, timetables may be temporarily disrupted by COVID-19 at the time of writing)

D4.42 Cycle parking is provided at the station in the form of 900 sheltered stands. Cycle hire is also available from outside of the station through Santander Cycles.

D4.43 The station has a car park with 964 spaces. 18 of these spaces are accessible spaces, and parking is free for disabled users.

D4.44 Milton Keynes Central railway station is located approximately 6km (corresponding to approximately 1hr 20-minute walk time at a typical walking speed of 4.8km/h) south-west from the nearest Site access via Willen Road, forming its western boundary. It is therefore unlikely that the station is accessed on foot from the site. This is in line with the DMRB's (TA 91/05) findings that the majority of walking distances do not tend to exceed a distance of two miles (approx. 3.2km).

D4.45 The station is located 7.2km (corresponding to approximately 26-minute cycle time at a typical cycling speed of 16km/h), the nearest Site access on Willen Road via the local cycle routes. Whilst the DMRB (TA 91/05) states that trips of up to five miles *"could easily be cycled by the majority of people",* the National Travel Survey (2019 data) suggests that the average cycle trip is currently 3.3 miles (approx. 5.3km; see TTN9 for more details). There are potential barriers to cycling in the form of major roads in the local area. Cyclists would have to cross and/or cycle on the A509 in addition to several B Roads.

D4.46 To access Milton Keynes Central railway station by bus from the site, users would take the bus service no. C10 from the bus stops on Willen Road, forming its western boundary. The C10 Service stops directly at Milton Keynes Central railway station, and the journey time is approximately 30 minutes.

Woburn Sands Railway Station

D4.47 Woburn Sands railway station is located on Station Road, less than 1km east of the city centre. The station opened in 1846 and is situated on the Marston Vale Line, between Bedford and Bletchley. The London Northwestern Railways serves this station and operates Mondays – Saturdays only. The station has two platforms and step-free access. Woburn Sands railway station does not have a ticket office or ticket machines.

D4.48 Based on the data available from the Office of Rail and Road (ORR) data (June 2020), Woburn Sands railway station attracted about 52,000 passengers in 2018/2019. This has increased from 47,000 passengers in 2017/2018.

D4.49 A summary of the rail services serving Woburn Sands railway station (at the time of writing this ES) can be seen be in Table D4.4 below.

Table D4.4 Rail services from Woburn Sands Railway Station

Destination	Frequency per hour		First and last services (Monday – Friday)	Last service returning from destination (Monday – Friday)	Approximate duration
	AM Peak (outbound)	PM Peak (return)			
Bletchley	1	2	06:51 - 23:32	21:32	11 mins
Ridgmont	2	4	05:33 - 21:51	23:17	34 mins
Stewartby	2	4	05:33 - 21:51	22:55	17 mins
Kempston Hardwick	1	2	05:35 - 23:32	22:47	21 mins
Bedford St Johns	2	4	05:33 - 21:51	22:52	27 mins
Bedford	2	4	05:33 - 23:32	22:28	29 mins

Source: National Rail (up to date as of February 2021, timetables may be temporarily disrupted by COVID-19 at the time of writing)

D4.50 Woburn Sands railway station provides cycle parking in the form of 12 stands. The cycle storage is not sheltered. There is no car park at the station.

D4.51 Woburn Sands railway station is located approximately 6.5km (corresponding to approximately 1hr 21-minute walk time) south-east of the nearest Site access on the A509 London Road. Similar to the analysis above covering Milton Keynes Central railway station, it is therefore unlikely that the station is accessed on foot from the site.

D4.52 The station is located 7.4km (corresponding to approximately 27-minute cycle time at a typical cycling speed of 16km/h) from the nearest Site access on the A509 London Road via the local cycle routes. Whilst the DMRB (TA 91/05) states that trips of up to five miles *"could easily be cycled by the majority of people",* there are barriers to cycling in the form of major roads in the local area. Cyclists would have to cycle along the A509, leaving the site and cross the A421, in addition to several B Roads.

D4.53 To access Woburn Sands Station by bus from the site, users would take the bus service no. 1 from the bus stops on Willen Road and change at stops B3/B4 (Theatre District) to board the service no. 301 to Woburn Sands railway station. The journey time would be approximately 1hr 15minutes (excluding wait time).

Personal Injury Accident (PIA)

D4.54 The Personal Injury Accident ('PIA') records for the most recently available five-year period between 01/06/2015 and 31/05/2020 have been obtained from MKC for the local highway network, including the section of the M1 between Newport Pagnell Motorway Services and Broughton Road overbridge.

D4.55 A summary of the PIA data recorded within the study area during the five-year study period is provided in Table D4.5 below.

Table D4.5 Personal Injury Accident Summary

Severity	Total PIA		PIA involving pedestrians		PIA involving cyclists		PIA involving motorcycles	
	No.	%	No.	%	No.	%	No.	%
Slight	274	86.4%	11	3.5%	21	6.6%	14	4.4%
Serious	36	11.4%	5	1.6%	5	1.6%	8	2.5%
Fatal	7	2.2%	1	0.3%	0	0.0%	0	0.0%
Total	317	100.0%	17	5.4%	26	8.2%	22	6.9%

Source: MKC PIA records/consultant calculation

D4.56 As summarised in Table D4.5 above, a total of 317 accidents took place during the five-year period in the study area, 274 of which resulted in slight injury, 36 in serious injury and seven were fatal casualties.

D4.57 In addition to the above, the data analysis indicates that 17 of the recorded PIAs involved a pedestrian, 26 involved a cyclist, and 22 involved a motorcyclist.

D4.58 The data, as supplied by MKC as well as their detailed analysis, is provided in the TA (Appendix D1). The extent of the study area and the recorded PIA plotted by location are shown in Figure D4.3, provided at Volume 2 to this ES.

Future Baseline

D4.59 The future baseline conditions result from likely changes in the transport trends and committed/planned developments (other than the Proposed Development) in the site locality. As outlined in preceding sections, several committed/planned developments (including their associated infrastructure) are embedded in the traffic model developed for the purposes of the assessment of the impacts associated with the Proposed Development.

D4.60 The future year (2031 and 2048) modelled traffic volumes within the study area are provided in full in Appendix D6. As would be expected, the increase in growth in 2031 accounting for Local Plan growth and associated developments results in increased areas of delay and congestion, especially at key junctions in the locality, such as Marsh End Roundabout, Tickford Roundabout, Junction 14 and Northfields Roundabout. Beyond 2031, further background growth is applied in the 2048 scenario, further exacerbating underlying capacity constraints. AECOM, on behalf of MKC, have set out the assessment of the future baseline conditions within their Technical Note 30, which is attached to the TA (Appendix D1) as Appendix K-2.

D4.61 It should be noted that the baseline conditions described earlier in this Transport Chapter represent the current observed conditions and does not account for changes resulting from planned/committed schemes. However, as outlined above, the planned/committed schemes are embedded in the MKMMM, which forms the basis for the assessment discussed later in this Transport Chapter.

D5.0 Potential Effects

D5.1 The assessment of the effects resulting from the Proposed Development is considered in the following sections:

- During Construction – consideration is given to impacts resulting from the construction of the Proposed Development.
- During Operation -)– consideration is given to all links exceeding the thresholds set out by Rule 1 and Rule 2. Consideration is also given to impacts resulting from the operation of the Proposed Development at different stages of its lifecycle.

During Construction

D5.2 The construction traffic, including the measures to monitor, manage and minimise any potential impacts, is considered in detail in the CLP provided in Appendix D5. In addition to the CLP, the principal contractor (once appointed) will produce a Construction Environmental Management Plan (CEMP) addressing effects on the environment associated with the construction phases of the Proposed Development. Details and scope of the CEMP are provided in Chapter Q of this ES (Mitigation and Monitoring).

D5.3 Construction traffic results in a temporary traffic impact as it usually ceases upon completing the construction works. The construction traffic is generally significantly lower in volume than the traffic associated with the operation of development (of this type). Thus, the effects tend to be temporary and less significant. The traffic volume will also depend heavily on the rate of delivery and the triggers for delivering parts of the infrastructure. As the preferred main contractor has not been identified yet, appropriate assumptions have been made for construction traffic.

D5.4 Given the scale of the Proposed Development, it is expected that it will be delivered in four main phases (enabling works/infrastructure and Phase 1 to Phase 3) over the period of approximately 26 years, with an expected commencement of enabling works/works in 2022. It is expected that the Proposed Development will be delivered with an annual build-out rate of approximately 200 dwellings (approximately 50 dwellings under construction concurrently). The employment, community and education land uses are also expected to be constructed during this period.

D5.5 The traffic associated with the construction phase(s) would include heavy plant and lifting machinery and material deliveries by HGVs and Light Goods Vehicles (LGV) transporting the construction workforce. The number of construction vehicles would fluctuate on a daily basis and would depend on the stage of the construction process.

D5.6 Where possible, construction staff would be encouraged to travel by public transport or alternative modes of transport. It is expected that the staff would arrive early in the day and leave before or after the end of the typical working day (i.e. outside usual AM and PM peak hours) due to likely shift patterns. It is a common practice that construction staff often arrive and leave together rather than in separate vehicles. Promotion of car-sharing within the CLP and workplace travel plans (and therefore embedded mitigation) will further encourage this behaviour.

D5.7 Based on the above assumptions, it has been estimated that the approximate volume of construction traffic generated by the Proposed Development would be in a region of 485 two-way trips per day (i.e. AADT) at the peak of the construction process. The estimated total number of trips consists of both LGV and HGV traffic, with the latter forming approximately 18% of all trips. The CLP included in Appendix D5 provides the rationale behind the construction traffic estimates.

D5.8 The construction traffic is expected to utilise the MKC's preferred Lorry Route Network (LRN), as defined in Lorry Management Strategy (MKC, 2009), including the M1, A509 and A422. Given that these routes represent the main highway corridors in the area carrying significant traffic volumes, the construction movements associated with the delivery of the Proposed Development are likely to be within the daily variations of the traffic.

D5.9 The number of construction vehicles forecast for the site do not go above the thresholds needed for further assessment when applying the methodology assessment as set out in Section D3.0. Furthermore, the distribution of construction vehicles, set out in the TA and CLP identifies that vehicles will route utilising a mixture of both strategic and local road networks. Given the sites location, is it sensible to utilise the SRN where possible, but the distribution confirms that the construction trips per link across the site will be less as they will utilise the M1 and other corridors, such as the A422 and A509. It is also important to note that the construction methodology applied on site includes a comprehensive earthworks strategy, which will seek to 'win' material (e.g. take material and re-use from the cut and full profiles), thereby significantly reducing or possibly even negating the need for importing material; which will therefore have a significant benefit in reducing construction vehicle movements.

D5.10 The construction traffic movements generated during the construction phase of the Proposed Development are considered to represent only a fraction of the traffic subsequently generated by the completed development. They will be of a temporary and local nature. Therefore, the significance of effects is considered to be **slight**, with the effects expected to be **short term, temporary, adverse** and **'not significant'** in EIA terms. As such, no specific mitigation measures are required to reduce the effects (the CLP and CEMP are considered embedded mitigation).

During Operation

D5.11 Once the Proposed Development becomes operational (either in the interim year of 2031 or full build-out year of 2048), there is likely to be traffic associated with:

1 residents and visitors of the proposed dwellings;

2 employees and visitors to the proposed employment areas;

3 employees and pupils of the proposed schools; and

4 employees and visitors of the mixed-use centre and associated facilities.

D5.12 The assessment presented in this Transport Chapter is only concerned about the links (and scenarios) where the forecast traffic volumes exceed the rules (i.e. Rule 1 and Rule 2), as set out earlier.

D5.13 The generation, distribution and assignment of the trips generated by the Proposed Development have been undertaken by the MKMMM, with details provided in the TA and the associated TTNs. The parameters defining the trip generation, distribution and assignment have been agreed during the extensive consultations with MKC and AECOM.

D5.14 The effects of the Proposed Development on the operation of the surrounding highway network have been assessed using the outputs from the aforementioned model. The likely effects of the traffic associated with the operational phase of the Proposed Development are considered for all links identified earlier in this Transport Chapter and for the relevant scenarios (i.e. 2031 and/or 2048). It should be reiterated that the scenarios where no links satisfy Rule 1 or Rule 2 are not further discussed in this Transport Chapter.

D5.15 The likely effects of the traffic associated with the operation phase (i.e. 'with development' scenarios, both 2031 and 2048) are assessed against the Future Year Reference Case (both 2031

and 2048). The sensitivity and the magnitude of change have been assigned to the identified links based on the criteria set out in the methodology section of this Transport Chapter. Subsequently, the significance of the effect has been determined using the matrix provided in Table D3.1 above.

D5.16 As identified in the TA (Appendix D1), the Do Something scenarios (the introduction of the development plus associated infrastructure) result in existing / background traffic re-routeing and utilising different parts of the network. Therefore, it is important to note that the impacts or changes between with and without Development are not necessarily attributable to just the Proposed Development itself.

Links Identified for Assessment (During Operation)

D5.17 The application of Rule 1 and Rule 2 set out earlier to the modelled links within the study area is included for both future years (i.e. 2031 and 2048) in full in Appendix D6. As a result of the analysis, several links have been identified for the detailed assessment in this Transport Chapter.

D5.18 It should be highlighted that not all identified links exceed the thresholds set out by the two screening rules in both scenarios. Therefore, only the links identified as exceeding the threshold(s) in a given future year are assessed in detail as part of that scenario. It should also be noted that large/complex junctions are represented in the MKMMM by a series of relatively short modelled links, which may include vehicular only internal lanes.

D5.19 The links identified for the detailed assessment in this Transport Chapter are summarised in Table D5.1 below, along with the identification in which future year scenario they are considered as a result of meeting one of the screening rules set out earlier.

Table D5.1 Links Identified for Detailed Assessment

Link ID	Road Name / Location	Future Year Assessment	
		2031	2048
1	A509 London Road between Newport Road and Broughton Interchange (M1 Junction 14)	✓	✓
2	Silbury Boulevard between Blairmont Street and Skeldon Roundabout	✓	✓
3	Silbury Boulevard between Campbell Park Roundabout and Blairmont St	✓	✓
4	High St between Union Street and St John Street	✗	✓
5	Renny Park Road	✗	✓
6	North Crawley Road between Morello Way/Renny Park Road Roundabout and Tickford Street/London Road Roundabout	✓	✓
7	St John Street between High Street and Silver Street	✓	✓
8	St John Street between Silver Street and River Side	✓	✓
9	Tickford Street between Priory Street/Severn Drive and St Margarets Close	✓	✗
10	Tickford Street between St Margarets Close and Chicheley Street	✓	✗
11	High Street between Union Street and The Dolphin	✗	✓
12	High Street between The Dolphin and Queens Ave	✗	✓
13	Tongwell St between the entrance to BMX Racing Club and Pineham Roundabout	✓	✓
14	A509 between Pagoda Roundabout and Pineham Roundabout	✓	✓

Link ID	Road Name / Location	Future Year Assessment	
		2031	2048
15	A509 eastbound approach/westbound exit to/from Pagoda Roundabout	✓	✗
16	A509 eastbound exit/westbound approach to/from North Overgate Roundabout	✓	✗
17	A509 between North Overgate Roundabout and Pagoda Roundabout	✓	✗
18	Cranfield Road between Unnamed Road and University Way	✓	✓
19	Moulsoe Road between University Way and Cranfield Road	✓	✓
20	Cranfield Road between the east part of Moulsoe and Unnamed Road	✓	✓
21	Cranfield Road/Newport Road through Moulsoe	✓	✓
22	University Way between unnamed roundabout east of Virta Global Charging Station and Folly Lane	✗	✓
23	(Cranfield) High Street/Bedford Road between Court Road and Crane Way	✗	✓
24	A509 northbound approach to Chicheley Roundabout	✓	✓
25	Tongwell Street from the entrance to BMX Racing Club towards Carleton Gate	✓	✓
26	Tongwell Street towards Carleton Gate	✓	✓
27	Tongwell St between the entrance to Carleton Gate and new junction leading to new M1 bridge	✓	✓
28	J14 M1 Eastbound on-slip	✓	✗
29	V9 Overstreet between Sovereign Drive and Neath Hill Roundabout	✓	✗
30	H4 Dansteed Way between Delaware Drive and Willen Roundabout	✓	✓
31	B526 Between Ousebank Street and Sherington Road	✓	✗
32	V9 Overstreet between Sovereign Drive and Great Linford Roundabout	✓	✗
33	High Street (Cranfield) between Lodge Road and Court Road	✓	✗
34	V11 Tongwell Street northbound exit from the Brinklow Roundabout	✓	✗
35	Willen Road northbound approach to the Marsh End Roundabout	✓	✓
36	Newport Road between Main Road and Gog Lane	✓	✗
37	A509 High Street/Market Place (Olney) between Church Street and Yardley Road	✓	✓
38	H3 Monks Way between Erica Road and Colley Hill.	✗	✓
39	H3 Monks Way between Bancroft Roundabout and Colley Hill.	✗	✓
40	V8 Marlborough Street between Redbridge Roundabout and Currier Drive.	✗	✓
41	V8 Marlborough Street between Currier Drive and Downs Barn Roundabout.	✗	✓
42	V10 Brickhill Street between Delaware Drive and Willen roundabout.	✗	✓
43	V8 Marlborough Street between Downs Barn Roundabout and Downs Barn Boulevard.	✗	✓

Link ID	Road Name / Location	Future Year Assessment	
		2031	2048
44	H3 Monks Way between Abbey Hill Roundabout and Stacy Bushes Roundabout.	✖	✓
45	High St between Station Road and Queens Avenue. Screening Rule 2 applies.	✖	✓
46	Tickford Street between Riverside and Priory Street.	✖	✓
47	Tickford Street between Chicheley St and The Canons.	✖	✓
48	Tickford Street between The Canons and North Crawley Road.	✖	✓
49	TH5 A509 Portway westbound approach Pineham Roundabout.	✖	✓
50	H6 Childs Way between S Enmore Roundabout and S Overgate Roundabout.	✖	✓
51	H6 Childs Way S Enmore Roundabout eastern approach.	✖	✓
52	H6 Childs Way S Enmore Roundabout western approach.	✖	✓
53	H6 Childs Way between S Enmore Roundabout and S Marlborough Roundabout.	✖	✓
54	H6 Childs Way S Marlborough Roundabout eastern approach.	✖	✓
55	H3 Monks Way between V9 Overstreet and V8 Marlborough Street.	✖	✓
56	H6 Childs Way between Hensman Gate and a bridge over the River Ouzel.	✖	✓
57	College Road between Crawley road and Merchant Lane.	✖	✓
58	College Road between Prince Phillip Avenue and Merchant Lane.	✖	✓
59	A509 southbound from Chicheley Hill Roundabout to the N Crawley Road underbridge.	✖	✓
60	Willen Road southbound exit from the Marsh End Roundabout.	✖	✓
61	A509 between Prospect Place and High Street.	✖	✓
62	A509 between Newton Road (Emberton) and Olney.	✖	✓
63	A509 between Prospect Place and Newton Road (Emberton)	✖	✓

D5.21 The links identified for the detailed assessment are graphically represented in Figure D5.1, provided at Volume 2 to this ES**.**

Severance

D5.22 The summary of the assessment of severance is provided for each of the identified links and scenarios in Table D5.2 below.

