Document 6.2

The West Midlands Rail Freight Interchange Order 201X

ES - Vol 1 - Chapter 15: Transport and Access

Regulation 5(2)(a)

WSP - July 2018

West Midlands Interchange

Four Ashes Ltd

15 Transport and Access

Introduction

15.1 This chapter of the ES assesses the likely significant environmental effects associated with the Proposed Development in respect of Transport and Access. In particular, this chapter describes the relevant legislation and Transport policy context; the methods used for assessment and details of the criteria used to determine significance; the baseline Transport conditions at and surrounding the Site; the potential impacts and effects as a result of the Proposed Development; any mitigation or control measures required to reduce or eliminate adverse effects; and the subsequent residual effects and likely significant effects associated with the Proposed Development.

15.2 Specifically, it considers the likely significant effects on severance, driver stress and delay, pedestrian and cyclist delay, amenity and accidents and safety.

15.3 The Transport Chapter of the Environmental Statement (Chapter 15) is supported by a suite of documents which address the environmental and transport matters for which significant impacts have been identified in the ES and thus where mitigation measures are required. The following figure shows the relationship between the Transport Chapter of the ES, the Transport Assessment and the suite of transport management plans and strategies.

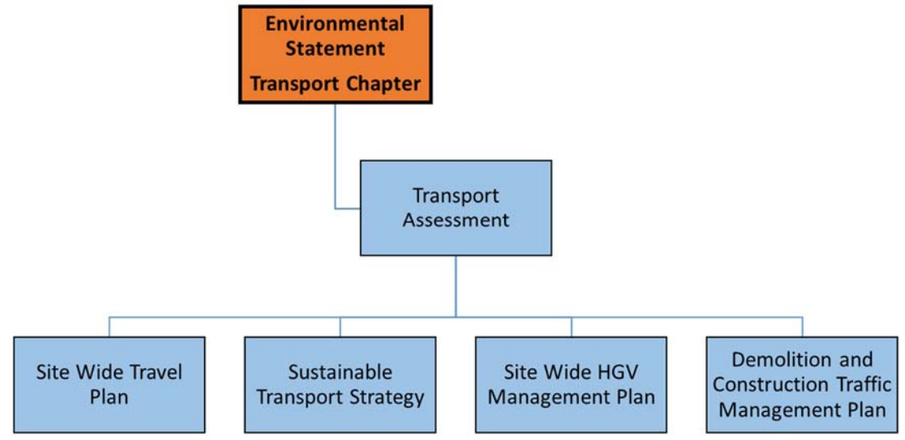

Diagram15.1 - Transport Document Hierarchy

15.4 A Transport Assessment (TA) has been produced and is included in Technical Appendix 15.1. The TA considers the transport strategy for the construction and operation of the Proposed Development.

15.5 The TA is supported by additional transport documents. These include the Site Wide Travel Plan (SWTP), the Demolition and Construction Traffic Management Plan (DCTMP) and the Site Wide HGV Management Plan. The implementation of these three documents will be secured through the DCO Requirements.

15.6 The SWTP describes the various measures that would be implemented in order to maximise the use of non-car modes of transport for travel to/from the Proposed Development. In addition, there are proposals to improve walking and cycling infrastructure in the local area, to encourage further use of non-car modes of transport. The overall management and implementation of the SWTP will be the responsibility of the Travel Plan Co-ordinator under the employment of FAL. The SWTP will be used as an overarching document within which individual occupiers will produce their own Occupier Travel Plans (OTP). OTPs will be required to be in place prior to occupation of a new warehouse on-site.

15.7 The Sustainable Transport Strategy is also included as an appendix to the Transport Assessment. This sets out the strategy to improve the bus, walking and cycling infrastructure. Contributions towards key elements of the Sustainable Transport Strategy, including shuttle buses, will be secured through the Section 106 Agreement and improvements to walking and cycling infrastructure are included on the General Arrangement drawings.

15.8 The Site Wide HGV Management Plan sets out the key requirements and management guidance for individual occupiers to follow and implement. It governs all HGV movements to and from the warehouses and rail terminal. The Site Wide Management Plan will be used as an overarching document within which individual occupiers will produce their own Occupier HGV Management Plans. Occupier HGV Management Plans will need to be in place before occupation of a new warehouse on site.

15.9 Finally, the DCTMP provides details on the requirements for the management of transport impacts associated with the construction phases of the Proposed Development.

15.10 Once the principal contractor has been appointed there will be opportunity for them to review and adjust the DCTMP in agreement with the local authorities.

15.11 This chapter is also accompanied by figures 15.1 – 15.10.

15.12 This chapter is written by WSP.

Legislation and Policy Context

15.13 The assessment of wider transport and sustainability criteria is based on policy and current best practice and exemplified in a number of policy documents at a national, regional and local level. A comprehensive review of policy documents is provided in the TA (Technical Appendix 15.1 but included below is a review of those directly relevant to this ES Chapter. These documents comprise:

National Policy

- National Policy Statement for National Networks (DfT);
- National Planning Policy Framework (NPPF);
- National Planning Practice Guidance - Overarching principles on Travel Plans, Transport Assessments and Statements, 2014;
- The Strategic Road Network and Delivery of Sustainable Development (DfT Circular 02/2013);

Regional Policy

- Movement for Growth: The West Midlands Strategic Transport Plan (December 2015);
- West Midlands Metropolitan Freight Strategy 2030, Support Our Economy; Tackling Carbon (April 2013);
- West Midlands Strategic Employment Sites Study (Peter Brett Associates, JLL, September 2015);

Local Policy

- South Staffordshire Core Strategy DPD 2012; and
- Staffordshire Local Transport Plan 2011.

