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ES Chapter 10 - Transport and Access

Authored by SLR

November 2025

THE CROWN ESTATE

East Hemel

10. Transport and Access

10.1 Introduction

10.1.1 This Chapter reports the likely significant effects of the Development in terms of traffic and transport in the context of the Site and surrounding area. It details the assessment methodology, the baseline conditions at the Site and the surrounding area, the likely significant effects, the mitigation measures required to prevent, reduce or offset any significant adverse effects, and the likely residual effects after these measures have been implemented.

10.1.2 The Chapter has been prepared by SLR Consulting Ltd, and individuals with professional competency, as required by the EIA Regulations.

10.1.3 This Chapter is not intended to be read as a standalone assessment and is supported by Chapters 1 to 6 of this ES. Furthermore, this Chapter makes reference to a standalone Transport Assessment (TA) and Framework Travel Plan (FTP) which have been prepared by SLR Consulting and have been submitted as appendices to this ES (**ES Volume 3, Appendix 10.1: Transport Assessment** and **ES Volume 3, Appendix 10.2: Framework Travel Plan**).

10.2 Assessment Methodology and Significance Criteria

Assessment Methodology

Legislation, Policy and Guidance

10.2.1 The relevant legislation, policy and guidance are listed, below, with more details provided in the **ES Volume 3 Appendix 10.1**.

Legislative Framework

10.2.2 There relevant legislation is set out below and reviewed further in **Appendix 10.1**:

- Highways Act 1980 (as amended);
- New Roads and Street Works Act 1991 (as amended);
- Traffic Management Act 2004; and
- Local Transport Act 2008 (as amended).

Planning Policy and Guidance

10.2.3 Planning policy at the national, regional and local level and its relevance to environmental design and assessment is discussed in the Planning Statement submitted as part of the Application.

10.2.4 The applicable planning policy relevant to this Chapter is provided in full within **Appendix 10.1** and is summarised below:

- National Planning Policy Framework (NPPF) (2024);
- Hertfordshire Local Transport Plan 4 (2018 – 2031);
- St Albans City and District Local Plan Review: Saved Policies (1994);
- St Albans City and District Draft Local Plan to 2041 – Regulation 19;
- Dacorum Core Strategy 2006-2031 (Adopted 2013);
- Dacorum Local Plan 1991-2011: Saved Policies (2004); and
- Dacorum draft Local Plan to 2040 – Regulation 19.

Guidance

10.2.5 The applicable guidance relevant to this Chapter is listed below:

- National Planning Practice Guidance;
- Design Manual for Roads and Bridges (DMRB);
- Department for Transport (DfT) Web-based Transport Analysis Guidance – Transport Analysis Guidance (TAG) (DfT, 2023);
- DfT Circular 01/2022 'Strategic road network and the delivery of sustainable development'; and
- Institute of Environmental Management and Assessment (IEMA) (now the Institute of Sustainability and Environment Professionals (ISEP)): Guidance on the Environmental Assessment of Road Traffic (2023), hereafter referred to as the 'IEMA Guidelines'.

Scope of Assessment

10.2.6 An EIA Scoping Report was submitted to St Albans City & District Council (SADC) and Dacorum Borough Council (DBC) on 9th December 2024 and a formal EIA Scoping Opinion was received from SADC and DBC on the 31st and 29th January 2025 respectively.

10.2.7 In accordance with the IEMA Guidelines, it is recommended that the impacts of major developments are considered under each category:

- Severance of communities;
- Road vehicle driver and passenger delay;
- Pedestrian and cycle delay (including Public Rights of Way (PRoW)) where applicable);
- Pedestrian and cycle amenity (including PRoW where applicable);
- Fear and intimidation; and

- Accidents and safety.

10.2.8 For clarity, the topic not covered within this Chapter will be hazardous loads as there are no expected movements of such material during the Works or the completed and operational Development.

10.2.9 In relation to public transport, the effects of any changes in bus flows will be assessed within the traffic-based assessment.

10.2.10 The assessment of traffic and transport has considered the potential impacts during the Works and the completed and operational Development resulting in likely significant effects.

Consultation

10.2.11 Chapter 4 of **Appendix 10.1** provides a full summary of the consultation undertaken specifically in relation to transport. This includes a series of pre-application meetings with SADC, DBC, Hertfordshire County Council (HCC) and National Highways (NH).

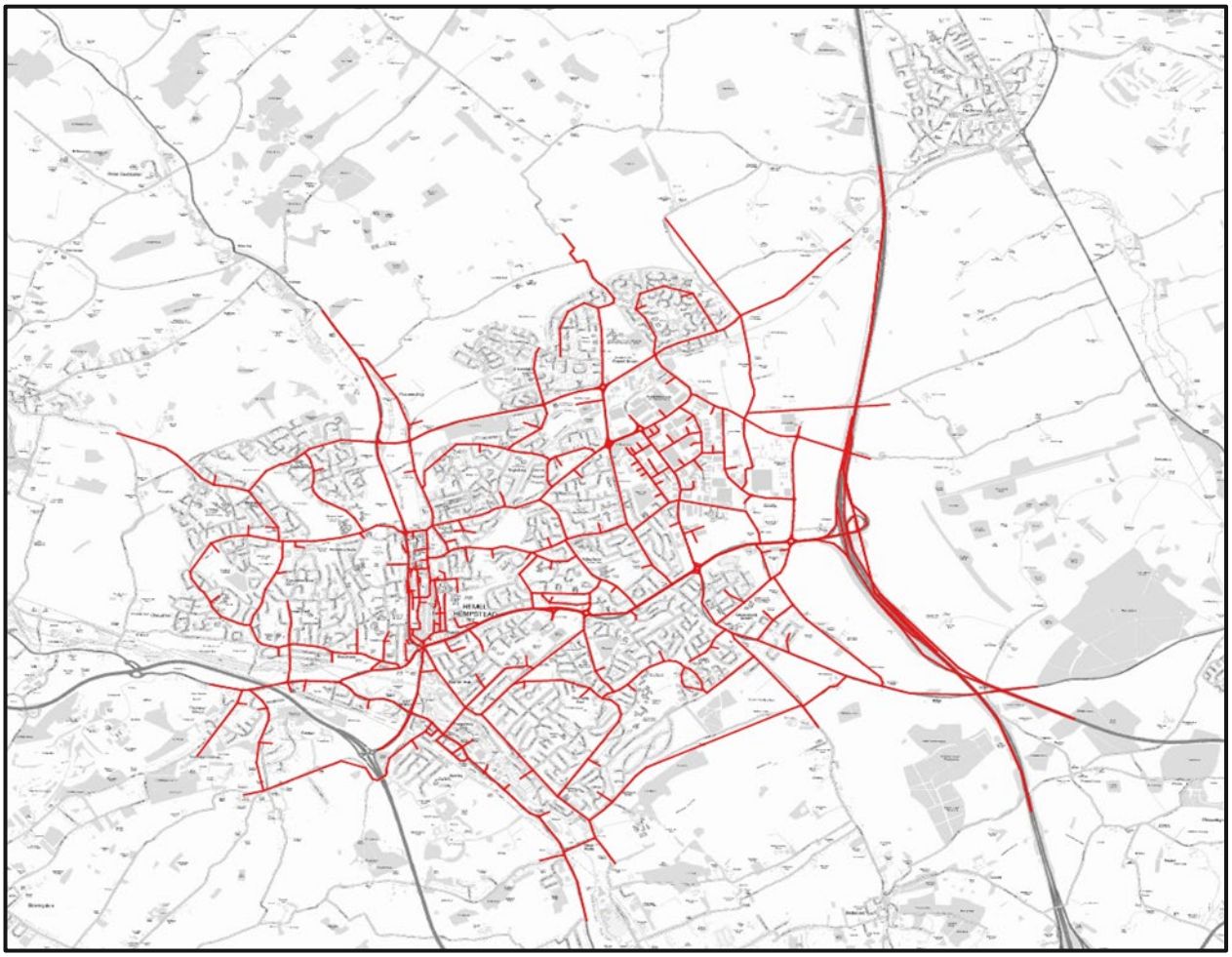
10.2.12 A range of other key stakeholders were also met, and extensive public consultation has also been undertaken. The outcome of this is set out in the Statement of Community Involvement which is submitted with the outline planning application.

Extent of the Study Area

10.2.13 A Paramics microsimulation model exists for Hemel Hempstead which is owned by HCC. SLR has agreed to use this for the purpose of the Application, and this modelling will form the basis of the assessment. This includes main links such as the M1, A414, A4147 and Redbourn Road plus lower classified roads in the immediate vicinity of the Site such as Green Lane, Three Cherry Trees Lane and Cherry Tree Lane.

10.2.14 The extent of the model, which forms the basis of the Transport Assessment, has been agreed with SADC, DBC, HCC and NH as suitable for the Development. The extent of the model is shown at **Figure 10.1** below.

Figure 10.1: Study Area



10.2.15 In addition, a desktop study has been undertaken to establish if there is any requirement to add links outside of the modelled area. As a consequence additional links have been identified outside of the modelled area. These links have been surveyed by Automatic Traffic Counts (ATCs) and turning counts. The locations of these links are summarised below:

- A1081 London Road, St Albans;
- Hollywell Hill, St Albans;
- A4251 London Road, Hemel Hempstead;
- Lawn Lane, Hemel Hempstead;
- B487 Redbourn Road; and
- A5183 Dunstable Road.

Screening

10.2.16 While an overall study area has been identified, the IEMA Guidelines specify two broad rules which can be used as a screening process to define the scale and extent of the assessment. These rules are:

- Rule 1: include highway links where traffic flows will increase by more than 30% (or the number of heavy goods vehicles (HGV) will increase by more than 30%); and
- Rule 2: include highway links of high sensitivity where traffic flows have increased by 10% or more.

10.2.17 Where the predicted increase in traffic flows is lower than the above thresholds, the IEMA Guidelines suggest the significance of the effects can be stated to be negligible and further detailed assessments are not warranted. Furthermore, increases in traffic flows below 10% are generally considered to be insignificant in environmental terms given that daily variations in background traffic flow may vary by this amount.

10.2.18 As a result, the first stage of the assessment is to assess traffic generated by the Development and identify the links where the changes in traffic flows are less than the rules above when compared with the scenario without development but which includes future traffic growth and committed development This is undertaken within the assessment presented in this Chapter.

Methods and Sources of Data

10.2.19 The following desk-based research and data sources have informed this assessment:

- Ordnance Survey (OS) mapping;
- Public transport timetables from bus operating companies' websites;
- Walk Wheel Cycle Trust (formerly Sustrans) for cycle route information;
- HCC website for information on PRoW and walking / cycling routes;
- Traffic surveys;
- TRICS database to estimate the projected traffic generation of the Development;
- 2011 Census data to estimate the method of travel to work and the origin / destination of travel;
- National Travel Survey Data to estimate the journey purpose (i.e. travel to work, education etc.);
- Trip End Model Presentation Program (TEMPro) to provide projections of growth over time for use in local and regional transport models;
- HCC COMET modelling; and
- Published data and SADC's and DBC's online planning portals for information on committed developments and their associated effects in transport terms.

10.2.20 As set out within **Appendix 10.1**, a range of surveys were undertaken on the local road network in May 2019 to determine the baseline traffic conditions. The scope of these surveys was agreed with the local highway authority, HCC, as part of the updating of the Hemel Hempstead Paramics model.

10.2.21 In addition, surveys were undertaken in March and May 2025 to determine the baseline traffic conditions of the additional links outside the Hempstead Paramics model.

Assessment Methodology

10.2.22 The IEMA Guidance has been used to ensure that any adverse environmental effects arising due to predicted changes in traffic levels are properly and comprehensively addressed.

10.2.23 A multi-modal trip generation assessment was undertaken to identify the quantum of movements by mode and time as a result of the completed and operational Development and these were then assigned to the transport network.

10.2.24 **Appendix 10.1** provides a detailed analysis of the transport effects of the Development and, in particular, a thorough analysis of the traffic effects and driver delay potentially caused by the Development. A summary of these driver delay impacts is reported in this Chapter.

10.2.25 The first assessment (Core Assessment) has been undertaken against the Baseline to assess the Development on its own merits. An assessment has also been made against the Baseline with the requested committed developments included. It should be noted that the assessment in the baseline year does not include generic background traffic growth.

10.2.26 A Future Year (2041) assessment has been undertaken specifically for the ES only (it is not set out within the TA) which includes committed development (listed in Table 2.6 of this ES), planned developments through the local plan and traffic growth and is in effect a cumulative assessment. For clarity this does not include all of the growth set out within the 2041 Local Plan assessment which is based on COMET.

10.2.27 A Local Plan (2041) assessment has been undertaken to assess the effect of the Development traffic. It should be noted that the Future Baseline traffic conditions include committed development (listed in Table 2.6 of this ES), planned developments through the local plan and traffic growth and is in effect a cumulative assessment. This includes all of the growth within the HCC COMET model for the region and is designed to ensure consistency with the Local Plan assessments. The full list of inputs to this assessment are set out in Appendix Q: Forecasting Methodology of **Appendix 10.1**.

10.2.28 The Future Year (2041) and Local Plan (2041) assessments differ as the Local Plan (2041) assessment includes all growth within the HCC Comet model for the entire region whereas the Future Year (2041) assessment only includes cumulative development as agreed with the relevant authorities. Therefore it was agreed that both assessments would be undertaken to ensure an agreed assessment was undertaken but also to ensure the Transport Assessments were consistent with the Local Plan assessments undertaken to date.

10.2.29 It was agreed with the relevant authorities that the TA would include two assessments for the completed and operational Development, these are the Core Assessment and the Local Plan Assessment. Within this Chapter, an additional assessment in 2041 which does not include the future growth in SADC's and DBC's Local Plan is included. As such, reference to the scenarios between the TA and this Chapter are different, and to clarify this, the TA scenario reference is included in italics in the following Section.

10.2.30 Finally there is an Interim Assessment, undertaken when the Development is under construction. The year selected for this assessment is 2030 which is the period when construction is anticipated to peak and when there will be in the order of 250 homes complete. The methodology is set out within the **ES Volume 2, Chapter 6: The Works** and within **Appendix 10.1**.

Assessment Years

10.2.31 The proposed assessment years and scenarios are set out below.

Core Assessment

10.2.32 The following assessments have been considered:

- **Scenario 1 -** Observed Hemel Hempstead Base Model (2019 Base) (*Transport Assessment Scenario 1*);
- **Scenario 2 –** Estimated 2024 Year;
- **Scenario 3 -** Reference Case: 2019 Base Model + Committed Development (*Transport Assessment Scenario 2*); and
- **Scenario 4 -** Reference Case plus Development (*Transport Assessment Scenario 3*).

10.2.33 The observed traffic flows used to inform the assessment have been gathered from surveys undertaken on the local road network from May 2019.

10.2.34 The year used for the Base and Baseline assessments is 2019 as this is the last date before COVID when the traffic model for Hemel Hempstead was updated on behalf of HCC and this model has recently (2025) been agreed with HCC/NH as acceptable for use.

10.2.35 For the purpose of the ES, a 2024 estimated year has been provided which includes some updates to traffic flows based on surveys and / or traffic growth factors where available.

10.2.36 The traffic modelling methodologies are set out in detail within the TA within the Local Model Validation Report (LMVR), Model Specification Report and the Forecasting Methodology.

10.2.37 As part of the Development there is a requirement to provide a significant number of infrastructure schemes set out in detail within the TA. Where it is proposed as part of the Development this is included within the description of development (see **ES Volume 2, Chapter 5**) and where it is an offsite highways work (either direct S278 work or contribution towards a wider improvement) this is described within the TA.

ES Only Cumulative Assessment

10.2.38 The following assessments have been considered:

- **Scenario 5 –** Base Year Plus Committed Development (Scenario 3) and Cumulative Developments (Table 2.6); and

- **Scenario 6 -** Base Year Plus Committed Development (Scenario 3) and Cumulative Developments (Table 2.6) Plus East Hemel Hempstead.

10.2.39 The Base Year Cumulative assessment has been undertaken in addition to the standard base year assessment. This assessment has been undertaken to assess the effects of the Development against the baseline plus twenty-one committed developments set out within **ES Volume 2, Chapter 2** .

End of Local Plan Cumulative Assessment

10.2.40 A year of 2041 has been assessed for the 2041 Local Plan Reference Case and 2041 Local Plan Reference plus Development Case as this is the end of the Local Plan period.

10.2.41 The following assessments have been considered:

- **Scenario 7 –** 2041 Future Year (*Transport Assessment Scenario 4*); and
- **Scenario 8 –** 2041 Future Year Plus East Hemel Hempstead (*Transport Assessment Scenario 5*).

Interim Assessment 2030

10.2.42 In addition, an interim assessment has also been undertaken when peak construction is anticipated at the same time as some of the Site is occupied. The year chosen for this assessment is 2030. The assumptions for this assessment are set out in **ES Volume 2, Chapter 6: The Works** and **ES Volume 3, Appendix 10.1**.

10.2.43 The following assessments have been considered:

- **Scenario 9 –** Interim Assessment Reference Case (insert Transport Assessment Scenario 6); and
- **Scenario 10 –** Interim Assessment Reference plus Development Case (insert Transport Assessment Scenario 7).

Embedded and Additional Mitigation

10.2.44 The core assessment in this Chapter includes “designed in” mitigation which is considered to be embedded mitigation such as the Sustainable Transport Corridor (STC). The full list is set out within **Appendix 10.1**.

10.2.45 In the Future Years (Cumulative Assessment and Local Plan Assessment) the schemes included are those identified within applications, as part of the IDP and are schemes considered to be a product of the overall impacts of traffic growth (primarily due to Local Plan allocations) and not directly linked to the delivery of the East Hemel development. However, without these schemes it is not possible to obtain a proper estimation of network conditions, in 2041, without East Hemel. This is critical in considering the comparison between the scenarios without East Hemel and comparing them with the scenarios with East Hemel in order to isolate the effects of the East Hemel development. This full list is set out within **Appendix 10.1**.

Table 10.1: Summary of Potential Transport Provision

Ref.	Scheme	Description	Drawing No.	On / Off Site	Direct Delivery (DD) or Contribution
On Site and Access Provision (including Quietways)					
1	Redbourn Road Access	Create new site access to serve EHH and H1 Site	EHUK-VEC-ZZZ-XXX-DR-CR-00010.0-P10	On	DD with H1
2	Crossing of Nickey Line	Crossing of Nickey Line	EHUK-VEC-ZZZ-XXX-DR-CR-00010.0-P10	On	DD
3	Sustainable Transport Corridor	STC through the Site with associated junctions	EHUK-VEC-ZZZ-XXX-DR-CR-00010.0-P10	On	DD
4	Secondary and Tertiary Roads and Streets	As per Parameter Plans and Illustrative Layout	As per Parameter Plans and Illustrative Layout	On	DD
5	A414 / Breakspear Way Junction	A414 / Breakspear Way Junction Improvements	EHUK-VEC-ZZZ-XXX-DR-CR-00010.0-P10	On	DD
6	Foot/Cycle Bridge over A414	New foot/cycle bridge	Parameter Plans	On	DD
7	A4147 Leverstock Green - Site Accesses	Site access x 3 onto A4147	EHUK-VEC-ZZZ-XXX-DR-CR-00010.0-P10	On	DD
8	Cherry Tree Lane Quietway	Closure of Cherry Tree Lane to through traffic and crossing of B487 to connect to Holtsmere Lane	EHUK-VEC-ZZZ-XXX-DR-CR-00073-P2	On	DD
9	Hogg End Lane Quietway	Closure of Hogg End Lane to through traffic	EHUK-VEC-ZZZ-XXX-DR-CR-00073-P2	On	DD
10	Punchbowl Lane Quietway	Closure of Punchbowl Lane to through traffic	EHUK-VEC-ZZZ-XXX-DR-CR-00073-P2	On	DD
11	Green Lane (south of A414)	Closure of Green Lane as a through route between A414 and A4147 Leverstock Green Road	EHUK-VEC-ZZZ-XXX-DR-CR-00073-P2 + EHUK-VEC-ZZZ-XXX-DR-CR-0071	On	DD
12	Westwick Row	Closure of Westwick Row to through-traffic and no access from STC	EHUK-VEC-ZZZ-XXX-DR-CR-00073-P2	On	DD
13	Foot/Cycle Paths, PROW Improvements etc.	New off-street routes, PROW upgrades etc.	Parameter Plans	On	DD
14	Primary Mobility Hub	Commercial Area Primary Mobility Hub	N/A	On	DD
15	Secondary and Tertiary Mobility Hubs	Smaller Mobility Hubs within the Site as per Dev Spec	N/A	On	DD
Off-Site Highway Mitigation Included in Core Modelling Test					
1	A414/Maylands Avenue	Partial signalisation	EHUK-VEC-ZZZ-XXX-DR-CR-00078-P1	Off	Contribution
2	Three Cherry Trees Lane / Redbourn Road	Three Cherry Trees Lane / Redbourn Road/Shenley Road Signalisation	EHUK-VEC-ZZZ-XXX-DR-CR-00081-P1	Off	Contribution
3	Redbourn Road / Link Road / St Agnells Lane	Partial signalisation	EHUK-VEC-ZZZ-XXX-DR-CR-00077.2-P1	Off	Contribution
4	Link Road / Aycliffe Drive / Cambrian Way	Minor widening of entry / exit arms	EHUK-VEC-ZZZ-XXX-DR-CR-00077.1-P1	Off	Contribution
5	Speed Limit Amendments to roads surrounding the Site i.e. A4147 and B487	Speed limit changes - signage and TRO	N/A	Off	DD/Contribution
Potential Sustainable Transport Interventions (subject to discussion related to HGC IDP)					

Ref.	Scheme	Description	Drawing No.	On / Off Site	Direct Delivery (DD) or Contribution
1	A414	Active travel route on A414 from Green Lane (in the east) to Park Lane (in the west)	N/A	Off	Contribution
2	A4147	Active travel route on A4147 from southern site boundary to King Harry Lane (route to St Albans)	N/A	Off	Contribution
3	Swallowdale Lane / Queensway / Midland Road	Active travel route from site through Spencers Park along Queensway (B487) to the Marlowes	N/A	Off	Contribution
4	Redbourn Road	Active travel route from site access west along Redbourn Road to Redbourn Road / St Agnells Lane junction	N/A	Off	Contribution
5	Nickey Line	Improvements to surfacing, signage and potentially lighting on Nickey Line. Scope of works to be determined.	N/A	On/Off	Contribution
6	Nickey Line crossing - east of M1	Signalised crossing on Redbourn Road east of M1 where Nickey Line goes from south to north of carriageway (south west of Redbourn)	EHUK-VEC-ZZZ-XXX-DR-CR-00075-P1	Off	Contribution
7	Bus Priority Measures on A414	Bus priority at various locations	N/A	On/Off	Contribution
Travel Plan and Bus Subsidy					
1	New and Diverted Bus Routes	Bus subsidy to assist in pump priming bus service enhancements inc DRT	N/A	On/Off	Contribution
2	Travel Plan Measures	Various measures such as bus vouchers, cycle hire scheme, car club etc.	N/A	On/Off	DD and Contributions

Assumptions and Limitations

10.2.46 The following assumptions have been made:

- The main limitation to the baseline conditions presented within this Chapter is the precision of the traffic counts that form the baseline scenario. The link counts would have been recorded over a week and are typically subject to an accuracy of + or – 10%;
- The precise detail of Cumulative Schemes which are not permitted are based on publicly available data and where data is not available professional judgement has been used;
- A number of assumptions have been made in order to establish the trip generation of the completed and operational Development, including the proportion of new vehicle trips on the local highway network. The trip forecasts are based upon consideration of floor areas with trip rates proportional to the quantum of floorspace and the uses proposed. Further assumptions have been made regarding the assignment of these trips onto the highway network. The methodology for trip distribution is detailed within the **Appendix 10.1**;

- A number of assumptions have been made in relation to the interim assessment. Construction related movements estimates are set out in the CEMP alongside assumptions. It has been assumed that construction activities access will be from the A414 for HGVs. For construction staff, these have been distributed based on employment distribution for EH. It has been assumed that 250 homes are occupied at this interim assessment stage are split evenly between the northern and southern residential areas.