Table D5.2 Assessment of Severance

Link ID	Sensitivity		Magnitude of change		Significance
	Link type	Assigned sensitivity	Change in traffic volume	Assigned magnitude	
2031 Future Year + Proposed Development					
1	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	13.3% (AM peak)	Negligible	Neutral or Slight
2	Link in a semi-urban area providing access to Campbell Park. Off-road	High	8.2% (PM peak)	Negligible	Slight

Link ID	Sensitivity		Magnitude of change		Significance
	Link type	Assigned sensitivity	Change in traffic volume	Assigned magnitude	
	pedestrian/cycle provision, including an informal pedestrian crossing point (with tactile paving) as well as toucan crossing.				
3	Link in a semi-urban area providing access to Campbell Park. Off-road pedestrian/cycle provision. Informal pedestrian crossing point (no tactile paving)	High	7.8% (PM peak)	Negligible	Slight
6	Link in the urban area connecting up the two roundabouts. An informal pedestrian crossing (with tactile paving) at the Morello Way/Renny Park Road Roundabout. Footway along the southern side. Footway/cycleway (Redway) along the northern side.	High	37.3% (PM peak)	Minor	Slight or Moderate
7	Link in the urban area connecting to Newport Pagnell High St. Zebra pedestrian crossing. Wide footways on both sides. No cycle facilities.	High	26.5% (AM peak)	Negligible	Slight
8	Link in the urban area connecting to Newport Pagnell High St. Informal pedestrian crossing with tactile paving. Pedestrian footways on both sides. No cycle facilities.	High	28.1% (AM peak)	Negligible	Slight
9	Link in the urban area, main arterial link through Tickford. Several informal crossing points with tactile paving. A Redway along the southern side. Footway and section of a shared footway/cycleway along the northern side.	High	36.7% (AM peak)	Minor	Slight or Moderate
10	Link in the urban area, main arterial link through Tickford. No crossing points. Pedestrian footways on both sides. No cycle facilities.	High	31.1% (AM peak)	Minor	Slight or Moderate
13	Link in the semi-urban area connecting Fox Milne with Willen. Off-road pedestrian/cycle provision. Informal pedestrian crossing with tactile paving at the junction with access to Anglian Water facility.	Medium	30.1% (PM peak)	Minor	Slight
15	Link in a semi-urban area. Off-road pedestrian/cycle provision. No at-level crossing points but Pedestrian/Cycle subway.	Medium	15.4% (AM peak)	Negligible	Neutral or Slight
16	Link in a semi-urban area. Off-road pedestrian/cycle provision. No at-level crossing points but Pedestrian/Cycle subway.	Medium	15.4% (AM peak)	Negligible	Neutral or Slight

Link ID	Sensitivity		Magnitude of change		Significance
	Link type	Assigned sensitivity	Change in traffic volume	Assigned magnitude	
17	Link in a semi-urban area, connecting V9 Overstreet to V10 Brickhill St. Off-road pedestrian/cycle provision running parallel to the eastbound carriageway. 2x Pedestrian/Cycle subway near the River Ouzel.	Medium	15.4% (AM peak)	Negligible	Neutral or Slight
18	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	84.2% (PM peak)	Moderate	Slight
19	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	33.3% (PM peak)	Minor	Neutral or Slight
20	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	91.5% (PM peak)	Major	Slight or Moderate
21	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	76.0% (PM peak)	Moderate	Slight
24	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	39.2% (PM peak)	Minor	Neutral or Slight
25	Link in a semi-urban area. Off-road pedestrian/cycle provision or crossing points.	Medium	26.2% (PM peak)	Negligible	Neutral or Slight
26	Link in a semi-urban area. No pedestrian/cycle provision or crossing points.	Medium	26.2% (PM peak)	Negligible	Neutral or Slight
27	Link in a semi-urban area. Off-road pedestrian/cycle provision.	Medium	37.5% (PM peak)	Minor	Slight
28	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	37.4% (PM peak)	Minor	Neutral or Slight
29	Link in the urban area connecting Sovereign Drive to Neath Hill Roundabout segregated from the existing residential area/local centre. Off-road pedestrian/cycle provision. 2x Pedestrian/cycle subway.	High	15.2% (AM peak)	Negligible	Slight
30	Link in a semi-urban area, partially dual carriageway. Off-road pedestrian/cycle provision running parallel to the eastbound carriageway. Pedestrian/cycling subways at Willen Roundabout.	Medium	-11.2% (AM peak)	No change	Neutral
31	Link predominantly in a rural area. Footway along the western side of the carriageway. No designated cycle provision or crossing points.	Low	0.8% (PM peak)	Negligible	Neutral or Slight
32	Link in the urban area connecting Sovereign Drive to Neath Hill Roundabout segregated from the existing residential area/. Off-road pedestrian/cycle provision. Pedestrian/cycle subway to the south of Great Linford Roundabout	High	13.7% (AM peak)	Negligible	Slight

Link ID	Sensitivity		Magnitude of change		Significance
	Link type	Assigned sensitivity	Change in traffic volume	Assigned magnitude	
33	Link in the urban area. Footway along the eastern side of the carriageway up to the junction with Townsend Close. Footways on both sides for the rest of the length. A zebra crossing near the junction with Plough Close. No designated cycle provision.	High	15.1% (AM peak)	Negligible	Slight
34	Link in a semi-urban area. Off-road pedestrian/cycle provision, including subways.	Medium	4.9% (AM peak)	Negligible	Neutral or Slight
35	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	-60.2% (PM peak)	No Change	Neutral
36	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	10.8% (AM peak)	Negligible	Neutral or Slight
37	Link in urban area/town centre setting. Footways of variable width along both sides of the carriageway with several informal crossing opportunities. A Pelican crossing provided near The Bull Hotel, and a zebra crossing provided to the south of the junction with Yarley Road.	Very High	8.3% (AM peak)	Negligible	Slight
2048 Future Year + Proposed Development					
1	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	48.8% (AM peak)	Minor	Neutral or Slight
2	Link in a semi-urban area providing access to Campbell Park. Off-road pedestrian/cycle provision including an informal pedestrian crossing point (with tactile paving) as well as toucan crossing.	High	14.9% (AM peak)	Negligible	Slight
3	Link in a semi-urban area providing access to Campbell Park. Off-road pedestrian/cycle provision. Informal pedestrian crossing point (no tactile paving)	High	15.5% (AM peak)	Negligible	Slight
4	Link in urban area/town centre with footways on both sides and multiple crossing opportunities, including a raised informal pedestrian crossing with tactile paving and a raised puffin crossing.	Very high	14.8% (AM peak)	Negligible	Slight
5	Link in a semi-urban area serving the existing industrial estate to the east and providing NMU and emergency access to the residential properties on Hopton Grove. No pedestrian crossing point except an informal crossing at the junction with N Crawley Road. Footways along both sides of the carriageway.	Negligible	111.3% (AM peak)	Major	Slight
6	Link in the urban area connecting up the two roundabouts. An informal pedestrian	High	7.8% (AM peak)	Negligible	Slight

Link ID	Sensitivity		Magnitude of change		Significance
	Link type	Assigned sensitivity	Change in traffic volume	Assigned magnitude	
	crossing (with tactile paving) at the Morello Way/Renny Park Road Roundabout. Footway along the southern side. Footway/cycleway (Redway) along the northern side.				
7	Link in the urban area connecting to Newport Pagnell High St. Zebra pedestrian crossing. Pedestrian footways (both sides and wide) but no cycle facilities.	High	22.5% (AM peak)	Negligible	Slight
8	Link in the urban area connecting up to Newport Pagnell High St. Informal pedestrian crossing (with tactile paving). Pedestrian footways (both sides) but no cycle facilities.	High	25.3% (AM peak)	Negligible	Slight
9	Link in the urban area, main arterial link through Tickford. Several informal crossing points (with tactile paving). A Redway along the southern side. Footway and section of a shared footway/cycleway along the northern side.	High	9.6% (AM peak)	Negligible	Slight
10	Link in the urban area, main arterial link through Tickford. No crossing points. Pedestrian footways (on both sides) but no cycle facilities.	High	9.7% (AM peak)	Negligible	Slight
11	Link in urban area/town centre with footways on both sides. Raised table informal pedestrian crossing near Union Street	Very high	14.8% (AM peak)	Negligible	Slight
12	Link in urban area/town centre with footways on both sides. Raised table informal pedestrian crossings at each end of the link.	Very high	19.7% (AM peak)	Negligible	Slight
13	Link in the semi-urban area connecting Fox Milne with Willen. Off-road pedestrian/cycle provision. An informal pedestrian crossing (with tactile paving) at the junction with access to the Anglian Water facility.	Medium	7.2% (PM peak)	Negligible	Neutral or Slight
14	Link in a semi-urban area, connecting V10 Brickhill St to V11 Tongwell St. Off-road pedestrian/cycle provision running parallel to the eastbound carriageway. 3x pedestrian/Cycle underpass.	Medium	47.9% (AM peak)	Minor	Slight
18	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	69.1% (PM peak)	Moderate	Slight
19	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	64.9% (PM peak)	Moderate	Slight
20	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	80.2% (PM peak)	Moderate	Slight

Link ID	Sensitivity		Magnitude of change		Significance
	Link type	Assigned sensitivity	Change in traffic volume	Assigned magnitude	
21	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	75.4% (PM peak)	Moderate	Slight
22	Link serving Cranfield University Technology Park and other industrial properties. Informal crossing points with dropped kerbs and tactile paving at each junction. Shared footway/cycleway along the northern/western side of the carriageway. Informal crossing with tactiles and dropped kerbs combined with speed reduction measures immediately the University Way bus stop. Footway only along the eastern edge of the carriageway to the north of the bus stop towards Folly Lane.	Medium	38.1% (PM peak)	Minor	Slight
23	Link in an urban area with footways on both sides and several informal crossing points with dropped kerbs and tactile paving. A zebra crossing in front of The Cross Keys PH.	High	34.9% (PM peak)	Minor	Slight or Moderate
24	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	68.7% (AM peak)	Moderate	Slight
25	Link in a semi-urban area. Off-road pedestrian/cycle provision.	Medium	6.9% (PM peak)	Negligible	Neutral or Slight
26	Link in a semi-urban area. No pedestrian/cycle provision or crossing points.	Medium	6.9% (PM peak)	Negligible	Neutral or Slight
27	Link in a semi-urban area. Off-road pedestrian/cycle provision.	Medium	21.8% (AM peak)	Minor	Slight
30	Link in a semi-urban area. Footways/cycleways segregated from a link only on the northern edge. Connects to underpass crossings at the roundabout (Willen Roundabout).	Medium	2.3% (PM peak)	Negligible	Neutral or Slight
35	Link in a rural area. No pedestrian/cycle facilities. The link represents part of the approach/exit to the roundabout. No crossing facilities are provided at Marsh End Roundabout.	Low	-35.1% (AM peak)	No change	Neutral
37	Link in urban area/town centre setting. Footways of variable width along both sides of the carriageway with several informal crossing opportunities. A Pelican crossing provided near The Bull Hotel, and a zebra crossing provided to the south of the junction with Yarley Road.	Very High	3.2% (AM peak)	Negligible	Slight
38	Link in a semi-urban area. Off-road pedestrian/cycle provision. Underpass provides connections to Redway Bw03.	Medium	0.5% (AM peak)	Negligible	Neutral or Slight

Link ID	Sensitivity		Magnitude of change		Significance
	Link type	Assigned sensitivity	Change in traffic volume	Assigned magnitude	
39	Link in a semi-urban area. Off-road pedestrian/cycle provision. Facilities only on the southern side. Lower levels links to underpasses. No continuous connection along Monks Way.	Medium	1.1% (AM peak)	Negligible	Neutral or Slight
40	Link in a semi-urban area. No pedestrian/cycle provision or crossing points. Footways/cycleways completely segregated from the link. No crossings points.	Medium	3.6% (PM peak)	Negligible	Neutral or Slight
41	Link in a semi-urban area. Footways/cycleways completely segregated from the link. Some connections to bus stops. Underpass crossings on link north of the junction with Glazier Dr and north of Downs Barn Roundabout.	Medium	3.5% (PM peak)	Negligible	Neutral or Slight
42	Link in a semi-urban area. Footways/cycleways completely segregated from the link. Underpass crossing on the link near to the junction with Delaware Dr. No direct connections to Willen Roundabout.	Medium	11.4% (PM peak)	Negligible	Neutral or Slight
43	Link in a semi-urban area. Footways/cycleways segregated from the link. Connections to underpass crossings at the Downs Barn Roundabout. Underpass connections and the junction of Downs Barn Blvd and V8.	Medium	14.4% (AM peak)	Negligible	Neutral or Slight
44	Link in semi-urban/rural area. Footways/cycleways segregated from the link. Connections to underpass crossing mid link but no direct crossings or facilities on the link itself.	Low	-0.1% (AM peak)	No change	Neutral
45	Link in high street/urban area. Footways on both sides of the carriageway. At grade signalised crossing mid link (west of Bury St).	Very high	9.5% (AM peak)	Negligible	Slight
46	Link in high street/urban area. Segregated footway on the southern side of Tickford Bridge. Narrow footways on the northern side of the bridge carriageway. No formal crossing points, but informal crossings present with dropped kerbs and tactiles - near to the roundabout junction with Priory St. Traffic calming present.	High	20.0% (AM peak)	Negligible	Slight
47	Link in the urban area. Footways on both sides of the carriageway. Signalised at grade crossing south of Chicheley St. On-	Medium	10.8% (AM peak)	Negligible	Neutral or Slight

Link ID	Sensitivity		Magnitude of change		Significance
	Link type	Assigned sensitivity	Change in traffic volume	Assigned magnitude	
	street parking and other informal crossing points (drop kerb with refuge island) along the link. No clear/identified cycle facilities.				
48	Link in the urban area. Footways on both sides of the carriageway. Informal crossing points (drop kerb with refuge island) along the link, e.g. opposite Petrol Filling Station and north of mini-roundabout (N Crawley Road). No clear/identified cycle facilities.	Medium	11.5% (AM peak)	Negligible	Neutral or Slight
49	Link in a semi-urban area. No direct footways or cycleways present on the link. No crossing points. The A509 is a key strategic link with high volumes of mixed traffic.	Negligible	1.8% (PM peak)	Negligible	Neutral
50	Link in semi-urban/rural area. No direct footways or cycleways present on the link. Segregated footway/cycleway on the southern side of the link, although approximately 30m south from the carriageway, has verge and tree planting as a barrier. No crossing points either on the link or at either roundabout.	Negligible	1.4% (AM peak)	Negligible	Neutral
51	Link in semi-urban/rural area. No direct footways or cycleways present on the link. Segregated footway/cycleway on the southern side of the link, although approximately 30m south from the carriageway, has verge and tree planting as a barrier. No crossing points on the roundabout. This link represents the approach to the roundabout - which has no pedestrian/cyclist facilities.	Negligible	1.4% (AM peak)	Negligible	Neutral
52	Link in semi-urban/rural area. No direct footways or cycleways. The underpass on the edge of the link, which provides an N/S crossing point. Bus stops located nearby on the links, which connect to the underpass link. No crossing points on link or roundabout. This link represents the approach to the roundabout. However, it is close to other pedestrian/cyclist facilities.	Negligible	9.8% (AM peak)	Negligible	Neutral
53	Link in semi-urban/rural area. No direct footways or cycleways. Segregated footway/cycleway on the southern side of the link, although approximately 30m south from the carriageway, has verge and tree planting as a barrier. Two	Negligible	9.8% (AM peak)	Negligible	Neutral

Link ID	Sensitivity		Magnitude of change		Significance
	Link type	Assigned sensitivity	Change in traffic volume	Assigned magnitude	
	underpass connections (eastern and western ends).				
54	Link in semi-urban/rural area. No direct footways or cycleways. The underpass on the eastern edge of the link, which provides an N/S crossing point. No crossing points on link or roundabout. This link represents the approach to the roundabout. However, it is close to other pedestrian/cyclist facilities.	Negligible	9.8% (AM peak)	Negligible	Neutral
55	Link in a semi-urban area. No pedestrian/cyclist facilities running alongside it. However, a series of underpasses along the link provide connections N/S to segregated pedestrian/cycle facilities. Bus Stops located along the link connect to the underpass. At grade crossing points on the carriageway, as link utilises underpasses.	Medium	5.9% (PM peak)	Negligible	Neutral or Slight
56	Link in a semi-urban area. Redway north of the link. Segregated footway/cycleway south of the link - approximately 30m south of the carriageway, screened by verge and tree line. The link does not have a crossing point (the Redways connect to underpasses further east or west of this link).	Low	1.4% (PM peak)	Negligible	Neutral or Slight
57	The link is rural. No pedestrian or cyclist crossing facilities. A footway on the western edge running from Merchant Lane junction for approximately 450m to a farm access gate. Relatively large verge on the western side as link continues northwards.	Low	-0.9% (PM peak)	No change	Neutral
58	Link in rural/semi-urban area. Passes university buildings. Footways present on both side of the carriageway. On-street parking on the southern edge. At grade zebra crossing near to the roundabout with Duncan Road.	Medium	-0.9% (PM peak)	No change	Neutral
59	Link in a rural area. No pedestrian or cyclist facilities. Wide verge on the western side at the northern section of the link. A509 is key strategic link. No formal crossing points.	Low	57.9% (AM peak)	Minor	Neutral or Slight
60	Link in a rural area. No pedestrian or cyclist facilities. The link represents part of the approach/exit to the roundabout. No crossing facilities are provided at Marsh End Roundabout at this location.	Low	-32.3% (PM peak)	No change	Neutral

Link ID	Sensitivity		Magnitude of change		Significance
	Link type	Assigned sensitivity	Change in traffic volume	Assigned magnitude	
61	Link in a rural area. Pedestrian/cycle link facility on the western edge - originating from High Street. Informal crossing opposite Filgrave turn bus stop. However, this is for the minor road, not the A509. The link has no formal crossings (E/W).	Low	6.6% (AM peak)	Negligible	Neutral or Slight
62	Link in a rural area. Pedestrian/cycle link facility on the western edge of the carriageway. Informal crossings (including cycle crossing at High Street/Newton Road junction). Western footway/cycleway variable in width approaching Olney. No formal crossing points across the A509.	Low	3.9% (AM peak)	Negligible	Neutral or Slight
63	Link in a rural area. Pedestrian/cycle link facility on the western edge. No crossings on A509.	Low	5.6% (AM peak)	Negligible	Neutral or Slight

Review of Issues identified in Table D5.2 (Severance)

2031

D5.23 As outlined in Table D5.2 above, the significance of severance on the links within the study area in the 2031 Future Year + Proposed Development scenario has been established as neutral or slight, with the exception of the following links:

- Link 6 - North Crawley Road between Morello Way/Renny Park Road Roundabout and Tickford Street/London Road Roundabout;
- Link 9 - Tickford Street between Priory Street/Severn Drive and St Margarets Close;
- Link 10 - Tickford Street between St Margarets Close and Chicheley Street; and
- Link 20 - Cranfield Road between the east part of Moulsoe and Unnamed Road.