15.14 A full review of the relevant national, regional and local policies is summarised below.

National Legislation and Policy

National Policy Statement for National Networks, 2014

15.15 The National Networks National Policy Statement (NPS) was published in December 2014 and sets out the need for, and Government's policies to deliver, development of nationally significant infrastructure projects (NSIPs) on the national road and rail networks in England.

15.16 The NPS states that the users and buyers of warehousing and distribution services are increasingly looking to integrate rail freight into their transport operations. This will necessitate the development of new freight and logistics facilities which are located in proximity to the major rail routes and also close to major trunk roads and conurbations. In addition, some degree of flexibility is needed when schemes are being developed in order to allow development to respond to market requirements (para 2.45).

15.17 Paragraph 3.17 of the NPS stresses the importance of accommodating pedestrians and cyclists, noting:

> *"there is a direct role for the national road network to play in helping pedestrians and cyclists. The Government expects applicants to use reasonable endeavours to address the needs of cyclists and pedestrians in the design of new schemes. The Government also expects applicants to identify opportunities to invest in infrastructure in locations where the national road network severs communities and acts as a barrier to cycling and walking, by correcting historic problems, retrofitting the latest solutions and ensuring that it is easy and safe for cyclists to use junctions".*

15.18 The NPS provides details on how the business case for road and rail schemes (excluding SRFIs) should be assessed using the WebTAG methodology (Paragraph 4.5). This business case will be used to inform investment decisions on road and rail projects. However, SRFIs, which are privately funded, are not required to develop a business case using WebTAG but rather "*a judgement of viability will be made within the Market Framework and taking account of government interventions such as investment in the strategic rail freight network"* (Paragraph 4.8).

15.19 Section 5 of the NPS discusses the impacts on transport networks. The NPPF states that all developments generating significant movement should be supported by a Transport Assessment using the WebTAG methodology stipulated in Department for Transport guidance, or successor to such methodology. It goes on to state that:

> *"If a development is subject to EIA and is likely to have significant environmental impacts arising from impacts on transport networks, the applicant's environmental statement should describe those impacts." "the applicant should prepare a travel plan including management measures to mitigate transport impacts. The applicant should also provide details of proposed measures to improve access by public transport and sustainable modes where relevant, to reduce the need for any parking associated with the proposal and to mitigate transport impacts".*

National Planning Policy Framework, 2012

15.20 The NPPF was published in March 2012 and replaced all Planning Policy Guidance (PPG) and Planning Policy Statements (PPS) relating to Transport.

15.21 The NPPF's objectives in relation to transport are:

- "actively manage patterns of growth to make the fullest possible use of public transport, walking and cycling, and focus significant development in locations which are or can be made sustainable" (Paragraph 17);
- "facilitating sustainable development but also in contributing to wider sustainability and health objectives" (Paragraph 29);
- "support reductions in greenhouse gas emissions and reduce congestion. In preparing Local Plans, local planning authorities should therefore support a pattern of development which, where reasonable to do so, facilitates the use of sustainable modes of transport" (Paragraph 30); and
- "develop strategies for the provision of viable infrastructure necessary to support sustainable development" (Paragraph 31).

15.22 The framework provides guidance on the key transport issues which should be considered through the planning process for developments that generate significant amounts of traffic movements. Paragraph 32 states that plans and decisions should consider:

- *"the opportunities for sustainable transport modes have been taken up depending on the nature and location of the site, to reduce the need for major transport infrastructure;*
- *safe and suitable access to the site can be achieved for all people; and*
- *improvements can be undertaken within the transport network that cost effectively limit the significant impacts of the development. Development should only be prevented or refused on transport grounds where the residual impacts of development are severe."*

15.23 Paragraph 36 goes on to state that a key tool to facilitate this will be a Travel Plan. All developments which generate significant amounts of movement should be required to provide a Travel Plan.

15.24 There is some cross over between the NPPF and NPS, particularly with regard to providing for sustainable transport modes and reducing car travel.

National Planning Practice Guidance – Overarching principles on Travel Plans, Transport Assessments and Statements, 2014

15.25 The NPPG has a specific section on Travel Plans, Transport Statements and Transport Assessments and cross references Paragraph 32 of the NPPF as noted in paragraph 12.6.

15.26 The PPG states that *"Travel Plans should, where possible, be considered in parallel to development proposals and readily integrated into the design and occupation of the new site rather than retrofitted after occupation"*. – Paragraph 003 Reference ID 42-003-20140306

15.27 Paragraph 006 Reference ID 42-006-20140306 of the PPG outlines that Travel Plans, Transport Assessments and Statements can positively contribute to:

- encouraging sustainable travel;
- lessening traffic generation and its detrimental impacts;
- reducing carbon emissions and climate impacts;
- creating accessible, connected, inclusive communities;
- improving health outcomes and quality of life;
- improving road safety; and
- reducing the need for new development to increase existing road capacity or provide new roads.

The Strategic Road Network and the Delivery of Sustainable Development (DfT Circular 02/2013)

15.28 This document sets out the way in which Highways England (formerly The Highways Agency) will engage with communities and the development industry to deliver sustainable

development and thus, economic growth, whilst safeguarding the primary function and purpose of the strategic road network.

15.29 Paragraph 9 states;

"Development proposals are likely to be acceptable if they can be accommodated within the existing capacity of a section (link or junction) of the strategic road network, or they do not increase demand for use of a section that is already operating at over-capacity levels' and 'Development should only be prevented or refused on transport grounds where the residual cumulative impacts of development are severe".

15.30 Paragraph 45 states that;

"developers must ensure all environmental implications associated with their proposal, are adequately assessed and reported so as to ensure that the mitigation of any impact is compliant with prevailing policies and standards. This requirement applies in respect of the environmental impacts arising from the temporary construction works and the permanent transport solution associated with the development, as well as the environmental impact of the existing trunk road upon the development itself".