Significance Criteria

Link Sensitivity

10.2.47 The significance criteria within the IEMA Guidelines provide definitions of environmentally sensitive receptors, as well as affected groups and special interests. It further advises that the traffic effects from a development should be considered in respect of these receptors.

10.2.48 The sensitivity of a road or street can be defined by the vulnerability of the user groups who may use it, e.g., elderly people or children. A sensitive area may be where pedestrian activity is high, for example, in the vicinity of a school or where there is already an existing safety issue. The sensitivity of the receptor is judged on the sensitivity of road users (primarily pedestrians). It also takes account of the existing nature of the road e.g., an existing 'A' road is likely to have a lower sensitivity than a minor residential road.

10.2.49 **Table 10.2** details the environmentally sensitive receptors as defined by the IEMA Guidelines.

Table 10.2: Receptor Sensitivity Criteria

Receptor Sensitivity	Receptor Type
High	Receptors of greatest sensitivity to traffic flow: schools, colleges, playgrounds, accident clusters, retirement homes, road without footways that are used by pedestrians.
Medium	Traffic flow sensitive receptors: congested junctions, doctors' surgeries, hospitals, shopping areas with roadside frontage, roads with narrow footways, recreation facilities.
Low	Receptors with some sensitivity to traffic flow: places of worship, public open space, tourist attractions and residential areas with adequate footway provision.
Very Low	Receptors with low sensitivity to traffic flows and those sufficiently distanced from affected roads and junctions: links where no pedestrian activity occurs and where there is no provision for pedestrians. For example, strategic roads such as motorways and trunk roads or rural roads where there are no pedestrian-generating land uses within the vicinity.

10.2.50 A desktop exercise along with a series of Site visits has been undertaken to identify the sensitivity of each receptor in the study area. All road links within the study area have been assessed and assigned sensitivity primarily based

on the criteria set out in **Table 10.2**, as well as the assessors experience and judgement. The sensitivity of each link is provided in the **Section 10.4**.

Magnitude of Impact

10.2.51 Each impact is determined as the predicted deviation from the baseline conditions. The IEMA Guidelines advise that changes in traffic flow can be categorised by the magnitude of change and categorised as a magnitude of impact accordingly. This guidance sets out considerations, and in some cases thresholds, in respect of changes in the volume and composition of traffic to facilitate a subjective judgement of traffic impact and magnitude of impact. These thresholds are guidance only and provide a starting point by which a detailed analysis will inform a subjective analysis of the impact magnitude.

10.2.52 Within the IEMA Guidelines, the two broad rules set out above indicate that increases in traffic flows, which are greater than 10% (sensitive links) and greater than 30% (not sensitive links), are the starting point for any assessment.

10.2.53 Where the predicted increase in traffic flows is lower than the above thresholds, the IEMA Guidelines suggest that the significance of the effects can be stated to be Negligible and not significant and further detailed assessments are not warranted. Furthermore, increases in traffic flows below 10% are generally considered to be insignificant in environmental impact terms, given that daily variations in background traffic flow may vary by this amount.

10.2.54 The criteria relating to the magnitude of impact are 'negligible', 'low', 'medium or 'high'.

10.2.55 **Table 10.3** demonstrates the criteria used to determine magnitude of impacts. However, the absolute level of an impact is also important e.g., the total flow of traffic or heavy-duty vehicles (HDV) on a link. This is because an increase of, for example, 100% in the traffic flow on a road is likely to still lead to impacts of very low or low magnitude if the existing flows are low.

Table 10.3: Summary of Magnitude of Impacts (Based on IEMA Guidelines)

Issue / Impact	Magnitude of Impact			
	Negligible	Low	Medium	High
Severance	Change in total traffic or HDV flows of less than 30%	Change in total traffic or HDV flows of 30-60%	Change in total traffic or HDV flows of 60-90%	Change in total traffic or HDV flows over 90%
Driver Delay	A judgement based on the journey time assessment within the traffic model and the results of junction capacity assessment.			
Pedestrian Delay	Two-way traffic flow < 1,400 vehicles per hour	A judgement based on the road links with two-way traffic flow exceeding 1,400 vehicles per hour in context of the individual characteristics		

Issue / Impact	Magnitude of Impact			
	Negligible	Low	Medium	High
Pedestrian Amenity	Change in total traffic or HDV flows of less than 100%	A judgement based on the routes with >100% change in context of their individual characteristics		
Fear and Intimidation	A judgement based on the volume of traffic, HDV composition, proximity to people and the level of protection and summarised in this Chapter			
Accidents and Safety	A judgement based on quantitative analysis of collision data, summarised in this Chapter.			

Defining and Categorising the Effect

10.2.56 The scale of an effect has been judged based on the relationship between the magnitude of impact and the assessed sensitivity of the receptor.

10.2.57 **Table 10.4** presents the Scale of Effects Matrix used within this assessment.

Table 10.4: Scale of Effects Matrix

		Sensitivity of Receptor			
		High	Medium	Low	Very Low
Magnitude of Impact	High	Major (Significant)	Major (Significant)	Moderate (Significant or Not Significant)	Minor (Not Significant)
	Medium	Major (Significant)	Moderate (Significant or Not Significant)	Minor (Not Significant)	Minor (Not Significant)
	Low	Moderate (Significant or Not Significant)	Minor (Not Significant)	Minor (Not Significant)	Negligible (Not Significant)
	Negligible	Minor (Not Significant)	Minor (Not Significant)	Negligible (Not Significant)	Negligible (Not Significant)

10.2.58 Potential effects are therefore concluded to be of Negligible, Minor, Moderate or Major in scale. For each effect, it is concluded whether the effect is 'Beneficial' or 'Adverse'. Whether an effect is considered to be significant or not is identified above.

10.2.59 The following terms have been used to define the scale of effects:

- Major: where the Development is likely to cause a considerable change from the baseline conditions and the receptor has limited adaptability, tolerance or recoverability or is of the highest sensitivity. This effect is considered to be 'Significant';
- Moderate: where the Development is likely to cause either a considerable change from the baseline conditions at a receptor which has a degree of adaptability, tolerance or recoverability or a less than considerable change at a receptor that has limited adaptability, tolerance or recoverability. This effect is considered more likely to be 'Significant', but will be subject to professional judgement;
- Minor: where the Development is likely to cause a small, but noticeable change from the baseline conditions on a receptor which has limited adaptability, tolerance or recoverability or is of the highest sensitivity; or where the Development is likely to cause a considerable change from the baseline conditions at a receptor which can adapt, is tolerant of the change or/and can recover from the change. This effect is considered likely to be 'Not Significant' but will be subject to professional judgement; and
- Negligible: where the Development is unlikely to cause a noticeable change at a receptor, despite its level of sensitivity or there is a considerable change at a receptor which is not considered sensitive to a change. This effect is 'Not Significant.'

Temporal Scope of Effects

10.2.60 The temporal range of effects is described as short, medium or long term, or temporary or permanent, as shown below. For the assessment of the Development's operational phase, the impacts are permanent, whereas for construction they are likely to be long term and temporary.

- Short term: < 12 months;
- Medium Term: 1 - 5 years;
- Long term: > 5 years; and
- Permanent: effects that are considered to be irreversible or extremely long lasting.

10.2.61 At a spatial level, 'Site' or 'local' effects are those affecting the Site and neighbouring receptors, while effects upon receptors beyond the vicinity of the Site and its neighbours, are at a 'district' level. Effects affecting Hertfordshire are at a 'regional' level, whilst those which affect different parts of the country, or England as a whole, are at a 'national' level.

10.2.62 It should be noted that these temporal and spatial effects are only applied to effects which are considered to be significant effects.

10.3 Relevant Baseline Conditions

Pedestrian Accessibility

10.3.1 The existing facilities for pedestrians in the vicinity of the Site are considered appropriate for the current location of the Site and level of movement in the surround area. The majority of the roads have suitable footway provision with the exception of Cherry Trees Lane, Green Lane and Westwick Row to the west of the Site.

10.3.2 There is a footway provided along the north side of the A414 Breakspear Way carriageway to the west of the Breakspear Roundabout which leads into the centre of Hemel Hempstead. To the west of the junction with Buncefield Lane, the footway widens to become a shared use footway / cycleway. On the south side of the A414 Breakspear Way a recently constructed footway runs between the Breakspear Roundabout and the junction with Buncefield Lane. On the eastern side of Buncefield Lane, the footway becomes a shared use footway / cycleway which connects to a signal-controlled staggered toucan crossing which facilitates crossing of the A414 Breakspear Way for pedestrians and cyclists. An additional dropped kerb crossing with tactile paving is provided to the west of the Breakspear Roundabout with pedestrians able to use the central verge separation as a refuge island. To the east of the junction there is a footway on the south side of the A414 Breakspear Way which connects to the existing Public Right of Way. There are currently limited opportunities to cross the A414 Breakspear Way carriageway elsewhere within the vicinity of the Site.

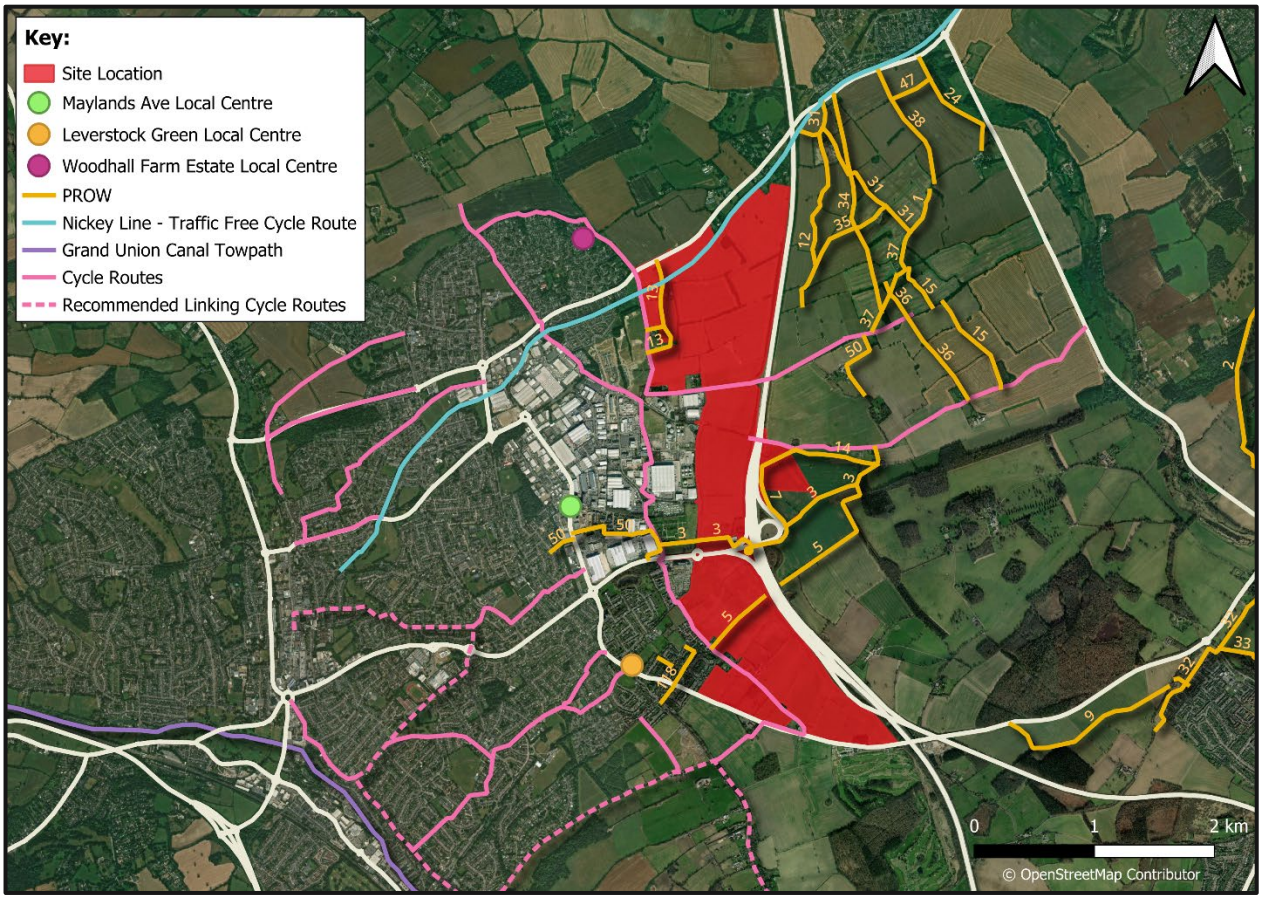
10.3.3 In the immediate vicinity of the Site (to the east of Cherry Tree Lane), there are limited footways on B487 Hemel Hempstead Road (Redbourn Road). From Cherry Tree Lane heading west into Hemel Hempstead there are footways along the southern side of the carriageway. A footway commences on the northern side of the carriageway west of Shenley Road. The footway on the south side of the carriageway provides suitable walking routes to local facilities within the Woodhall and Grovehill areas to the northwest of the Site.

10.3.4 Buncefield Lane benefits from a recently introduced 'Quietway' which provides a walking and cycling route, to Leverstock Green, Maylands and the Nickey Line. At the Buncefield Lane / Boundary Way roundabout, a Dutch-style roundabout has been constructed providing cycle lanes around the roundabout connecting to the Quietway on Buncefield Lane, new pedestrian crossing point and wide footways.

10.3.5 Footways of appropriate width are provided throughout the residential areas to the southwest of the Site, as well as along the A4147 Hemel Hempstead Road, within the vicinity of the Leverstock Green local centre. Street lighting is present at regular intervals and dropped kerbs are in place at crossing points.

10.3.6 The Nickey Line runs in an east-west direction to the north of the Development. The Nickey Line provides an attractive walking route from close to the Site towards Hemel Hempstead Town Centre as well as traffic-free access to local schools and employment areas. A number of PRoWs intersect the Nickey Line and provide onwards connectivity to destinations within Hemel Hempstead. **Figure 10.2** shows the location of all PRoWs including footpaths and bridleways and the Nickey Line in the vicinity of the Site.

Figure 10.2: Existing Walking and Cycling Routes



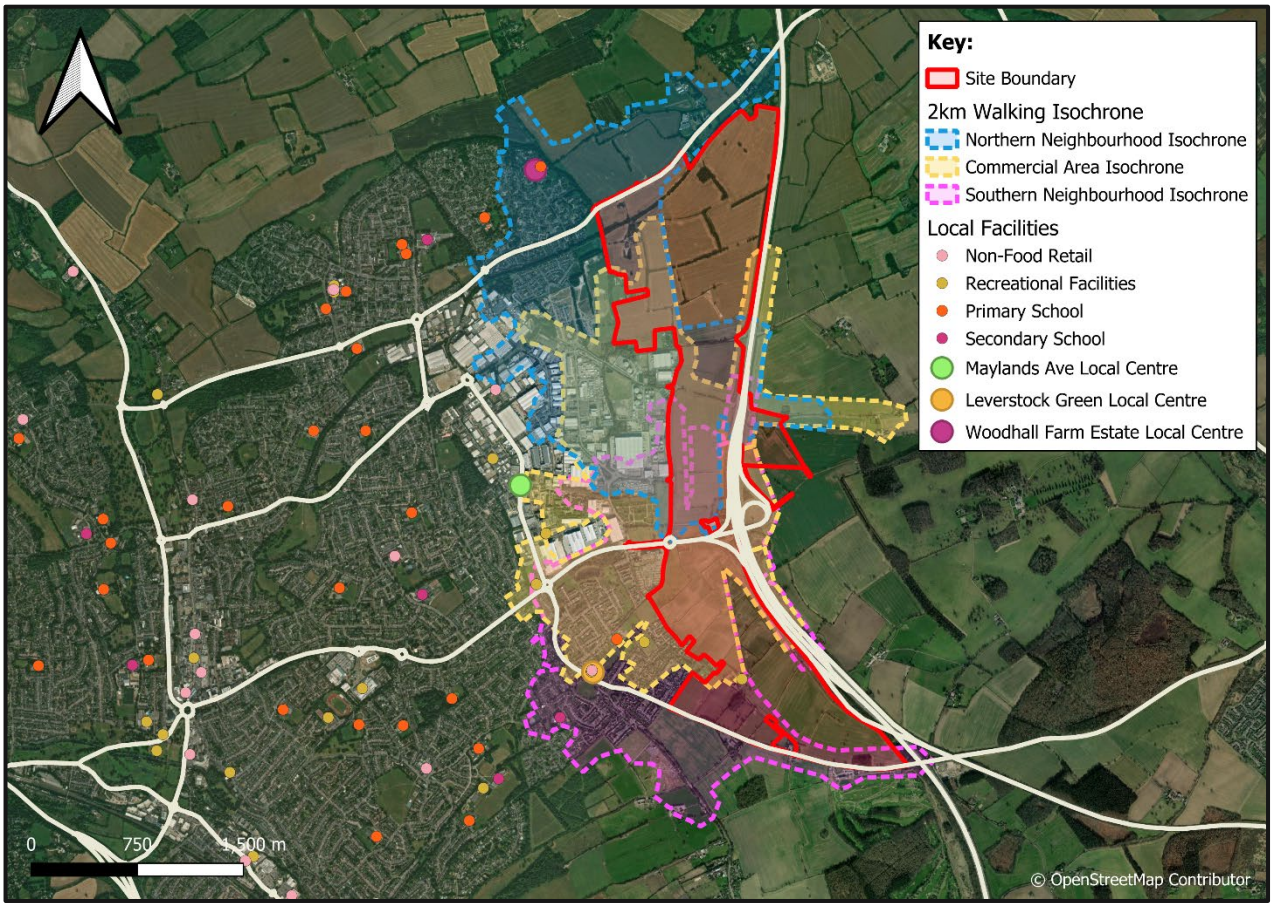
10.3.7 Footpath (FP) 003 runs through the area proposed to form the Commercial Area parcel of the Site. From Green Lane, it runs parallel to the north of the A414 Breakspear Way before passing beneath the northbound on-slip and, via a stairwell, travelling above the M1 and leading towards further open agricultural areas to the east of the M1 motorway.

10.3.8 FP131 provides a short pedestrian route between Green Lane and Buncefield Lane, passing approximately 100m to the north of the A414 Breakspear Way. Upgrades to FP131 were secured as part of planning permission 21/03793/MOA to provide a surfaced, 3m wide route between Green Lane and Buncefield Lane. To the north of the Site, both FP13 and FP44 join together to form a pedestrian route that runs parallel to Cherry Tree Lane. To the south, FP5 bisects the area proposed to be occupied by the Southern Neighbourhood, connecting with Westwick Row at its western extent.

10.3.9 Further PROWS (FP50, FP51 and FP52) provide routes through the Maylands Employment Area to the west of the Site.

10.3.10 A walking isochrone showing a 2km distance from the centre of each development parcel is shown at **Figure 10.3**.

Figure 10.3: 2km Catchment from Each Development Parcel



10.3.11 The isochrone demonstrates that based on the existing network that several local facilities within the Woodhall Farm and Leverstock Green areas comprising a range of facilities such as a community centre, post office, medical centre and a Sainsbury's supermarket are within walking distance of the closest development area. Additionally, the Maylands Employment Area and Maylands Avenue local centre are also accessible within this walking distance.