D5.24 The significance of severance identified on Link 6, Link 9, Link 10 and Link 20 is slight or moderate. As outlined earlier, any effect with moderate significance is potentially significant in EIA terms. However, the qualitative evaluation of the pedestrian provision, including crossing points along these links, suggests sufficient pedestrian facilities along Link 6 and Link 9. Therefore, the significance of the effect is slight rather than moderate.

D5.25 Given the relatively short length (approx. 65m) of Link 10, situated between two junctions, and the fact that there are pedestrian facilities on both sides of the carriageway with the crossing opportunity immediately east of one of the junctions, it is also considered that the significance of effect on this link is slight rather than moderate.

D5.26 Link 20 is a link situated in a rural area to the east of the village of Moulsoe, and there are no pedestrian facilities along the link. Given the rural nature of the area and the minimum of destinations that could be accessed on foot, it is not considered necessary to accommodate journeys on foot along this link. As such, the significance of the effect on this link is considered slight rather than moderate.

D5.27 Overall, the significance of the effect on all assessed links is **neutral** or **slight**, with the effects expected to be **long term**, **permanent** and **adverse**. The effects of the Proposed Development on these links are considered to be **'not significant'** in EIA terms.

2048

D5.28 In the 2048 Future Year + Proposed Development scenario, a single link (Link 23 - Cranfield High Street/Bedford Road between Court Road and Crane Way) has been identified with slight or moderate effect significance. As outlined earlier, any effect with moderate significance is potentially significant in EIA terms. However, the qualitative evaluation of the pedestrian provision, including crossing points along this link, suggests that there are sufficient pedestrian facilities along the link, including a zebra crossing and several informal crossing opportunities. As such, the significance of the effect on this link is considered slight rather than moderate.

D5.29 Based on the above, the significance of effect on all assessed links in this scenario is **neutral** or **slight**, with the effects expected to be **long term**, **permanent** and **adverse**. The effects of the Proposed Development are considered to be **'not significant'** in EIA terms.

Driver / Bus Passenger Delay

D5.30 The summary of the assessment of driver and bus passenger delay is provided for each of the identified links/scenarios in Table D5.3 below.

Table D5.3 Assessment of Driver / Bus passenger Delay

Link ID	Sensitivity		Magnitude of change*		Significance
	V/C (Highest)	Assigned sensitivity	Change in delay	Assigned magnitude	
2031 Future Year + Proposed Development					
1	27.52	Negligible	n/a	n/a	Neutral or Slight
2	49.69	Negligible	n/a	n/a	Neutral or Slight
3	45.93	Negligible	n/a	n/a	Neutral or Slight
6	46.95	Negligible	n/a	n/a	Neutral or Slight
7	32.78	Negligible	n/a	n/a	Neutral or Slight
8	21.75	Negligible	n/a	n/a	Neutral or Slight
9	32.12	Negligible	n/a	n/a	Neutral or Slight
10	25.96	Negligible	n/a	n/a	Neutral or Slight
13	59.27	Negligible	n/a	n/a	Neutral or Slight
15	67.10	Negligible	n/a	n/a	Neutral or Slight
16	60.57	Negligible	n/a	n/a	Neutral or Slight
17	41.78	Negligible	n/a	n/a	Neutral or Slight
18	32.87	Negligible	n/a	n/a	Neutral or Slight
19	28.10	Negligible	n/a	n/a	Neutral or Slight
20	31.49	Negligible	n/a	n/a	Neutral or Slight
21	26.57	Negligible	n/a	n/a	Neutral or Slight
24	96.00	High	135.10%	Significant effect	
25	76.37	Low	n/a	n/a	Neutral or Slight
26	75.05	Low	n/a	n/a	Neutral or Slight
27	66.91	Negligible	n/a	n/a	Neutral or Slight
28	29.01	Negligible	n/a	n/a	Neutral or Slight
29	52.63	Negligible	n/a	n/a	Neutral or Slight
30	38.20	Negligible	n/a	n/a	Neutral or Slight
31	51.36	Negligible	n/a	n/a	Neutral or Slight
32	57.53	Negligible	n/a	n/a	Neutral or Slight
33	45.99	Negligible	n/a	n/a	Neutral or Slight

Link ID	Sensitivity		Magnitude of change*		Significance
	V/C (Highest)	Assigned sensitivity	Change in delay	Assigned magnitude	
34	39.10	Negligible	n/a	n/a	Neutral or Slight
35	31.69	Negligible	n/a	n/a	Neutral or Slight
36	44.16	Negligible	n/a	n/a	Neutral or Slight
37	53.33	Negligible	n/a	n/a	Neutral or Slight
2048 Future Year + Proposed Development					
1	36.80	Negligible	n/a	n/a	Neutral or Slight
2	69.57	Negligible	n/a	n/a	Neutral or Slight
3	70.34	Low	n/a	n/a	Neutral or Slight
4	65.58	Negligible	n/a	n/a	Neutral or Slight
5	65.97	Negligible	n/a	n/a	Neutral or Slight
6	70.64	Low	n/a	n/a	Neutral or Slight
7	60.36	Negligible	n/a	n/a	Neutral or Slight
8	37.72	Negligible	n/a	n/a	Neutral or Slight
9	56.75	Negligible	n/a	n/a	Neutral or Slight
10	45.72	Negligible	n/a	n/a	Neutral or Slight
11	48.26	Negligible	n/a	n/a	Neutral or Slight
12	59.77	Negligible	n/a	n/a	Neutral or Slight
13	81.95	Medium	n/a	n/a	Neutral or Slight
14	45.83	Negligible	n/a	n/a	Neutral or Slight
18	56.02	Negligible	n/a	n/a	Neutral or Slight
19	38.63	Negligible	n/a	n/a	Neutral or Slight
20	54.36	Negligible	n/a	n/a	Neutral or Slight
21	42.74	Negligible	n/a	n/a	Neutral or Slight
22	14.29	Negligible	n/a	n/a	Neutral or Slight
23	15.42	Negligible	n/a	n/a	Neutral or Slight
24	87.43	Medium	n/a	n/a	Neutral or Slight
25	98.50	High	92.70%	Significant effect	
26	96.44	High	60.90%	Significant effect	
27	98.85	High	2842.90%	Significant effect	
30	51.51	Negligible	n/a	n/a	Neutral or Slight
35	75.04	Low	n/a	n/a	Neutral or Slight
37	63.94	Negligible	n/a	n/a	Neutral or Slight
38	52.48	Negligible	n/a	n/a	Neutral or Slight
39	66.51	Negligible	n/a	n/a	Neutral or Slight
40	69.44	Negligible	n/a	n/a	Neutral or Slight
41	67.28	Negligible	n/a	n/a	Neutral or Slight
42	63.15	Negligible	n/a	n/a	Neutral or Slight
43	80.51	Medium	n/a	n/a	Neutral or Slight
44	53.02	Negligible	n/a	n/a	Neutral or Slight
45	78.47	Low	n/a	n/a	Neutral or Slight
46	49.39	Negligible	n/a	n/a	Neutral or Slight
47	37.74	Negligible	n/a	n/a	Neutral or Slight
48	77.53	Low	n/a	n/a	Neutral or Slight

Link ID	Sensitivity		Magnitude of change*		Significance
	V/C (Highest)	Assigned sensitivity	Change in delay	Assigned magnitude	
49	66.60	Negligible	n/a	n/a	Neutral or Slight
50	49.59	Negligible	n/a	n/a	Neutral or Slight
51	73.48	Low	n/a	n/a	Neutral or Slight
52	67.18	Negligible	n/a	n/a	Neutral or Slight
53	43.81	Negligible	n/a	n/a	Neutral or Slight
54	70.74	Low	n/a	n/a	Neutral or Slight
55	104.26	Very High	379.00%	Significant effect	
56	41.54	Negligible	n/a	n/a	Neutral or Slight
57	57.14	Negligible	n/a	n/a	Neutral or Slight
58	29.76	Negligible	n/a	n/a	Neutral or Slight
59	77.28	Low	n/a	n/a	Neutral or Slight
60	47.76	Negligible	n/a	n/a	Neutral or Slight
61	84.94	Medium	n/a	n/a	Neutral or Slight
62	64.65	Negligible	n/a	n/a	Neutral or Slight
63	90.53	High	92.30%	n/a	Neutral or Slight

Note: * Magnitude of change based on the percentage change in the delay is only applicable on links approaching or over their theoretical capacity (i.e. V/C above 90). V/C values below 90 indicate a spare capacity, and the links/junctions operate satisfactorily without significant delays.

Review of Issues identified in Table D5.3 (Driver/Bus Passenger Delay)

2031

D5.31 As outlined in Table D5.3 above, the significance of driver/bus passenger delay on the links within the study area in the 2031 Future Year + Proposed Development scenario has been established as **neutral** or **slight**, with the exception of Link 24 (A509 northbound approach to Chicheley Roundabout). The effects are expected to be **long term**, **permanent** and **adverse**. The effects of the Proposed Development on these links are considered to be **'not significant'** in EIA terms.

D5.32 Given that the V/C value modelled for Link 24 exceeds the value of 90, the effects on driver/bus passenger delay is considered to be **'significant'** in EIA terms. The effects are expected to be **long term**, **permanent** and **adverse**. This result indicates that mitigation would typically be required to reduce the significance of the effect.

2048

D5.33 In the 2048 Future Year + Proposed Development scenario, the V/C values modelled for the following links exceed 90, with the impact of the Proposed Development on driver/bus passenger delay is considered to be **'significant'** in EIA terms:

- Link 25 - Tongwell Street from the entrance to BMX Racing Club towards Carleton Gate;
- Link 26 - Tongwell Street towards Carleton Gate;
- Link 27 - Tongwell St between the entrance to Carleton Gate and new junction leading to new M1 bridge; and
- Link 55 - H3 Monks Way between V9 Overstreet and V8 Marlborough Street.

D5.34 Link 25, Link 26 and Link 27 form part of the transport corridor, providing one of the main accesses to the Proposed Development. Link 55 is a link in a dual carriageway link semi-urban

area. The effects on these links are expected to be **long term**, **permanent** and **adverse**. This result indicates that mitigation would typically be required to reduce the significance of the effect.

Pedestrian Delay

D5.35 The summary of the assessment of pedestrian delay is provided for each of the identified links/scenarios in Table D5.4 below.

Table 5.4 Assessment of Pedestrian Delay

Link ID	Sensitivity		Magnitude of change		Significance
	Link type	Assigned sensitivity	Change in traffic volume	Assigned magnitude	
2031 Future Year + Proposed Development					
1	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	13.3% (AM peak)	Negligible	Neutral or Slight
2	Link in a semi-urban area providing access to Campbell Park. Off-road pedestrian/cycle provision, including an informal pedestrian crossing point (with tactile paving) as well as toucan crossing.	High	8.2% (PM peak)	Negligible	Slight
3	Link in a semi-urban area providing access to Campbell Park. Off-road pedestrian/cycle provision. Informal pedestrian crossing point (no tactile paving)	High	7.8% (PM peak)	Negligible	Slight
6	Link in the urban area connecting up the two roundabouts. An informal pedestrian crossing (with tactile paving) at the Morello Way/Renny Park Road Roundabout. Footway along the southern side. Footway/cycleway (Redway) along the northern side.	High	37.3% (PM peak)	Minor	Slight or Moderate
7	Link in the urban area connecting to Newport Pagnell High St. Zebra pedestrian crossing. Wide footways on both sides. No cycle facilities.	High	26.5% (AM peak)	Negligible	Slight
8	Link in the urban area connecting to Newport Pagnell High St. Informal pedestrian crossing with tactile paving. Pedestrian footways on both sides. No cycle facilities.	High	28.1% (AM peak)	Negligible	Slight
9	Link in the urban area, main arterial link through Tickford. Several informal crossing points with tactile paving. A Redway along the southern side. Footway and section of a shared footway/cycleway along the northern side.	High	36.7% (AM peak)	Minor	Slight or Moderate
10	Link in the urban area, main arterial link through Tickford. No crossing points. Pedestrian footways on both sides. No cycle facilities.	High	31.1% (AM peak)	Minor	Slight or Moderate

Link ID	Sensitivity		Magnitude of change		Significance
	Link type	Assigned sensitivity	Change in traffic volume	Assigned magnitude	
13	Link in the semi-urban area connecting Fox Milne with Willen. Off-road pedestrian/cycle provision. Informal pedestrian crossing with tactile paving at the junction with access to Anglian Water facility.	Medium	30.1% (PM peak)	Minor	Slight
15	Link in a semi-urban area. Off-road pedestrian/cycle provision. No at-level crossing points but Pedestrian/Cycle subway.	Medium	15.4% (AM peak)	Negligible	Neutral or Slight
16	Link in a semi-urban area. Off-road pedestrian/cycle provision. No at-level crossing points but Pedestrian/Cycle subway.	Medium	15.4% (AM peak)	Negligible	Neutral or Slight
17	Link in a semi-urban area, connecting V9 Overstreet to V10 Brickhill St. Off-road pedestrian/cycle provision running parallel to the eastbound carriageway. 2x Pedestrian/Cycle subway near the River Ouzel.	Medium	15.4% (AM peak)	Negligible	Neutral or Slight
18	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	84.2% (PM peak)	Moderate	Slight
19	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	33.3% (PM peak)	Minor	Neutral or Slight
20	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	91.5% (PM peak)	Major	Slight or Moderate
21	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	76.0% (PM peak)	Moderate	Slight
24	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	39.2% (PM peak)	Minor	Neutral or Slight
25	Link in a semi-urban area. Off-road pedestrian/cycle provision or crossing points.	Medium	26.2% (PM peak)	Negligible	Neutral or Slight
26	Link in a semi-urban area. No pedestrian/cycle provision or crossing points.	Medium	26.2% (PM peak)	Negligible	Neutral or Slight
27	Link in a semi-urban area. Off-road pedestrian/cycle provision.	Medium	37.5% (PM peak)	Minor	Slight
28	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	37.4% (PM peak)	Minor	Neutral or Slight
29	Link in the urban area connecting Sovereign Drive to Neath Hill Roundabout segregated from the existing residential area/local centre. Off-road pedestrian/cycle provision. 2x Pedestrian/cycle subway.	High	15.2% (AM peak)	Negligible	Slight
30	Link in a semi-urban area, partially dual carriageway. Off-road pedestrian/cycle	Medium	-11.2% (AM peak)	No change	Neutral

Link ID	Sensitivity		Magnitude of change		Significance
	Link type	Assigned sensitivity	Change in traffic volume	Assigned magnitude	
	provision running parallel to the eastbound carriageway. Pedestrian/cycling subways at Willen Roundabout.				
31	Link predominantly in a rural area. Footway along the western side of the carriageway. No designated cycle provision or crossing points.	Low	0.8% (PM peak)	Negligible	Neutral or Slight
32	Link in the urban area connecting Sovereign Drive to Neath Hill Roundabout segregated from the existing residential area/. Off-road pedestrian/cycle provision. Pedestrian/cycle subway to the south of Great Linford Roundabout	High	13.7% (AM peak)	Negligible	Slight
33	Link in the urban area. Footway along the eastern side of the carriageway up to the junction with Townsend Close. Footways on both sides for the rest of the length. A zebra crossing near the junction with Plough Close. No designated cycle provision.	High	15.1% (AM peak)	Negligible	Slight
34	Link in a semi-urban area. Off-road pedestrian/cycle provision, including subways.	Medium	4.9% (AM peak)	Negligible	Neutral or Slight
35	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	-60.2% (PM peak)	No Change	Neutral
36	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	10.8% (AM peak)	Negligible	Neutral or Slight
37	Link in urban area/town centre setting. Footways of variable width along both sides of the carriageway with several informal crossing opportunities. A Pelican crossing provided near The Bull Hotel, and a zebra crossing provided to the south of the junction with Yarley Road.	Very High	8.3% (AM peak)	Negligible	Slight
2048 Future Year + Proposed Development					
1	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	48.8% (AM peak)	Minor	Neutral or Slight
2	Link in a semi-urban area providing access to Campbell Park. Off-road pedestrian/cycle provision including an informal pedestrian crossing point (with tactile paving) as well as toucan crossing.	High	14.9% (AM peak)	Negligible	Slight
3	Link in a semi-urban area providing access to Campbell Park. Off-road pedestrian/cycle provision. Informal pedestrian crossing point (no tactile paving)	High	15.5% (AM peak)	Negligible	Slight