15.31 Paragraph 47 of the DfT Circular states that;

"developers must ensure that adequate environmental information is provided at all stages of the planning process to satisfy the local planning authority and any other consenting authorities that the environmental impacts have been appropriately considered".

15.32 Paragraph 48 goes on to state that;

"Transport Assessment undertaken by the promoter of the development should be comprehensive enough to establish the likely environmental impacts, including air quality, light pollution and noise, and to identify the measures to mitigate these impacts. This will enable local authorities to fulfil their remit of considering appropriate environmental impact assessment of the development".

Regional Policy

Movement for Growth: The West Midlands Strategic Transport Plan, 2015

15.33 The document sets out the five challenges for which an excellent transport system is an essential part of the solution:

- A - Economic growth and Economic Inclusion;
- B - Population Growth and Housing Development;
- C – Environment;
- D - Public Health; and
- E - Social Well-Being.

15.34 Section 3 of the document sets out the vision and objectives for transport.

15.35 The vision is stated as;

"We will make great progress for a Midlands economic 'Engine for Growth', clean air, improved heath and quality of life for the people of the West Midlands. We will do this by creating a transport system befitting a sustainable, attractive conurbation in the world's sixth largest economy."

15.36 Key statements in support of this vision are:

- *"Introduce a fully integrated rail and rapid transit network that connects our main centres with quick, frequent services, and which is connected into wider local bus networks;*
- *Reduce transport's impact on our environment – improving air quality, reducing carbon emissions and improving road safety;*
- *Ensure that walking and cycling are a safe and attractive option for many journeys especially short journeys, by delivering a strategic cycle network and enhancing local conditions for active travel;*
- *Facilitate the efficient movement of people on our transport networks to enable access to education and employment opportunities and health and leisure services;*
- *Enable businesses to connect to supply chains, key markets and strategic gateways through improved strategic connections by road and rail; and*
- *Maintain and develop our transport infrastructure and services effectively to help ensure they are safe and easily accessible for all."*

15.37 Nine objectives are set out based on the theme of the 5 challenges (A – E above). These include supporting growth and employment within the West Midlands Metropolitan area and increasing active travel in the West Midlands Metropolitan area.

15.38 These objectives are supported by 15 policies. The key policies relevant to this ES Chapter are as follows:

- *"Policy 2 To use existing transport capacity more effectively to provide greater reliability and average speed for the movement of people and goods."*
- *"Policy 3 To maintain existing transport capacity more effectively to provide greater resilience and greater reliability for the movement of people and goods."*
- *"Policy 4 To improve connections to new economic development locations to help them flourish."*
- *"Policy 7 To ensure the affordability of public transport for people accessing skills and entering employment."*
- *"Policy 11 To significantly increase the amount of active travel in the West Midlands Metropolitan Area."*

15.39 Section 4 provides an overview of the long term approach to implement the policies and outlines there are three broad paths for transport strategy to follow to achieve this, after making better use of the existing transport capacity:

- *"Meeting increased demand by providing new road capacity for private car and road freight vehicles;*
- *Meeting increased demand by providing higher quality public transport, better conditions for walking and cycling and new public transport capacity, rail freight capacity, and cycling and walking capacity; and*
- *Considering different blends of the two above"*

West Midlands Metropolitan Freight Strategy 2030, 2013

15.40 This document, produced by Transport for West Midlands, aspires to deliver investment in freight to meet the following vision.

"By 2030, the Metropolitan Area will have safer, more reliable and efficient freight and logistics movements to, from and within the West Midlands, which support sustainable economic growth by enhancing our trade links, boosts productivity, addresses carbon emissions and attracts investment into the Metropolitan Area."

15.41 Paragraph 1.13 outlines the need for key objectives to focus investment and measure success whilst reflecting national transport policy goals and the West Midlands Local Transport Plan (LTP). Its key objectives are:

- **KO1: Supporting Sustainable Economic Growth**: by improving productivity and competitiveness through reduced costs for businesses and freight operators; enhancing market access and; attracting new companies and industrial sectors to relocate here, creating new jobs and economic growth.

- **KO2: Reducing Carbon Emissions**: through shorter, more reliable journeys whilst also promoting and encouraging greater use of low carbon modes of freight.

15.42 The document discusses further national and local transport priorities and objectives that investment in freight can help to achieve:

- **KO3: Health, Personal Security & Safety**: Investment in freight which either reduces road freight miles on our road network or educates road users will reduce the chance of road traffic collisions, particularly with vulnerable users such as cyclists. Investment in our transport networks which support modal shift, enhance road journey flows or reduces community intrusion will improve also air quality levels to the benefit of people's health.
- **KO4: Equality of Opportunity Investment in freight** which will boost productivity and competitiveness whilst attracting new or existing business investment to create jobs and opportunities.
- **KO5: Quality of Life and Local Environment**: Investment in freight which either reduces road freight miles on our road network or reduces intrusion into residential areas along with improvements to air quality will enhance quality of life and local environments.

15.43 Paragraph 9.25 states;

"Without SRFI, businesses are forced to make longer distance deliveries to their stores from other distribution centres. This leads to cost, congestion, carbon and air quality impacts."

15.44 Section 2.98 outlines SRFI's;

"require a strategic approach to identify suitable sites that appropriately balance the need and benefits of SRFI for the wider regional economy against the potential localised impacts such sites can generate."

West Midlands Strategic Employment Sites Study, 2015

15.45 The brief for the study, produced by Peter Brett Associates and JLL is as follows;

"West Midlands Local Authority Chief Executives recognise the value of having a reserve of strategic sites, which are attractive and able to accommodate internationally footloose businesses and very large scale logistics facilities".