Cyclists

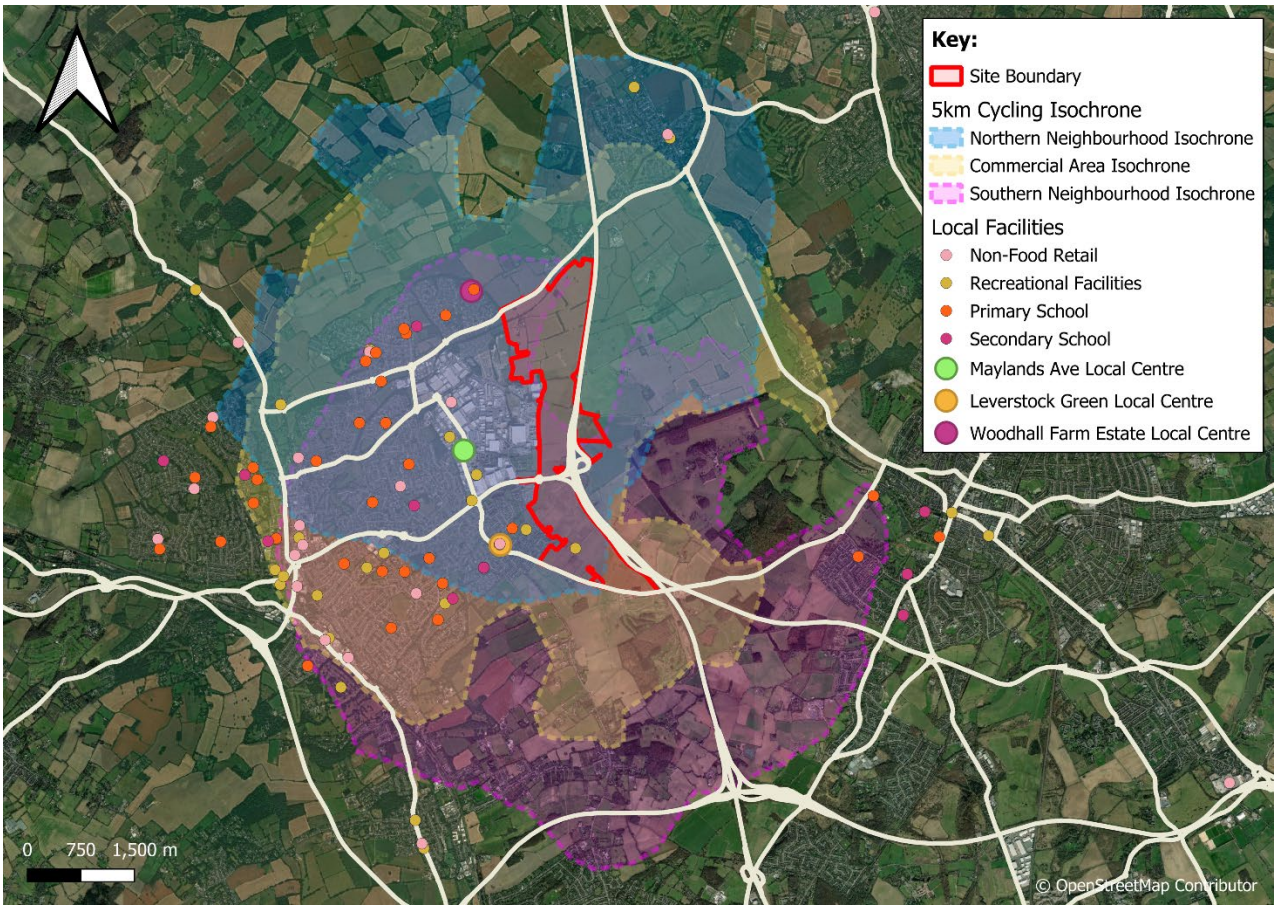
10.3.12 To accompany the shared use footway / cycleway which runs along the northern side of the A414 Breakspear Way from Buncefield Lane to Maylands Avenue, cycle parking has been provided on both sides of the carriageway within the vicinity of the Buncefield Lane junctions.

10.3.13 As previously mentioned, a Quietway has been provided on Buncefield Lane between its junction with Green Lane to the south and Cherry Trees Lane to the north. Bollards have been installed between Green Lane and A414 Breakspear Way and Green Lane whilst rumble strips have been added between Boundary Way and Cherry Trees Lane to alert drivers to the presence of the Quietway and encourage lower vehicle speeds. The route connects to the toucan crossing on the A414 Breakspear Way and the new Dutch roundabout with Boundary Way.

10.3.14 To the north of the Site is the Nickey Line which is an off-road cycle route connecting with Harpenden to the north and leading towards Hemel Hempstead Town Centre.

10.3.15 In addition to the dedicated cycling facilities in the vicinity of the Site, there is also the opportunity for cyclists to use the local roads. A large number of facilities are within 5 km of the Site, including the town centre and railway station. Based on the local cycle routes, a cycling catchment showing a 5km and 8km distance from the centre of each development parcel is included at **Figure 10.4**.

Figure 10.4: 5km Catchment from Each Development Parcel



Existing Bus Services

10.3.16 Within the vicinity of the Northern Neighbourhood and the Commercial Area, there are several existing bus services that pass within an accessible distance of the Site. There are four bus stops located within the immediate vicinity of the boundary of the Site on Boundary Way, Redbourn Road, opposite Shenley Road, and Redbourn Road near Cherry Tree Lane.

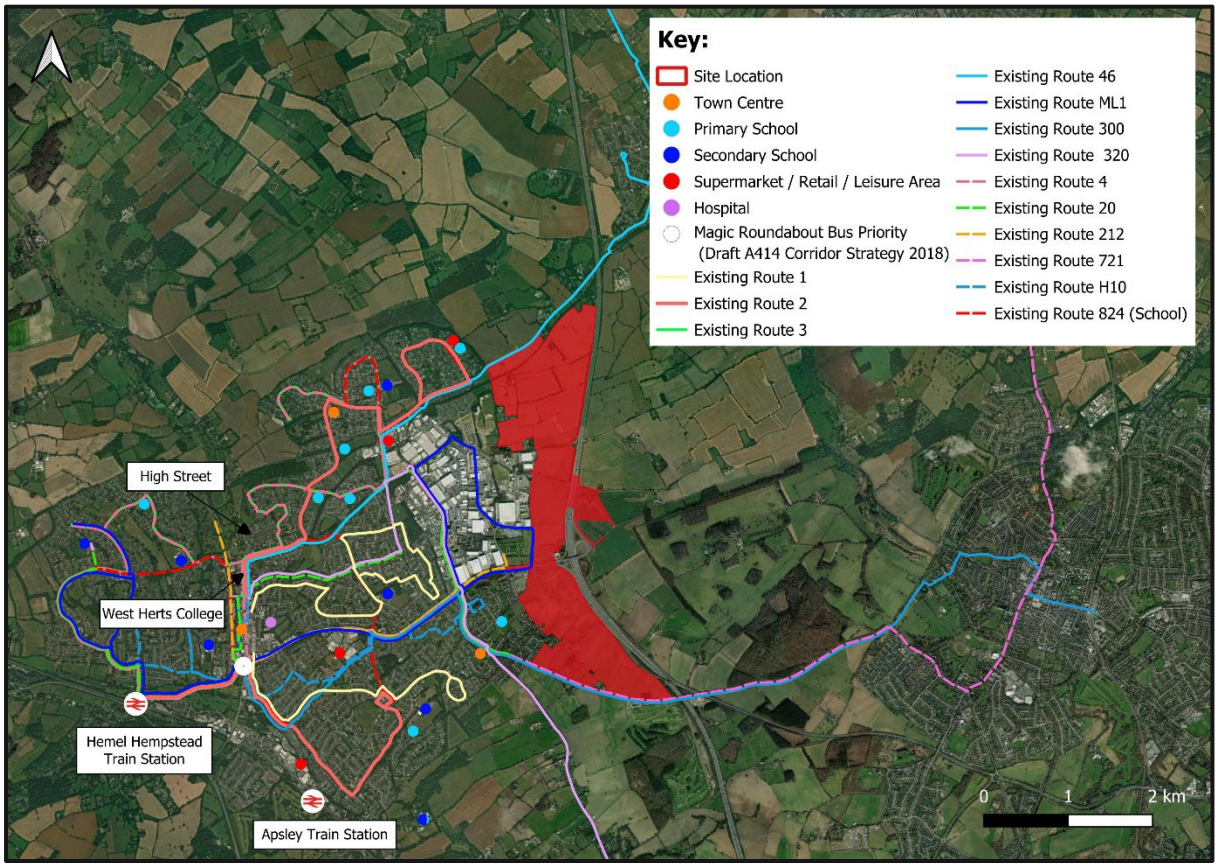
10.3.17 With regards to the Southern Neighbourhood, a number of bus stops can be found along the A414 within the vicinity of its junction with Green Lane as well as along the A4147 near to Pancake Lane and Greenacres.

10.3.18 Existing local services and their approximate frequencies are listed in **Table 10.5** below and shown on **Figure 10.5** (along with bus stop locations).

Table 10.5: Local Bus Services & Approximate Frequencies

Service	Route	Approximate Frequency (mins)		
		Weekday	Saturday	Sunday
1	Leverstock Green (Circular)	60	60	-
2	Woodhall Farm – Bennetts End	20	30	60
46	Luton – Hemel Hempstead	60	60	-
ML1	Hemel Hempstead Railway Station – Maylands Ave. (Circular)	30 (peak periods only)	-	-
302	Hemel Hempstead Railway Station – Welwyn Garden City Bus Station	30	30	60

Figure 10.5: Existing Bus Services and Stops



Existing Rail Services

10.3.19 There are two railway stations within an approximate distance of 5km of the Site: Hemel Hempstead Railway Station and Apsley Railway Station. Both stations are managed by London Midland and direct services are provided to destinations in the south such as London and Croydon and in the north, such as Tring, Milton Keynes and Northampton.

10.3.20 Additionally, Harpenden Station is approximately 8km to the northeast of the Site and is accessible via the Nickey Line. Harpenden Station can be reached in around half an hour by bicycle from the centre of the Northern Neighbourhood, while a cycle time of around 40-minutes is achievable from the Commercial Area and the Southern Neighbourhood. Services available from Harpenden Station include Thameslink services via central London to Rainham and Three Bridges, while to the north, services run to Bedford and Luton.

10.3.21 Apsley Railway Station benefits from 12 secure cycle parking spaces whilst Hemel Hempstead station benefits from 200 secure cycle parking spaces.

10.3.22 A summary of the destinations and frequencies of services from Apsley and Hemel Hempstead railway stations is provided in the **Table 10.6** below.

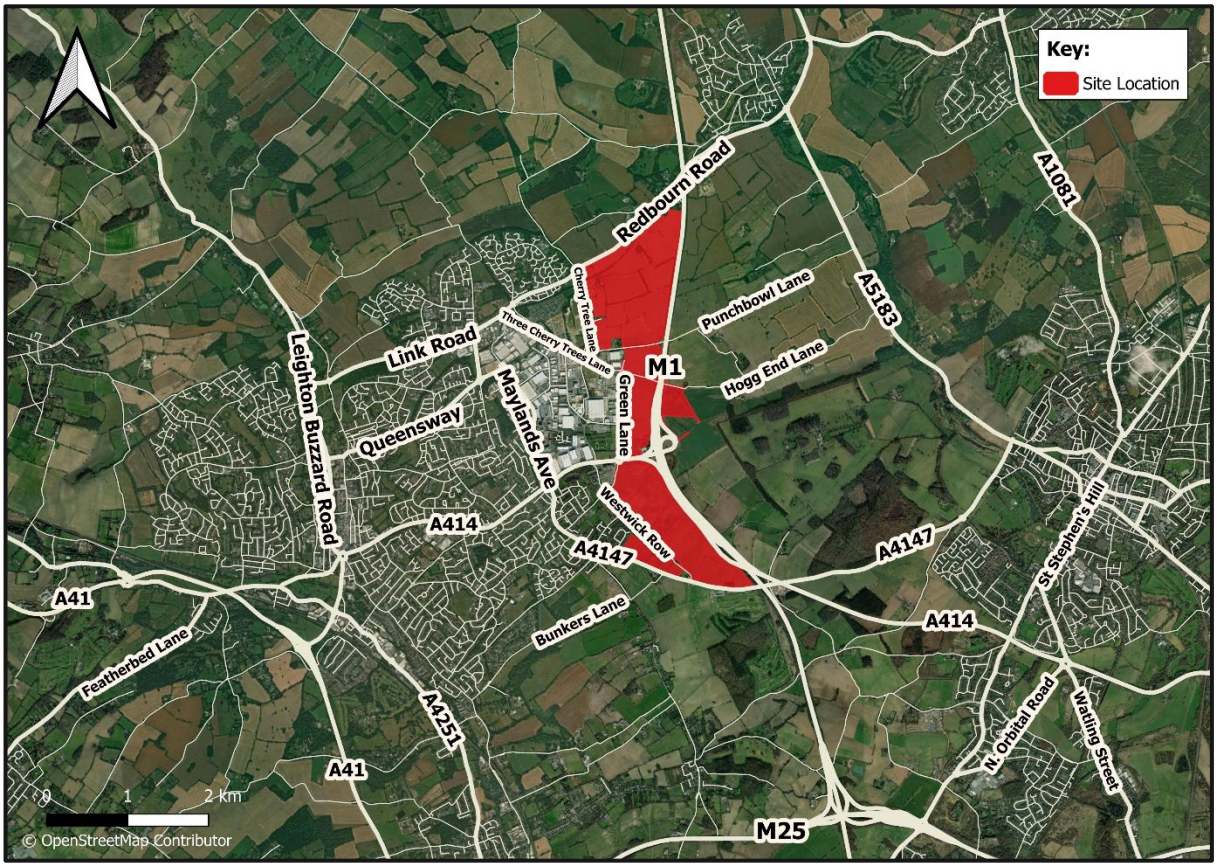
Table 10.6: Local Bus Services & Approximate Frequencies

Service	Destinations	Approximate Frequency (mins)	
		Monday - Saturday	Sunday
London Euston – Tring	London Euston, Harrow & Wealdstone, Watford Junction, Hemel Hempstead, Berkhamsted, Tring	10-30	30-60
London Euston – Milton Keynes Central	London Euston, Harrow & Wealdstone, Bushey, Watford Junction, Kings Langley, Apsley, Hemel Hempstead, Berkhamsted, Tring, Cheddington, Leighton Buzzard, Bletchley, Milton Keynes Central	30	60

Local Highway Network

10.3.23 The Site has good connections to the local and strategic highway network; these are shown in **Figure 10.6**.

Figure 10.6: Local and Strategic Highway Network



The M1 motorway

10.3.24 The M1 motorway bounds the Site to the east and is a north-south motorway connecting London to Leeds. Four lanes are provided along the M1 motorway in each direction for through-traffic within the vicinity of M1 Junction 8.

10.3.25 M1 Junction 8 connects the A414 Breakspear Way (discussed below) with the M1. Junction 8 has both north and south facing slip roads which allows travel in both directions.

A414

10.3.26 The A414 runs parallel to the M1 motorway for approximately 1.8km to the south of Junction 8 and connects St Albans to Hemel Hempstead. It then forms a junction with the M1 (Junction 8) and provides access into Hemel Hempstead town centre to the west.

10.3.27 The A414 is a strategic route which passes through Hemel Hempstead with a general east-west alignment. To the west, the A414 provides access into Hemel Hempstead town centre before connecting with the A41. To the east, the A414 forms an orbital route to the south of neighbouring St Albans.

10.3.28 The A414 Breakspear Way forms a four-armed roundabout junction with Green Lane known as Breakspear Roundabout to the west of Junction 8.

10.3.29 Between the M1 (Junction 8) and Breakspear Roundabout, the A414 is a dual carriageway subject to the national speed limit. On approach to the roundabout, the A414 westbound carriageway divides into three lanes and is subject to part-time traffic signals to stagger the westbound traffic flows onto the roundabout.

10.3.30 Approximately 230 metres to the east of the roundabout, the A414 westbound carriageway forms a signalised priority-controlled junction with the M1 motorway northbound off-slip. To the east of Breakspear Roundabout, the A414 eastbound is a dual carriageway subject to 50 miles per hour speed limit. It provides access to the on-slips to the M1 motorway.

Redbourn Road / Hemel Hempstead Road (B487)

10.3.31 The B487 runs along the northern boundary of the Northern Neighbourhood and connects Hemel Hempstead to Redbourn village in the north. To the north-east, the B487 passes under the M1 and forms a roundabout junction with the A5183 and High Street. The A5183 connects to Junction 9 of the M1 motorway further to the north.

10.3.32 To the east of the B487 Hemel Hempstead Road / Cherry Tree Lane / Holtsmere End Land crossroads junction (at the north-western edge of the Site) to the B487 Hemel Hempstead Road / A5183 / High Street roundabout at Redbourn, the B487 Hemel Hempstead Road is subject to the national speed limit.

10.3.33 Although there are no pedestrian or cycle facilities along this section of the road, there are three bus stops, which are served by bus route 46. Two of these stops are located close to Aubrey Lane, whilst the other is located along the northern side of the B487 Hemel Hempstead Road near its junction with Little Revel End in Redbourn.

10.3.34 Two further bus stops are located either side of the road near the B487 Hemel Hempstead Road (Redbourn Road) / Cherry Tree Lane / Holtsmere End Land crossroads junction, which are also served by bus routes 46 and 307.

10.3.35 Approximately 300m to the west of the junction with Cherry Tree Lane, there is a signalised junction of the B487 Redbourn Road and Shenley Road which is the eastern access to the residential area known as Woodhall Farm /

Grovehill. Shenley Road provides a loop from the B487 Redbourn Road to the nearby schools, supermarket and the residential area to the north of the Site.

10.3.36 Continuing west there is a four-arm roundabout connecting B487 Redbourn Road / Three Cherry Trees Lane and Shenley Road which provides access to the Woodhall Farm / Grovehill residential area to the north and Maylands Industrial Estate to the south.

10.3.37 Further west, the B487 Redbourn Road forms a roundabout with St Agnells Lane/A4147 Link Road /B487 Redbourn Road.

10.3.38 The section of the B487 Redbourn Road between the B487 Redbourn Road / Cherry Tree Lane / Holtsmere End Land crossroads and the St Agnells Lane / A4147 Link Road / B487 Redbourn Road roundabout is subject to 40 miles per hour speed limit.

10.3.39 To the west of the B487 Redbourn Road / Shenley Road roundabout towards the B487 Redbourn Road / St Agnells Lane / A4147 Link Road / B487 Redbourn Road roundabout, the B487 Redbourn Road benefits from footways along both sides of the road up to the B487 Redbourn Road / Half Moon Meadow, where the southern footway terminates. This section of the B487 Redbourn Road also has good pedestrian crossing facilities and is considered to be suitable for cyclists.

10.3.40 It should also be noted that the B487 Redbourn Road is one of the main routes into Hemel Hempstead town centre from the north-east.

Cherry Tree Lane

10.3.41 Cherry Tree Lane is a single carriageway road located to the west of the Northern Neighbourhood. It is subject to a 7.5 tonne weight restriction along the extent of the road. There is a narrow footway along its eastern side but none on the western side.

10.3.42 Cherry Tree Lane is a tree-lined rural road. It has been identified in local consultation events that this route is often used for rat running traffic.

10.3.43 Cherry Tree Lane forms a crossroad junction with Three Cherry Trees Lane and Buncefield Lane to the south and with B487 Redbourn Road to the north. Cherry Trees Lane also provides a connection to Hogg End Lane, Green Lane and Punchbowl Lane.

Punchbowl Lane

10.3.44 Punchbowl Lane is accessed via Cherry Tree Lane to the west and is relatively rural in nature. Punchbowl Lane passes under the M1 motorway before providing access onto A5183 Redbourn Road to the east. It is currently used as a route to access St Albans.

Three Cherry Trees Lane

10.3.45 Three Cherry Trees Lane is a single carriageway road subject to 30 miles per hour speed limit. Towards its northern end, Three Cherry Trees Lane forms a priority-controlled junction with Swallowdale Lane, although this is to be upgraded to signals as part of the Spencers Park residential scheme. Further north of this junction, there is a height restriction in place along Three Cherry Trees Lane under the Nickey Line bridge and a width restriction preventing large vehicles from accessing this road from the B487 Redbourn Road/Shenley Road/Three Cherry Trees Lane roundabout to the north. The road provides access to the new residential development known as Spencer's Park which is accessed via a new roundabout and simple priority junctions. The development is currently under construction.

Hogg End Lane

10.3.46 Hogg End Lane is accessed via the Green Lane/Three Cherry Trees Lane/Hogg End Lane roundabout to the west. Similar to Punchbowl Lane, Hogg End Lane is relatively rural in nature and also passes under the M1 motorway, providing access to A5183 Redbourn Road to the east and thus providing a route between the east side of Hemel Hempstead and St Albans.

Green Lane

10.3.47 Green Lane is located to the west of the Site and forms a roundabout with the A414.

10.3.48 To the north of the A414, it provides access to the Maylands Employment Area and is used by a high percentage of HGVs and is a single carriageway road of industrial nature. It connects to Boundary Way and Cherry Tree Lane to provide onwards northern connectivity though the Maylands Employment Area.

10.3.49 As part of planning permission for new commercial units (ref 21/03793/MOA which was granted by DBC in June 2023), a new 3m wide shared footway/cycleway has been secured between the A414 and Boundary Way. This development gains access at the Boundary Way/Green Lane roundabout.

10.3.50 To the south of the A414, Green Lane provides access to Breakspear Park office development, and the residential area of Leverstock Green including Leverstock Green C of E Primary School. It is a single carriageway road and is rural in nature at its northern end.

10.3.51 From the school to where Green Lane joins the A4147bLeverstock Green Way, it becomes more residential in nature and has good level of provision for pedestrians and cyclists.

Hemel Hempstead Road (A4147)

10.3.52 The A4147 Hemel Hempstead Road is a single carriageway road that runs along the southern boundary of the Site.

10.3.53 At its northern extent, the A4147 Leverstock Green Way connects with the A414 Breakspear Way/St Albans Road/Maylands Avenue/A4147 Leverstock Green Way four-armed roundabout. To the south, the A4147 Hemel Hempstead Road provides onward connectivity to St Albans.

10.3.54 Within the vicinity of the Leverstock Green residential neighbourhoods, the A4147 Leverstock Green Way is subject to 30 miles per hour speed limit. To the south of its junction with Greenacres, where it becomes the A4147 Hemel Hempstead Road, the speed limit increases to 40 miles per hour.