Link ID	Sensitivity		Magnitude of change		Significance
	Link type	Assigned sensitivity	Change in traffic volume	Assigned magnitude	
4	Link in urban area/town centre with footways on both sides and multiple crossing opportunities, including a raised informal pedestrian crossing with tactile paving and a raised puffin crossing.	Very high	14.8% (AM peak)	Negligible	Slight
5	Link in a semi-urban area serving the existing industrial estate to the east and providing NMU and emergency access to the residential properties on Hopton Grove. No pedestrian crossing point except an informal crossing at the junction with N Crawley Road. Footways along both sides of the carriageway.	Negligible	111.3% (AM peak)	Major	Slight
6	Link in the urban area connecting up the two roundabouts. An informal pedestrian crossing (with tactile paving) at the Morello Way/Renny Park Road Roundabout. Footway along the southern side. Footway/cycleway (Redway) along the northern side.	High	7.8% (AM peak)	Negligible	Slight
7	Link in the urban area connecting to Newport Pagnell High St. Zebra pedestrian crossing. Pedestrian footways (both sides and wide) but no cycle facilities.	High	22.5% (AM peak)	Negligible	Slight
8	Link in the urban area connecting up to Newport Pagnell High St. Informal pedestrian crossing (with tactile paving). Pedestrian footways (both sides) but no cycle facilities.	High	25.3% (AM peak)	Negligible	Slight
9	Link in the urban area, main arterial link through Tickford. Several informal crossing points (with tactile paving). A Redway along the southern side. Footway and section of a shared footway/cycleway along the northern side.	High	9.6% (AM peak)	Negligible	Slight
10	Link in the urban area, main arterial link through Tickford. No crossing points. Pedestrian footways (on both sides) but no cycle facilities.	High	9.7% (AM peak)	Negligible	Slight
11	Link in urban area/town centre with footways on both sides. Raised table informal pedestrian crossing near Union Street	Very high	14.8% (AM peak)	Negligible	Slight
12	Link in urban area/town centre with footways on both sides. Raised table informal pedestrian crossings at each end of the link.	Very high	19.7% (AM peak)	Negligible	Slight
13	Link in the semi-urban area connecting Fox Milne with Willen. Off-road	Medium	7.2% (PM peak)	Negligible	Neutral or Slight

Link ID	Sensitivity		Magnitude of change		Significance
	Link type	Assigned sensitivity	Change in traffic volume	Assigned magnitude	
	pedestrian/cycle provision. An informal pedestrian crossing (with tactile paving) at the junction with access to the Anglian Water facility.				
14	Link in a semi-urban area, connecting V10 Brickhill St to V11 Tongwell St. Off-road pedestrian/cycle provision running parallel to the eastbound carriageway. 3x pedestrian/Cycle underpass.	Medium	47.9% (AM peak)	Minor	Slight
18	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	69.1% (PM peak)	Moderate	Slight
19	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	64.9% (PM peak)	Moderate	Slight
20	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	80.2% (PM peak)	Moderate	Slight
21	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	75.4% (PM peak)	Moderate	Slight
22	Link serving Cranfield University Technology Park and other industrial properties. Informal crossing points with dropped kerbs and tactile paving at each junction. Shared footway/cycleway along the northern/western side of the carriageway. Informal crossing with tactiles and dropped kerbs combined with speed reduction measures immediately the University Way bus stop. Footway only along the eastern edge of the carriageway to the north of the bus stop towards Folly Lane.	Medium	38.1% (PM peak)	Minor	Slight
23	Link in an urban area with footways on both sides and several informal crossing points with dropped kerbs and tactile paving. A zebra crossing in front of The Cross Keys PH.	High	34.9% (PM peak)	Minor	Slight or Moderate
24	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	68.7% (AM peak)	Moderate	Slight
25	Link in a semi-urban area. Off-road pedestrian/cycle provision.	Medium	6.9% (PM peak)	Negligible	Neutral or Slight
26	Link in a semi-urban area. No pedestrian/cycle provision or crossing points.	Medium	6.9% (PM peak)	Negligible	Neutral or Slight
27	Link in a semi-urban area. Off-road pedestrian/cycle provision.	Medium	21.8% (AM peak)	Minor	Slight
30	Link in a semi-urban area. Footways/cycleways segregated from a link only on the northern edge. Connects to underpass crossings at the roundabout (Willen Roundabout).	Medium	2.3% (PM peak)	Negligible	Neutral or Slight

Link ID	Sensitivity		Magnitude of change		Significance
	Link type	Assigned sensitivity	Change in traffic volume	Assigned magnitude	
35	Link in a rural area. No pedestrian/cyclists facilities. The link represents part of the approach/exit to the roundabout. No crossing facilities are provided at Marsh End Roundabout.	Low	-35.1% (AM peak)	No change	Neutral
37	Link in urban area/town centre setting. Footways of variable width along both sides of the carriageway with several informal crossing opportunities. A Pelican crossing provided near The Bull Hotel, and a zebra crossing provided to the south of the junction with Yarley Road.	Very High	3.2% (AM peak)	Negligible	Slight
38	Link in a semi-urban area. Off-road pedestrian/cycle provision. Underpass provides connections to Redway Bw03.	Medium	0.5% (AM peak)	Negligible	Neutral or Slight
39	Link in a semi-urban area. Off-road pedestrian/cycle provision. Facilities only on the southern side. Lower levels links to underpasses. No continuous connection along Monks Way.	Medium	1.1% (AM peak)	Negligible	Neutral or Slight
40	Link in a semi-urban area. No pedestrian/cycle provision or crossing points. Footways/cycleways completely segregated from the link. No crossings points.	Medium	3.6% (PM peak)	Negligible	Neutral or Slight
41	Link in a semi-urban area. Footways/cycleways completely segregated from the link. Some connections to bus stops. Underpass crossings on link north of the junction with Glazier Dr and north of Downs Barn Roundabout.	Medium	3.5% (PM peak)	Negligible	Neutral or Slight
42	Link in a semi-urban area. Footways/cycleways completely segregated from the link. Underpass crossing on the link near to the junction with Delaware Dr. No direct connections to Willen Roundabout.	Medium	11.4% (PM peak)	Negligible	Neutral or Slight
43	Link in a semi-urban area. Footways/cycleways segregated from the link. Connections to underpass crossings at the Downs Barn Roundabout. Underpass connections and the junction of Downs Barn Blvd and V8.	Medium	14.4% (AM peak)	Negligible	Neutral or Slight
44	Link in semi-urban/rural area. Footways/cycleways segregated from the link. Connections to underpass crossing mid link but no direct crossings or facilities on the link itself.	Low	-0.1% (AM peak)	No change	Neutral

Link ID	Sensitivity		Magnitude of change		Significance
	Link type	Assigned sensitivity	Change in traffic volume	Assigned magnitude	
45	Link in high street/urban area. Footways on both sides of the carriageway. At grade signalised crossing mid link (west of Bury St).	Very high	9.5% (AM peak)	Negligible	Slight
46	Link in high street/urban area. Segregated footway on the southern side of Tickford Bridge. Narrow footways on the northern side of the bridge carriageway. No formal crossing points, but informal crossings present with dropped kerbs and tactiles - near to the roundabout junction with Priory St. Traffic calming present.	High	20.0% (AM peak)	Negligible	Slight
47	Link in the urban area. Footways on both sides of the carriageway. Signalised at grade crossing south of Chicheley St. On-street parking and other informal crossing points (drop kerb with refuge island) along the link. No clear/identified cycle facilities.	Medium	10.8% (AM peak)	Negligible	Neutral or Slight
48	Link in the urban area. Footways on both sides of the carriageway. Informal crossing points (drop kerb with refuge island) along the link, e.g. opposite Petrol Filling Station and north of mini-roundabout (N Crawley Road). No clear/identified cycle facilities.	Medium	11.5% (AM peak)	Negligible	Neutral or Slight
49	Link in a semi-urban area. No direct footways or cycleways present on the link. No crossing points. The A509 is a key strategic link with high volumes of mixed traffic.	Negligible	1.8% (PM peak)	Negligible	Neutral
50	Link in semi-urban/rural area. No direct footways or cycleways present on the link. Segregated footway/cycleway on the southern side of the link, although approximately 30m south from the carriageway, has verge and tree planting as a barrier. No crossing points either on the link or at either roundabout.	Negligible	1.4% (AM peak)	Negligible	Neutral
51	Link in semi-urban/rural area. No direct footways or cycleways present on the link. Segregated footway/cycleway on the southern side of the link, although approximately 30m south from the carriageway, has verge and tree planting as a barrier. No crossing points on the roundabout. This link represents the approach to the roundabout - which has no pedestrian/cyclist facilities.	Negligible	1.4% (AM peak)	Negligible	Neutral

Link ID	Sensitivity		Magnitude of change		Significance
	Link type	Assigned sensitivity	Change in traffic volume	Assigned magnitude	
52	Link in semi-urban/rural area. No direct footways or cycleways. The underpass on the edge of the link, which provides an N/S crossing point. Bus stops located nearby on the links, which connect to the underpass link. No crossing points on link or roundabout. This link represents the approach to the roundabout. However, it is close to other pedestrian/cyclist facilities.	Negligible	9.8% (AM peak)	Negligible	Neutral
53	Link in semi-urban/rural area. No direct footways or cycleways. Segregated footway/cycleway on the southern side of the link, although approximately 30m south from the carriageway, has verge and tree planting as a barrier. Two underpass connections (eastern and western ends).	Negligible	9.8% (AM peak)	Negligible	Neutral
54	Link in semi-urban/rural area. No direct footways or cycleways. The underpass on the eastern edge of the link, which provides an N/S crossing point. No crossing points on link or roundabout. This link represents the approach to the roundabout. However, it is close to other pedestrian/cyclist facilities.	Negligible	9.8% (AM peak)	Negligible	Neutral
55	Link in a semi-urban area. No pedestrian/cyclist facilities running alongside it. However, a series of underpasses along the link provide connections N/S to segregated pedestrian/cycle facilities. Bus Stops located along the link connect to the underpass. At grade crossing points on the carriageway, as link utilises underpasses.	Medium	5.9% (PM peak)	Negligible	Neutral or Slight
56	Link in a semi-urban area. Redway north of the link. Segregated footway/cycleway south of the link - approximately 30m south of the carriageway, screened by verge and tree line. The link does not have a crossing point (the Redways connect to underpasses further east or west of this link).	Low	1.4% (PM peak)	Negligible	Neutral or Slight
57	The link is rural. No pedestrian or cyclist crossing facilities. A footway on the western edge running from Merchant Lane junction for approximately 450m to a farm access gate. Relatively large verge on the western side as link continues northwards.	Low	-0.9% (PM peak)	No change	Neutral

Link ID	Sensitivity		Magnitude of change		Significance
	Link type	Assigned sensitivity	Change in traffic volume	Assigned magnitude	
58	Link in rural/semi-urban area. Passes university buildings. Footways present on both side of the carriageway. On-street parking on the southern edge. At grade zebra crossing near to the roundabout with Duncan Road.	Medium	-0.9% (PM peak)	No change	Neutral
59	Link in a rural area. No pedestrian or cyclist facilities. Wide verge on the western side at the northern section of the link. A509 is key strategic link. No formal crossing points.	Low	57.9% (AM peak)	Minor	Neutral or Slight
60	Link in a rural area. No pedestrian or cyclist facilities. The link represents part of the approach/exit to the roundabout. No crossing facilities are provided at Marsh End Roundabout at this location.	Low	-32.3% (PM peak)	No change	Neutral
61	Link in a rural area. Pedestrian/cycle link facility on the western edge - originating from High Street. Informal crossing opposite Filgrave turn bus stop. However, this is for the minor road, not the A509. The link has no formal crossings (E/W).	Low	6.6% (AM peak)	Negligible	Neutral or Slight
62	Link in a rural area. Pedestrian/cycle link facility on the western edge of the carriageway. Informal crossings (including cycle crossing at High Street/Newton Road junction). Western footway/cycleway variable in width approaching Olney. No formal crossing points across the A509.	Low	3.9% (AM peak)	Negligible	Neutral or Slight
63	Link in a rural area. Pedestrian/cycle link facility on the western edge. No crossings on A509.	Low	5.6% (AM peak)	Negligible	Neutral or Slight

Review of Issues identified in Table D5.4 (Pedestrian Delay)

2031

D5.36 As outlined in Table D5.4 above, the significance of pedestrian delay on the links within the study area in the 2031 Future Year + Proposed Development scenario has been established as neutral or slight, with the exception of the following links:

- Link 6 - North Crawley Road between Morello Way/Renny Park Road Roundabout and Tickford Street/London Road Roundabout;
- Link 9 - Tickford Street between Priory Street/Severn Drive and St Margarets Close;
- Link 10 - Tickford Street between St Margarets Close and Chicheley Street; and
- Link 20 - Cranfield Road between the east part of Moulsoe and Unnamed Road.

D5.37 The significance of pedestrian delay identified on Link 6, Link 9, Link 10 and Link 20 is slight or moderate. As outlined earlier, any effect with moderate significance is potentially significant in EIA terms. However, the qualitative evaluation of the pedestrian provision, including crossing

points along these links, suggests sufficient pedestrian facilities along Link 6 and Link 9. Therefore, the significance of the effect is slight rather than moderate.

D5.38 Given the relatively short length (approx. 65m) of Link 10, situated between two junctions, and the fact that there are pedestrian facilities on both sides of the carriageway with the crossing opportunity immediately east of one of the junctions, it is also considered that the significance of effect on this link is slight rather than moderate.

D5.39 Link 20 is a link situated in a rural area to the east of the village of Moulsoe, and there are no pedestrian facilities along the link. Given the rural nature of the area and the minimum of destinations that could be accessed on foot, it is not considered necessary to accommodate journeys on foot along this link. As such, the significance of the effect on this link is considered slight rather than moderate.

D5.40 Overall, the significance of the effect on all assessed links is **neutral** or **slight**, with the effects expected to be **long term**, **permanent** and **adverse**. The effects of the Proposed Development on these links are considered to be **'not significant'** in EIA terms.

2048

D5.41 In the 2048 Future Year + Proposed Development scenario, a single link (Link 23 - Cranfield High Street/Bedford Road between Court Road and Crane Way) has been identified with slight or moderate effect significance. As outlined earlier, any effect with moderate significance is potentially significant in EIA terms. However, the qualitative evaluation of the pedestrian provision, including crossing points along this link, suggests that there are sufficient pedestrian facilities along the link, including a zebra crossing and several informal crossing opportunities. As such, the significance of the effect on this link is considered slight rather than moderate.

D5.42 Based on the above, the significance of effect on all assessed links in this scenario is **neutral** or **slight**, with the effects expected to be **long term**, **permanent** and **adverse**. The effects of the Proposed Development are considered to be **'not significant'** in EIA terms.

Pedestrian / Cyclist Amenity

D5.43 The summary of the assessment of pedestrian/cyclist amenity is provided for each of the identified links/scenarios in Table D5.5 below.