15.46 The document provides a history of strategic employment sites in West Midlands Regional Planning and concludes two defining features which remain consistent:

- Strategic sites aim to attract net additional economic activity and jobs;
- The sites need larger-than-local planning, because they meet requirements that would not otherwise be accommodated in the region. the local planning process would not bring forward sites with the same qualities, for two main reasons:
  - The sites are very large – originally at least 50 ha; and
  - To provide the quality that attracts the target occupiers they may have to provide greenfield land outside the main urban areas.

15.47 Paragraph 2.22 outlines that;

"the Midlands is one of the most competitive and effective locations in the UK for major distribution occupiers."

15.48 Furthermore, paragraph 2.22 outlines a very limited supply of development ready logistic sites to serve the Midlands over the medium and long-term.

Local Policy

South Staffordshire Core Strategy DPD, 2012

15.49 The South Staffordshire Local Plan Core Strategy was adopted on the 11th December 2012. The core strategy sets out South Staffordshire County Council's policies for development in the district until 2028. The Core Strategy sets out several policies which deal with transport issues, including the following:

- *"To reduce the need to travel, to secure improvements to public transport infrastructure and services and make it safer and easier for the community to travel to jobs and key services by sustainable forms of transport, such as public transport walking and cycling"* (Strategic Objective 13).
- *"All proposals for development must include provision for sustainable forms of transport to access the site, and within the development. Measures commensurate with the development proposed must be incorporated as an integral part of the design of all development proposals"* (Policy EV11).
- *"The council will require appropriate provision to be made for off-street parking in development proposals in accordance with adopted parking standards"* (Policy EV12).

South Staffordshire Local Transport Plan 3, 2011

15.50 The Third South Staffordshire Local Transport Plan was adopted during 2011. The Local Transport Plan sets out SSDC's policies for transport provision in the county, including walking, cycling, public transport, car based travel and freight, together with the management and maintenance of local roads and footways. The Local Transport Plan sets out several policies, including the following:

- Page 14 outlines Policy 1.1:

  "*We will stimulate regeneration and support areas of deprivation. The documents present how this will be achieved;*
  - *Ensuring the transport network - its management, maintenance and development – contributes to the attractiveness and vibrancy of towns and villages: and*
  - *Supporting schemes that 'add value' to the transport network, particularly those that promote its 'Place' role."*
- Page 20 highlights Policy 1.8:

  "We will improve the efficiency of Freight Distribution and sets out that this will be achieved through the actions set out in the Staffordshire Freight Strategy."
- Page 68 & 69 outlines Policy 5.1:

  "We will promote alternatives to private motor vehicles. The policy sets out a number of points on how this will be achieved, including:
  - *Supporting new development that includes or is located in areas with good public transport links, well-connected to walking and cycling networks and facilities, and where the demand for 'place' and 'movement' is considered together.*
  - *Working with local planning authorities and developers to mitigate impacts of development in less sustainable locations but which is essential to support regeneration and economic growth.*
  - *Delivering the priorities and actions contained in the Staffordshire Freight Strategy."*
- Page 77 discusses Policy 6.1, which states:

  "We will create a physical and cultural environment in which everyone feels confident to walk and cycle."

Assessment Methodology

Baseline Characterisation

15.51 Regular Transport Working Group meetings have been held to discuss the transport implications of the Proposed Development. The Transport Working Group comprised WSP Highways England (HE), Staffordshire County Council (SCC) and other interested parties. Details of these discussions are provided within the TA (Technical Appendix 15.1). These

discussions have informed the definition of the study area that is considered within the TA, the assessment methodology and the mitigation proposed to address the development impact.

15.52 Site visits have been carried out to establish the existing conditions surrounding the Site.

15.53 Desk studies have been undertaken in order to develop the trip generation approach of the Proposed Development, together with the resultant distribution of all vehicular trips.

15.54 Information about existing bus and rail services and facilities was also obtained through desk studies, using the operators' websites and timetables.

Extent of the Study Area and Assessment Scenarios

15.55 As set out in the TA it is expected that occupation of the Proposed Development will begin during 2021 and therefore this has been chosen for the future year assessments. As required by Circular 02/2013, the assessment will consider the provision of the full quantum of development at this future year. In practice, the development will take a significant number of years to build. It is expected that the development will be completed by 2036.

15.56 It has been agreed with Highways England that in order to assess the full impact of a 2036 future scenario, any assessment would need to allow for the introduction of the planned M54/M6/M6 Toll link road, which is a committed Road Investment Strategy (RIS) 1 scheme. Whilst Highways England have identified three route options for the planned M54/M6/M6 Toll link road, these routes have been issued for public consultation purposes only and a preferred route option for this infrastructure remains to be identified. The public consultation exercise concluded on 13 October 2017 and based upon the findings of this exercise, a preferred route is due to be announced in 2018 with DCO consultation due to take place during Autumn 2018, leading to DCO submission in Summer 2019.

15.57 Whilst preliminary work has been carried out that identifies there would be improvements to journey times and a reduction in traffic flows along the A460 and A449 as a result of the proposed new road, in the absence of a preferred route it is not possible to carry out traffic modelling on which an assessment can be based. Therefore it has been agreed with Highways England that, the 2036 assessment cannot be undertaken.

15.58 However, as agreed with Highways England, an assessment has been undertaken that deals with junction capacity of the proposed A5 and A449 junctions that will serve the development at the 2036 future year. As a worst case, this makes no allowance for the inclusion of the M54/M6/M6 Toll link road and is reported within the TA (Technical Appendix 15.1). This assessment is a requirement of the Design Manual for Roads and Bridges (DMRB)TD 37/93 to report future traffic conditions fifteen years after scheme opening.