Westwick Row

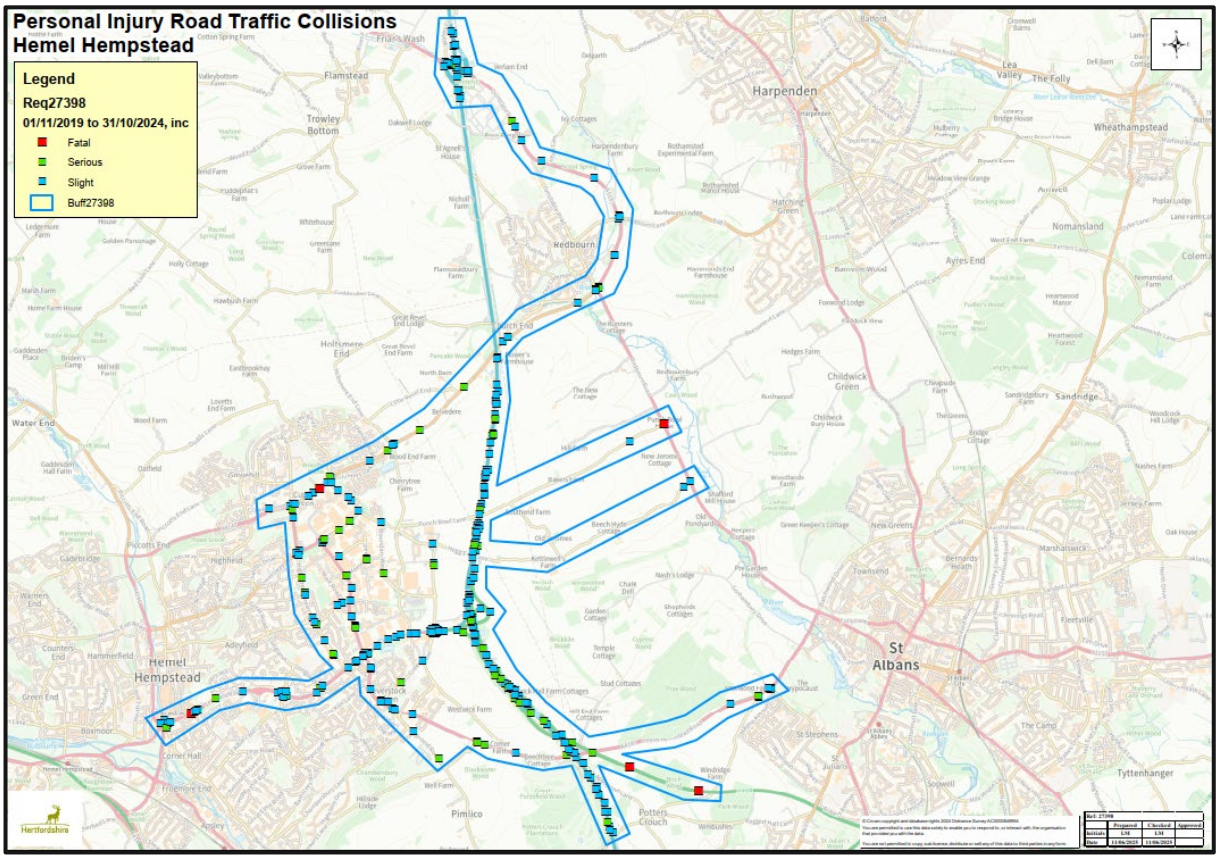
10.3.55 Westwick Row is a single carriageway road subject to the national speed limit and passes along the western boundary of the Southern Neighbourhood of the Site. At present Westwick Row provides access to a number of residential properties and is mainly rural in nature.

10.3.56 Westwick Row forms a priority junction with both Green Lane and the A4147 Hemel Hempstead Road to the north and south respectively.

Accident Data

10.3.57 Details of the Personal Injury Accidents (PIAs) recorded in the study area have been obtained from HCC for the latest 5-year period between 08th November 2019 and 20th October 2024. The study area is illustrated in **Figure 10.7** and includes the M1 motorway, the A414, the A4147, the A5138 and B487.

Figure 10.7: Collision Data within the Study Area



10.3.58 The data demonstrates that there was a total of 356 accidents recorded in the study area during the five-year period, resulting in a total of 547 casualties. Of the recorded casualties, 282 were classified as being 'Slight', 69 were deemed to be 'Serious', and 5 were classified as 'Fatal'.

10.3.59 A summary of the accidents recorded during the five-year period is provided in **Table 10.7** below.

Table 10.7: Summary of Accidents

Year	Severity			
	Fatal	Serious	Slight	Total
2019	0	2	10	12
2020	2	10	42	54
2021	0	16	74	90
2022	0	15	65	80
2023	2	16	60	78
2024	1	10	31	42
Total	**5**	**69**	**282**	**356**

Future Baseline Conditions

10.3.60 It is anticipated that as other committed and cumulative developments are built out that there will be changes to the transport network.

10.3.61 For each of the reference cases (Scenario 3, Scenario 5, Scenario 7 and Scenario 9) there are a range of transport schemes proposed which alter the pedestrian, cycle, public transport and highway network. This is set out in detail within the Transport Assessment.

Traffic Flows

10.3.62 The Reference Case traffic flows are shown **in Appendix 10.3** for 24 Hour AADT, AM peak hour and PM peak hour.

10.3.63 The Development Case traffic flows are shown **in Appendix 10.3** for 24 Hour AADT, AM peak hour and PM peak hour.

10.3.64 The traffic flows are defined in terms of total vehicles and HDV, which is a class of vehicle over 3.5 tonnes and this includes vehicles from transit vans to rigid/articulated vehicles with three or more axles with a maximum gross weight of up 44 tonnes, including Public Service Vehicles (PSVs). It should be noted at this point that not all Heavy Good Vehicles (HGVs) are also HDVs. The classification of HGVs is the same as HDVs except that PSVs are excluded.

10.3.65 The traffic flows are provided for the following periods:

- 24 Hour AADT;
- AM peak hour – 08:00-09:00; and

- PM peak hour – 17:00-18:00.

With Development Conditions

10.3.66 A full description of the Development has been provided within **ES Volume 2, Chapter 5: The Development** and within the Transport Assessment. The following paragraphs provide a summary of the principles of the Development proposals.

10.3.67 When considering the design of the Site, the overarching transport vision for the Development is to reduce the need to travel offsite by private car. Sustainable means of travel will be supported and incentivised in order to achieve a modal shift away from private car journeys and this is summarised in detail within the Sustainable Transport Strategy which has been submitted as part of the Transport Assessment.

10.3.68 As part of the proposals, the following accesses will be constructed and will serve the Development:

- Northern Neighbourhood
  - Access from B487 Redbourn Road via a signalised junction, including an at grade crossing of the Nickey Line;
  - Separate Bus only access from B487 Redbourn Road;
  - Connection to Spencer's Park Phase 2 to the west for sustainable modes only;
  - Connection to Punchbowl Lane; and
  - HGV control between northern residential area and commercial area.
- Commercial Area
  - Access from Three Cherry Trees Lane / Green Lane junction;
  - Connection to Hogg End Lane with movement to the east of M1 motorway restricted;
  - Roundabout providing access to safeguarded route for potential future new M1 motorway overbridge;
  - Roundabout providing access to Green Lane and connecting to Prologis commercial development;
  - Access from A414 Breakspear Way; and
  - Accesses onto Green Lane;
- Southern Neighbourhood
  - Access from A414 Breakspear Way;
  - Access from A4147 Hemel Hempstead Road to the south; and
  - Access from A4147 to the residential plot south of Westwick Row.

10.3.69 As part of the overall strategy a STC will eventually be created from B487 Redbourn Road in the north to the A4147 Hemel Hempstead Road in the south.

10.3.70 Full details of the Transport Strategy are included within the Transport Assessment and the plans submitted for determination.

Walking and Cycling

10.3.71 To encourage walking and reduce the need for car journeys a comprehensive network of pedestrian and cycle routes will be provided across the Site, enabling internal journeys to be undertaken without using a car. These routes will link with existing walking and cycling facilities in the local area, in order to encourage active travel between the Site and local facilities.

10.3.72 The Access and Movement Parameter Plan shows the key routes which are briefly described below:

- Connection to the Nickey Line at the at grade crossing;
- A north/south route commencing at the existing farm access on B487 Redbourn Road and in the main utilising existing tracks to reach Punchbowl Lane;
- An east/west route that will run alongside the road link connecting Spencer's Park with the STC and continue further to the east to serve the secondary school and local centre;
- Further connection opportunities to the Cherry Tree Quietway;
- A route running along the eastern side of the southern residential neighbourhood that links the A414 and A4147 Hemel Hempstead Road (allowing a connection to the proposed cycle route on the A4147 to St Albans);
- Connection to Green Lane in the north west corner of southern residential area; and
- A new foot/cycle bridge over the A414 at Breakspear to facilitate active travel between the north/central and southern areas.

10.3.73 The Masterplan aim is to create a walkable and cyclable neighbourhood. It is to provide day to day facilities, to encourage healthy lifestyles and to provide convenience and useful services for the residents, employees and visitors of the Development.

Public Transport Improvements

10.3.74 The STC will be served by bus routes along its length, connecting to Hemel Garden Communities (HGC) to the north as well into Hemel Hempstead, Redbourn, and St Albans. This will be provided by a combination of new and extended existing routes.

10.3.75 The bus routes will align with key mobility hubs, offering interchanges between transport modes, such as bus to cycle and bus to walk (vice-versa).

10.3.76 There is also the potential to integrate the Hertfordshire Essex Rapid Transit (HERT) as part of the strategic public transport network. Within the southern neighbourhood, the layout of residential development areas will facilitate a future link between the STC and the A414 to accommodate Bus-Only movements westbound from St Albans as part of the potential future HERT network.

10.3.77 The location of this link off the A414 will be positioned to avoid any impact on the existing or future noise bund that runs parallel and to the west of the M1/A414.

10.3.78 The link will encompass a corridor comprised of a 6.3m carriageway plus segregated pedestrian footpaths to either side, and its alignment will be capable of accommodating westbound bus movements (eastbound HERT movements are expected to route along the A414 to the east of the M1).

10.3.79 Because of the need for a residential street in this location with or without the link, the future STC link can be accommodated within the residential area without any material change to the quantum of residential development land or the character, density and housing typology envisaged for this location.

10.3.80 The precise alignment and design of the link from the STC will be determined at Key Phase and/or through Reserved Matters Applications.

10.3.81 Parcels south of Westwick Row will additionally be served by new stops on existing routes along A4147 Hemel Hempstead Road.

10.3.82 Mobility Hubs will be provided within the development areas. A Primary Mobility Hub will be provided within the commercial area close to the A414. A Secondary Mobility Hub will be provided in each of the two local centres. Tertiary Mobility Hubs will be located at intervals within the development. The vast majority of homes will be within 400m walking distance of a bus stop. Further detail on Mobility Hubs is included in the Sustainable Transport Section.

10.3.83 TCE will work in partnership with the highway authorities and local bus operators to facilitate attractive and viable bus routes. Bus services will be delivered in a phased manner responding to increased demand. It is proposed to ensure that services are provided early in the life of the development in order to encourage establishment of sustainable habits.

Travel Planning

10.3.84 As part of the Development an FTP has been submitted. The purpose of this FTP is to set out an overarching strategy to ensure that travel made by residents and visitors of the Site is carried out in the most sustainable means possible.

10.3.85 The predominant aim of this FTP is to put in place the management tools deemed necessary to enable users to make more informed decisions about their travel which at the same time minimises the adverse impacts of the Development on the environment. This is achieved by setting out a strategy for eliminating the barriers keeping people from using sustainable modes which in effect self manages single-occupancy vehicle use.

10.4 Likely Effects of the Development and their Significance

The Works – Scenario 9 and 10

10.4.1 As noted previously within this Chapter, Scenario 9 and Scenario 10 form the Works Assessment. The standard assessment considers the effects of the construction of the Development plus occupation of 250 homes on Site against the transport network including traffic and infrastructure improvements associated with committed developments i.e. those with planning permission (including but not limited to Spencer's Park and Prologis) plus prorata growth to 2030. Therefore the transport chapter has undertaken a cumulative assessment.

10.4.2 The 24-hour AADT traffic flows have been calculated on each link using daily factors derived from traffic flow information of the surrounding links.

10.4.3 Flows for Scenario 9 and Scenario 10, are contained within **Appendix 10.3**, present the total vehicle flows by link with and without development for the AM peak, PM peak and 24 Hour AADT respectively.

10.4.4 It is shown that, over a 24-hour period, a total of one link experiences an increase in total vehicle traffic above 30%. A further single link experiences an estimated increase in HDV movements only of above 30%. Therefore, only these 2 links are above the threshold for undertaking more detailed assessment (Rule 1 at paragraph 10.2.16).

10.4.5 A further 5 links are considered to have a receptor sensitivity of either medium or high and an increase of between 10%-30% in terms of HDVs, whilst no further single link meets the threshold in terms of total vehicles. These 5 further links are therefore also included in this detailed assessment (Rule 2 at paragraph 10.2.16).

10.4.6 The 7 links listed below therefore require a more detailed assessment:

- Link 25 - Jupiter Drive (West) (Rule 2 – HDVs);
- Link 26 - Jupiter Drive (East) (Rule 1 – HDVs);
- Link 55 – High Street (Rule 2 – HDVs);
- Link 74 – B4505 Box Lane (Rule 2 – HDVs);
- Link 88 – Belswains Lane (South) (Rule 2 – HDVs);
- Link 95 – Bennets End Road (Rule 2 – HDVs); and
- Link 102 – Westwick Row (Rule 1 – Total Vehicles).

10.4.7 Some links within the study area are expected to experience reductions in total traffic and/or HDV traffic flows. This is the result of the Paramics modelling software creating a dynamic model, whereby traffic is reassigned to the most convenient route if its chosen route becomes less convenient. For example, if additional traffic associated with construction is allocated to specific links via a routing strategy, some background traffic may be displaced to other links which provide a more convenient option in this situation.

10.4.8 The potential effects, following the magnitude of change and scale of effect criteria set out in **Table 10.3** and **Table 10.4**, are summarised below in **Table 10.8**. It should be noted that as per IEMA guidelines, the individual characteristics of each link has been considered when applying magnitude of change criteria. For example, where percentage changes in traffic flows may be deemed significant, the actual increase in traffic may be just a few vehicles, if the existing flows are low. This has been noted when defining the residual effects. In addition, in some cases, strategic links may not permit pedestrian/cycle activity. Where this is the case, this is noted and there is deemed to be no impact on Severance, Non-Motorised User (NMU) Delay, NMU Amenity and Fear and Intimidation.

Table 10.8: Assessment of potential effects, embedded mitigation, residual effects and monitoring during Interim Assessment Year (Works Scenarios)

Sensitive Receptor	Sensitivity of Receptor	Potential Effects / Embedded Mitigation / Residual Effects and Monitoring
Link 25 - Jupiter Drive (West) (Rule 2 – HDVs)	High	Across a day there is an 2% increase in total traffic and a 29% increase in HDVs on this link. However, based on further investigation while the level of HDVs increases by 29% this increase is only 16 vehicles across 24 hours. As such the magnitude of change has been reduced based on professional judgement from high to negligible in relation to severance. This volume of change on this link is not considered to be a material change to the character of the link. There is a small reduction in queuing at the junction of Jupiter Drive and Queensway during the AM and PM Peak Period which are considered to be a negligible magnitude of change. Across an hour the level of vehicle movement is very low and as such the change in terms of pedestrian delay / amenity is negligible. There are no collision clusters on this link attributable to the highway layout or infrastructure. The magnitude of change in relation to accidents and safety, based on the change in traffic flows and the character of the link is therefore negligible. Summary of magnitude of change on the link: • Severance: Negligible magnitude of change; • Driver Delay: Negligible magnitude of change; • NMU Delay: Negligible magnitude of change; • NMU Amenity: Negligible magnitude of change; • Fear and Intimidation: Negligible magnitude of change; and • Accidents and Safety: Negligible magnitude of change. **Embedded Mitigation** N/A **Residual Impact** The sensitivity of Link 25 is high. All residual effects are direct, local and temporary. • Severance: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**;

Sensitive Receptor	Sensitivity of Receptor	Potential Effects / Embedded Mitigation / Residual Effects and Monitoring
		• Driver Delay: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)** ; • NMU Delay: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)** ; • NMU Amenity: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)** ; • Fear and Intimidation: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**; • Accidents and Safety: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant).**
Link 26 - Jupiter Drive (East) (Rule 2 – HDVs)	High	Across a day there is an 3% increase in total traffic and a 38% increase in HDVs on this link. However, based on further investigation while the level of HDVs increases by 38% this increase is only 19 vehicles across 24 hours. As such the magnitude of change has been reduced based on professional judgement from high to negligible in relation to severance. This volume of change on this link is not considered to be a material change to the character of the link. There is no material change in queuing at the junction of Jupiter Drive and Queensway during the AM and PM Peak Period which are considered to be a negligible magnitude of change. Across an hour the level of vehicle movement is very low and as such the change in terms of pedestrian delay / amenity is negligible. There are no collision clusters on this link attributable to the highway layout or infrastructure. The magnitude of change in relation to accidents and safety, based on the change in traffic flows and the character of the link is therefore negligible. Summary of magnitude of change on the link: • Severance: Negligible magnitude of change; • Driver Delay: Negligible magnitude of change; • NMU Delay: Negligible magnitude of change; • NMU Amenity: Negligible magnitude of change; • Fear and Intimidation: Negligible magnitude of change; and • Accidents and Safety: Negligible magnitude of change. **Embedded Mitigation** N/A **Residual Impact** The sensitivity of Link 26 is high. All residual effects are direct, local and temporary. • Severance: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**;

Sensitive Receptor	Sensitivity of Receptor	Potential Effects / Embedded Mitigation / Residual Effects and Monitoring
		• Driver Delay: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**; • NMU Delay: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**; • NMU Amenity: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**; • Fear and Intimidation: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**; and • Accidents and Safety: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**.
Link 55 – High Street	Medium	Across a day there is an 0.4% increase in total traffic and a 20% increase in HDVs on this link. However, based on further investigation while the level of HDVs increases by 20% this increase is only 1 vehicle across 24 hours. As such the magnitude of change has been reduced based on professional judgement from medium to negligible in relation to severance. This volume of change on this link is not considered to be a material change to the character of the link. There is no material change in queuing at the junction of High Street during the AM and PM Peak Period which are considered to be a negligible magnitude of change. Across an hour the level of vehicle movement is very low and as such the change in terms of pedestrian delay / amenity is negligible. There are no collision clusters on this link attributable to the highway layout or infrastructure. The magnitude of change in relation to accidents and safety, based on the change in traffic flows and the character of the link is therefore negligible. Summary of magnitude of change on the link: • Severance: Negligible magnitude of change; • Driver Delay: Negligible magnitude of change; • NMU Delay: Negligible magnitude of change; • NMU Amenity: Negligible magnitude of change; • Fear and Intimidation: Negligible magnitude of change; and • Accidents and Safety: Negligible magnitude of change. **Embedded Mitigation** N/A **Residual Impact** The sensitivity of Link 55 is medium. All residual effects are direct, local and temporary. • Severance: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**;

Sensitive Receptor	Sensitivity of Receptor	Potential Effects / Embedded Mitigation / Residual Effects and Monitoring
		• Driver Delay: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; • NMU Delay: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; • NMU Amenity: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; • Fear and Intimidation: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; and • Accidents and Safety: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant).**
Link 74 – Box Lane	Medium	Across a day there is a 1% increase in total traffic and a 10% increase in HDVs on this link. However, based on further investigation while the level of HDVs increases by 10% this increase is only 34 vehicles across 24 hours which equates to 1-2 per hour. As such the magnitude of change has been reduced based on professional judgement to low in relation to severance. This volume of change on this link is not considered to be a material change to the character of the link. There is an no increase in queuing at the junction of Box Lane / A4251 London Road which is considered to be a negligible magnitude of change. There are no collision clusters on this link attributable to the highway layout or infrastructure. The magnitude of change in relation to accidents and safety, based on the change in traffic flows and the character of the link is therefore negligible. Summary of magnitude of change on the link: • Severance: Low magnitude of change; • Driver Delay: Negligible magnitude of change; • NMU Delay: Negligible magnitude of change; • NMU Amenity: Negligible magnitude of change; • Fear and Intimidation: Negligible magnitude of change; and • Accidents and Safety: Negligible magnitude of change. **Embedded Mitigation** N/A **Residual Impact** The sensitivity of Link 74 is medium. All residual effects are direct, local and temporary. • Severance: The magnitude of change, following mitigation, is low. The effect is **Minor Adverse (Not Significant)**; • Driver Delay: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**;

Sensitive Receptor	Sensitivity of Receptor	Potential Effects / Embedded Mitigation / Residual Effects and Monitoring

		• NMU Delay: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**;
		• NMU Amenity: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**;
		  • Fear and Intimidation: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**; and
		  • Accidents and Safety: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant).**

Link 88 – Belswains Lane (South)	Medium	Across a day there is an 0.7% increase in total traffic and a 18% increase in HDVs on this link. However, based on further investigation while the level of HDVs increases by 11% this increase is only 19 vehicles across 24 hours. As such the magnitude of change has been reduced based on professional judgement to low in relation to severance. This volume of change on this link is not considered to be a material change to the character of the link. There is an no increase in queuing at the junction of Belswains Lane which is considered to be a negligible magnitude of change. There are no collision clusters on this link attributable to the highway layout or infrastructure. The magnitude of change in relation to accidents and safety, based on the change in traffic flows and the character of the link is therefore negligible. Summary of magnitude of change on the link: • Severance: Low magnitude of change; • Driver Delay: Negligible magnitude of change; • NMU Delay: Negligible magnitude of change; • NMU Amenity: Negligible magnitude of change; • Fear and Intimidation: Negligible magnitude of change; and • Accidents and Safety: Negligible magnitude of change. **Embedded Mitigation** N/A **Residual Impact** The sensitivity of Link 88 is medium. All residual effects are direct, local and temporary. • Severance: The magnitude of change, following mitigation, is low. The effect is **Minor Adverse (Not Significant)**; • Driver Delay: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**; • NMU Delay: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**;