Table D5.5 Assessment of Pedestrian and Cyclist Amenity

Link ID	Sensitivity		Magnitude of change		Significance
	Link type	Assigned sensitivity	Change in traffic volume	Assigned magnitude	
2031 Future Year + Proposed Development					
1	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	13.3% (AM peak)	Negligible	Neutral or Slight
2	Link in a semi-urban area providing access to Campbell Park. Off-road pedestrian/cycle provision, including an informal pedestrian crossing point (with tactile paving) as well as toucan crossing.	High	8.2% (PM peak)	Negligible	Slight
3	Link in a semi-urban area providing access to Campbell Park. Off-road pedestrian/cycle provision. Informal pedestrian crossing point (no tactile paving)	High	7.8% (PM peak)	Negligible	Slight

Link ID	Sensitivity		Magnitude of change		Significance
	Link type	Assigned sensitivity	Change in traffic volume	Assigned magnitude	
6	Link in the urban area connecting up the two roundabouts. An informal pedestrian crossing (with tactile paving) at the Morello Way/Renny Park Road Roundabout. Footway along the southern side. Footway/cycleway (Redway) along the northern side.	High	37.3% (PM peak)	Minor	Slight or Moderate
7	Link in the urban area connecting to Newport Pagnell High St. Zebra pedestrian crossing. Wide footways on both sides. No cycle facilities.	High	26.5% (AM peak)	Negligible	Slight
8	Link in the urban area connecting to Newport Pagnell High St. Informal pedestrian crossing with tactile paving. Pedestrian footways on both sides. No cycle facilities.	High	28.1% (AM peak)	Negligible	Slight
9	Link in the urban area, main arterial link through Tickford. Several informal crossing points with tactile paving. A Redway along the southern side. Footway and section of a shared footway/cycleway along the northern side.	High	36.7% (AM peak)	Minor	Slight or Moderate
10	Link in the urban area, main arterial link through Tickford. No crossing points. Pedestrian footways on both sides. No cycle facilities.	High	31.1% (AM peak)	Minor	Slight or Moderate
13	Link in the semi-urban area connecting Fox Milne with Willen. Off-road pedestrian/cycle provision. Informal pedestrian crossing with tactile paving at the junction with access to Anglian Water facility.	Medium	30.1% (PM peak)	Minor	Slight
15	Link in a semi-urban area. Off-road pedestrian/cycle provision. No at-level crossing points but Pedestrian/Cycle subway.	Medium	15.4% (AM peak)	Negligible	Neutral or Slight
16	Link in a semi-urban area. Off-road pedestrian/cycle provision. No at-level crossing points but Pedestrian/Cycle subway.	Medium	15.4% (AM peak)	Negligible	Neutral or Slight
17	Link in a semi-urban area, connecting V9 Overstreet to V10 Brickhill St. Off-road pedestrian/cycle provision running parallel to the eastbound carriageway. 2x Pedestrian/Cycle subway near the River Ouzel.	Medium	15.4% (AM peak)	Negligible	Neutral or Slight
18	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	84.2% (PM peak)	Moderate	Slight
19	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	33.3% (PM peak)	Minor	Neutral or Slight
20	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	91.5% (PM peak)	Major	Slight or Moderate

Link ID	Sensitivity		Magnitude of change		Significance
	Link type	Assigned sensitivity	Change in traffic volume	Assigned magnitude	
21	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	76.0% (PM peak)	Moderate	Slight
24	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	39.2% (PM peak)	Minor	Neutral or Slight
25	Link in a semi-urban area. Off-road pedestrian/cycle provision or crossing points.	Medium	26.2% (PM peak)	Negligible	Neutral or Slight
26	Link in a semi-urban area. No pedestrian/cycle provision or crossing points.	Medium	26.2% (PM peak)	Negligible	Neutral or Slight
27	Link in a semi-urban area. Off-road pedestrian/cycle provision.	Medium	37.5% (PM peak)	Minor	Slight
28	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	37.4% (PM peak)	Minor	Neutral or Slight
29	Link in the urban area connecting Sovereign Drive to Neath Hill Roundabout segregated from the existing residential area/local centre. Off-road pedestrian/cycle provision. 2x Pedestrian/cycle subway.	High	15.2% (AM peak)	Negligible	Slight
30	Link in a semi-urban area, partially dual carriageway. Off-road pedestrian/cycle provision running parallel to the eastbound carriageway. Pedestrian/cycling subways at Willen Roundabout.	Medium	-11.2% (AM peak)	No change	Neutral
31	Link predominantly in a rural area. Footway along the western side of the carriageway. No designated cycle provision or crossing points.	Low	0.8% (PM peak)	Negligible	Neutral or Slight
32	Link in the urban area connecting Sovereign Drive to Neath Hill Roundabout segregated from the existing residential area/. Off-road pedestrian/cycle provision. Pedestrian/cycle subway to the south of Great Linford Roundabout	High	13.7% (AM peak)	Negligible	Slight
33	Link in the urban area. Footway along the eastern side of the carriageway up to the junction with Townsend Close. Footways on both sides for the rest of the length. A zebra crossing near the junction with Plough Close. No designated cycle provision.	High	15.1% (AM peak)	Negligible	Slight
34	Link in a semi-urban area. Off-road pedestrian/cycle provision, including subways.	Medium	4.9% (AM peak)	Negligible	Neutral or Slight
35	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	-60.2% (PM peak)	No Change	Neutral
36	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	10.8% (AM peak)	Negligible	Neutral or Slight
37	Link in urban area/town centre setting. Footways of variable width along both sides of the carriageway with several informal	Very High	8.3% (AM peak)	Negligible	Slight

Link ID	Sensitivity		Magnitude of change		Significance
	Link type	Assigned sensitivity	Change in traffic volume	Assigned magnitude	
	crossing opportunities. A Pelican crossing provided near The Bull Hotel, and a zebra crossing provided to the south of the junction with Yarley Road.				
2048 Future Year + Proposed Development					
1	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	48.8% (AM peak)	Minor	Neutral or Slight
2	Link in a semi-urban area providing access to Campbell Park. Off-road pedestrian/cycle provision including an informal pedestrian crossing point (with tactile paving) as well as toucan crossing.	High	14.9% (AM peak)	Negligible	Slight
3	Link in a semi-urban area providing access to Campbell Park. Off-road pedestrian/cycle provision. Informal pedestrian crossing point (no tactile paving)	High	15.5% (AM peak)	Negligible	Slight
4	Link in urban area/town centre with footways on both sides and multiple crossing opportunities, including a raised informal pedestrian crossing with tactile paving and a raised puffin crossing.	Very high	14.8% (AM peak)	Negligible	Slight
5	Link in a semi-urban area serving the existing industrial estate to the east and providing NMU and emergency access to the residential properties on Hopton Grove. No pedestrian crossing point except an informal crossing at the junction with N Crawley Road. Footways along both sides of the carriageway.	Negligible	111.3% (AM peak)	Major	Slight
6	Link in the urban area connecting up the two roundabouts. An informal pedestrian crossing (with tactile paving) at the Morello Way/Renny Park Road Roundabout. Footway along the southern side. Footway/cycleway (Redway) along the northern side.	High	7.8% (AM peak)	Negligible	Slight
7	Link in the urban area connecting to Newport Pagnell High St. Zebra pedestrian crossing. Pedestrian footways (both sides and wide) but no cycle facilities.	High	22.5% (AM peak)	Negligible	Slight
8	Link in the urban area connecting up to Newport Pagnell High St. Informal pedestrian crossing (with tactile paving). Pedestrian footways (both sides) but no cycle facilities.	High	25.3% (AM peak)	Negligible	Slight
9	Link in the urban area, main arterial link through Tickford. Several informal crossing points (with tactile paving). A Redway along the southern side. Footway and section of a shared footway/cycleway along the northern side.	High	9.6% (AM peak)	Negligible	Slight

Link ID	Sensitivity		Magnitude of change		Significance
	Link type	Assigned sensitivity	Change in traffic volume	Assigned magnitude	
10	Link in the urban area, main arterial link through Tickford. No crossing points. Pedestrian footways (on both sides) but no cycle facilities.	High	9.7% (AM peak)	Negligible	Slight
11	Link in urban area/town centre with footways on both sides. Raised table informal pedestrian crossing near Union Street	Very high	14.8% (AM peak)	Negligible	Slight
12	Link in urban area/town centre with footways on both sides. Raised table informal pedestrian crossings at each end of the link.	Very high	19.7% (AM peak)	Negligible	Slight
13	Link in the semi-urban area connecting Fox Milne with Willen. Off-road pedestrian/cycle provision. An informal pedestrian crossing (with tactile paving) at the junction with access to the Anglian Water facility.	Medium	7.2% (PM peak)	Negligible	Neutral or Slight
14	Link in a semi-urban area, connecting V10 Brickhill St to V11 Tongwell St. Off-road pedestrian/cycle provision running parallel to the eastbound carriageway. 3x pedestrian/Cycle underpass.	Medium	47.9% (AM peak)	Minor	Slight
18	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	69.1% (PM peak)	Moderate	Slight
19	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	64.9% (PM peak)	Moderate	Slight
20	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	80.2% (PM peak)	Moderate	Slight
21	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	75.4% (PM peak)	Moderate	Slight
22	Link serving Cranfield University Technology Park and other industrial properties. Informal crossing points with dropped kerbs and tactile paving at each junction. Shared footway/cycleway along the northern/western side of the carriageway. Informal crossing with tactiles and dropped kerbs combined with speed reduction measures immediately the University Way bus stop. Footway only along the eastern edge of the carriageway to the north of the bus stop towards Folly Lane.	Medium	38.1% (PM peak)	Minor	Slight
23	Link in an urban area with footways on both sides and several informal crossing points with dropped kerbs and tactile paving. A zebra crossing in front of The Cross Keys PH.	High	34.9% (PM peak)	Minor	Slight or Moderate
24	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	68.7% (AM peak)	Moderate	Slight

Link ID	Sensitivity		Magnitude of change		Significance
	Link type	Assigned sensitivity	Change in traffic volume	Assigned magnitude	
25	Link in a semi-urban area. Off-road pedestrian/cycle provision.	Medium	6.9% (PM peak)	Negligible	Neutral or Slight
26	Link in a semi-urban area. No pedestrian/cycle provision or crossing points.	Medium	6.9% (PM peak)	Negligible	Neutral or Slight
27	Link in a semi-urban area. Off-road pedestrian/cycle provision.	Medium	21.8% (AM peak)	Minor	Slight
30	Link in a semi-urban area. Footways/cycleways segregated from a link only on the northern edge. Connects to underpass crossings at the roundabout (Willen Roundabout).	Medium	2.3% (PM peak)	Negligible	Neutral or Slight
35	Link in a rural area. No pedestrian/cycle facilities. The link represents part of the approach/exit to the roundabout. No crossing facilities are provided at Marsh End Roundabout.	Low	-35.1% (AM peak)	No change	Neutral
37	Link in urban area/town centre setting. Footways of variable width along both sides of the carriageway with several informal crossing opportunities. A Pelican crossing provided near The Bull Hotel, and a zebra crossing provided to the south of the junction with Yarley Road.	Very High	3.2% (AM peak)	Negligible	Slight
38	Link in a semi-urban area. Off-road pedestrian/cycle provision. Underpass provides connections to Redway Bw03.	Medium	0.5% (AM peak)	Negligible	Neutral or Slight
39	Link in a semi-urban area. Off-road pedestrian/cycle provision. Facilities only on the southern side. Lower levels links to underpasses. No continuous connection along Monks Way.	Medium	1.1% (AM peak)	Negligible	Neutral or Slight
40	Link in a semi-urban area. No pedestrian/cycle provision or crossing points. Footways/cycleways completely segregated from the link. No crossings points.	Medium	3.6% (PM peak)	Negligible	Neutral or Slight
41	Link in a semi-urban area. Footways/cycleways completely segregated from the link. Some connections to bus stops. Underpass crossings on link north of the junction with Glazier Dr and north of Downs Barn Roundabout.	Medium	3.5% (PM peak)	Negligible	Neutral or Slight
42	Link in a semi-urban area. Footways/cycleways completely segregated from the link. Underpass crossing on the link near to the junction with Delaware Dr. No direct connections to Willen Roundabout.	Medium	11.4% (PM peak)	Negligible	Neutral or Slight
43	Link in a semi-urban area. Footways/cycleways segregated from the	Medium	14.4% (AM peak)	Negligible	Neutral or Slight

Link ID	Sensitivity		Magnitude of change		Significance
	Link type	Assigned sensitivity	Change in traffic volume	Assigned magnitude	
	link. Connections to underpass crossings at the Downs Barn Roundabout. Underpass connections and the junction of Downs Barn Blvd and V8.				
44	Link in semi-urban/rural area. Footways/cycleways segregated from the link. Connections to underpass crossing mid link but no direct crossings or facilities on the link itself.	Low	-0.1% (AM peak)	No change	Neutral
45	Link in high street/urban area. Footways on both sides of the carriageway. At grade signalised crossing mid link (west of Bury St).	Very high	9.5% (AM peak)	Negligible	Slight
46	Link in high street/urban area. Segregated footway on the southern side of Tickford Bridge. Narrow footways on the northern side of the bridge carriageway. No formal crossing points, but informal crossings present with dropped kerbs and tactiles - near to the roundabout junction with Priory St. Traffic calming present.	High	20.0% (AM peak)	Negligible	Slight
47	Link in the urban area. Footways on both sides of the carriageway. Signalised at grade crossing south of Chicheley St. On-street parking and other informal crossing points (drop kerb with refuge island) along the link. No clear/identified cycle facilities.	Medium	10.8% (AM peak)	Negligible	Neutral or Slight
48	Link in the urban area. Footways on both sides of the carriageway. Informal crossing points (drop kerb with refuge island) along the link, e.g. opposite Petrol Filling Station and north of mini-roundabout (N Crawley Road). No clear/identified cycle facilities.	Medium	11.5% (AM peak)	Negligible	Neutral or Slight
49	Link in a semi-urban area. No direct footways or cycleways present on the link. No crossing points. The A509 is a key strategic link with high volumes of mixed traffic.	Negligible	1.8% (PM peak)	Negligible	Neutral
50	Link in semi-urban/rural area. No direct footways or cycleways present on the link. Segregated footway/cycleway on the southern side of the link, although approximately 30m south from the carriageway, has verge and tree planting as a barrier. No crossing points either on the link or at either roundabout.	Negligible	1.4% (AM peak)	Negligible	Neutral
51	Link in semi-urban/rural area. No direct footways or cycleways present on the link. Segregated footway/cycleway on the southern side of the link, although	Negligible	1.4% (AM peak)	Negligible	Neutral

Link ID	Sensitivity		Magnitude of change		Significance
	Link type	Assigned sensitivity	Change in traffic volume	Assigned magnitude	
	approximately 30m south from the carriageway, has verge and tree planting as a barrier. No crossing points on the roundabout. This link represents the approach to the roundabout - which has no pedestrian/cyclist facilities.				
52	Link in semi-urban/rural area. No direct footways or cycleways. The underpass on the edge of the link, which provides an N/S crossing point. Bus stops located nearby on the links, which connect to the underpass link. No crossing points on link or roundabout. This link represents the approach to the roundabout. However, it is close to other pedestrian/cyclist facilities.	Negligible	9.8% (AM peak)	Negligible	Neutral
53	Link in semi-urban/rural area. No direct footways or cycleways. Segregated footway/cycleway on the southern side of the link, although approximately 30m south from the carriageway, has verge and tree planting as a barrier. Two underpass connections (eastern and western ends).	Negligible	9.8% (AM peak)	Negligible	Neutral
54	Link in semi-urban/rural area. No direct footways or cycleways. The underpass on the eastern edge of the link, which provides an N/S crossing point. No crossing points on link or roundabout. This link represents the approach to the roundabout. However, it is close to other pedestrian/cyclist facilities.	Negligible	9.8% (AM peak)	Negligible	Neutral
55	Link in a semi-urban area. No pedestrian/cyclist facilities running alongside it. However, a series of underpasses along the link provide connections N/S to segregated pedestrian/cycle facilities. Bus Stops located along the link connect to the underpass. At grade crossing points on the carriageway, as link utilises underpasses.	Medium	5.9% (PM peak)	Negligible	Neutral or Slight
56	Link in a semi-urban area. Redway north of the link. Segregated footway/cycleway south of the link - approximately 30m south of the carriageway, screened by verge and tree line. The link does not have a crossing point (the Redways connect to underpasses further east or west of this link).	Low	1.4% (PM peak)	Negligible	Neutral or Slight
57	The link is rural. No pedestrian or cyclist crossing facilities. A footway on the western edge running from Merchant Lane junction for approximately 450m to a farm access	Low	-0.9% (PM peak)	No change	Neutral

Link ID	Sensitivity		Magnitude of change		Significance
	Link type	Assigned sensitivity	Change in traffic volume	Assigned magnitude	
	gate. Relatively large verge on the western side as link continues northwards.				
58	Link in rural/semi-urban area. Passes university buildings. Footways present on both side of the carriageway. On-street parking on the southern edge. At grade zebra crossing near to the roundabout with Duncan Road.	Medium	-0.9% (PM peak)	No change	Neutral
59	Link in a rural area. No pedestrian or cyclist facilities. Wide verge on the western side at the northern section of the link. A509 is key strategic link. No formal crossing points.	Low	57.9% (AM peak)	Minor	Neutral or Slight
60	Link in a rural area. No pedestrian or cyclist facilities. The link represents part of the approach/exit to the roundabout. No crossing facilities are provided at Marsh End Roundabout at this location.	Low	-32.3% (PM peak)	No change	Neutral
61	Link in a rural area. Pedestrian/cycle link facility on the western edge - originating from High Street. Informal crossing opposite Filgrave turn bus stop. However, this is for the minor road, not the A509. The link has no formal crossings (E/W).	Low	6.6% (AM peak)	Negligible	Neutral or Slight
62	Link in a rural area. Pedestrian/cycle link facility on the western edge of the carriageway. Informal crossings (including cycle crossing at High Street/Newton Road junction). Western footway/cycleway variable in width approaching Olney. No formal crossing points across the A509.	Low	3.9% (AM peak)	Negligible	Neutral or Slight
63	Link in a rural area. Pedestrian/cycle link facility on the western edge. No crossings on A509.	Low	5.6% (AM peak)	Negligible	Neutral or Slight

Review of Issues identified in Table D5.5 (Pedestrian/Cyclist Amenity)

2031

D5.44 As outlined in Table D5.5 above, the significance of pedestrian/cyclist amenity on the links within the study area in the 2031 Future Year + Proposed Development scenario has been established as neutral or slight, with the exception of the following links:

- Link 6 - North Crawley Road between Morello Way/Renny Park Road Roundabout and Tickford Street/London Road Roundabout;
- Link 9 - Tickford Street between Priory Street/Severn Drive and St Margarets Close;
- Link 10 - Tickford Street between St Margarets Close and Chicheley Street; and
- Link 20 - Cranfield Road between the east part of Moulsoe and Unnamed Road.

D5.45 The significance of pedestrian/cyclist amenity identified on Link 6, Link 9, Link 10 and Link 20 is slight or moderate. As outlined earlier, any effect with moderate significance is potentially significant in EIA terms.

D5.46 A section of shared footway/cycleway (redway) is provided along the northern edge of the carriageway, with informal crossing points consisting of dropped kerbs and tactile paving at each junction setting the limits of Link 6. A footway is provided along the southern side of the link.

D5.47 The southern side of Link 9 is also delineated by a shared footway/cycleway facility (redway). Several informal crossing points consisting of dropped kerbs and tactile paving provide crossing opportunities to the footway and/or a section of the shared footway/cycleway along the northern side of the carriageway.

D5.48 Link 10 is a relatively short link (approx. 65m) situated between two junctions. There are pedestrian facilities on both sides of the carriageway, with the crossing opportunity immediately east of one of the junctions. Given the existing constraints, there are no designated cyclist facilities. However, off-road cycle routes are provided immediately to the east and west of the junctions at each end of Link 10.

D5.49 The qualitative evaluation of the pedestrian/cyclist provision, including crossing points along these links, suggests sufficient pedestrian facilities along Link 6, Link 9 and Link 10. Therefore, the significance of the effect is slight rather than moderate.