15.59 Therefore the following scenarios have been assessed for the purposes of this chapter:

- 2015 Baseline;
- 2021 opening year baseline (2021 Do Minimum) including committed development but excludes the Proposed Development; and
- 2021 with Proposed Development (2021 Do Something) including committed development and all the Proposed Development.

15.60 For the purposes of consistency and robustness, the local external highway network assessed in the TA, the extent of which has been agreed by the highway stakeholders, has been used as a starting point for the assessment of the likely significant environmental effects. This has then been extended for the ES assessment to ensure a robust area of coverage is considered and any relevant sensitive receptors have been taken into account.

15.61 The links considered for assessment are shown in Figure 15.1. A link can be defined as a specific section of highway between identified junctions within the study area. The links assessed are listed below.

Links for Assessment

15.62 The main links on the surrounding road network identified for assessment are as follows:

- Link 1 – M6 (between Junctions 13 and 14);
- Link 2 – A449 Stafford Road (between M6 junction 13 and Pinfold Lane);
- Link 3 - Cannock Road (between Wolgarston Way and the A34);
- Link 4 – A5 Watling Street (between M6 junction 12 and the proposed Site access);
- Link 5 - A5 Watling Street (between Vicarage Road and M6 J12);
- Link 6 – M6 (between Junctions 9 and 10);
- Link 7 – A5 Watling Street (between Vicarage Road and the A4061);
- Link 8 – A5 Watling Street (between the A449 and proposed Site access);
- Link 9 – A5 Watling Street (between the A449 and A41);
- Link 10 – A5 Watling Street (between A41 and A4640 Redhill Way);
- Link 11 – A449 (between A5 and Gravelly Way);
- Link 12 – A449 (between Gravelly Way and Station Drive);
- Link 13 – Vicarage Road (between the Site access and the A5);
- Link 14 – Straight Mile (between Vicarage Road and Oak Lane);
- Link 15 – Station Road (Between Enterprise Drive and Site access);
- Link 16 - Station Drive (between the A449 and Enterprise Drive);
- Link 17 – Four Ashes Road (between the A449 and Claygates Road);
- Link 18 - A449 (between Station Drive and Brewood Road);
- Link 19 – Poplars Farm Way (between the A449 and Lawn Lane);
- Link 20 – A449 Stafford Road (between M54 J2 and Brewood Road);
- Link 21 – A449 Stafford Road (between M54 J2 and Wobaston Road);
- Link 22 – Wobaston Road (between Stafford Road and the Droveway);
- Link 23 – A449 Stafford Road (between Wobaston Road and the A460);
- Link 24 – B5012 Wolgarston Way (between Cannock Road and A449);
- Link 25 – A449 Wolverhampton Road (between Boscomoor Lane and Pinfold Lane);
- Link 26 – A449 Wolverhampton Road (between Boscomoor Lane and the A5);
- Link 27 – A5 Watling Street (between A4601 and the M6 toll);
- Link 28 – A4601 Wolverhampton Road (between A5 and M6 toll);
- Link 29 – A4601 Wolverhampton Road (between A5 and Longford Road);
- Link 30 – M6 (between junction 10 and 10a);
- Link 31 - M6 (between junction 12 and 13);
- Link 32 – M6 (between junction 11 and 12);
- Link 33 – M6 (between Junction 10a and 11); and
- Link 34 – A5 (between A34 and the B4154).

Method of Assessment

Guidance

15.63 The assessment of transport issues has been undertaken in accordance with industry-accepted methodologies and references.

15.64 The assessment has also been undertaken in accordance with the web-based PPG to provide a robust assessment of the transport impacts of the Proposed Development.

15.65 Full details of the highway operational and capacity analysis are provided in the TA.

15.66 Best practice guidance considered as part of this assessment includes the Institute of Environmental Management and Assessment's (IEMA) note Guidelines for the Environmental

Assessment of Road Traffic[1]. This note sets out the recommended list of likely significant effects which could be considered as potentially significant whenever a new development is likely to give rise to changes in traffic flows, which in turn affect the baseline conditions to be considered. These include effects on drivers, pedestrians and other road users, including delays, severance and general amenity.

15.67 In accordance with the IEMA guidelines an assessment of sensitive receptors has been undertaken identifying the proximity of each receptor to the local highway network in order to inform the selection of the links for assessment. Locations which have been considered to be sensitive receptors include:

- Schools;
- Health facilities;
- Community facilities; and
- Areas with significant pedestrian movements.

15.68 Figure 15.2 illustrates the location of these sensitive receptors within the area considered by this assessment.

15.69 In order to determine the extent of the local highway network to be assessed, the IEMA guidelines advise assessors to consider all links where traffic flows are expected to increase by more than 30%, or where HGV flows are expected to change by more than 30% as a result of the Proposed Development.

15.70 If a link is close to a sensitive receptor IEMA guidelines advise it should be included for assessment if total traffic or HGV flows change by more than 10%.

15.71 The assessment years, study area and trip generation considered in this document is set out and discussed in greater detail in the TA (Technical Appendix 15.1).

15.72 In order to assess the transport effects of the Proposed Development, the Design Manual for Roads and Bridges (DMRB) has been consulted. Volume 11 of DMRB, the Manual for Environmental Assessment (MEA)[2], details specific assessment areas and methodologies which have been applied to the assessment.

Traffic Data

15.73 The baseline traffic data has been gathered using traffic surveys undertaken in 2013, 2015 and 2016. The extent and type of surveys carried out is shown in Figure 15.3.