Sensitive Receptor	Sensitivity of Receptor	Potential Effects / Embedded Mitigation / Residual Effects and Monitoring
		• NMU Amenity: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**; • Fear and Intimidation: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**; and • Accidents and Safety: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant).**
Link 95 – Bennetts End Road	High	Across a day there is an 1.7% increase in total traffic and a 16% increase in HDVs on this link. However, based on further investigation while the level of HDVs increases by 11% this increase is only 16 vehicles across 24 hours. As such the magnitude of change has been reduced based on professional judgement to low in relation to severance. This volume of change on this link is not considered to be a material change to the character of the link. There are no collision clusters on this link attributable to the highway layout or infrastructure. The magnitude of change in relation to accidents and safety, based on the change in traffic flows and the character of the link is therefore negligible. Summary of magnitude of change on the link: • Severance: Low magnitude of change; • Driver Delay: Negligible magnitude of change; • NMU Delay: Negligible magnitude of change; • NMU Amenity: Negligible magnitude of change; • Fear and Intimidation: Negligible magnitude of change; and • Accidents and Safety: Negligible magnitude of change. **Embedded Mitigation** N/A **Residual Impact** The sensitivity of Link 95 is high. All residual effects are direct, local and temporary. • Severance: The magnitude of change, following mitigation, is low. The effect is **Minor Adverse (Not Significant)**; • Driver Delay: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**; • NMU Delay: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**; • NMU Amenity: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**; • Fear and Intimidation: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant**); and

Sensitive Receptor	Sensitivity of Receptor	Potential Effects / Embedded Mitigation / Residual Effects and Monitoring
		• Accidents and Safety: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant).**
Link 102 – Westwick Row	High	Across a day there is an 32% increase in total traffic and no change in HDVs on this link. However, based on further investigation while the level of traffic increases by 32% this increase is only 173 cars across 24 hours. As such the magnitude of change has been reduced based on professional judgement to low in relation to severance. It should also be noted that this is only a short term effect as in the long term Westwick Row is closed as a through route through the creation of a quietway but it is not assumed it is created during the construction phase. This volume of change on this link is not considered to be a material change to the character of the link. There are no collision clusters on this link attributable to the highway layout or infrastructure. The magnitude of change in relation to accidents and safety, based on the change in traffic flows and the character of the link is therefore negligible. Summary of magnitude of change on the link: • Severance: Low magnitude of change; • Driver Delay: Negligible magnitude of change; • NMU Delay: Negligible magnitude of change; • NMU Amenity: Negligible magnitude of change; • Fear and Intimidation: Negligible magnitude of change; and • Accidents and Safety: Negligible magnitude of change. **Embedded Mitigation** N/A **Residual Impact** The sensitivity of Link 102 is high. All residual effects are direct, local and temporary. • Severance: The magnitude of change, following mitigation, is low. The effect is **Minor Adverse (Not Significant)**; • Driver Delay: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**; • NMU Delay: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**; • NMU Amenity: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**; • Fear and Intimidation: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**; and • Accidents and Safety: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant).**

The Completed and Operational Development

Core Assessment (Scenario 3 and Scenario 4)

10.4.9 As noted previously within this Chapter, Scenario 3 and Scenario 4 form the Core Assessment. The Core Assessment considers the effects of the Development against the transport network including traffic and infrastructure improvements associated with committed developments i.e. those with planning permission (including but not limited to Spencer's Park and Prologis). Therefore the transport chapter has undertaken a cumulative assessment.

10.4.10 A detailed traffic generation methodology and distribution exercise is included within the TA for the Development.

10.4.11 The 24-hour AADT traffic flows have been calculated on each link using daily factors derived from traffic flow information of the surrounding links.

10.4.12 Flows for Scenario 3 and Scenario 4, the latter of which are contained within **Appendix 10.3**, present a comparison of the total vehicle flows by link with and without development for the AM peak, PM peak and 24 Hour AADT respectively.

10.4.13 It is shown that, over a 24-hour period, a total of two links experience an increase in total vehicle traffic above 30%. Of these, one link also experiences an increase of over 30% in terms of HDV movements. A further nine links experience an estimated increase in HDV movements only of above 30%. Therefore, only these 11 links are above the threshold for undertaking more detailed assessment (Rule 1 at paragraph 10.2.16).

10.4.14 A further 2 links are considered to have a receptor sensitivity of either medium or high and an increase of between 10%-30% in terms of total vehicles, whilst a further single link meets the threshold in terms of HDVs. These 3 further links are therefore also included in this detailed assessment (Rule 2 at paragraph 10.2.16).

10.4.15 The 14 links listed below therefore require a more detailed assessment:

- Link 4 - M1 motorway SB On/Offslip (J8 Bridge) (Rule 1 – HDVs);
- Link 6 - A414 Breakspear Way (East) (Rule 1 – HDVs);
- Link 7 - A414 Breakspear Way (W of Buncefield Lane) (Rule 1 – Total Vehicles);
- Link 14 - Piccotts End Road (N of Link Road) (Rule 1 & 2 – HDVs);
- Link 26 - Jupiter Drive (East) (Rule 2 – HDVs);
- Link 48 - Green Lane (N of Boundary Way) (Rule 1 – HDVs);
- Link 54 - Green Lane (S of Boundary Way) (Rule 1 – Total Vehicles & HDVs);
- Link 97 - A4147 Leverstock Green Way (Rule 2 – Total Vehicles & HDVs);
- Link 104 - A4147 Hemel Hempstead Road (Rule 1 – HDVs);

- Link 107 - A414 SB (S of J8) (Rule 1 – HDVs);
- Link 108 - A414 NB Offslip of J8 (Rule 1 – HDVs);
- Link 110 - A414 NB Onslip of J8 (Rule 1 – HDVs);
- Link 117 - A414 to M1 motorway SB Onslip of J8 (Rule 1 – HDVs); and
- Link 123 - A4147 Leverstock Green Way (Rule 2 – Total Vehicles & HDVs).

10.4.16 Some links within the study area are expected to experience reductions in total traffic and/or HDV traffic flows. This is the result of the Paramics modelling software creating a dynamic model, whereby traffic is reassigned to the most convenient route if its chosen route becomes less convenient. For example, if additional traffic associated with construction is allocated to specific links via a routing strategy, some background traffic may be displaced to other links which provide a more convenient option in this situation.

10.4.17 The potential effects, following the magnitude of change and scale of effect criteria set out in **Table 10.3** and **Table 10.4**, are summarised below in **Table 10.9.** It should be noted that as per IEMA guidelines, the individual characteristics of each link has been considered when applying magnitude of change criteria. For example, where percentage changes in traffic flows may be deemed significant, the actual increase in traffic may be just a few vehicles, if the existing flows are low. This has been noted when defining the residual effects. In addition, in some cases, strategic links may not permit pedestrian/cycle activity. Where this is the case, this is noted and there is deemed to be no impact on Severance, Non-Motorised User (NMU) Delay, NMU Amenity and Fear and Intimidation.

Table 10.9: Assessment of potential effects, embedded mitigation, residual effects and monitoring during Operational Year (Core Scenarios)

Sensitive Receptor	Sensitivity of Receptor	Potential Effects/Embedded Mitigation/Residual Effects and Monitoring
Link 4 - M1 motorway SB On/Off slip (J8 Bridge)	Very Low	Across a day there is a 22% increase in total traffic and a 43% increase in HDVs on this link. Link 4 is the bridge over the M1 motorway. There are no crossing points and a footway separated by guard railing is provided to the south of the road. Due to the strategic nature of this link, only minimal pedestrians have been recorded in this location and no cyclists have been recorded. There are no immediate desire lines, apart from people making use of the PRoW network to the east of the M1 motorway. As such NMU delay, amenity and fear and intimidation are reduced to negligible in terms of magnitude of change based on professional judgement. This volume of change on links to/from the motorway is not considered to be a material change to the character of the link, which is strategic in nature. There are no collision clusters on this link attributable to the highway layout or infrastructure. The magnitude of change in relation to accidents and safety, based on the change in traffic flows and the character of the link is therefore negligible. Summary of magnitude of change on the link:

Sensitive Receptor	Sensitivity of Receptor	Potential Effects/Embedded Mitigation/Residual Effects and Monitoring
		• Severance: Low magnitude of change; • Driver Delay: Low magnitude of change; • NMU Delay: Negligible magnitude of change; • NMU Amenity: Negligible magnitude of change; • Fear and Intimidation: Negligible magnitude of change; and • Accidents and Safety: Negligible magnitude of change. **Embedded Mitigation** This link is to the east of the highway works for Breakspear Junction and as a result part of an overall network of improvements as part of the Development which are considered embedded mitigation. **Residual Impact** The sensitivity of Link 4 is very low. All residual effects are direct, local and permanent. • Severance: The magnitude of change, following mitigation, is low. The effect is **Negligible (Not Significant)**; • Driver Delay: The magnitude of change, following mitigation, is low. The effect is **Negligible (Not Significant)**; • NMU Delay: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; • NMU Amenity: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; • Fear and Intimidation: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; and • Accidents and Safety: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant).**
Link 6 - A414 Breakspear Way (East)	Very Low	Across a day there is a 19% increase in total traffic and a 36% increase in HDVs on this link. Link 6 is the A414 link between Green Lane and the M1 motorway. There are no existing pedestrian crossing points and a footway is provided to the south of the road. Due to the strategic nature of this link, only minimal pedestrians have been recorded in this location and no cyclists have been recorded. There are no immediate desire lines, apart from people making use of the PRoW network to the east of the M1 motorway. As such NMU delay, amenity and fear and intimidation are reduced to negligible in terms of magnitude of change based on professional judgement. This volume of change on this link which connects to the M1 motorway is not considered to be a material change to the character of the link, which is strategic in nature.

Sensitive Receptor	Sensitivity of Receptor	Potential Effects/Embedded Mitigation/Residual Effects and Monitoring
		There are no collision clusters on this link attributable to the highway layout or infrastructure. The magnitude of change in relation to accidents and safety, based on the change in traffic flows and the character of the link is therefore negligible. Summary of magnitude of change on the link: • Severance: Low magnitude of change; • Driver Delay: Low magnitude of change; • NMU Delay: Negligible magnitude of change; • NMU Amenity: Negligible magnitude of change; • Fear and Intimidation: Negligible magnitude of change; and • Accidents and Safety: Negligible magnitude of change. **Embedded Mitigation** This link is part of the improvement as part of the Development at Breakspear Junction and as a result part of an overall network of improvements as part of the Development which are considered embedded mitigation. Furthermore, a new pedestrian and cycle bridge will be provided across this link to further reduce the potential for any pedestrian/cycle effects. **Residual Impact** The sensitivity of Link 6 is very low. All residual effects are direct, local and permanent. • Severance: The magnitude of change, following mitigation, is low. The effect is **Negligible (Not Significant)**; • Driver Delay: The magnitude of change, following mitigation, is low. The effect is **Negligible (Not Significant)**; • NMU Delay: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; • NMU Amenity: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; • Fear and Intimidation: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; and • Accidents and Safety: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant).**
Link 7 - A414 Breakspear Way (W of Buncefield Lane)	Low	Across a day there is a 40% increase in total traffic and an 8% increase in HDVs on this link. Link 7 is the A414 link between Green Lane and Maylands Avenue. The flows on this link increase largely as a result of the infrastructure improvements included within the assessment at both Green Lane / A414 and Maylands

Sensitive Receptor	Sensitivity of Receptor	Potential Effects/Embedded Mitigation/Residual Effects and Monitoring
		Avenue / A414 which release a constraint within the network by improving junction performance. There is a footway along the northside of the A414 Breakspear Way along the length of the link, there is a signalised pedestrian crossing in the middle of the link which has recently been installed by HCC and to the east of the link there is a newly improved pedestrian footpath. Due to these relatively recent improvements there are some pedestrian movements in the area as new developments have been built on the northside of the A414 Breakspear Way. Traffic flows are generally over 1,400 vehicles per hour and speeds can be above 40mph. This volume of change on this link while over 30% is not a significant change as the road is currently a dual carriageway and will remain the same and accommodate the same level of traffic. There are no collision clusters on this link attributable to the highway layout or infrastructure. The magnitude of change in relation to accidents and safety, based on the change in traffic flows and the character of the link is therefore negligible. Summary of magnitude of change on the link: • Severance: Low magnitude of change; • Driver Delay: Low magnitude of change; • NMU Delay: Low magnitude of change; • NMU Amenity: Negligible magnitude of change; • Fear and Intimidation: Negligible magnitude of change; and • Accidents and Safety: Negligible magnitude of change. **Embedded Mitigation** This link is part of the improvement as part of the Development at Breakspear Junction and as a result part of an overall network of improvements as part of the Development which are considered embedded mitigation. **Residual Impact** The sensitivity of Link 7 is low. All residual effects are direct, local and permanent. • Severance: The magnitude of change, following mitigation, is low. The effect is **Minor Adverse (Not Significant)**; • Driver Delay: The magnitude of change, following mitigation, is low. The effect is **Minor Adverse (Not Significant)**; • NMU Delay: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**; • NMU Amenity: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**;

Sensitive Receptor	Sensitivity of Receptor	Potential Effects/Embedded Mitigation/Residual Effects and Monitoring
		• Fear and Intimidation: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; and • Accidents and Safety: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant).**
Link 14 - Piccotts End Road (N of Link Road)	Medium	Across a day there is a 2% increase in total traffic and a 100% increase in HDVs on this link. However, based on further investigation while the level of HDVs increases by 100% this increase is only 18 vehicles across 24 hours which equates to less than 1 per hour and is only a total of 35 HDVs on this link in 24 hours. As such the magnitude of change has been reduced based on professional judgement from high to low in relation to severance. Link 14 is the Piccotts End Road which connects Piccotts End to Hemel Hempstead via Link Road. It has a footway present along its length on the eastern side of the carriageway. This volume of change on this link is not considered to be a material change to the character of the link. There is an increase in queuing at the junction of Piccotts End Road and Link Road however this is only in the AM Peak hour which is considered to be a low magnitude of change. There are no collision clusters on this link attributable to the highway layout or infrastructure. The magnitude of change in relation to accidents and safety, based on the change in traffic flows and the character of the link is therefore negligible. Summary of magnitude of change on the link: • Severance: Low magnitude of change; • Driver Delay: Low magnitude of change; • NMU Delay: Negligible magnitude of change; • NMU Amenity: Negligible magnitude of change; • Fear and Intimidation: Negligible magnitude of change; and • Accidents and Safety: Negligible magnitude of change. **Embedded Mitigation** N/A **Residual Impact** The sensitivity of Link 14 is medium. All residual effects are direct, local and permanent. • Severance: The magnitude of change, following mitigation, is low. The effect is **Minor Adverse (Not Significant)**; • Driver Delay: The magnitude of change, following mitigation, is low. The effect is **Minor Adverse (Not Significant)**;

Sensitive Receptor	Sensitivity of Receptor	Potential Effects/Embedded Mitigation/Residual Effects and Monitoring
		• NMU Delay: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**; • NMU Amenity: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant);** • Fear and Intimidation: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**; and • Accidents and Safety: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant).**
Link 26 - Jupiter Drive (East)	High	Across a day there is an 8% increase in total traffic and a 11% increase in HDVs on this link. However, based on further investigation while the level of HDVs increases by 11% this increase is only 5 vehicles across 24 hours. As such the magnitude of change has been reduced based on professional judgement from high to negligible in relation to severance. This volume of change on this link is not considered to be a material change to the character of the link. There is a small reduction in queuing at the junction of Jupiter Drive and Queensway during the AM Peak Period and a negligible change in the PM Peak Period which are considered to be a negligible magnitude of change. Across an hour the level of vehicle movement is very low and as such the change in terms of pedestrian delay / amenity is negligible. There are no collision clusters on this link attributable to the highway layout or infrastructure. The magnitude of change in relation to accidents and safety, based on the change in traffic flows and the character of the link is therefore negligible. Summary of magnitude of change on the link: • Severance: Very Low magnitude of change; • Driver Delay: Negligible magnitude of change; • NMU Delay: Negligible magnitude of change; • NMU Amenity: Negligible magnitude of change; • Fear and Intimidation: Negligible magnitude of change; and • Accidents and Safety: Negligible magnitude of change. **Embedded Mitigation** N/A **Residual Impact** The sensitivity of Link 26 is high. All residual effects are direct, local and permanent. • Severance: The magnitude of change, following mitigation, is low. The effect is **Minor Adverse (Not Significant)**;

Sensitive Receptor	Sensitivity of Receptor	Potential Effects/Embedded Mitigation/Residual Effects and Monitoring

		• Driver Delay: The magnitude of change, following mitigation, is low. The effect is **Minor Adverse (Not Significant)**;
		• NMU Delay: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**;
		• NMU Amenity: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**;
		  • Fear and Intimidation: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**; and
		  • Accidents and Safety: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant).**

Link 48 - Green Lane (N of Boundary Way)	Very Low	Across a day there is an 80% reduction in total traffic and a 90% increase in HDVs on this link. This is because Green Lane north of Boundary Way is closed to through traffic but provides access to some commercial buildings within the Site. However while there is an 90% increase in HDVs this only equates to an increase in 22 HDVS over 24 hours on an industrial road as such this has been reduced to a low magnitude of change. Link 54 is the existing Green Lane link to the A414 from Maylands which accommodates traffic and HDVs associated with the Maylands Industrial Estate. At present there is no footway on this link as it located adjacent to Buncefield Terminal. However, based on observations there are limited observed pedestrian and cycle movements in this area at present and predicted in future. There are no collision clusters on this link attributable to the highway layout or infrastructure. The magnitude of change in relation to accidents and safety, based on the change in traffic flows and the character of the link is therefore negligible. **Embedded Mitigation** This link is closed to through traffic as part of the Development as such it significantly reduces the quantity of traffic on the link. **Residual Impact** The sensitivity of Link 48 is very low. All residual effects are direct, local and permanent. • Severance: The magnitude of change, following mitigation, is low. The effect is **Negligible (Not Significant)**; • Driver Delay: The magnitude of change, following mitigation, is low. The effect is **Negligible (Not Significant)**;

Sensitive Receptor	Sensitivity of Receptor	Potential Effects/Embedded Mitigation/Residual Effects and Monitoring
		• NMU Delay: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; • NMU Amenity: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; • Fear and Intimidation: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; and • Accidents and Safety: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant).**
Link 54 - Green Lane (S of Boundary Way)	Very Low	Across a day there is a 33% increase in total traffic and a 63% increase in HDVs on this link. Link 54 is the existing Green Lane link to the A414 from Maylands which accommodates traffic and HDVs associated with the Maylands Industrial Estate. At present there is a footway on the west of the link and a PRoW crosses the link but without any formal crossing provision. However, based on observations there are limited observed pedestrian and cycle movements in this area at present. In future there is embedded mitigation set out below. Traffic flows on this link are generally over 1,400 per hour during peak times. There are no collision clusters on this link attributable to the highway layout or infrastructure. The magnitude of change in relation to accidents and safety, based on the change in traffic flows and the character of the link is therefore negligible. **Embedded Mitigation** This link is part of the improvement as part of the Development at Breakspear Junction and as a result part of an overall network of improvements as part of the Development which are considered embedded mitigation and significantly enhance this link. These include new signalised crossing of the PRoW to reduce the current conflicts. Overall this will have a beneficial effect on NMU amenity and delay on this link and reduces queuing and delay for traffic. **Residual Impact** The sensitivity of Link 54 is very low. All residual effects are direct, local and permanent. • Severance: The magnitude of change, following mitigation, is low. The effect is **Negligible (Not Significant)**; • Driver Delay: The magnitude of change, following mitigation, is low. The effect is **Negligible (Not Significant)**; • NMU Delay: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; • NMU Amenity: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**;

Sensitive Receptor	Sensitivity of Receptor	Potential Effects/Embedded Mitigation/Residual Effects and Monitoring
		• Fear and Intimidation: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; and • Accidents and Safety: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant).**
Link 97 - A4147 Leverstock Green Way	Medium	Across a day there is a 22% increase in total traffic and a 21% increase in HDVs on this link. The change in traffic on the A4147 Leverstock Green is largely as a result of the Development and the closure of Green Lane connection to A414. The closure of the connection of Green Lane to the A414 was largely in response to local feedback from consultation events. The A4147 Leverstock Green Way is an A road and is signed to be 30 mph through this area around Leverstock Green Village Centre. It provides a route between Hemel Hempstead and St Albans. It includes footpaths on both sides which are wide and of good quality through Leverstock Green village. Along the length of the link signalised pedestrian crossings are provided in key locations. Traffic flows are generally over 1,400 vehicles per hour along this link but signalised crossings are provided for pedestrians at key desire lines which means he magnitude has been classed as low in relation to pedestrian delay. As part of the Development, there is an upgrade to the junction of A414 / Leverstock Green Way which includes partial signalisation and inevitably signalisation of junctions leads to a degree of reduction in journey times which associated with the increase in traffic will lead to a low magnitude of change in terms of journey times. There are no collision clusters on this link attributable to the highway layout or infrastructure. The magnitude of change in relation to accidents and safety, based on the change in traffic flows and the character of the link is therefore negligible. Summary of magnitude of change on the link: • Severance: Negligible magnitude of change; • Driver Delay: Low magnitude of change; • NMU Delay: Low magnitude of change; • NMU Amenity: Negligible magnitude of change; • Fear and Intimidation: Negligible magnitude of change; and • Accidents and Safety: Negligible magnitude of change. **Embedded Mitigation** N/A **Residual Impact**