D5.50 Link 20 is a link situated in a rural area to the east of the village of Moulsoe, and there are no pedestrian/cyclist facilities along the link. Given the rural nature of the area and the minimum of destinations that could be accessed on foot/bicycle, it is not considered necessary to accommodate these journeys along this link. As such, the significance of the effect on this link is considered slight rather than moderate.

D5.51 Overall, the significance of the effect on all assessed links is **neutral** or **slight**, with the effects expected to be **long term**, **permanent** and **adverse**. The effects of the Proposed Development on these links are considered to be **'not significant'** in EIA terms.

2048

D5.52 In the 2048 Future Year + Proposed Development scenario, a single link (Link 23 - Cranfield High Street/Bedford Road between Court Road and Crane Way) has been identified with slight or moderate effect significance. As outlined earlier, any effect with moderate significance is potentially significant in EIA terms. However, the qualitative evaluation of the pedestrian/cyclist provision, including crossing points, suggests that there are sufficient pedestrian facilities along the link, including a zebra crossing and several informal crossing opportunities. As such, the significance of the effect on this link is considered slight rather than moderate.

D5.53 Based on the above, the significance of effect on all assessed links in this scenario is **neutral** or **slight**, with the effects expected to be **long term**, **permanent** and **adverse**. The effects of the Proposed Development are considered to be **'not significant'** in EIA terms.

Fear and Intimidation

D5.54 The summary of the assessment of fear and intimidation is provided for each of the identified links/scenarios in Table D5.6 below.

Table D5.6 Assessment of Fear and Intimidation

Link ID	Sensitivity		Magnitude of change			Significance
	Link type	Assigned sensitivity	Avg hourly flow (18hr)	Total HGV flow (18hr)	Assigned magnitude	
2031 Future Year + Proposed Development						
1	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	472	749	Negligible	Neutral or Slight
2	Link in a semi-urban area providing access to Campbell Park. Off-road pedestrian/cycle provision, including an informal pedestrian crossing point (with tactile paving) as well as toucan crossing.	High	363	245	Negligible	Slight
3	Link in a semi-urban area providing access to Campbell Park. Off-road pedestrian/cycle provision. Informal pedestrian crossing point (no tactile paving)	High	378	246	Negligible	Slight
6	Link in the urban area connecting up the two roundabouts. An informal pedestrian crossing (with tactile paving) at the Morello Way/Renny Park Road Roundabout. Footway along the southern side. Footway/cycleway (Redway) along the northern side.	High	230	21	Negligible	Slight
7	Link in the urban area connecting to Newport Pagnell High St. Zebra pedestrian crossing. Wide footways on both sides. No cycle facilities.	High	226	64	Negligible	Slight
8	Link in the urban area connecting to Newport Pagnell High St. Informal pedestrian crossing with tactile paving. Pedestrian footways on both sides. No cycle facilities.	High	223	66	Negligible	Slight
9	Link in the urban area, main arterial link through Tickford. Several informal crossing points with tactile paving. A Redway along the southern side. Footway and section of a shared footway/cycleway along the northern side.	High	248	78	Negligible	Slight
10	Link in the urban area, main arterial link through Tickford. No crossing points. Pedestrian footways on both sides. No cycle facilities.	High	268	82	Negligible	Slight
13	Link in the semi-urban area connecting Fox Milne with Willen. Off-road pedestrian/cycle provision. Informal pedestrian crossing with tactile paving	Medium	757	316	Minor	Slight

Link ID	Sensitivity		Magnitude of change			Significance
	Link type	Assigned sensitivity	Avg hourly flow (18hr)	Total HGV flow (18hr)	Assigned magnitude	
	at the junction with access to Anglian Water facility.					
15	Link in a semi-urban area. Off-road pedestrian/cycle provision. No at-level crossing points but Pedestrian/Cycle subway.	Medium	955	383	Minor	Slight
16	Link in a semi-urban area. Off-road pedestrian/cycle provision. No at-level crossing points but Pedestrian/Cycle subway.	Medium	955	383	Minor	Slight
17	Link in a semi-urban area, connecting V9 Overstreet to V10 Brickhill St. Off-road pedestrian/cycle provision running parallel to the eastbound carriageway. 2x Pedestrian/Cycle subway near the River Ouzel.	Medium	955	383	Minor	Slight
18	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	176	77	Negligible	Neutral or Slight
19	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	111	73	Negligible	Neutral or Slight
20	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	170	72	Negligible	Neutral or Slight
21	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	184	74	Negligible	Neutral or Slight
24	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	442	205	Negligible	Neutral or Slight
25	Link in a semi-urban area. Off-road pedestrian/cycle provision or crossing points.	Medium	842	352	Minor	Slight
26	Link in a semi-urban area. No pedestrian/cycle provision or crossing points.	Medium	749	316	Minor	Slight
27	Link in a semi-urban area. Off-road pedestrian/cycle provision.	Medium	719	310	Minor	Slight
28	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	45	135	Negligible	Neutral or Slight
29	Link in the urban area connecting Sovereign Drive to Neath Hill Roundabout segregated from the existing residential area/local centre. Off-road pedestrian/cycle provision. 2x Pedestrian/cycle subway.	High	564	176	Negligible	Slight
30	Link in a semi-urban area, partially dual carriageway. Off-road pedestrian/cycle provision running parallel to the eastbound carriageway.	Medium	414	156	Negligible	Neutral or Slight

Link ID	Sensitivity		Magnitude of change			Significance
	Link type	Assigned sensitivity	Avg hourly flow (18hr)	Total HGV flow (18hr)	Assigned magnitude	
	Pedestrian/cycling subways at Willen Roundabout.					
31	Link predominantly in a rural area. Footway along the western side of the carriageway. No designated cycle provision or crossing points.	Low	330	70	Negligible	Neutral or Slight
32	Link in the urban area connecting Sovereign Drive to Neath Hill Roundabout segregated from the existing residential area/. Off-road pedestrian/cycle provision. Pedestrian/cycle subway to the south of Great Linford Roundabout	High	533	163	Negligible	Slight
33	Link in the urban area. Footway along the eastern side of the carriageway up to the junction with Townsend Close. Footways on both sides for the rest of the length. A zebra crossing near the junction with Plough Close. No designated cycle provision.	High	196	96	Negligible	Slight
34	Link in a semi-urban area. Off-road pedestrian/cycle provision, including subways.	Medium	411	348	Negligible	Neutral or Slight
35	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	107	81	Negligible	Neutral or Slight
36	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	378	254	Negligible	Neutral or Slight
37	Link in urban area/town centre setting. Footways of variable width along both sides of the carriageway with several informal crossing opportunities. A Pelican crossing provided near The Bull Hotel, and a zebra crossing provided to the south of the junction with Yarley Road.	Very High	467	234	Negligible	Slight
2048 Future Year + Proposed Development						
1	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	607	932	Minor	Neutral or Slight
2	Link in a semi-urban area providing access to Campbell Park. Off-road pedestrian/cycle provision including an informal pedestrian crossing point (with tactile paving) as well as toucan crossing.	High	506	237	Negligible	Slight
3	Link in a semi-urban area providing access to Campbell Park. Off-road pedestrian/cycle provision. Informal	High	522	238	Negligible	Slight

Link ID	Sensitivity		Magnitude of change			Significance
	Link type	Assigned sensitivity	Avg hourly flow (18hr)	Total HGV flow (18hr)	Assigned magnitude	
	pedestrian crossing point (no tactile paving)					
4	Link in urban area/town centre with footways on both sides and multiple crossing opportunities, including a raised informal pedestrian crossing with tactile paving and a raised puffin crossing.	Very high	488	135	Negligible	Slight
5	Link in a semi-urban area serving the existing industrial estate to the east and providing NMU and emergency access to the residential properties on Hopton Grove. No pedestrian crossing point except an informal crossing at the junction with N Crawley Road. Footways along both sides of the carriageway.	Negligible	268	123	Negligible	Neutral
6	Link in the urban area connecting up the two roundabouts. An informal pedestrian crossing (with tactile paving) at the Morello Way/Renny Park Road Roundabout. Footway along the southern side. Footway/cycleway (Redway) along the northern side.	High	347	48	Negligible	Slight
7	Link in the urban area connecting to Newport Pagnell High St. Zebra pedestrian crossing. Pedestrian footways (both sides and wide) but no cycle facilities.	High	391	89	Negligible	Slight
8	Link in the urban area connecting up to Newport Pagnell High St. Informal pedestrian crossing (with tactile paving). Pedestrian footways (both sides) but no cycle facilities.	High	396	93	Negligible	Slight
9	Link in the urban area, main arterial link through Tickford. Several informal crossing points (with tactile paving). A Redway along the southern side. Footway and section of a shared footway/cycleway along the northern side.	High	429	108	Negligible	Slight
10	Link in the urban area, main arterial link through Tickford. No crossing points. Pedestrian footways (on both sides) but no cycle facilities.	High	460	114	Negligible	Slight
11	Link in urban area/town centre with footways on both sides. Raised table	Very high	488	135	Negligible	Slight

Link ID	Sensitivity		Magnitude of change			Significance
	Link type	Assigned sensitivity	Avg hourly flow (18hr)	Total HGV flow (18hr)	Assigned magnitude	
	informal pedestrian crossing near Union Street					
12	Link in urban area/town centre with footways on both sides. Raised table informal pedestrian crossings at each end of the link.	Very high	454	138	Negligible	Slight
13	Link in the semi-urban area connecting Fox Milne with Willen. Off-road pedestrian/cycle provision. An informal pedestrian crossing (with tactile paving) at the junction with access to the Anglian Water facility.	Medium	973	343	Minor	Slight
14	Link in a semi-urban area, connecting V10 Brickhill St to V11 Tongwell St. Off-road pedestrian/cycle provision running parallel to the eastbound carriageway. 3x pedestrian/Cycle underpass.	Medium	1019	418	Minor	Slight
18	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	281	138	Negligible	Neutral or Slight
19	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	148	122	Negligible	Neutral or Slight
20	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	261	130	Negligible	Neutral or Slight
21	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	283	132	Negligible	Neutral or Slight
22	Link serving Cranfield University Technology Park and other industrial properties. Informal crossing points with dropped kerbs and tactile paving at each junction. Shared footway/cycleway along the northern/western side of the carriageway. Informal crossing with tactiles and dropped kerbs combined with speed reduction measures immediately the University Way bus stop. Footway only along the eastern edge of the carriageway to the north of the bus stop towards Folly Lane.	Medium	54	47	Negligible	Neutral or Slight
23	Link in an urban area with footways on both sides and several informal crossing points with dropped kerbs and tactile paving. A zebra crossing in front of The Cross Keys PH.	High	136	130	Negligible	Slight
24	Link in a rural area. No pedestrian/cycle provision or crossing points.	Low	419	141	Negligible	Neutral or Slight
25	Link in a semi-urban area. Off-road pedestrian/cycle provision.	Medium	1076	364	Minor	Slight

Link ID	Sensitivity		Magnitude of change			Significance
	Link type	Assigned sensitivity	Avg hourly flow (18hr)	Total HGV flow (18hr)	Assigned magnitude	
26	Link in a semi-urban area. No pedestrian/cycle provision or crossing points.	Medium	960	315	Minor	Slight
27	Link in a semi-urban area. Off-road pedestrian/cycle provision.	Medium	985	337	Minor	Slight
30	Link in a semi-urban area. Footways/cycleways segregated from a link only on the northern edge. Connects to underpass crossings at the roundabout (Willen Roundabout).	Medium	558	174	Negligible	Neutral or Slight
35	Link in a rural area. No pedestrian/cyclist facilities. The link represents part of the approach/exit to the roundabout. No crossing facilities are provided at Marsh End Roundabout.	Low	180	131	Negligible	Neutral or Slight
37	Link in urban area/town centre setting. Footways of variable width along both sides of the carriageway with several informal crossing opportunities. A Pelican crossing provided near The Bull Hotel, and a zebra crossing provided to the south of the junction with Yarley Road.	Very High	589	209	Negligible	Slight
38	Link in a semi-urban area. Off-road pedestrian/cycle provision. Underpass provides connections to Redway Bw03.	Medium	867	273	Minor	Slight
39	Link in a semi-urban area. Off-road pedestrian/cycle provision. Facilities only on the southern side. Lower levels links to underpasses. No continuous connection along Monks Way.	Medium	828	262	Minor	Slight
40	Link in a semi-urban area. No pedestrian/cycle provision or crossing points. Footways/cycleways completely segregated from the link. No crossings points.	Medium	793	112	Minor	Slight
41	Link in a semi-urban area. Footways/cycleways completely segregated from the link. Some connections to bus stops. Underpass crossings on link north of the junction with Glazier Dr and north of Downs Barn Roundabout.	Medium	789	102	Minor	Slight
42	Link in a semi-urban area. Footways/cycleways completely segregated from the link. Underpass crossing on the link near to the junction	Medium	522	108	Negligible	Neutral or Slight

Link ID	Sensitivity		Magnitude of change			Significance
	Link type	Assigned sensitivity	Avg hourly flow (18hr)	Total HGV flow (18hr)	Assigned magnitude	
	with Delaware Dr. No direct connections to Willen Roundabout.					
43	Link in a semi-urban area. Footways/cycleways segregated from the link. Connections to underpass crossings at the Downs Barn Roundabout. Underpass connections and the junction of Downs Barn Blvd and V8.	Medium	1048	124	Minor	Slight
44	Link in semi-urban/rural area. Footways/cycleways segregated from the link. Connections to underpass crossing mid link but no direct crossings or facilities on the link itself.	Low	932	249	Minor	Neutral or Slight
45	Link in high street/urban area. Footways on both sides of the carriageway. At grade signalised crossing mid link (west of Bury St).	Very high	466	162	Negligible	Slight
46	Link in high street/urban area. Segregated footway on the southern side of Tickford Bridge. Narrow footways on the northern side of the bridge carriageway. No formal crossing points, but informal crossings present with dropped kerbs and tactiles - near to the roundabout junction with Priory St. Traffic calming present.	High	424	105	Negligible	Slight
47	Link in the urban area. Footways on both sides of the carriageway. Signalised at grade crossing south of Chicheley St. On-street parking and other informal crossing points (drop kerb with refuge island) along the link. No clear/identified cycle facilities.	Medium	504	124	Negligible	Neutral or Slight
48	Link in the urban area. Footways on both sides of the carriageway. Informal crossing points (drop kerb with refuge island) along the link, e.g. opposite Petrol Filling Station and north of mini-roundabout (N Crawley Road). No clear/identified cycle facilities.	Medium	512	124	Negligible	Neutral or Slight
49	Link in a semi-urban area. No direct footways or cycleways present on the link. No crossing points. The A509 is a key strategic link with high volumes of mixed traffic.	Negligible	505	313	Negligible	Neutral

Link ID	Sensitivity		Magnitude of change			Significance
	Link type	Assigned sensitivity	Avg hourly flow (18hr)	Total HGV flow (18hr)	Assigned magnitude	
50	Link in semi-urban/rural area. No direct footways or cycleways present on the link. Segregated footway/cycleway on the southern side of the link, although approximately 30m south from the carriageway, has verge and tree planting as a barrier. No crossing points either on the link or at either roundabout.	Negligible	1077	123	Minor	Neutral or Slight
51	Link in semi-urban/rural area. No direct footways or cycleways present on the link. Segregated footway/cycleway on the southern side of the link, although approximately 30m south from the carriageway, has verge and tree planting as a barrier. No crossing points on the roundabout. This link represents the approach to the roundabout - which has no pedestrian/cyclist facilities.	Negligible	1077	123	Minor	Neutral or Slight
52	Link in semi-urban/rural area. No direct footways or cycleways. The underpass on the edge of the link, which provides an N/S crossing point. Bus stops located nearby on the links, which connect to the underpass link. No crossing points on link or roundabout. This link represents the approach to the roundabout. However, it is close to other pedestrian/cyclist facilities.	Negligible	919	109	Minor	Neutral or Slight
53	Link in semi-urban/rural area. No direct footways or cycleways. Segregated footway/cycleway on the southern side of the link, although approximately 30m south from the carriageway, has verge and tree planting as a barrier. Two underpass connections (eastern and western ends).	Negligible	919	109	Minor	Neutral or Slight
54	Link in semi-urban/rural area. No direct footways or cycleways. The underpass on the eastern edge of the link, which provides an N/S crossing point. No crossing points on link or roundabout. This link represents the approach to the roundabout. However, it is close to other pedestrian/cyclist facilities.	Negligible	919	109	Minor	Neutral or Slight
55	Link in a semi-urban area. No pedestrian/cyclist facilities running alongside it. However, a series of underpasses along the link provide	Medium	1051	352	Minor	Slight

Link ID	Sensitivity		Magnitude of change			Significance
	Link type	Assigned sensitivity	Avg hourly flow (18hr)	Total HGV flow (18hr)	Assigned magnitude	
	connections N/S to segregated pedestrian/cycle facilities. Bus Stops located along the link connect to the underpass. At grade crossing points on the carriageway, as link utilises underpasses.					
56	Link in a semi-urban area. Redway north of the link. Segregated footway/cycleway south of the link - approximately 30m south of the carriageway, screened by verge and tree line. The link does not have a crossing point (the Redways connect to underpasses further east or west of this link).	Low	974	165	Minor	Neutral or Slight
57	The link is rural. No pedestrian or cyclist crossing facilities. A footway on the western edge running from Merchant Lane junction for approximately 450m to a farm access gate. Relatively large verge on the western side as link continues northwards.	Low	157	54	Negligible	Neutral or Slight
58	Link in rural/semi-urban area. Passes university buildings. Footways present on both side of the carriageway. On-street parking on the southern edge. At grade zebra crossing near to the roundabout with Duncan Road.	Medium	157	54	Negligible	Neutral or Slight
59	Link in a rural area. No pedestrian or cyclist facilities. Wide verge on the western side at the northern section of the link. A509 is key strategic link. No formal crossing points.	Low	591	214	Negligible	Neutral or Slight
60	Link in a rural area. No pedestrian or cyclist facilities. The link represents part of the approach/exit to the roundabout. No crossing facilities are provided at Marsh End Roundabout at this location.	Low	242	168	Negligible	Neutral or Slight
61	Link in a rural area. Pedestrian/cycle link facility on the western edge - originating from High Street. Informal crossing opposite Filgrave turn bus stop. However, this is for the minor road, not the A509. The link has no formal crossings (E/W).	Low	920	281	Minor	Neutral or Slight
62	Link in a rural area. Pedestrian/cycle link facility on the western edge of the carriageway. Informal crossings	Low	722	264	Minor	Neutral or Slight

Link ID	Sensitivity		Magnitude of change			Significance
	Link type	Assigned sensitivity	Avg hourly flow (18hr)	Total HGV flow (18hr)	Assigned magnitude	
	(including cycle crossing at High Street/Newton Road junction). Western footway/cycleway variable in width approaching Olney. No formal crossing points across the A509.					
63	Link in a rural area. Pedestrian/cycle link facility on the western edge. No crossings on A509.	Low	1007	283	Minor	Neutral or Slight

Review of Issues identified in Table D5.6 (Fear and Intimidation)

2031

D5.55 As outlined in Table D5.6 above, the significance of fear and intimidation on the links within the study area in the 2031 Future Year + Proposed Development scenario has been established as **neutral** or **slight**, with the effects expected to be **long term**, **permanent** and **adverse**. The effects of the Proposed Development are considered to be **'not significant'** in EIA terms.