15.74 Baseline traffic data for the study area at 2021 has been obtained from two strategic traffic models. These modelling platforms are the M54 / M6 / M6 Toll Link Road SATURN Model (M54/M6SM) and the South Staffordshire VISSIM Model (SSVM). The M54/M6SM was developed by Atkins on behalf of Highways England with a 2012 Base Year and forecast years of 2021 and 2036. The SSVM has been developed by Systra on behalf of Highways England with a Base Year of 2015. Details of the extent of these models are provided in Figures 15.4 and 15.5.

15.75 Both Atkins and Systra were commissioned separately to undertake further modelling in order to assess the implications of the Proposed Development with the agreement of Highways England and SCC.

15.76 It has been agreed with both Highways England and SCC that the demand forecasting of the Proposed Development should be supplied from the 2021 SATURN model, with the VISSIM model utilised to assess the impact of the Proposed Development and demonstrate the effectiveness of the proposed highway mitigation package.

15.77 The SSVM has been developed in order to reflect the forecast year of 2021. In addition, further traffic data was obtained during 2016 and 2017 in order to expand the SSVM to include validated vehicle queue lengths at the following junctions:

- A449 / Station Drive;
- A5 / Vicarage Road; and
- Vicarage Road / Straight Mile.

15.78 The SSVM has also been further developed in order to match the level of traffic at both ends of Station Drive / Vicarage Road.

15.79 Therefore, for each traffic model type, two separate scenarios have been modelled. As set out above, these are:

- 2021 Do Minimum (including committed development); and
- 2021 Do Something (including committed development and Proposed Development)

15.80 The Highway Authority's required that further committed / allocated sites be included within the M54/M6SM model. At the request of the Highway Authorities, the extent of these schemes included within the model was expanded in order to account for further schemes that have been consented since the preparation of the original 2021 M54/M6SM. These additional schemes are:

- Ward Street, Ettingshall (650 dwellings)
- Bilston Urban Village (478 dwellings)
- Watery Lane, Codsall (180 dwellings)
- Cley Road, Cannock (34,560 sqm B8 floor space)
- Kingswood Lakeside, Blakey Way (12,454 sqm B8 floor space)
- Bericote, Gravelly Way, Four Ashes (21,806 sqm B1 (c) B2, B8) – 2016 Consent

15.81 In accordance with Circular 02/2013, all development consents within the vicinity of the Site should be included within Baseline traffic flow. On this basis and as required by the Highway Authorities, they have been included within the strategic traffic modelling that has been undertaken.

15.82 In relation to the Bericote Development, a further consent was secured during 2016 and the associated development traffic was not included within the original M54/M6SM. Whilst this site does form part of the cumulative site search area, it was necessary to include for the further traffic associated with the additional consent within the traffic modelling.

15.83 Finally, the original 2021 M54/M6SM included allowances for strategic improvements to the A449 corridor. These improvements are not committed therefore these infrastructure alterations to the highway network have been removed from the model.

15.84 The 2021 Do Something scenario in both models has been derived using an agreed WMI trip generation and distribution, which has been agreed with both HE and SCC. More details on trip generation and distribution are provided in the TA (Technical Appendix 15.1). This scenario includes the proposed access junctions on the A5, A449 and Vicarage Road as well as the proposed public route through the Site, the removal of the right turn from the A449 to Station Drive and altering Crateford Lane to one way only in an east bound direction. More information on these highway proposals are provided in the TA (Technical Appendix 15.1).

15.85 Following completion of the 2021 Do Minimum and Do Something scenarios, an interim development scenario has been assessed referred to in this chapter as 2021 Interim. This assesses 185,900 sq. m (2 million sq. ft) of warehouse development only with 139,400 sq. m served from the A5 access and 46,500 sq. m served from the Vicarage Road access with no A449 / A5 link through the Site or rail terminal. This scenario does not include any of the other highway mitigation. Separate trip generation rates for this scenario have been agreed with HE and are set out in the TA (Technical Appendix 15.1).

15.86 The above approach (including traffic generation and distribution) has been agreed with both highway authorities as an appropriate means for assessment.

[1] Institute of Environmental Management and Assessment (2003) Guidelines for the Environmental Assessment of Road Traffic. Lincoln: IEMA.

[2] Highways Agency (various dates) Design Manual for Roads and Bridges [online] Available at: www.dft.gov.uk/ha/standards/dmrb/index.htm.

15.87 As both the Interim and Do Something scenarios use a base year of 2021, links have only been considered for assessment in the 2021 Interim scenario in this ES if the flows are higher than those in the 2021 Do Something scenario. This ensures all appropriate links are assessed when the impact is at its worse.

15.88 The Annual Average Daily Traffic (AADT) flow ranges and associated changes in traffic flows in 2021 with the addition of the development for all links that form the study area are shown in Tables 15.1. Table 15.2 sets out the changes with the addition of construction traffic and Table 15.3 sets out the changes on the relevant links for the interim development. The locations of the links assessed are shown on Figure 15.1.