Sensitive Receptor	Sensitivity of Receptor	Potential Effects/Embedded Mitigation/Residual Effects and Monitoring
		The sensitivity of Link 97 is medium. All residual effects are direct, local and permanent. • Severance: The magnitude of change, following mitigation, is low. The effect is **Minor Adverse (Not Significant)**; • Driver Delay: The magnitude of change, following mitigation, is low. The effect is **Minor Adverse (Not Significant)**; • NMU Delay: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**; • NMU Amenity: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**; • Fear and Intimidation: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**; and • Accidents and Safety: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant).**
Link 104 - A4147 Hemel Hempstead Road	Very Low	Across a day there is a 16% increase in total traffic and a 84% increase in HDVs on this link. However, based on further investigation while the level of HDVs increases by 84% this increase is less than 75 vehicles across 24 hours which equates to 3 per hour on an A road which is not considered to be materially different. As such the magnitude of change has been reduced based on professional judgement from medium to low in relation to severance. Link 104 is the A4147 route connecting Hemel Hempstead and St Albans. It has no footway/cycleways at present along its length. As such NMU delay and amenity are reduced to negligible in terms of magnitude of change based on professional judgement. This volume of change on this link is not considered to be a material change to the character of the link. There are no collision clusters on this link attributable to the highway layout or infrastructure. The magnitude of change in relation to accidents and safety, based on the change in traffic flows and the character of the link is therefore negligible. Summary of magnitude of change on the link: • Severance: Low magnitude of change; • Driver Delay: Low magnitude of change; • NMU Delay: Negligible magnitude of change; • NMU Amenity: Negligible magnitude of change; • Fear and Intimidation: Negligible magnitude of change; and • Accidents and Safety: Negligible magnitude of change. **Embedded Mitigation**

Sensitive Receptor	Sensitivity of Receptor	Potential Effects/Embedded Mitigation/Residual Effects and Monitoring
		As part of the Development and the St Albans Local Plan and Local Cycling and Walking Infrastructure Plan (LCWIP), a shared footway / cycleway has been proposed along the north of the route to ensure any desire lines are accommodated safely and to promote sustainable travel. This will further reduce any effects on pedestrians/cyclists on this link and will be positive but is not expected to experience a high flow of movement as such it will not, on balance, change the overall residual impact. **Residual Impact** The sensitivity of Link 104 is very low. All residual effects are direct, local and permanent. • Severance: The magnitude of change, following mitigation, is low. The effect is **Negligible (Not Significant)**; • Driver Delay: The magnitude of change, following mitigation, is low. The effect is **Negligible (Not Significant)**; • NMU Delay: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; • NMU Amenity: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; • Fear and Intimidation: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; and • Accidents and Safety: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant).**
Link 107 - A414 SB (S of J8)	Very Low	Across a day there is a 19% increase in total traffic and a 35% increase in HDVs on this link. Link 107 is a connector link from M1 J8 to the A414 dual carriageway to the east of M1 J8. It has no footway/cycleways. As such NMU delay, amenity and fear and intimidation are reduced to negligible in terms of magnitude of change based on professional judgement. This volume of change on this link which connects to the M1 motorway is not considered to be a material change to the character of the link, which is strategic in nature. There are no collision clusters on this link attributable to the highway layout or infrastructure. The magnitude of change in relation to accidents and safety, based on the change in traffic flows and the character of the link is therefore negligible. Summary of magnitude of change on the link: • Severance: Low magnitude of change; • Driver Delay: Low magnitude of change; • NMU Delay: Negligible magnitude of change;

Sensitive Receptor	Sensitivity of Receptor	Potential Effects/Embedded Mitigation/Residual Effects and Monitoring
		• NMU Amenity: Negligible magnitude of change; • Fear and Intimidation: Negligible magnitude of change; and • Accidents and Safety: Negligible magnitude of change. **Embedded Mitigation** N/A **Residual Impact** The sensitivity of Link 107 is very low. All residual effects are direct, local and permanent. • Severance: The magnitude of change, following mitigation, is low. The effect is **Negligible (Not Significant)**; • Driver Delay: The magnitude of change, following mitigation, is low. The effect is **Negligible (Not Significant)**; • NMU Delay: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; • NMU Amenity: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; • Fear and Intimidation: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; and • Accidents and Safety: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**.
Link 108 - A414 NB Offslip of J8	Very Low	Across a day there is a 19% increase in total traffic and a 30% increase in HDVs on this link. Link 108 is a connector link from the M1 to A414 (NB offslip). To the south of the link there is a footway setback behind a large verge and a crossing to the north of the link at the traffic lights. Limited demand from pedestrians/cyclists have been observed on the footway and crossing. Based on this it has been classed as low in terms of magnitude of change based on professional judgement. This volume of change on this link which connects to the M1 motorway is not considered to be a material change to the character of the link, which is strategic in nature. There are no collision clusters on this link attributable to the highway layout or infrastructure. The magnitude of change in relation to accidents and safety, based on the change in traffic flows and the character of the link is therefore negligible. Summary of magnitude of change on the link: • Severance: Low magnitude of change; • Driver Delay: Low magnitude of change;

Sensitive Receptor	Sensitivity of Receptor	Potential Effects/Embedded Mitigation/Residual Effects and Monitoring
		• NMU Delay: Low magnitude of change; • NMU Amenity: Low magnitude of change; • Fear and Intimidation: Negligible magnitude of change; and • Accidents and Safety: Negligible magnitude of change. **Embedded Mitigation** This link is part of the improvement as part of the Development at Breakspear Junction and as a result part of an overall network of improvements as part of the Development which are considered embedded mitigation. **Residual Impact** The sensitivity of Link 108 is very low. All residual effects are direct, local and permanent. • Severance: The magnitude of change, following mitigation, is low. The effect is **Negligible (Not Significant)**; • Driver Delay: The magnitude of change, following mitigation, is low. The effect is **Negligible (Not Significant)**; • NMU Delay: The magnitude of change, following mitigation, is low. The effect is **Negligible (Not Significant)**; • NMU Amenity: The magnitude of change, following mitigation, is low. The effect is **Negligible (Not Significant)**; • Fear and Intimidation: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; and • Accidents and Safety: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**.
Link 110 - A414 NB Onslip of J8	Very Low	Across a day there is a 14% increase in total traffic and a 41% increase in HDVs on this link. Link 110 is a connector link onto the M1 motorway NB. It has no footway / cycleways and is part of M1 J8. As such NMU delay and amenity are reduced to negligible in terms of magnitude of change based on professional judgement. This volume of change on this link which connects to the M1 motorway is not considered to be a material change to the character of the link, which is strategic in nature. There are no collision clusters on this link attributable to the highway layout or infrastructure. The magnitude of change in relation to accidents and safety, based on the change in traffic flows and the character of the link is therefore negligible. Summary of magnitude of change on the link: • Severance: Low magnitude of change; • Driver Delay: Low magnitude of change;

Sensitive Receptor	Sensitivity of Receptor	Potential Effects/Embedded Mitigation/Residual Effects and Monitoring
		• NMU Delay: Negligible magnitude of change; • NMU Amenity: Negligible magnitude of change; • Fear and Intimidation: Negligible magnitude of change; and • Accidents and Safety: Negligible magnitude of change. **Embedded Mitigation** This link is close to the proposed improvement at Breakspear Junction and there are some minor works to signing / kerbs which may alter the link but would not change it in relation to this assessment but are considered embedded mitigation. **Residual Impact** The sensitivity of Link 110 is very low. All residual effects are direct, local and permanent. • Severance: The magnitude of change, following mitigation, is low. The effect is **Negligible (Not Significant)**; • Driver Delay: The magnitude of change, following mitigation, is low. The effect is **Negligible (Not Significant)**; • NMU Delay: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; • NMU Amenity: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; • Fear and Intimidation: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; and • Accidents and Safety: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**.
Link 117 - A414 to M1 SB Onslip of J8	Very Low	Across a day there is a 27% increase in total traffic and a 67% increase in HDVs on this link. Link 117 is a connector link onto the M1 SB. It has no footway/cycleways and is part of M1 J8. As such As such NMU delay, amenity and fear and intimidation are reduced to negligible in terms of magnitude of change based on professional judgement. This volume of change on this link which connects to the M1 motorway is not considered to be a material change to the character of the link, which is strategic in nature. There are no collision clusters on this link attributable to the highway layout or infrastructure. The magnitude of change in relation to accidents and safety, based on the change in traffic flows and the character of the link is therefore negligible. Summary of magnitude of change on the link:

Sensitive Receptor	Sensitivity of Receptor	Potential Effects/Embedded Mitigation/Residual Effects and Monitoring
		• Severance: Low magnitude of change; • Driver Delay: Low magnitude of change; • NMU Delay: Negligible magnitude of change; • NMU Amenity: Negligible magnitude of change; • Fear and Intimidation: Negligible magnitude of change; and • Accidents and Safety: Negligible magnitude of change. **Embedded Mitigation** N/A. **Residual Impact** The sensitivity of Link 117 is very low. All residual effects are direct, local and permanent. • Severance: The magnitude of change, following mitigation, is low. The effect is **Negligible (Not Significant)**; • Driver Delay: The magnitude of change, following mitigation, is low. The effect is **Negligible (Not Significant)**; • NMU Delay: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; • NMU Amenity: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; • Fear and Intimidation: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; and • Accidents and Safety: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant).**
Link 123 - A4147 Leverstock Green Way	Medium	Link 123 is the A4147 Leverstock Green Way and is similar to Link 97 above. Across a day there is a 20% increase in total traffic and a 29% increase in HDVs on this link. The change in traffic on the A4147 Leverstock Green is largely as a result of the Development and the closure of Green Lane connection to A414. The closure of the connection of Green Lane to the A414 was largely in response to local feedback from consultation events. The A4147 Leverstock Green Way is an A road and is signed to be 30 mph through this area around Leverstock Green Village Centre. It provides a route between Hemel Hempstead and St Albans. It includes footpaths on both sides within Leverstock Green which are wide and of good quality. Along the length of the link signalised pedestrian crossings are provided in key locations. Traffic flows are generally over 1,400 vehicles per hour along this link but signalised crossings are provided for pedestrians at key desire lines which means the magnitude has been classed as low in relation to pedestrian delay.

Sensitive Receptor	Sensitivity of Receptor	Potential Effects/Embedded Mitigation/Residual Effects and Monitoring
		As part of the Development, there is an upgrade to the junction of A414 / Leverstock Green Way which includes partial signalisation. Signalisation of junctions can lead to a degree of reduction in journey times which associated with the increase in traffic will lead to a low magnitude of change in terms of journey times. There are no collision clusters on this link attributable to the highway layout or infrastructure. The magnitude of change in relation to accidents and safety, based on the change in traffic flows and the character of the link is therefore negligible. Summary of magnitude of change on the link: • Severance: Negligible magnitude of change; • Driver Delay: Low magnitude of change; • NMU Delay: Low magnitude of change; • NMU Amenity: Negligible magnitude of change; • Fear and Intimidation: Negligible magnitude of change; and • Accidents and Safety: Negligible magnitude of change. **Embedded Mitigation** N/A **Residual Impact** The sensitivity of Link 123 is medium. All residual effects are direct, local and permanent. • Severance: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**; • Driver Delay: The magnitude of change, following mitigation, is low. The effect is **Minor Adverse (Not Significant)**; • NMU Delay: The magnitude of change, following mitigation, is low. The effect is **Minor Adverse (Not Significant)**; • NMU Amenity: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**; • Fear and Intimidation: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**; and • Accidents and Safety: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant).**

Future Year Cumulative Assessment (Scenario 5 and 6)

10.4.18 A Future Year (2041) assessment has been undertaken specifically for the ES only (it is not set out within the Transport Assessment) as set out in Paragraph 10.2.26.

10.4.19 The following assessments have been considered:

- **Scenario 5 –** Base Year Plus Committed and Cumulative Development; and
- **Scenario 6 -** Base Year Plus Committed and Cumulative Development Plus East Hemel Hempstead.

10.4.20 The Base Year Cumulative assessment has been undertaken in addition to the standard base year assessment. This assessment has been undertaken to assess the effects of the Development against the baseline plus twenty-one committed developments set out in Table 2.6 of this ES. Therefore the transport chapter has undertaken a cumulative assessment.

10.4.21 A detailed traffic generation methodology and distribution exercise is included within the TA for the Development.

10.4.22 The 24-hour AADT traffic flows have been calculated on each link using daily factors derived from traffic flow information of the surrounding links.

10.4.23 Flows for Scenario 5 and Scenario 6, the latter of which are contained within **ES Volume 3, Appendix 10.1**, present a comparison of the total vehicle flows by link with and without development for the AM peak, PM peak and 24 Hour AADT respectively.

10.4.24 It is shown that, over a 24-hour period, a total of two links experience an increase in total vehicle traffic above 30%. Of these, one link also experiences an increase of over 30% in terms of HDV movements. A further 7 links experience an estimated increase in HDV movements only of above 30%. Therefore, only these 9 links are above the threshold for undertaking more detailed assessment (Rule 1 at paragraph 10.2.16).

10.4.25 A further two links are considered to have a receptor sensitivity of either medium or high and an increase of between 10% -30% in terms of total vehicles, whilst a further two links meet the threshold in terms of HDVs. These four further links are therefore also included in this detailed assessment (Rule 2 at paragraph 10.2.16).

10.4.26 The 13 links listed below therefore require a more detailed assessment:

- Link 4 - M1 SB On/Offslip (J8 Bridge) (Rule 1 – HDVs);
- Link 6 - A414 Breakspear Way (East) (Rule 1 – HDVs);
- Link 7 - A414 Breakspear Way (W of Buncefield Lane) (Rule 1 – Total Vehicles);
- Link 25 - Jupiter Drive (West) (Rule 2 – HDVs);
- Link 54 - Green Lane (S of Boundary Way) (Rule 1 – Total Vehicles & HDVs);
- Link 55 – High Street (Rule 2 – HDVs);
- Link 97- A4147 Leverstock Green Road (Rule 2 – Total Vehicles and HDVs);
- Link 104 - A4147 Hemel Hempstead Road (Rule 1 – HDVs);
- Link 107 - A414 SB (S of J8) (Rule 1 – HDVs);
- Link 108 - A414 NB Offslip of J8 (Rule 1 – HDVs);

- Link 110 - A414 NB Onslip of J8 (Rule 1 – HDVs);
- Link 117 - A414 to M1 SB Onslip of J8 (Rule 1 – HDVs); and
- Link 123 - A4147 Leverstock Green Road (Rule 2 – Total Vehicles and HDVs).

10.4.27 The potential effects, following the magnitude of change and scale of effect criteria set out in **Table 10.3** and **Table 10.4**, are summarised below in **Table 10.10**. It should be noted that as per IEMA guidelines, the individual characteristics of each link has been considered when applying magnitude of change criteria. For example, where percentage changes in traffic flows may be deemed significant, the actual increase in traffic may be just a few vehicles, if the existing flows are low. This has been noted when defining the residual effects. In addition, in some cases, strategic links may not permit pedestrian/cycle activity. Where this is the case, this is noted and there is deemed to be no impact on Severance, NMU Delay, NMU Amenity and Fear and Intimidation.

Table 10.10: Assessment of potential effects, embedded mitigation, residual effects and monitoring during Operational Year (Scenario 6 compared to Scenario 5)

Sensitive Receptor	Sensitivity of Receptor	Potential Effects/Embedded Mitigation/Residual Effects and Monitoring
Link 4 - M1 SB On/Offslip (J8 Bridge)	Very Low	Across a day there is a 23% increase in total traffic and a 40% increase in HDVs on this link. Link 4 is the bridge over the M1 motorway. There are no crossing points and a footway separated by guard railing is provided to the south of the road. Due to the strategic nature of this link, only minimal pedestrians have been recorded in this location and no cyclists have been recorded. There are no immediate desire lines, apart from people making use of the PRoW network to the east of the M1 motorway. As such NMU delay, amenity and fear and intimidation are reduced to negligible in terms of magnitude of change based on professional judgement. This volume of change on links to/from the motorway is not considered to be a material change to the character of the link, which is strategic in nature. There are no collision clusters on this link attributable to the highway layout or infrastructure. The magnitude of change in relation to accidents and safety, based on the change in traffic flows and the character of the link is therefore negligible. Summary of magnitude of change on the link: • Severance: Low magnitude of change; • Driver Delay: Low magnitude of change; • NMU Delay: Negligible magnitude of change; • NMU Amenity: Negligible magnitude of change; • Fear and Intimidation: Negligible magnitude of change; and • Accidents and Safety: Negligible magnitude of change. **Embedded Mitigation**

Sensitive Receptor	Sensitivity of Receptor	Potential Effects/Embedded Mitigation/Residual Effects and Monitoring
		This link is to the east of the highway works for Breakspear Junction and as a result part of an overall network of improvements as part of the Development which are considered embedded mitigation. **Residual Impact** The sensitivity of Link 4 is very low. All residual effects are direct, local and permanent. • Severance: The magnitude of change, following mitigation, is low. The effect is **Negligible (Not Significant)**; • Driver Delay: The magnitude of change, following mitigation, is low. The effect is **Negligible (Not Significant)**; • NMU Delay: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; • NMU Amenity: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; • Fear and Intimidation: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; and • Accidents and Safety: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**.
Link 6 - A414 Breakspear Way (East)	Very Low	Across a day there is a 20% increase in total traffic and a 36% increase in HDVs on this link. Link 6 is the A414 link between Green Lane and the M1 motorway. There are no existing pedestrian crossing points and a footway is provided to the south of the road. Due to the strategic nature of this link, only minimal pedestrians have been recorded in this location and no cyclists have been recorded. There are no immediate desire lines, apart from people making use of the PRoW network to the east of the M1 motorway. As such NMU delay, amenity and fear and intimidation are reduced to negligible in terms of magnitude of change based on professional judgement. This volume of change on this link which connects to the M1 motorway is not considered to be a material change to the character of the link, which is strategic in nature. There are no collision clusters on this link attributable to the highway layout or infrastructure. The magnitude of change in relation to accidents and safety, based on the change in traffic flows and the character of the link is therefore negligible. Summary of magnitude of change on the link: • Severance: Low magnitude of change; • Driver Delay: Low magnitude of change; • NMU Delay: Negligible magnitude of change;

Sensitive Receptor	Sensitivity of Receptor	Potential Effects/Embedded Mitigation/Residual Effects and Monitoring
		• NMU Amenity: Negligible magnitude of change; • Fear and Intimidation: Negligible magnitude of change; and • Accidents and Safety: Negligible magnitude of change. **Embedded Mitigation** This link is part of the improvement as part of the Development at Breakspear Junction and as a result part of an overall network of improvements as part of the Development which are considered embedded mitigation. Furthermore, a new pedestrian and cycle bridge will be provided across this link to further reduce the potential for any pedestrian/cycle effects. **Residual Impact** The sensitivity of Link 6 is very low. All residual effects are direct, local and permanent. • Severance: The magnitude of change, following mitigation, is low. The effect is **Negligible (Not Significant)**; • Driver Delay: The magnitude of change, following mitigation, is low. The effect is **Negligible (Not Significant)**; • NMU Delay: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; • NMU Amenity: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; • Fear and Intimidation: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; and • Accidents and Safety: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant).**
Link 7 - A414 Breakspear Way (W of Buncefield Lane)	Low	Across a day there is a 31% increase in total traffic and a 4% increase in HDVs on this link. Link 7 is the A414 link between Green Lane and Maylands Avenue. The flows on this link increase largely as a result of the infrastructure improvements included within the assessment at both Green Lane / A414 Breakspear Way and Maylands Avenue / A414 which release a constraint within the network by improving junction performance. There is a footway along the northside of the A414 Breakspear Way along the length of the link, there is a signalised pedestrian crossing in the middle of the link which has recently been installed by HCC and to the east of the link there is a newly improved pedestrian footpath. Due to these relatively recent improvements there are some pedestrian movements in the area as new developments have been built on the northside of the A414. Traffic flows are generally over 1,400 vehicles per hour and speeds can be above 40mph.

Sensitive Receptor	Sensitivity of Receptor	Potential Effects/Embedded Mitigation/Residual Effects and Monitoring
		This volume of change on this link while over 30% is not a significant change as the road is currently a dual carriageway and will remain the same and accommodate the same level of traffic. There are no collision clusters on this link attributable to the highway layout or infrastructure. The magnitude of change in relation to accidents and safety, based on the change in traffic flows and the character of the link is therefore negligible. Summary of magnitude of change on the link: • Severance: Low magnitude of change; • Driver Delay: Low magnitude of change; • NMU Delay: Low magnitude of change; • NMU Amenity: Negligible magnitude of change; • Fear and Intimidation: Negligible magnitude of change; and • Accidents and Safety: Negligible magnitude of change. **Embedded Mitigation** This link is part of the improvement as part of the Development at Breakspear Junction and as a result part of an overall network of improvements as part of the Development which are considered embedded mitigation. **Residual Impact** The sensitivity of Link 7 is low. All residual effects are direct, local and permanent. • Severance: The magnitude of change, following mitigation, is low. The effect is **Minor Adverse (Not Significant)**; • Driver Delay: The magnitude of change, following mitigation, is low. The effect is **Minor Adverse (Not Significant)**; • NMU Delay: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**; • NMU Amenity: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; • Fear and Intimidation: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; and • Accidents and Safety: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant).**
Link 25 - Jupiter Drive (West)	High	Across a day there is no change in total traffic and a 13% increase in HDVs on this link. However, based on further investigation while the level of HDVs increases by 10% this increase is only 9 vehicles across 24 hours. As such the magnitude of change has been reduced based on professional judgement from high to negligible in relation to severance.