2048

D5.56 In the 2048 Future Year + Proposed Development scenario, the significance of fear and intimidation on the links within the study area has been established as **neutral** or **slight**, with the effects expected to be **long term**, **permanent** and **adverse**. The effects of the Proposed Development are considered to be **'not significant'** in EIA terms.

Accidents and Safety

D5.57 The summary of the assessment of accidents and safety is provided for each of the identified links/scenarios in Table D5.7 below.

Table D5.7 Assessment of Accidents and Safety

Link ID	Sensitivity		Magnitude of change			Significance
	No of PIA – 2016 base (Actual/ Typical)	Assigned sensitivity	Number of accidents (5-year period)	Change in Traffic Flow (AADT)	Assigned magnitude	
2031 Future Year + Proposed Development						
1	0/1	Low	0	-1.3%	No change	Neutral
2	0/1	Low	0	6.4%	Negligible	Neutral or Slight
3	0/1	Low	0	6.2%	Negligible	Neutral or Slight
6	0/1	Low	0	5.1%	Negligible	Neutral or Slight
7	0/1	Low	2	-4.3%	No change	Neutral
8	1/1	Medium	3	-4.4%	No change	Neutral
9	0/1	Low	1	0.0%	No change	Neutral
10	0/1	Low	2	-1.1%	No change	Neutral
13	0/1	Low	0	23.4%	Negligible	Neutral or Slight
15	0/1	Low	0	9.4%	Negligible	Neutral or Slight
16	0/1	Low	1	9.4%	Negligible	Neutral or Slight

Link ID	Sensitivity		Magnitude of change			Significance
	No of PIA – 2016 base (Actual/ Typical)	Assigned sensitivity	Number of accidents (5-year period)	Change in Traffic Flow (AADT)	Assigned magnitude	
17	0/1	Low	0	9.4%	Negligible	Neutral or Slight
18	0/1	Low	0	44.1%	Moderate	Slight
19	0/1	Low	0	25.3%	Negligible	Neutral or Slight
20	0/1	Low	0	50.2%	Moderate	Slight
21	1/2	Low	1	45.2%	Moderate	Slight
24	2/2	Medium	10	29.7%	Minor	Slight
25	0/1	Low	0	19.5%	Negligible	Neutral or Slight
26	0/1	Low	1	18.2%	Negligible	Neutral or Slight
27	0/1	Low	0	32.2%	Moderate	Slight
28	0/1	Low	1	37.4%	Moderate	Slight
29	1/1	Medium	1	12.8%	Negligible	Neutral or Slight
30	1/1	Medium	10	-20.1%	No change	Neutral
31	0/1	Low	2	0.3%	Negligible	Neutral or Slight
32	0/1	Low	5	9.1%	Minor	Neutral or Slight
33	0/1	Low	2	14.2%	Negligible	Neutral or Slight
34	0/1	Low	3	0.9%	Negligible	Neutral or Slight
35	0/1	Low	0	-63.9%	No change	Neutral
36	2/4	Low	5	8.0%	Minor	Neutral or Slight
37	1/3	Low	12	8.3%	Minor	Neutral or Slight
2048 Future Year + Proposed Development						
1	0/1	Low	0	20.0%	Negligible	Neutral or Slight
2	0/1	Low	0	4.3%	Negligible	Neutral or Slight
3	0/1	Low	0	4.4%	Negligible	Neutral or Slight
4	1/1	Medium	2	6.6%	Negligible	Neutral or Slight
5	0/1	Low	1	61.3%	Moderate	Slight
6	0/1	Low	0	5.9%	Negligible	Neutral or Slight
7	0/1	Low	2	8.7%	No change	Neutral
8	1/1	Medium	3	9.9%	No change	Neutral
9	0/1	Low	1	4.7%	Negligible	Neutral or Slight
10	0/1	Low	2	4.5%	Negligible	Neutral or Slight
11	0/1	Low	1	6.6%	Negligible	Neutral or Slight
12	0/1	Low	1	9.0%	Negligible	Neutral or Slight
13	0/1	Low	0	3.2%	Negligible	Neutral or Slight
14	1/1	Medium	5	22.1%	Negligible	Neutral or Slight
18	0/1	Low	0	44.1%	Moderate	Slight
19	0/1	Low	0	39.5%	Negligible	Neutral or Slight
20	0/1	Low	0	43.9%	Moderate	Slight
21	1/2	Low	1	43.4%	Moderate	Slight
22	0/1	Low	0	7.3%	Negligible	Neutral or Slight
23	1/1	Medium	5	19.8%	Minor	Slight
24	2/2	Medium	10	35.6%	Minor	Slight

Link ID	Sensitivity		Magnitude of change			Significance
	No of PIA – 2016 base (Actual/ Typical)	Assigned sensitivity	Number of accidents (5-year period)	Change in Traffic Flow (AADT)	Assigned magnitude	
25	0/1	Low	0	5.3%	Negligible	Neutral or Slight
26	0/1	Low	1	5.9%	Negligible	Neutral or Slight
27	0/1	Low	0	16.7%	Moderate	Slight
30	1/1	Medium	10	-3.9%	No change	Neutral
35	0/1	Low	0	-54.4%	No change	Neutral
37	1/3	Low	12	0.7%	Minor	Neutral or Slight
38	2/1	High	5	0.0%	No change	Neutral
39	0/1	Low	2	0.7%	Negligible	Neutral or Slight
40	1/1	Medium	6	-0.5%	No change	Neutral
41	0/1	Low	3	0.5%	Negligible	Neutral or Slight
42	0/1	Low	2	-6.8%	No change	Neutral
43	0/1	Low	3	5.7%	Negligible	Neutral or Slight
44	0/1	Low	2	-0.3%	No change	Neutral
45	0/1	Low	1	3.3%	Negligible	Neutral or Slight
46	0/1	Low	0	8.3%	Negligible	Neutral or Slight
47	0/1	Low	2	4.9%	Negligible	Neutral or Slight
48	1/1	Medium	1	5.5%	Negligible	Neutral or Slight
49	0/1	Low	1	-1.7%	No change	Neutral
50	1/1	Medium	1	0.5%	Negligible	Neutral or Slight
51	0/1	Low	2	0.5%	Negligible	Neutral or Slight
52	0/1	Low	1	4.8%	Negligible	Neutral or Slight
53	0/1	Low	0	4.8%	Negligible	Neutral or Slight
54	1/1	Medium	1	4.8%	Negligible	Neutral or Slight
55	1/1	Medium	9	-0.5%	No change	Neutral
56	0/1	Low	4	-2.2%	No change	Neutral
57	0/1	Low	0	-13.3%	No change	Neutral
58	0/1	Low	0	-13.3%	No change	Neutral
59	0/2	Low	4	26.7%	Negligible	Neutral
60	0/1	Low	0	-34.9%	No change	Neutral
61	1/1	Medium	2	2.4%	Negligible	Neutral or Slight
62	0/1	Low	8	1.4%	Minor	Neutral or Slight
63	1/2	Low	1	2.1%	Negligible	Neutral or Slight

Review of Issues identified in Table D5.7 (Accidents and Safety)

2031

D5.58 As outlined in Table D5.7 above, the significance of accidents and safety on the links within the study area in the 2031 Future Year + Proposed Development scenario has been established as **neutral** or **slight**, with the effects expected to be **long term**, **permanent** and **adverse**. The effects of the Proposed Development are considered to be **'not significant'** in EIA terms.

2048

D5.59 In the 2048 Future Year + Proposed Development scenario, the significance of accidents and safety on the links within the study area has been established as **neutral** or **slight**, with the effects expected to be **long term**, **permanent** and **adverse**. The effects of the Proposed Development are considered to be **'not significant'** in EIA terms.

D6.0 Mitigation and Monitoring

During Construction

D6.1 Construction traffic is transitional, and any environmental effects are temporary. However, this does not obviate the need to identify suitable management practices and to ensure the programme limits the effects, where practicable.

D6.2 Other than embedded mitigation that would be secured by planning condition, such as the CLP (and subsequently CEMP), which seeks to reduce the impact of construction traffic on the highway network and transport network users, no other specific mitigation is proposed as the likely effects are **'not significant'** in EIA terms.

D6.3 The above applies to the construction of all phases of the Proposed Development.

D6.4 The CLP (Appendix D5**)** provides a framework for the requirements for the management of transport effects associated with the construction phases of the Proposed Development. It is part of a suite of documents, which address the transport effects of the Proposed Development and identify where mitigation measures may be required.

D6.5 The document provides details on the requirements for the management of transport effects associated with the construction phases of the Proposed Development. Once the principal contractor has been appointed, there will be an opportunity for them to review and adjust the CLP as well as to produce the CEMP in agreement with the local authorities.

D6.6 The CLP provides detailed information regarding the construction traffic, including:

- construction vehicle routeing;
- proposed programme and duration;
- number of construction personnel including travel arrangements and mitigation;
- number of construction and delivery vehicles using the public highway; and
- traffic management.

D6.7 The aims of the CLP are to set out the measures minimising any potential effects of the traffic associated with the construction of the Proposed Development. The CLP has the primary objective of minimising impact and disruption to existing users of the public highway network and the surrounding community, forming the framework within which all contractors are expected to work. This will be achieved by:

- adhering to the Demand Management Plan (i.e. a Travel Plan for construction staff);
- minimising the number of vehicular trips required for the movement of material and people;
- ensuring construction traffic trips and routes used are planned to be safe, efficient and timely;
- encouraging greater use of sustainable freight modes;
- ensuring the impact to nearby residents, local sensitive receptors and the travelling public are minimised; and
- encouraging the most efficient use of construction freight vehicles.

During Operation

D6.8 As demonstrated in this Transport Chapter, the Proposed Development effects during its operational phase are not significant in EIA terms except for Link 24 (A509 northbound approach to Chicheley Roundabout) in the 2031 Future Year + Proposed Development scenario and Link 25 (Tongwell Street from the entrance to BMX Racing Club towards Carleton Gate), Link26 (Tongwell Street towards Carleton Gate), Link 27 (Tongwell St between the entrance to Carleton Gate and new junction leading to new M1 bridge) and Link 55 (H3 Monks Way between V9 Overstreet and V8 Marlborough Street) in the 2048 Future Year + Proposed Development scenario.

D6.9 In both future year scenarios (i.e. 2031 and 2048), the significance of driver/bus passenger delay has been calculated to be large or very large on these specific links. As such, the effects of the Proposed Development are considered to be ***'significant'*** in EIA terms. This result indicates that mitigation would typically be required to reduce the significance of the effect.

2031

D6.10 In this scenario, only Link 24 has been identified to experience significant effects of the Proposed Development. Link 24 forms part of the A509 running from the eastern outskirts of Newport Pagnell towards the Chicheley Hill Roundabout to the northeast. The link is a northbound section of the existing A509 dual carriageway, and it is situated in a rural area with no junctions or direct accesses along its length

D6.11 It should be noted that the southern end of the link forms the northbound exit of the proposed site access junction from the A509. The details of the new junction, including its operational assessment demonstrating that it is expected to operate satisfactorily, is provided in the TA (Appendix D1). It should also be highlighted that the TA (Appendix D1) provides the operational assessment of the Chicheley Hill Roundabout and proposes the site-wide measures mitigating the impacts of the Proposed Development, where deemed necessary across the local transport networks.

D6.12 As outlined above, traffic delays are generally witnessed at or near junctions and can therefore be determined through the analysis of junction capacity assessment results. As both the new and existing junctions have been designed/mitigated to accommodate the traffic volumes generated by the Proposed Development (as calculated by the MKMMM), it is deemed that the delays will be within acceptable levels. As a result of these inbuilt measures, the significance of driver delay/bus passenger delay is expected to reduce. In combination with the other embedded mitigation outlined below, the post-mitigation effect is expected to be **'not significant'** in EIA terms.

D6.13 It should also be highlighted that the driver delay/bus passenger delay is only significant in EIA terms in 2031 and not in 2048. The Proposed Development would effectively act as a mitigation measure.

2048

D6.14 Four links (Link 25, Link 26, Link 27 and Link 55) have been identified to experience significant effects of the Proposed Development in the 2048 scenario.

D6.15 Link 25, Link 26 and Link 27 links form part of the Tongwell Street corridor running from the existing BMX Racing Club entrance via the existing priority-controlled T-junction with Carleton Gate towards the proposed bridge over the M1 and the new junction formed by the new access road and the northwest section of Tongwell Street.

D6.16 It is acknowledged that the Tongwell Street corridor would provide one of the main access routes to the Proposed Development. It is proposed as part of the delivery of the Proposed Development to upgrade the Tongwell Street corridor to a dual carriageway to accommodate the traffic to/from the site.

D6.17 As outlined above, traffic delays are generally witnessed at or near junctions and can therefore be determined through the analysis of junction capacity assessment results. Given the substantial changes proposed for Tongwell Street (i.e. upgrades to a dual carriageway), the existing junctions associated with the corridor, such as Pineham Roundabout and Tongwell Street/Carleton Gate, are also proposed to be upgraded to accommodate the new dual carriageway alignment.

D6.18 Although none of the links identified in this assessment is directly connected to Pineham Roundabout, they are part of the corridor leading to the junction. The existing roundabout is proposed to be reconfigured to accommodate the dualled Tongwell Street arm. This will ensure sufficient capacity for the traffic to/from the roundabout utilising Link 25, Link 26 and Link 27 to the north of the junction.

D6.19 The existing priority-controlled T-junction of Tongwell Street and Carleton Gate is proposed to be replaced with a three-arm roundabout designed to provide sufficient capacity for the volume of traffic associated with the Proposed Development as well as any background traffic.

D6.20 To the north of the new Tongwell Street/Carleton Gate roundabout, it is proposed to realign the existing alignment of Tongwell Street towards the new bridge over the M1 and further to the site. The existing section of Tongwell Street to the northwest of the new M1 bridge will then form a left-in only junction with the revised alignment of Tongwell Street. This arrangement will restrict any movement from Tongwell Street to the northwest of the new M1 bridge onto the southern section of Tongwell Street and towards the Proposed Development.

D6.21 The upgrades to the existing and provision of the new high-quality infrastructure outlined above are expected to provide connections commensurate to the Proposed Development scale and importance. The delivery of this infrastructure would mitigate the identified effects on driver/bus passenger delay. In combination with the other embedded mitigation outlined below, the post-mitigation effect is expected to be **'not significant'** in EIA terms.

D6.22 Link 55 is a link in a dual carriageway link semi-urban area. Given its considerable distance from the Proposed Development and the fact that none of the adjacent links has been identified to experience capacity issues resulting in significantly extended delays, it could be argued that the effect significance is attributed to a localised change in travel patterns in the future rather than to a direct impact of the Proposed Development.

D6.23 Notwithstanding the above, it should be highlighted that an improvement measure is proposed for Blakelands Roundabout situated to the east of Link55 on the same H3 Monks Way corridor and at several other junctions in the eastern part of Milton Keynes. It is considered that the wider mitigation measures will result in the redistribution of the traffic in the area and, therefore, relieve Link 55. In combination with the other embedded mitigation outlined below, the post-mitigation effect is expected to be **'not significant'** in EIA terms.

Other Embedded Mitigation

D6.24 Embedded mitigation includes the HIF bid infrastructure works, including the proposed M1 bridge and key road linking infrastructure.

D6.25 As set out earlier in this Transport Chapter, the Proposed Development is accompanied by several supporting documents and strategies, all prepared in accordance with the latest guidance.

D6.26 The benefits of these supporting strategies and plans are not accounted for in traffic modelling and subsequent assessments. Therefore, they are considered mitigation against the effects of the Proposed Development in general and it is anticipated that they will be secured by a combination of planning conditions and obligations.

Transport Assessment (Appendix D1)

Other off-site Junction mitigation

D6.27 The strategic infrastructure delivered as part of the site, is required to enable the Proposed Development to come forward. Linked with this however are several other transport interventions ensuring that the impacts of the scheme are adequately mitigated. In addition to on-site measures and connections to off-site infrastructure to encourage travel by non-car modes (e.g. through the Redway network, bus services, etc.), several off-site measures would need to be implemented, such as highway junction improvements.

D6.28 The outputs of the junction modelling work undertaken, set out in the TA (Appendix D1), were reviewed to understand which areas of the off-site highway network may require mitigation to accommodate the demand arising from the Proposed Development or as a consequence of introducing the new infrastructure.

D6.29 The TA (Appendix D1) sets out a series of mitigation proposals at the following junctions;

- Blakelands Roundabout;
- Willen Roundabout;
- Pagoda Roundabout;
- Woolstone Roundabout;
- Marsh End Roundabout;
- Fox Milne Roundabout;
- Pineham Roundabout; and
- Northfields Roundabout.