Table 15.1: Comparison of base and With Development Traffic Flows

Figure 15.2 Ref.	Road	Near to Sensitive Receptor?	AADT* Total Vehicles			AADT* HGV's			Assess Link?
			2021 DM No Development	2021 DS with Development	% Change	2021 DM No Development	2021 DS with Development	% Change	
1	M6 between Junction 13 and 14	No	154703	156209	0.97%	24835	25585	3.02%	No
2	A449 Stafford Road (between M6 J13 and Pinfold Lane)	No	16172	18168	12.34%	1026	1345	31.16 %	Yes
3	Cannock Road (between Wolgarston Way and A34)	Yes	15875	16566	4.36%	897	1123	25.26 %	Yes
4	A5 Watling Street (between M6 J12 and Proposed Site Access)	No	21459	33104	54.26%	1369	5773	321.65 %	Yes
5	A5 Watling Street (between Vicarage Road and M6 J12)	No	19038	24833	30.44%	2639	4574	73.35 %	Yes
6	M6 (between Junctions 9 and 10)	No	227417	230456	1.34%	28864	31087	7.70%	No
7	A5 Watling Street (between Vicarage Road and A4061)	No	20815	24035	15.47%	2627	3389	28.99 %	No
8	A5 Watling Street (between A449 and Proposed Site Access)	No	22515	22960	1.97%	1713	2231	30.21 %	Yes
9	A5 Watling Street (between A449 and A41)	No	19948	21453	7.55%	936	1482	58.28 %	Yes
10	A5 Watling Street (between A41 and A4640 Redhill Way)	No	11621	11884	2.26%	1010	1243	23.08 %	No
11	A449 (between A5 and Gravelly Way)	No	22165	21772	-1.77%	849	1466	72.63 %	Yes
12	A449 (between Gravelly Way and Station Drive)	No	20848	27404	31.44%	614	2144	249%	Yes
13	Vicarage Road (between Site	No	5701	9633	68.97%	389	2466	533.74 %	Yes

Table 15.1: Comparison of base and With Development Traffic Flows

	Access and A5)								
14	Straight Mile between Vicarage Road and Oak Lane	No	1680	1689	0.53%	21	24	16.67 %	No
15	Station Road / Vicarage Road between Enterprise Drive and Proposed Site Access	No	5658	5265	-6.95%	375	501	33.58 %	Yes
16	Station Drive (between A449 and Enterprise Drive)	No	9055	8213	-9.31%	525	647	23.22 %	No
17	Four Ashes Road between A449 and Claygates Road	No	1999	2096	4.81%	55	75	37.50 %	Yes
18	A449 (between Station Drive and Brewood Road)	Yes	28972	34481	19.02%	1021	2590	153.65 %	Yes
19	Poplars Farm Way (between A449 and Lawn Lane)	No	7776	8093	4.09%	186	186	0.00%	No
20	A449 Stafford Road (between M54 J2 and Brewood Road)	Yes	27609	32298	16.98%	1017	2445	140.49 %	Yes

Table 15.1: Comparison of base and With Development Traffic Flows

21	A449 Stafford Road (between M54 J2 and Wobaston Road)	No	37895	41483	9.47%	1223	2382	94.79 %	Yes
22	Wobaston Road (between Stafford Road and The Droveway)	No	25948	26186	0.92%	447	430	-3.64%	No
23	A449 Stafford Road (between Wobaston Road and A460)	Yes	36340	39434	8.52%	904	2014	122.80 %	Yes
24	B5012 Wolgarston Way (between Cannock Road and A449)	No	7619	8425	10.57%	373	410	9.79%	No
25	A449 Wolverthampton Road (between Boscomoor Lane and Pinfold Lane)	Yes	13293	15258	14.78%	1203	1286	6.82%	Yes
26	A449 Wolverthampton Road (between Boscomoor Lane and A5)	Yes	22664	23943	5.64%	811	954	17.65 %	Yes
27	A5 Watling Street (between	No	26264	26958	2.64%	3875	4209	8.61%	No

Table 15.1: Comparison of base and With Development Traffic Flows

	A4601 and M6 toll)								
28	A4601 Wolverhampton Road (between A5 and M6 toll)	No	19676	19803	0.64%	2396	2423	1.12%	No
29	A4601 Wolverhampton Road (between A5 and Longford Road)	No	16990	17283	1.72%	1164	1270	9.06%	No
30	M6 between Junction 10 and 10a	No	195105	199512	2.26%	31260	33613	7.53%	No
31	M6 between Junction 12 and 13	No	146703	150541	2.62%	21653	22636	4.54%	No
32	M6 between Junction 11 and 12	No	140453	150593	7.22%	20777	24705	18.90 %	No
33	M6 between Junction 10a and 11	No	112233	117169	4.40%	21926	24345	11.04 %	No
34	A5 between A34 and B4154	No	29524	29653	0.44%	3386	3499	3.34%	No

* AADT = Annual Average Daily Traffic

Table 15.2: Comparison of Base and With Development Traffic Flows – Demolition and Construction Phase

Figure 15.1 Ref.	Road	Near to Sensitive Receptor?	AADT* Total Vehicles			AADT* HDV's			Assess Link?
			2021 DM No Development	2021 DS with Development	% Change	2021 DM No Development	2021 DS with Development	% Change	
1	M6 between Junction 13 and 14	No	154703	154869	0.1%	12551	12628	0.6%	No
2	A449 Stafford Road (between M6 J13 and Pinfold Lane)	No	16172	16177	0.0%	1026	1026	0.0%	No
3	Cannock Road (between Wolgarston Way and A34)	Yes	15875	15875	0.0%	897	897	0.0%	No
4	A5 Watling Street (between M6 J12 and Proposed Site Access)	No	21260	21570	1.5%	1357	1613	18.9%	No
5	A5 Watling Street (between Vicarage Road and M6 J12)	No	19032	19073	0.2%	2654	2680	1.0%	No
6	M6 (between Junctions 9 and 10)	No	227417	227559	0.1%	28864	28973	0.4%	No
7	A5 Watling Street (between Vicarage Road and A4061)	No	20821	20862	0.2%	2652	2677	1.0%	No
8	A5 Watling Street	No	22310	22334	0.1%	1735	1751	0.9%	No

Table 15.2: Comparison of Base and With Development Traffic Flows – Demolition and Construction Phase