Sensitive Receptor	Sensitivity of Receptor	Potential Effects/Embedded Mitigation/Residual Effects and Monitoring
		This volume of change on this link is not considered to be a material change to the character of the link. There is a small reduction in queuing at the junction of Jupiter Drive and Queensway during the AM Peak Period and a negligible change in the PM Peak Period which are considered to be a negligible magnitude of change. Across an hour the level of vehicle movement is very low and as such the change in terms of pedestrian delay / amenity is negligible. There are no collision clusters on this link attributable to the highway layout or infrastructure. The magnitude of change in relation to accidents and safety, based on the change in traffic flows and the character of the link is therefore negligible. Summary of magnitude of change on the link: • Severance: Negligible magnitude of change; • Driver Delay: Negligible magnitude of change; • NMU Delay: Negligible magnitude of change; • NMU Amenity: Negligible magnitude of change; • Fear and Intimidation: Negligible magnitude of change; and • Accidents and Safety: Negligible magnitude of change. **Embedded Mitigation** N/A **Residual Impact** The sensitivity of Link 25 is high. All residual effects are direct, local and permanent. • Severance: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**; • Driver Delay: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**; • NMU Delay: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**; • NMU Amenity: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**; • Fear and Intimidation: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**; and • Accidents and Safety: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant).**
Link 54 - Green Lane (S of Boundary Way)	Very Low	Across a day there is a 46% increase in total traffic and a 64% increase in HDVs on this link.

Sensitive Receptor	Sensitivity of Receptor	Potential Effects/Embedded Mitigation/Residual Effects and Monitoring
		Link 54 is the existing Green Lane link to the A414 from Maylands which accommodates traffic and HDVs associated with the Maylands Industrial Estate. At present there is a footway on the west of the link and a PRoW crosses the link but without any formal crossing provision. However, based on observations there are limited observed pedestrian and cycle movements in this area at present. Traffic flows on this link are generally over 1,400 per hour during peak times. There are no collision clusters on this link attributable to the highway layout or infrastructure. The magnitude of change in relation to accidents and safety, based on the change in traffic flows and the character of the link is therefore negligible. **Embedded Mitigation** This link is part of the improvement as part of the Development at Breakspear Junction and as a result part of an overall network of improvements as part of the Development which are considered embedded mitigation and significantly enhance this link. These include new signalised crossing of the PRoW to reduce the current conflicts. Overall this will have a beneficial effect on NMU amenity and delay on this link and reduces queuing and delay for traffic. **Residual Impact** The sensitivity of Link 54 is very low. All residual effects are direct, local and permanent. • Severance: The magnitude of change, following mitigation, is low. The effect is **Negligible (Not Significant)**; • Driver Delay: The magnitude of change, following mitigation, is low. The effect is **Negligible (Not Significant)**; • NMU Delay: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; • NMU Amenity: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; • Fear and Intimidation: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; and • Accidents and Safety: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant).**
Link 55 - High Street	Medium	Across a day there is no change in total traffic and 17% increase in HDVs. However, based on further investigation while the level of HDVs increases by 17% this increase is only 2 vehicles across 24 hours. As such the magnitude of change has been reduced based on professional judgement from low to negligible in relation to severance.

Sensitive Receptor	Sensitivity of Receptor	Potential Effects/Embedded Mitigation/Residual Effects and Monitoring
		Link 55 is High Street through Hemel old town and has shops/restaurants on both sides and is a historic street. There are pedestrians and cyclists present, and the road is one way only. Traffic flows on this link are considerably lower than 1,400 per hour across the day and the street is designed at a pedestrian scale. There are no collision clusters on this link attributable to the highway layout or infrastructure. The magnitude of change in relation to accidents and safety, based on the change in traffic flows and the character of the link is therefore negligible. **Embedded Mitigation** N/A **Residual Impact** The sensitivity of Link 55 is medium. All residual effects are direct, local and permanent. • Severance: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; • Driver Delay: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**; • NMU Delay: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**; • NMU Amenity: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**; • Fear and Intimidation: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**; and • Accidents and Safety: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant**).
Link 97 - A4147 Leverstock Green Way	Medium	Across a day there is a 18% increase in total traffic and a 17% increase in HDVs on this link. The change in traffic on the A4147 Leverstock Green is largely as a result of the Development and the closure of Green Lane connection to A414. The closure of the connection of Green Lane to the A414 was largely in response to local feedback from consultation events. The A4147 Leverstock Green Way is an A road and is signed to be 30 mph through this area around Leverstock Green Village Centre. It provides a route between Hemel Hempstead and St Albans. It includes footpaths on both sides through Leverstock Green village which are wide and of good quality. Along the length of the link signalised pedestrian crossings are provided in key locations. Traffic flows are generally over 1,400 vehicles per hour along this link but signalised crossings are provided for pedestrians at key desire lines

Sensitive Receptor	Sensitivity of Receptor	Potential Effects/Embedded Mitigation/Residual Effects and Monitoring
		which means he magnitude has been classed as low in relation to pedestrian delay. As part of the Development, there is an upgrade to the junction of A414 / Leverstock Green Way which includes partial signalisation and inevitably signalisation of junctions leads to a degree of increase in journey times which associated with the increase in traffic will lead to a low magnitude of change in terms of journey times. There are no collision clusters on this link attributable to the highway layout or infrastructure. The magnitude of change in relation to accidents and safety, based on the change in traffic flows and the character of the link is therefore negligible. Summary of magnitude of change on the link: • Severance: Negligible magnitude of change; • Driver Delay: Low magnitude of change; • NMU Delay: Low magnitude of change; • NMU Amenity: Negligible magnitude of change; • Fear and Intimidation: Negligible magnitude of change; and • Accidents and Safety: Negligible magnitude of change. **Embedded Mitigation** N/A **Residual Impact** The sensitivity of Link 97 is medium. All residual effects are direct, local and permanent. • Severance: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**; • Driver Delay: The magnitude of change, following mitigation, is low. The effect is **Minor Adverse (Not Significant)**; • NMU Delay: The magnitude of change, following mitigation, is low. The effect is **Minor Adverse (Not Significant)**; • NMU Amenity: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; • Fear and Intimidation: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; and • Accidents and Safety: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**.
Link 104 - A4147 Hemel Hempstead Road	Very Low	Across a day there is a 17% increase in total traffic and a 33% increase in HDVs on this link. H

Sensitive Receptor	Sensitivity of Receptor	Potential Effects/Embedded Mitigation/Residual Effects and Monitoring
		Link 104 is the A4147 route connecting Hemel Hempstead and St Albans. It has no footway/cycleways at present along its length. As such NMU delay and amenity are reduced to negligible in terms of magnitude of change based on professional judgement. This volume of change on this link is not considered to be a material change to the character of the link. There are no collision clusters on this link attributable to the highway layout or infrastructure. The magnitude of change in relation to accidents and safety, based on the change in traffic flows and the character of the link is therefore negligible. Summary of magnitude of change on the link: • Severance: Low magnitude of change; • Driver Delay: Low magnitude of change; • NMU Delay: Negligible magnitude of change; • NMU Amenity: Negligible magnitude of change; • Fear and Intimidation: Negligible magnitude of change; and • Accidents and Safety: Negligible magnitude of change. **Embedded Mitigation** As part of the Development and the St Albans Local Plan and LCWIP, a shared footway / cycleway has been proposed along the north of the route to ensure any desire lines are accommodated safely and to promote sustainable travel. This will further reduce any effects on pedestrians / cyclists on this link and will be positive but is not expected to experience a high flow of movement as such it will not, on balance, change the overall residual impact. **Residual Impact** The sensitivity of Link 104 is very low. All residual effects are direct, local and permanent. • Severance: The magnitude of change, following mitigation, is low. The effect is **Negligible (Not Significant)**; • Driver Delay: The magnitude of change, following mitigation, is low. The effect is **Negligible (Not Significant)**; • NMU Delay: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; • NMU Amenity: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; • Fear and Intimidation: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; and

Sensitive Receptor	Sensitivity of Receptor	Potential Effects/Embedded Mitigation/Residual Effects and Monitoring
		• Accidents and Safety: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant).**
Link 107 - A414 SB (S of J8)	Very Low	Across a day there is a 19% increase in total traffic and a 33% increase in HDVs on this link. Link 107 is a connector link from M1 J8 to the A414 dual carriageway to the east of M1 J8. It has no footway/cycleways. As such NMU delay, amenity and fear and intimidation are reduced to negligible in terms of magnitude of change based on professional judgement. This volume of change on this link which connects to the M1 motorway is not considered to be a material change to the character of the link, which is strategic in nature. There are no collision clusters on this link attributable to the highway layout or infrastructure. The magnitude of change in relation to accidents and safety, based on the change in traffic flows and the character of the link is therefore negligible. Summary of magnitude of change on the link: • Severance: Low magnitude of change; • Driver Delay: Low magnitude of change; • NMU Delay: Negligible magnitude of change; • NMU Amenity: Negligible magnitude of change; • Fear and Intimidation: Negligible magnitude of change; and • Accidents and Safety: Negligible magnitude of change. **Embedded Mitigation** N/A **Residual Impact** The sensitivity of Link 107 is very low. All residual effects are direct, local and permanent. • Severance: The magnitude of change, following mitigation, is low. The effect is **Negligible (Not Significant)**; • Driver Delay: The magnitude of change, following mitigation, is low. The effect is **Negligible (Not Significant)**; • NMU Delay: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; • NMU Amenity: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; • Fear and Intimidation: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; and

Sensitive Receptor	Sensitivity of Receptor	Potential Effects/Embedded Mitigation/Residual Effects and Monitoring
		• Accidents and Safety: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant).**
Link 108 - A414 NB Offslip of J8	Very Low	Across a day there is a 20% increase in total traffic and a 33% increase in HDVs on this link. Link 108 is a connector link from the M1 motorway to A414 (NB offslip). To the south of the link there is a footway setback behind a large verge and a crossing to the north of the link at the traffic lights. Limited demand from pedestrians/cyclists have been observed on the footway and crossing. Based on this it has been classed as low in terms of magnitude of change based on professional judgement. This volume of change on this link which connects to the M1 is not considered to be a material change to the character of the link, which is strategic in nature. There are no collision clusters on this link attributable to the highway layout or infrastructure. The magnitude of change in relation to accidents and safety, based on the change in traffic flows and the character of the link is therefore negligible. Summary of magnitude of change on the link: • Severance: Low magnitude of change; • Driver Delay: Low magnitude of change; • NMU Delay: Low magnitude of change; • NMU Amenity: Low magnitude of change; • Fear and Intimidation: Negligible magnitude of change; and • Accidents and Safety: Negligible magnitude of change. **Embedded Mitigation** This link is part of the improvement as part of the Development at Breakspear Junction and as a result part of an overall network of improvements as part of the Development which are considered embedded mitigation. **Residual Impact** The sensitivity of Link 108 is very low. All residual effects are direct, local and permanent. • Severance: The magnitude of change, following mitigation, is low. The effect is **Negligible (Not Significant)**; • Driver Delay: The magnitude of change, following mitigation, is low. The effect is **Negligible (Not Significant)**; • NMU Delay: The magnitude of change, following mitigation, is low. The effect is **Negligible (Not Significant)**;

Sensitive Receptor	Sensitivity of Receptor	Potential Effects/Embedded Mitigation/Residual Effects and Monitoring
		• NMU Amenity: The magnitude of change, following mitigation, is low. The effect is **Negligible (Not Significant)**; • Fear and Intimidation: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; and • Accidents and Safety: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant).**
Link 110 - A414 NB Onslip of J8	Very Low	Across a day there is a 13% increase in total traffic and a 34% increase in HDVs on this link. Link 110 is a connector link onto the M1 NB. It has no footway/cycleways and is part of M1 J8. As such NMU delay and amenity are reduced to negligible in terms of magnitude of change based on professional judgement. This volume of change on this link which connects to the M1 is not considered to be a material change to the character of the link, which is strategic in nature. There are no collision clusters on this link attributable to the highway layout or infrastructure. The magnitude of change in relation to accidents and safety, based on the change in traffic flows and the character of the link is therefore negligible. Summary of magnitude of change on the link: • Severance: Low magnitude of change; • Driver Delay: Low magnitude of change; • NMU Delay: Negligible magnitude of change; • NMU Amenity: Negligible magnitude of change; • Fear and Intimidation: Negligible magnitude of change; and • Accidents and Safety: Negligible magnitude of change. **Embedded Mitigation** This link is close to the proposed improvement at Breakspear Junction and there are some minor works to signing / kerbs which may alter the link but would not change it in relation to this assessment but are considered embedded mitigation. **Residual Impact** The sensitivity of Link 110 is very low. All residual effects are direct, local and permanent. • Severance: The magnitude of change, following mitigation, is low. The effect is **Negligible (Not Significant)**; • Driver Delay: The magnitude of change, following mitigation, is low. The effect is **Negligible (Not Significant)**;

Sensitive Receptor	Sensitivity of Receptor	Potential Effects/Embedded Mitigation/Residual Effects and Monitoring
		• NMU Delay: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; • NMU Amenity: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; • Fear and Intimidation: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; and • Accidents and Safety: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant).**
Link 117 - A414 to M1 SB Onslip of J8	Very Low	Across a day there is a 28% increase in total traffic and a 60% increase in HDVs on this link. Link 117 is a connector link onto the M1 SB. It has no footway/cycleways and is part of M1 J8. As such NMU delay, amenity and fear and intimidation are reduced to negligible in terms of magnitude of change based on professional judgement. This volume of change on this link which connects to the M1 is not considered to be a material change to the character of the link, which is strategic in nature. There are no collision clusters on this link attributable to the highway layout or infrastructure. The magnitude of change in relation to accidents and safety, based on the change in traffic flows and the character of the link is therefore negligible. Summary of magnitude of change on the link: • Severance: Low magnitude of change; • Driver Delay: Low magnitude of change; • NMU Delay: Negligible magnitude of change; • NMU Amenity: Negligible magnitude of change; • Fear and Intimidation: Negligible magnitude of change; and • Accidents and Safety: Negligible magnitude of change. **Embedded Mitigation** N/A. **Residual Impact** The sensitivity of Link 117 is very low. All residual effects are direct, local and permanent. • Severance: The magnitude of change, following mitigation, is low. The effect is **Negligible (Not Significant)**; • Driver Delay: The magnitude of change, following mitigation, is low. The effect is **Negligible (Not Significant)**;

Sensitive Receptor	Sensitivity of Receptor	Potential Effects/Embedded Mitigation/Residual Effects and Monitoring
		• NMU Delay: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; • NMU Amenity: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; • Fear and Intimidation: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; and • Accidents and Safety: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant).**
Link 123 - A4147 Leverstock Green Way	Medium	Link 123 is the A4147 Leverstock Green Way and is similar to Link 97 above. Across a day there is a 28% increase in total traffic and a 21% increase in HDVs on this link. The change in traffic on the A4147 Leverstock Green is largely as a result of the Development and the closure of Green Lane connection to A414. The closure of the connection of Green Lane to the A414 was largely in response to local feedback from consultation events. The A4147 Leverstock Green Way is an A road and is signed to be 30 mph through this area around Leverstock Green Village Centre. It provides a route between Hemel Hempstead and St Albans. It includes footpaths on both sides through Leverstock Green village which are wide and of good quality. Along the length of the link signalised pedestrian crossings are provided in key locations. Traffic flows are generally over 1,400 vehicles per hour along this link but signalised crossings are provided for pedestrians at key desire lines which means he magnitude has been classed as low in relation to pedestrian delay. As part of the Development, there is an upgrade to the junction of A414 / Leverstock Green Way which includes partial signalisation and inevitably signalisation of junctions leads to a degree of reduction in journey times which associated with the increase in traffic will lead to a low magnitude of change in terms of journey times. There are no collision clusters on this link attributable to the highway layout or infrastructure. The magnitude of change in relation to accidents and safety, based on the change in traffic flows and the character of the link is therefore negligible. Summary of magnitude of change on the link: • Severance: negligible magnitude of change; • Driver Delay: Low magnitude of change; • NMU Delay: Low magnitude of change; • NMU Amenity: Negligible magnitude of change; • Fear and Intimidation: Negligible magnitude of change; and

Sensitive Receptor	Sensitivity of Receptor	Potential Effects/Embedded Mitigation/Residual Effects and Monitoring
		• Accidents and Safety: Negligible magnitude of change. **Embedded Mitigation** N/A **Residual Impact** The sensitivity of Link 123 is medium. All residual effects are direct, local and permanent. • Severance: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**; • Driver Delay: The magnitude of change, following mitigation, is low. The effect is **Minor Adverse (Not Significant)**; • NMU Delay: The magnitude of change, following mitigation, is low. The effect is **Minor Adverse (Not Significant)**; • NMU Amenity: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**; • Fear and Intimidation: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**; and • Accidents and Safety: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant).**

End of Local Plan Cumulative Assessment (Scenario 7 and 8)

10.4.28 A year of 2041 has been assessed for the 2041 Local Plan Reference Case and 2041 Local Plan Reference plus Development Case as this year is the end of the Local Plan period.

10.4.29 The following assessments have been considered:

- Scenario 7 – 2041 Future Year (Transport Assessment Scenario 4); and
- Scenario 8 – 2041 Future Year Plus East Hemel Hempstead (Transport Assessment Scenario 5)

10.4.30 Therefore the transport chapter has undertaken a cumulative assessment.

10.4.31 A detailed traffic generation methodology and distribution exercise is included within the TA for the Development.

10.4.32 The 24-hour AADT traffic flows have been calculated on each link using daily factors derived from traffic flow information of the surrounding links.

10.4.33 Flows for Scenario 7 and Scenario 8, the latter of which are contained within **Appendix 10.3**, present a comparison of the total vehicle flows by link with and without development for the AM peak, PM peak and 24 Hour AADT respectively.

10.4.34 It is shown that, over a 24-hour period, a total of two links experience an increase in total vehicle traffic above 30%. Of these, both links also experience an increase of over 30% in terms of HDV movements. A further six links experience an estimated increase in HDV movements only of above 30%. Therefore, only these eight links are above the threshold for undertaking more detailed assessment (Rule 1 at paragraph 10.2.16).

10.4.35 A further two links are considered to have a receptor sensitivity of either medium or high and an increase of between 10%-30% in terms of total vehicles, whilst a further single link meets the threshold in terms of HDVs. These three further links are therefore also included in this detailed assessment (Rule 2 at paragraph 10.2.16).

10.4.36 The 11 links listed below therefore require a more detailed assessment:

- Link 4 - M1 SB On/Offslip (J8 Bridge) (Rule 1 – HDVs);
- Link 6 - A414 Breakspear Way (East) (Rule 1 – HDVs);
- Link 25 - Jupiter Drive (West) (Rule 2 – HDVs);
- Link 54 - Green Lane (S of Boundary Way) (Rule 1 – Total Vehicles & HDVs);
- Link 55 – High Street (Rule 1 – HDVs);
- Link 97- A4147 Leverstock Green Road (Rule 2 – Total Vehicles and HDVs);
- Link 98 - Green Lane (E of Micklefield Road) (Rule 2 – Total Vehicles);
- Link 107 - A414 SB (S of J8) (Rule 1 – HDVs);
- Link 108 - A414 NB Offslip of J8 (Rule 1 – HDVs);
- Link 110 - A414 NB Onslip of J8 (Rule 1 – HDVs); and
- Link 123 - A4147 Leverstock Green Road (Rule 1 – Total Vehicles and HDVs).

10.4.37 The potential effects, following the magnitude of change and scale of effect criteria set out in **Table 10.3** and **Table 10.4**, are summarised below in **Table 10.11**. It should be noted that as per IEMA guidelines, the individual characteristics of each link has been considered when applying magnitude of change criteria. For example, where percentage changes in traffic flows may be deemed significant, the actual increase in traffic may be just a few vehicles, if the existing flows are low. This has been noted when defining the residual effects. In addition, in some cases, strategic links may not permit pedestrian/cycle activity. Where this is the case, this is noted and there is deemed to be no impact on Severance, NMU Delay, NMU Amenity and Fear and Intimidation.

Table 10.11: Assessment of potential effects, embedded mitigation, residual effects and monitoring during Operational Year (Scenario 8 compared to Scenario 7)

Sensitive Receptor	Sensitivity of Receptor	Potential Effects / Embedded Mitigation / Residual Effects and Monitoring
Link 4 - M1 SB On/Offslip (J8 Bridge)	Very Low	Across a day there is a 24% increase in total traffic and a 41% increase in HDVs on this link.