D6.30 It should be noted that the development itself may not be the sole trigger for improvements at the junctions, but the TA (Appendix D1) outlines where improvements could occur. This would in-turn provide a betterment to the local network. The TA (Appendix D1) sets out in more detail the mitigation schemes being considered, alongside the methodology for determining development impact, as well as potential mechanisms for securing contributions and delivery of the works.

Residential Travel Plan (RTP) & Workplace Travel Plan (WTP)

D6.31 Both RTP and WTP (provided in Appendix D2 and Appendix D3 respectively) have been prepared in conjunction with the TA (Appendix D1) and should be read alongside that document. It should also be highlighted that the Travel Plan for the construction staff during the construction phase of the Proposed Development forms part of the measures set out by the CLP and will be developed and tailored once the principal contractor is appointed.

D6.32 Both RTP and WTP documents have been prepared in accordance with industry best practice, such as Good Practice Guidelines (DfT, 2014), MKC Residential Travel Planning guidance

(MKC, 2018), MKC Workplace Travel Plans guidance (MKC, 2015) and Plan:MK 2016-2031 (MKC, 2019). It has also been prepared in line with scoping discussions held with MKC. It was agreed that both RTP and WTP will set out to achieve a bronze accreditation status from Modeshift STARS (The Centre of Excellence for the delivery of Effective of Travel Plans).

D6.33 The documents set out a multi-modal package of measures to encourage all residents/employees and users of the new development to adopt sustainable travel behaviour where possible and practical. The measures aim to minimise the number of single-occupancy vehicle journeys made to and from the Proposed Development and increase travel by sustainable modes, including walking, cycling, public transport and ridesharing/ride-hailing. Where practicable, measures will be in place prior to occupation, allowing residents/employees and users to benefit from day one.

D6.34 Both RTP and WTP also outlines a long-term management strategy with a clear set of objectives and targets. As living documents, they will require monitoring, review and revision throughout the development construction, where the effectiveness of the measures implemented will be assessed on a regular basis. Responsibility for the implementation of measures and monitoring will sit with the Travel Plan Manager to be appointed by the developer.

D6.35 A Travel Plan Steering Group (TPSG) is proposed as part of the travel plans and will act as an advisory body to review and guide the development of the RTP and WTP over time. The group will be Chaired by the Travel Plan Manager and is anticipated to include representation from Berkeley St James and key stakeholders, including Milton Keynes Council, Transport Service Providers and Highways England.

D6.36 The role of the TPSG will be to maintain strategic oversight of the RTP/WTP and to provide guidance and advise to the Travel Plan Manager on matters including, but not limited to:

- The composition and specification of the planned measures;
- Programme management and continuity;
- Monitoring processes and progress against the objectives;
- Area-wide opportunities to progress sustainable travel in partnership with other employers; and
- Discussing innovations in the industry and potential new service providers.

D6.37 The Travel Plan Manager (TPM) will assist in drafting a 'Terms of Reference' for the Travel Plan Steering Group to review and approve following the initial meeting. This will formalise the group's composition and detail how decisions are taken and the frequency of meetings, which are anticipated to occur at least annually.

D6.38 The TPM will be appointed by Berkeley St James and could be an internal or external consultant. They will be responsible for overseeing the implementation of travel planning measures, monitoring outcomes, and liaising with site users and project stakeholders to ensure the RTP and WTP objectives are achieved over time.

D6.39 The TPM will oversee the entire period through to full build-out and occupation of each of the residential parcels and the employment development plots associated with the RTP and WTP. This will include promoting the RTP and WTP from the outset, working closely with resident groups, public transport operators, the Council, employers and establishing contacts within the community.

D6.40 The TPSG will also be responsible for administering a dedicated 'Sustainable Mobility Investment Fund', allowing for annual expenditure on related infrastructure, services, or promotional initiatives that support the RTP objectives and target outcomes.

D6.41 Rather than pre-defining all travel planning measures in advance, this approach to managing and delivering the RTP will allow the Travel Plan Manager and associated stakeholders to consider new technologies and respond to changing social norms and travel demands as they materialise over time. This will ensure the RTP has and retains a defined funding source and flexibility.

D6.42 The WTP's will be monitored separately, and it is envisaged that each occupier/employer will build upon the framework documents to develop and fund their own strategy. The TPM will help guide the individual workplaces, ensuring that they appoint a Travel Plan Champion as part of their tenancy agreements and liaise with the TPM to oversee the implementation of the travel planning measures within their own organisations. This will include measures delivered by the TPM at a site-wide level and any measures that may be identified as specific to an individual employer.

Walking and Cycling Strategy (TTN9)

D6.43 The Proposed Development is supported by comprehensive Walking and Cycling Strategy

D6.44 The Walking and Cycling Strategy set out how sustainable travel will be implemented within the Proposed Development by creating a network of high-quality walking and cycle routes to connect the key land uses and make walking and cycling a main modal choice.

D6.45 Since walking and cycling are modes that may be chosen only by specific demographics of society, dedicated walking and cycling infrastructure built into the streetscape has been introduced in the Proposed Development. Therefore, the masterplan has created a permeable street network that provides dedicated provision for both pedestrians and cyclists, following desire lines to minimise distances between key origins and destinations.

D6.46 Crossing points between the Proposed Development regions and connecting to external infrastructure and developments in Newport Pagnell and Milton Keynes has been proposed to ensure permeability. These can be seen in the Movement and Access Parameter Plan. In summary, it will be a combination of new at grade, subway and footbridge crossings, both to link to existing infrastructure and to internally save roadway infrastructure.

D6.47 Where the highway route has been designed to be used by motorised vehicles, dedicated facilities for active travel users will be provided alongside the carriageway but physically separated (in the way of footways and cycleways).

D6.48 Cyclist and pedestrian infrastructure will also be provided by traffic-free routes where demand makes this necessary to reduce the potential conflict that results from differing speeds and different users' requirements.

D6.49 There will be an extensive network of traffic-free routes throughout the development, fitting with the existing PRoW and Redway networks provisions. Where new Redways are proposed, these have been designed utilising MKC's guidance on Redways to ensure acceptability.

D6.50 Additionally, a Green Linear Park is proposed and outlined in the Masterplan. This will mostly be used for leisure purposes. However, it will also be designed so that it can be utilised by those wishing to travel across the Green Linear Park for any purposes. As such, it will have a range of cycling and pedestrian opportunities and will also link to the existing Milton Keynes off-road active travel network.

PROW Strategy (TTN10)

D6.51 Alongside the Walking and Cycling strategy set out as part of the TA (Appendix D1), and PROW strategy has been developed to ensure that any changes, diversions or improvements are set out appropriately as a result of the Proposed Development changes.

D6.52 The strategy has been produced through a review of the existing PRoW network to connect and expand into the site reflecting the sustainable aspiration of the development, and identifies the key requirements affecting the PRoWs crossing the MKE site and the methodology to follow to make any amendments where required.

Public Transport Strategy

D6.53 The Public Transport Strategy (PTS) seeks to understand opportunities for public transport access to/from the site and develop a strategy for delivering public transport that achieves the sustainable aspirations of the Proposed Development.

D6.54 The outline strategy was shared with MKC and several bus operators. Conversations also took place with the developer(s) of the adjacent land to ensure that the proposed bus provisions are integrated.

D6.55 Feedback from the MKC's transport officers included the safeguarding of the Mass Rapid Transit (MRT) land, the provision of suitably integrated bus services until such a time when the MRT is implemented, and the opportunities to build upon the Milton Keynes Demand Responsive Transport (DRT) network where possible. These requests have been fully considered and included in the proposals.

D6.56 The proposals were discussed with adjacent developer Bloor to ensure the bus services planned are integrated and future residents are not limited by only having to use bus services within the boundaries of the specific developer.

D6.57 The strategy is predicated around a phased hierarchical approach as follows:

- The provision of a centrally located Multi-Modal Interchange Hub;
- A Principal Bus Route (PBR) between Milton Keynes East and Milton Keynes Central and Rail Station operating electric vehicles (to be replaced at an unspecified date by the Mass Rapid Transit (MRT) system promoted by Milton Keynes Council);
- The diversion and extension of a limited number of existing bus services (route 1 and C1, C11, CX);
- The provision of DRT services feeding into the Interchange Hub; and
- The potential conversion of the DRT services into semi-fixed or fixed-route services should it is justified by demand.

D6.58 The evaluation includes an assessment of operational cost using industry-standard cost and revenue calculations based on the modelling results and assuming a conservative bus mode share.

D6.59 While the network capacity provided matches the higher Future Mobility mode share, a cautious estimation of the revenue concluded that the cost of operation of the proposed network could be covered from year 15.

D7.0 Residual Effects

During Construction

D7.1 As set out above, it is expected that the effects associated with the construction phase of the Proposed Development would be temporary, and no long-term environmental effects are expected. There are no significant effects on the highway network from construction traffic. Therefore, the residual effects would be slight.

During Operation

D7.2 The proposed and embedded mitigation measures set out above would reduce the overall traffic generated by the Proposed Development and/or its redistribution. This would lessen the residual adverse environmental effects of the Proposed Development resulting from traffic volumes changes.

D7.3 The embedded mitigation measures seek to promote sustainable travel choices to reduce the proportion of private car trips. Targets and measures to increase walking, cycling and public transport trips are proposed on the basis that a remedial strategy would be put in place if targets are not met.

D7.4 As a result, none of the effects considered above would be significant (in EIA terms) after implementing the measures outlined in the previous section of this Transport Chapter.

D8.0 Summary & Conclusions

D8.1 In accordance with both IEMA Guidelines and DMRB guidance, the following effects have been assessed for all links in the study area surrounding the Proposed Development:

- severance;
- driver delay;
- pedestrian delay;
- pedestrian and cyclist amenity;
- fear and intimidation;
- accidents and safety; and
- bus passenger delay

D8.2 Hazardous and dangerous loads have been deemed likely to be insignificant due to the nature and type of development and have not been assessed further.

D8.3 The MKC's traffic model (MKMMM) adjusted for the purposes of the assessment of the Proposed Development has informed the assessment set out in this Transport Chapter. The model includes highway networks in the vicinity of the site as well as the wider area.

D8.4 The assessment identified that 63 links were required to be considered on the criteria set out by the screening rules.

D8.5 The assessment of the likely significant effects of the Proposed Development presented in this Transport Chapter demonstrates that the delivery of the Proposed Development would not result in any transport-related significant environmental effects (post-mitigation where required).

D8.6 The summary of the effects of the Proposed Development is provided in Table D8.1 below.

Table D8.1 Summary of Assessment

Effect	Link	Significance	Adverse / Beneficial	Duration	Permanence	Mitigation	Residual effect
During Construction							
Severance	All links	Slight	Adverse	Short term	Temporary	None required; CLP	Slight
Driver delay / Bus passenger delay	All links	Slight	Adverse	Short term	Temporary	None required; CLP	Slight
Pedestrian delay	All links	Slight	Adverse	Short term	Temporary	None required; CLP	Slight
Pedestrian and cyclist amenity	All links	Slight	Adverse	Short term	Temporary	None required; CLP	Slight
Fear and intimidation	All links	Slight	Adverse	Short term	Temporary	None required; CLP	Slight
Accidents and safety	All links	Slight	Adverse	Short term	Temporary	None required; CLP	Slight

Effect	Link	Significance	Adverse / Beneficial	Duration	Permanence	Mitigation	Residual effect
During Operation (2031 Future Year + Proposed Development)							
Severance	All links	Neutral or Slight	Adverse	Long term	Permanent	None required; RTP; WTP; Walking & Cycling strategy; PROW Strategy	Neutral or Slight
Driver delay / Bus passenger delay	All links except Link 24	Neutral or Slight	Adverse	Long term	Permanent	None required; RTP; WTP; Public Transport Strategy	Neutral or Slight
	Link 24	Significant	Adverse	Long term	Permanent	Site-wide measures; new infrastructure; RTP; WTP; Public Transport Strategy	Slight
Pedestrian delay	All links	Neutral or Slight	Adverse	Long term	Permanent	None required; RTP; WTP; Walking & Cycling Strategy; PROW Strategy	Neutral or Slight
Pedestrian and cyclist amenity	All links	Neutral or Slight	Adverse	Long term	Permanent	None required; RTP; WTP; Walking & Cycling Strategy; PROW Strategy	Neutral or Slight
Fear and intimidation	All links	Neutral or Slight	Adverse	Long term	Permanent	None required; RTP; WTP; Walking & Cycling Strategy; PROW Strategy	Neutral or Slight
Accidents and safety	All links	Neutral or Slight	Adverse	Long term	Permanent	None required; RTP; WTP; Walking & Cycling Strategy; PROW Strategy; Public Transport strategy	Neutral or Slight
During Operation (2048 Future Year + Proposed Development)							
Severance	All links	Neutral or Slight	Adverse	Long term	Permanent	None required; RTP; WTP; Walking & Cycling Strategy; PROW Strategy	Neutral or Slight
Driver delay / Bus passenger delay	All links except Link 25, 26, 27 and 55	Neutral or Slight	Adverse	Long term	Permanent	None required; RTP; WTP; Public Transport Strategy	Neutral or Slight
	Link 25	Significant	Adverse	Long term	Permanent	Dualling of the corridor, new Carleton Gate/ Tongwell Street roundabout, new Tongwell Street/ Site Access junction, Pineham Roundabout upgrade; RTP; WTP;	Slight

Effect	Link	Significance	Adverse / Beneficial	Duration	Permanence	Mitigation	Residual effect
						Public Transport Strategy	
	Link 26	Significant	Adverse	Long term	Permanent	Dualling of the corridor, new Carleton Gate/ Tongwell Street roundabout, new Tongwell Street/ Site Access junction, Pineham Roundabout upgrade; RTP; WTP; Public Transport Strategy	Slight
	Link 27	Significant	Adverse	Long term	Permanent	Dualling of the corridor, new Carleton Gate/ Tongwell Street roundabout, new Tongwell Street/ Site Access junction, Pineham Roundabout upgrade; RTP; WTP; Public Transport Strategy	Slight
	Link 55	Significant	Adverse	Long term	Permanent	Blakelands Roundabout upgrade, measures in the wider area; RTP; WTP; Public Transport Strategy	Slight
Pedestrian delay	All links	Neutral or Slight	Adverse	Long term	Permanent	None required; RTP; WTP; Walking & Cycling strategy; PROW Strategy	Neutral or Slight
Pedestrian and cyclist amenity	All links	Neutral or Slight	Adverse	Long term	Permanent	None required; RTP; WTP; Walking & Cycling strategy; PROW Strategy	Neutral or Slight
Fear and intimidation	All links	Neutral or Slight	Adverse	Long term	Permanent	None required; RTP; WTP; Walking & Cycling strategy; PROW Strategy	Neutral or Slight
Accidents and safety	All links	Neutral or Slight	Adverse	Long term	Permanent	None required; RTP; WTP; Walking & Cycling strategy; PROW Strategy; Public Transport strategy	Neutral or Slight

D9.0 Abbreviations & Definitions

- AADT - Average Annual Daily Traffic
- AAWT - Average Annual Weekday Traffic
- CBC - Central Bedfordshire Council
- CEMP - Construction Environmental Management Plan
- CLP - Construction Logistics Plan
- DfT - Department for Transport
- DMRB - Design Manual for Roads and Bridges
- DRT - Demand Responsive Transport
- EIA - Environmental Impact Assessment
- ES - Environmental Statement
- HGV - Heavy Goods Vehicle
- HIF - Highway Infrastructure Fund
- IEMA - Institute of Environmental Management and Assessment
- LGV - Light Goods Vehicles
- LTP - Local Transport Plan
- MK - Milton Keynes
- MKB - Milton Keynes Borough
- MKC - Milton Keynes Council
- MKE - Milton Keynes East
- MKMMM - Milton Keynes Multi-Modal Model
- MRT - Mass Rapid Transit
- NMU - Non-Motorised Users
- NPPF - National Planning Policy Framework
- NPPG - National Planning Practice Guidance
- NCN - National Cycle Network
- NCR - National Cycle Route
- NTEM - Trip End Model Presentation Program
- ORR - Office of Rail and Road
- PBR - Principal Bus Route
- PIA - Personal Injury Accidents
- PPG - Planning Policy Guidance
- PRN - Primary Road Network
- PRoW - Public Rights of Way
- PTS - Public Transport Strategy
- RTP - Residential Travel Plan

- SLA - Select Link Analysis
- SRN - Strategic Road Network
- SUE - Sustainable Urban Extension
- TA - Transport Assessment
- TAG - Transport Analysis Guidance
- TEMPro - Trip End Model Presentation Program
- TIDP - Transport Infrastructure Delivery Plan
- TTN - Transportation Technical Note
- V/C - Volume-to-Capacity ratio
- WCH - Walkers, Cyclists and Horse riders
- WTP - Workplace Travel Plan

D10.0 References

1 National Planning Policy Framework (DCLG, February 2019)

2 Plan:MK 2016-2031 (Milton Keynes Council, March 2019)

3 Mobility Strategy for Milton Keynes 2018-2036 (LTP4): Mobility for All (Milton Keynes Council, March 2018)

4 Mobility Strategy for Milton Keynes 2018-2036 (LTP4): Transport Infrastructure Delivery Plan (Milton Keynes Council, October 2019)

5 Milton Keynes East Strategic Urban Extension: Development Framework Supplementary Planning Document (Milton Keynes Council, March 2020)

6 MK Sustainability Strategy 2019-2050 (Milton Keynes Council, December 2018)

7 MK Strategy for 2050 (Engagement Draft) (Milton Keynes Council, January 2020)

8 IEMA Guidelines for Environmental Impact Assessment (IEMA, 2004)

9 IEMA Guidelines for the Environmental Assessment of Road Traffic (IEMA, 1993)

10 Design Manual for Roads and Bridges (Sustainability & Environment) LA 104: Environmental assessment and monitoring (July 2019)

11 Design Manual for Roads and Bridges (Sustainability & Environment) LA 112: Population and human health (January 2020)

12 Transport Analysis Guidance (Department for Transport, July 2020)