Sensitive Receptor	Sensitivity of Receptor	Potential Effects / Embedded Mitigation / Residual Effects and Monitoring
		Link 4 is the bridge over the M1 motorway. There are no crossing points and a footway separated by guard railing is provided to the south of the road. Due to the strategic nature of this link, only minimal pedestrians have been recorded in this location and no cyclists have been recorded. There are no immediate desire lines, apart from people making use of the PRoW network to the east of the M1 motorway. As such NMU delay, amenity and fear and intimidation are reduced to negligible in terms of magnitude of change based on professional judgement. This volume of change on links to/from the M1 motorway is not considered to be a material change to the character of the link, which is strategic in nature. There are no collision clusters on this link attributable to the highway layout or infrastructure. The magnitude of change in relation to accidents and safety, based on the change in traffic flows and the character of the link is therefore negligible. Summary of magnitude of change on the link: • Severance: Low magnitude of change; • Driver Delay: Low magnitude of change; • NMU Delay: Negligible magnitude of change; • NMU Amenity: Negligible magnitude of change; • Fear and Intimidation: Negligible magnitude of change; and • Accidents and Safety: Negligible magnitude of change. **Embedded Mitigation** This link is to the east of the highway works for Breakspear Junction and as a result part of an overall network of improvements as part of the Development which are considered embedded mitigation. **Residual Impact** The sensitivity of Link 4 is very low. All residual effects are direct, local and permanent. • Severance: The magnitude of change, following mitigation, is low. The effect is **Negligible (Not Significant)**; • Driver Delay: The magnitude of change, following mitigation, is low. The effect is **Negligible (Not Significant)**; • NMU Delay: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; • NMU Amenity: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; • Fear and Intimidation: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; and

Sensitive Receptor	Sensitivity of Receptor	Potential Effects / Embedded Mitigation / Residual Effects and Monitoring
		• Accidents and Safety: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**.
Link 6 - A414 Breakspear Way (East)	Very Low	Across a day there is a 21% increase in total traffic and a 37% increase in HDVs on this link. Link 6 is the A414 Breakspear Way link between Green Lane and the M1 motorway. There are no existing pedestrian crossing points and a footway is provided to the south of the road. Due to the strategic nature of this link, only minimal pedestrians have been recorded in this location and no cyclists have been recorded. There are no immediate desire lines, apart from people making use of the PRoW network to the east of the M1. As such NMU delay, amenity and fear and intimidation are reduced to negligible in terms of magnitude of change based on professional judgement. This volume of change on this link which connects to the M1 motorway is not considered to be a material change to the character of the link, which is strategic in nature. There are no collision clusters on this link attributable to the highway layout or infrastructure. The magnitude of change in relation to accidents and safety, based on the change in traffic flows and the character of the link is therefore negligible. Summary of magnitude of change on the link: • Severance: Low magnitude of change; • Driver Delay: Low magnitude of change; • NMU Delay: Negligible magnitude of change; • NMU Amenity: Negligible magnitude of change; • Fear and Intimidation: Negligible magnitude of change; and • Accidents and Safety: Negligible magnitude of change. **Embedded Mitigation** This link is part of the improvement as part of the Development at Breakspear Junction and as a result part of an overall network of improvements as part of the Development which are considered embedded mitigation. Furthermore, a new pedestrian and cycle bridge will be provided across this link to further reduce the potential for any pedestrian/cycle effects. **Residual Impact** The sensitivity of Link 6 is very low. All residual effects are direct, local and permanent. • Severance: The magnitude of change, following mitigation, is low. The effect is **Negligible (Not Significant)**; • Driver Delay: The magnitude of change, following mitigation, is low. The effect is **Negligible (Not Significant)**;

Sensitive Receptor	Sensitivity of Receptor	Potential Effects / Embedded Mitigation / Residual Effects and Monitoring
		• NMU Delay: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; • NMU Amenity: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; • Fear and Intimidation: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; and • Accidents and Safety: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant).**
Link 25 - Jupiter Drive (West)	High	Across a day there is an 2% decrease in total traffic and a 10% increase in HDVs on this link. However, based on further investigation while the level of HDVs increases by 10% this increase is only 7 vehicles across 24 hours. As such the magnitude of change has been reduced based on professional judgement from high to negligible in relation to severance. This volume of change on this link is not considered to be a material change to the character of the link. There is a small reduction in queuing at the junction of Jupiter Drive and Queensway during the AM Peak Period and a negligible change in the PM Peak Period which are considered to be a negligible magnitude of change. Across an hour the level of vehicle movement is very low and as such the change in terms of pedestrian delay / amenity is negligible. There are no collision clusters on this link attributable to the highway layout or infrastructure. The magnitude of change in relation to accidents and safety, based on the change in traffic flows and the character of the link is therefore negligible. Summary of magnitude of change on the link: • Severance: Negligible magnitude of change; • Driver Delay: Negligible magnitude of change; • NMU Delay: Negligible magnitude of change; • NMU Amenity: Negligible magnitude of change; • Fear and Intimidation: Negligible magnitude of change; and • Accidents and Safety: Negligible magnitude of change. **Embedded Mitigation** N/A **Residual Impact** The sensitivity of Link 25 is high. All residual effects are direct, local and permanent. • Severance: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**;

Sensitive Receptor	Sensitivity of Receptor	Potential Effects / Embedded Mitigation / Residual Effects and Monitoring
		• Driver Delay: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**; • NMU Delay: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**; • NMU Amenity: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**; • Fear and Intimidation: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**; and • Accidents and Safety: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant).**
Link 54 - Green Lane (S of Boundary Way)	Very Low	Across a day there is a 46% increase in total traffic and a 63% increase in HDVs on this link. Link 54 is the existing Green Lane link to the A414 from Maylands which accommodates traffic and HDVs associated with the Maylands Industrial Estate. At present there is a footway on the west of the link and a PRoW crosses the link but without any formal crossing provision. However, based on observations there are limited observed pedestrian and cycle movements in this area at present. Traffic flows on this link are generally over 1,400 per hour during peak times. There are no collision clusters on this link attributable to the highway layout or infrastructure. The magnitude of change in relation to accidents and safety, based on the change in traffic flows and the character of the link is therefore negligible. **Embedded Mitigation** This link is part of the improvement as part of the Development at Breakspear Junction and as a result part of an overall network of improvements as part of the Development which are considered embedded mitigation and significantly enhance this link. These include new signalised crossing of the PRoW to reduce the current conflicts. Overall this will have a beneficial effect on NMU amenity and delay on this link and reduces queuing and delay for traffic. **Residual Impact** The sensitivity of Link 54 is very low. All residual effects are direct, local and permanent. • Severance: The magnitude of change, following mitigation, is low. The effect is **Negligible (Not Significant)**; • Driver Delay: The magnitude of change, following mitigation, is low. The effect is **Negligible (Not Significant)**; • NMU Delay: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**;

Sensitive Receptor	Sensitivity of Receptor	Potential Effects / Embedded Mitigation / Residual Effects and Monitoring
		• NMU Amenity: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; • Fear and Intimidation: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; and • Accidents and Safety: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant).**
Link 55 - High Street	Medium	Across a day there is a 6% increase in total traffic and 57% increase in HDVs. However, based on further investigation while the level of HDVs increases by 57% this increase is only 5 vehicles across 24 hours (a total flow of 14 HDVs across 24 hours compared to 9 in the Reference Case). As such the magnitude of change has been reduced based on professional judgement from low to negligible in relation to severance. Link 55 is High Street through Hemel old town and has shops/restaurants on both sides and is a historic street. There are pedestrians and cyclists present and the road is one way only. Traffic flows on this link are considerably lower than 1,400 per hour across the day and the street is designed at a pedestrian scale. There are no collision clusters on this link attributable to the highway layout or infrastructure. The magnitude of change in relation to accidents and safety, based on the change in traffic flows and the character of the link is therefore negligible. **Embedded Mitigation** N/A **Residual Impact** The sensitivity of Link 55 is medium. All residual effects are direct, local and permanent. • Severance: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**; • Driver Delay: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**; • NMU Delay: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**; • NMU Amenity: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**; • Fear and Intimidation: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**; and • Accidents and Safety: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**.

Sensitive Receptor	Sensitivity of Receptor	Potential Effects / Embedded Mitigation / Residual Effects and Monitoring
Link 97 - A4147 Leverstock Green Way	Medium	Across a day there is a 22% increase in total traffic and a 29% increase in HDVs on this link. The change in traffic on the A4147 Leverstock Green is largely as a result of the Development and the closure of Green Lane connection to A414. The closure of the connection of Green Lane to the A414 was largely in response to local feedback from consultation events. The A4147 Leverstock Green Way is an A road and is signed to be 30 mph through this area around Leverstock Green Village Centre. It provides a route between Hemel Hempstead and St Albans. It includes footpaths on both sides through Leverstock Green village which are wide and of good quality. Along the length of the link signalised pedestrian crossings are provided in key locations. Traffic flows are generally over 1,400 vehicles per hour along this link but signalised crossings are provided for pedestrians at key desire lines which means the magnitude has been classed as low in relation to pedestrian delay. As part of the Development, there is an upgrade to the junction of A414 / Leverstock Green Way which includes partial signalisation and inevitably signalisation of junctions leads to a degree of reduction in journey times which associated with the increase in traffic will lead to a low magnitude of change in terms of journey times. There are no collision clusters on this link attributable to the highway layout or infrastructure. The magnitude of change in relation to accidents and safety, based on the change in traffic flows and the character of the link is therefore negligible. Summary of magnitude of change on the link: • Severance: Negligible magnitude of change; • Driver Delay: Low magnitude of change; • NMU Delay: Low magnitude of change; • NMU Amenity: Negligible magnitude of change; • Fear and Intimidation: Negligible magnitude of change; and • Accidents and Safety: Negligible magnitude of change. **Embedded Mitigation** N/A **Residual Impact** The sensitivity of Link 97 is medium. All residual effects are direct, local and permanent. • Severance: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**;

Sensitive Receptor	Sensitivity of Receptor	Potential Effects / Embedded Mitigation / Residual Effects and Monitoring
		• Driver Delay: The magnitude of change, following mitigation, is low. The effect is **Minor Adverse (Not Significant)**; • NMU Delay: The magnitude of change, following mitigation, is low. The effect is **Minor Adverse (Not Significant)**; • NMU Amenity: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; • Fear and Intimidation: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; and • Accidents and Safety: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**.
Link 98 - Green Lane (east of Mickelfield Road)	High	Across a day there is a 15% increase in total traffic and no change in HDVs on this link. This equates to circa 140 extra vehicles per day. The change in traffic on this link is largely as result of the eastern end of Green Lane, which connected to the A414, being closed so all traffic has to exit to the west onto the A4147 Leverstock Green via Link 98. The closure of the connection of Green Lane to the A414 was largely in response to local feedback from consultation events. Green Lane in this location has a footway / cycleway on the north side and this will be improved to connect to the Development at its eastern end. Adjacent to the primary school, a raised table crossing is currently provided along with guard railing to ensure safe crossing to the school. Traffic flows on this link are considerably lower than 1,400 per hour across the day and the street is designed at a pedestrian scale. There are no collision clusters on this link attributable to the highway layout or infrastructure. The magnitude of change in relation to accidents and safety, based on the change in traffic flows and the character of the link is therefore negligible. Summary of magnitude of change on the link: • Severance: Negligible magnitude of change; • Driver Delay: Negligible magnitude of change; • NMU Delay: Negligible magnitude of change; • NMU Amenity: Negligible magnitude of change; • Fear and Intimidation: Negligible magnitude of change; and • Accidents and Safety: Negligible magnitude of change. **Embedded Mitigation** As part of the Development there are improvements to Green Lane at the eastern end with Westwick Row to improve pedestrian / cycle connectivity along Green Lane to the Development.

Sensitive Receptor	Sensitivity of Receptor	Potential Effects / Embedded Mitigation / Residual Effects and Monitoring
		Residual Impact The sensitivity of Link 98 is high. All residual effects are direct, local and permanent. • Severance: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**; • Driver Delay: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**; • NMU Delay: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**; • NMU Amenity: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**; • Fear and Intimidation: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**; and • Accidents and Safety: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant).**
Link 107 - A414 SB (S of J8)	Very Low	Across a day there is a 19% increase in total traffic and a 33% increase in HDVs on this link. Link 107 is a connector link from M1 J8 to the A414 dual carriageway to the east of M1 J8. It has no footway/cycleways. As such NMU delay, amenity and fear and intimidation are reduced to negligible in terms of magnitude of change based on professional judgement. This volume of change on this link which connects to the M1 motorway is not considered to be a material change to the character of the link, which is strategic in nature. There are no collision clusters on this link attributable to the highway layout or infrastructure. The magnitude of change in relation to accidents and safety, based on the change in traffic flows and the character of the link is therefore negligible. Summary of magnitude of change on the link: • Severance: Low magnitude of change; • Driver Delay: Low magnitude of change; • NMU Delay: Negligible magnitude of change; • NMU Amenity: Negligible magnitude of change; • Fear and Intimidation: Negligible magnitude of change; and • Accidents and Safety: Negligible magnitude of change. **Embedded Mitigation** N/A

Sensitive Receptor	Sensitivity of Receptor	Potential Effects / Embedded Mitigation / Residual Effects and Monitoring
		Residual Impact The sensitivity of Link 107 is very low. All residual effects are direct, local and permanent. • Severance: The magnitude of change, following mitigation, is low. The effect is **Negligible (Not Significant)**; • Driver Delay: The magnitude of change, following mitigation, is low. The effect is **Negligible (Not Significant)**; • NMU Delay: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; • NMU Amenity: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; • Fear and Intimidation: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; and • Accidents and Safety: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant).**
Link 108 - A414 NB Offslip of J8	Very Low	Across a day there is a 21% increase in total traffic and a 30% increase in HDVs on this link. Link 108 is a connector link from the M1 motorway to A414 (NB offslip). To the south of the link there is a footway setback behind a large verge and a crossing to the north of the link at the traffic lights. Limited demand from pedestrians/cyclists have been observed on the footway and crossing. Based on this it has been classed as low in terms of magnitude of change based on professional judgement. This volume of change on this link which connects to the M1 motorway is not considered to be a material change to the character of the link, which is strategic in nature. There are no collision clusters on this link attributable to the highway layout or infrastructure. The magnitude of change in relation to accidents and safety, based on the change in traffic flows and the character of the link is therefore negligible. Summary of magnitude of change on the link: • Severance: Low magnitude of change; • Driver Delay: Low magnitude of change; • NMU Delay: Low magnitude of change; • NMU Amenity: Low magnitude of change; • Fear and Intimidation: Negligible magnitude of change; and • Accidents and Safety: Negligible magnitude of change. **Embedded Mitigation**

Sensitive Receptor	Sensitivity of Receptor	Potential Effects / Embedded Mitigation / Residual Effects and Monitoring
		This link is part of the improvement as part of the Development at Breakspear Junction and as a result part of an overall network of improvements as part of the Development which are considered embedded mitigation. **Residual Impact** The sensitivity of Link 108 is very low. All residual effects are direct, local and permanent. • Severance: The magnitude of change, following mitigation, is low. The effect is **Negligible (Not Significant)**; • Driver Delay: The magnitude of change, following mitigation, is low. The effect is **Negligible (Not Significant)**; • NMU Delay: The magnitude of change, following mitigation, is low. The effect is **Negligible (Not Significant)**; • NMU Amenity: The magnitude of change, following mitigation, is low. The effect is **Negligible (Not Significant)**; • Fear and Intimidation: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; and • Accidents and Safety: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**.
Link 110 - A414 NB Onslip of J8	Very Low	Across a day there is a 15% increase in total traffic and a 38% increase in HDVs on this link. Link 110 is a connector link onto the M1 NB. It has no footway/cycleways and is part of M1 J8. As such NMU delay and amenity are reduced to negligible in terms of magnitude of change based on professional judgement. This volume of change on this link which connects to the M1 motorway is not considered to be a material change to the character of the link, which is strategic in nature. There are no collision clusters on this link attributable to the highway layout or infrastructure. The magnitude of change in relation to accidents and safety, based on the change in traffic flows and the character of the link is therefore negligible. Summary of magnitude of change on the link: • Severance: Low magnitude of change; • Driver Delay: Low magnitude of change; • NMU Delay: Negligible magnitude of change; • NMU Amenity: Negligible magnitude of change; • Fear and Intimidation: Negligible magnitude of change; and • Accidents and Safety: Negligible magnitude of change. **Embedded Mitigation**

Sensitive Receptor	Sensitivity of Receptor	Potential Effects / Embedded Mitigation / Residual Effects and Monitoring
		This link is close to the proposed improvement at Breakspear Junction and there are some minor works to signing / kerbs which may alter the link but would not change it in relation to this assessment but are considered embedded mitigation. **Residual Impact** The sensitivity of Link 110 is very low. All residual effects are direct, local and permanent. • Severance: The magnitude of change, following mitigation, is low. The effect is **Negligible (Not Significant)**; • Driver Delay: The magnitude of change, following mitigation, is low. The effect is **Negligible (Not Significant)**; • NMU Delay: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; • NMU Amenity: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; • Fear and Intimidation: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; and • Accidents and Safety: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant).**
Link 117 - A414 to M1 SB Onslip of J8	Very Low	Across a day there is a 27% increase in total traffic and a 67% increase in HDVs on this link. Link 117 is a connector link onto the M1 SB. It has no footway/cycleways and is part of M1 J8. As such NMU delay and amenity are reduced to negligible in terms of magnitude of change based on professional judgement. This volume of change on this link which connects to the M1 is not considered to be a material change to the character of the link, which is strategic in nature. There are no collision clusters on this link attributable to the highway layout or infrastructure. The magnitude of change in relation to accidents and safety, based on the change in traffic flows and the character of the link is therefore negligible. Summary of magnitude of change on the link: • Severance: Low magnitude of change; • Driver Delay: Low magnitude of change; • NMU Delay: Negligible magnitude of change; • NMU Amenity: Negligible magnitude of change; • Fear and Intimidation: Negligible magnitude of change; and • Accidents and Safety: Negligible magnitude of change.

Sensitive Receptor	Sensitivity of Receptor	Potential Effects / Embedded Mitigation / Residual Effects and Monitoring
		Embedded Mitigation N/A. **Residual Impact** The sensitivity of Link 117 is very low. All residual effects are direct, local and permanent. • Severance: The magnitude of change, following mitigation, is low. The effect is **Negligible (Not Significant)**; • Driver Delay: The magnitude of change, following mitigation, is low. The effect is **Negligible (Not Significant)**; • NMU Delay: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; • NMU Amenity: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; • Fear and Intimidation: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant)**; and • Accidents and Safety: The magnitude of change, following mitigation, is negligible. The effect is **Negligible (Not Significant).**
Link 123 - A4147 Leverstock Green Way	Medium	Link 123 is the A4147 Leverstock Green Way and is similar to Link 97 above. Across a day there is a 35% increase in total traffic and a 34% increase in HDVs on this link. The change in traffic on the A4147 Leverstock Green is largely as a result of the Development and the closure of Green Lane connection to A414. The closure of the connection of Green Lane to the A414 was largely in response to local feedback from consultation events. The A4147 Leverstock Green Way is an A road and is signed to be 30 mph through this area around Leverstock Green Village Centre. It provides a route between Hemel Hempstead and St Albans. It includes footpaths on both sides through Leverstock Green village which are wide and of good quality. Along the length of the link signalised pedestrian crossings are provided in key locations. Traffic flows are generally over 1,400 vehicles per hour along this link but signalised crossings are provided for pedestrians at key desire lines which means the magnitude has been classed as low in relation to pedestrian delay. As part of the Development, there is an upgrade to the junction of A414 / Leverstock Green Way which includes partial signalisation and inevitably signalisation of junctions leads to a degree of increase in journey times which associated with the increase in traffic will lead to a low magnitude of change in terms of journey times. There are no collision clusters on this link attributable to the highway layout or infrastructure. The magnitude of change in relation to accidents and safety,

Sensitive Receptor	Sensitivity of Receptor	Potential Effects / Embedded Mitigation / Residual Effects and Monitoring
		based on the change in traffic flows and the character of the link is therefore negligible. Summary of magnitude of change on the link: • Severance: Low magnitude of change; • Driver Delay: Low magnitude of change; • NMU Delay: Low magnitude of change; • NMU Amenity: Negligible magnitude of change; • Fear and Intimidation: Negligible magnitude of change; and • Accidents and Safety: Negligible magnitude of change. **Embedded Mitigation** N/A **Residual Impact** The sensitivity of Link 123 is medium. All residual effects are direct, local and permanent. • Severance: The magnitude of change, following mitigation, is low. The effect is **Minor Adverse (Not Significant)**; • Driver Delay: The magnitude of change, following mitigation, is low. The effect is **Minor Adverse (Not Significant)**; • NMU Delay: The magnitude of change, following mitigation, is low. The effect is **Minor Adverse (Not Significant)**; • NMU Amenity: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**; • Fear and Intimidation: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant)**; and • Accidents and Safety: The magnitude of change, following mitigation, is negligible. The effect is **Minor Adverse (Not Significant).**

10.5 Additional Mitigation / Enhancement and Likely Residual Effects of the Development and their Significance

The Works

10.5.1 As stated previously, the assessments undertaken above for the interim assessment include limited embedded mitigation other than the provision of the accesses. It is anticipated that a CEMP will be in place to mitigate effects during the Works phase, but the results of these are not quantifiable

at this stage. Therefore the residual effects of the assessment remain unchanged (at worst, minor adverse and not significant).

The Completed and Operational Development

10.5.2 As stated previously, the assessments undertaken above for the operational assessment include embedded (designed in) mitigation. The traffic flows used in the assessment are based on an assumption that the Sustainable Transport Strategy will be in place.

10.5.3 It is anticipated that there will be a greater shift away from the private car compared with the assumptions made in the assessment. This could be achieved through the Travel Plan. Whilst a reduction in flows could be achieved in this way and act as further mitigation of the identified effects. This further mitigation has not been assumed in the assessment so no further reduction between the effects assessed above and the residual effects has been included.

10.5.4 No further additional mitigation is identified / required beyond the monitor and manage strategy. The monitor and manage strategy is set out within the Transport Assessment. Therefore the residual effects of the assessment remain unchanged.

10.6 Likely Residual Cumulative Effects and their Significance

10.6.1 The main assessments described above are cumulative assessments as these include growth from specific committed developments. The growth generated by committed schemes and the derivation of the traffic flows for the Reference Case are described in detail in the Transport Assessment (**ES Volume 3, Appendix 10.1**) and its associated appendices, including the Forecasting Note.

10.7 Conclusions

10.7.1 In summary, during the interim (Works) phase the conclusions are as follows:

- Severance – minor adverse (not significant) effects on some links;
- Driver delay – minor adverse (not significant) effects on some links;
- Pedestrian delay – negligible / minor adverse (not significant) effects on some links;
- Pedestrian amenity - negligible / minor adverse (not significant) effects on some links;
- Accidents and safety - negligible (not significant) effects; and
- Fear and intimidation – negligible (not significant) effects.

10.7.2 During the Operational Phase, a series of tests have been undertaken above including a Core Scenario, Cumulative Scenario and End of Local Plan Scenario. The results of these, which include embedded mitigation and the sustainable transport strategy, are as follows:

- Severance – minor adverse (not significant) effects on some links;
- Driver delay – minor adverse (not significant) effects on some links;
- Pedestrian delay – negligible / minor adverse (not significant) effects on some links;
- Pedestrian amenity - negligible / minor adverse (not significant) effects on some links;
- Accidents and safety - negligible (not significant) effects; and
- Fear and intimidation – negligible (not significant) effects.

10.7.3 Overall, the Development will have at worst a **minor adverse** (**not significant**) residual effect in relation to severance and driver delay, a **negligible / minor adverse** (**not significant**) residual effect in relation to pedestrian delay and pedestrian amenity and a **negligible** (**not significant**) residual effect in relation to accidents and safety and fear and intimidation.