	(between A449 and Proposed Site Access)								
9	A5 Watling Street (between A449 and A41)	No	19918	19926	0.0%	944	948	0.4%	No
10	A5 Watling Street (between A41 and A4640 Redhill Way)	No	11621	11629	0.1%	1010	1014	0.4%	No
11	A449 (between A5 and Gravelly Way)	No	22306	22342	0.2%	421	431	2.4%	No
12	A449 (between Gravelly Way and Station Drive)	No	20713	20817	0.5%	314	354	12.7%	No
13	Vicarage Road (between Site Access and A5)	No	5778	5778	0.0%	405	405	0.0%	No
14	Straight Mile between Vicarage Road and Oak Lane	No	1661	1661	0.0%	21	21	0.0%	No
15	Station Road / Vicarage Road between Enterprise Drive and Proposed Site Access	No	5687	5687	0.0%	397	397	0.0%	No
16	Station Drive	No	9130	9130	0.0%	555	555	0.0%	No

Table 15.2: Comparison of Base and With Development Traffic Flows – Demolition and Construction Phase

	(between A449 and Enterprise Drive)								
17	Four Ashes Road between A449 and Claygates Road	No	1988	1988	0.0%	55	55	0.0%	No
18	A449 (between Station Drive and Brewood Road)	Yes	28986	29090	0.4%	504	544	7.9%	No
19	Poplars Farm Way (between A449 and and Lawn Lane)	No	7767	7767	0.0%	181	181	0.0%	No
20	A449 Stafford Road (between M54 J2 and Brewood Road)	Yes	27678	27782	0.4%	512	552	7.8%	No
21	A449 Stafford Road (between M54 J2 and Wobaston Road)	No	37911	37949	0.1%	618	626	1.3%	No
22	Wobaston Road (between Stafford Road and The Droveway)	No	25922	25922	0.0%	438	438	0.0%	No
23	A449 Stafford Road (between Wobaston Road and A460)	Yes	36292	36330	0.1%	884	905	2.4%	No

Table 15.2: Comparison of Base and With Development Traffic Flows – Demolition and Construction Phase

24	B5012 Wolgarston Way (between Cannock Road and A449)	No	7619	7619	0.0%	373	373	0.0%	No
25	A449 Wolverthampton Road (between Boscomoor Lane and Pinfold Lane)	Yes	13293	13298	0.0%	1203	1203	0.0%	No
26	A449 Wolverthampton Road (between Boscomoor Lane and A5)	Yes	22649	22654	0.0%	811	811	0.0%	No
27	A5 Watling Street (between A4601 and M6 toll)	No	26264	26295	0.1%	3875	3896	0.5%	No
28	A4601 Wolverhampton Road (between A5 and M6 toll)	No	19676	19680	0.0%	2396	2399	0.1%	No
29	A4601 Wolverthampton Road (between A5 and Longford Road)	No	16990	16996	0.0%	1164	1167	0.2%	No
30	M6 between Junction 10 and 10a	No	195105	195247	0.1%	31260	31368	0.3%	No
31	M6 between Junction 12 and 13	No	146703	146864	0.1%	21653	21807	0.7%	No
32	M6 between Junction 11 and 12	No	140453	140560	0.1%	20777	20854	0.4%	No

Table 15.2: Comparison of Base and With Development Traffic Flows – Demolition and Construction Phase

33	M6 between Junction 10a and 11	No	112233	112340	0.1%	21926	22002	0.4%	No
34	A5 between A34 and B4154	No	29524	29556	0.1%	3386	3407	0.6%	No

Table 15.3: Comparison of 2021 Base and Interim Development Traffic Flows**

Figure 15.3 Ref.	Road	Near to Sensitive Receptor?	AADT* Total Vehicles			AADT* HGV's			Assess Link?
			2021 DM No Development	2021 Interim Development	% Change	2021 DM No Development	2021 Interim Development	% Change	
8	A5 Watling Street (between A449 and Proposed Site Access)	**No**	**22515**	**23986**	**6.53 %**	**1713**	**2680**	**6.53%**	**Yes**
11	A449 (between A5 and Gravelly Way)	**No**	**22165**	**22443**	**1.25 %**	**849**	**1662**	**95.67 %**	**Yes**
15	Station Road / Vicarage Road between Enterprise Drive and Proposed Site Access	**No**	**5658**	**6193**	**9.45 %**	**375**	**579**	**54.57 %**	**Yes**
16	Station Drive (between A449 and Enterprise Drive)	**No**	**9055**	**9480**	**4.69 %**	**525**	**771**	**46.88 %**	**Yes**

** Only links where the 2021 interim development traffic flow is higher than the 2021 full development traffic flow have been considered as set out in Paragraph 15.87.

15.89 For the full development, Table 15.1 shows 14 of the 34 links are subject to a change in traffic flows of more than 30% with the addition of the Proposed Development. These links are Links 2, 4, 5, 8, 9, 11, 12, 13, 15, 17, 18, 20, 21 and 23. These links are assessed further within this chapter.

15.90 Taking into account the proximity of each link to sensitive receptors an additional three links require assessment as traffic flow changes are greater than 10%. These links are 3, 25 and 26.

15.91 Table 15.2 demonstrates that no links are forecast to see an increase in total vehicles or HGVs of over 30%, or 10% near sensitive receptors, therefore no detailed assessment is required of the construction phase in line with the assessment criteria set out earlier in this chapter.

15.92 For the Interim assessment, Table 15.3 demonstrates that Links 8, 11, 15 and 16 will require assessment for the 2021 Interim Development Scenario.

Scoping

15.93 The Scoping Opinion Request Report was submitted to PINS in September 2016. PINS issued a Scoping Opinion in October 2016 which is provided within Technical Appendix 2.2, ES Volume 2. Table 15.4 sets out the transport related comments received in the Scoping Opinion and how and where they have been addressed, either in this chapter or elsewhere.

Table 15.4: Scoping Response

Consultee	Comment Raised	Response to Comments
SoS	Further work required to understand construction methodology and phasing	Construction Methodology is considered in Chapter 5 of this ES whilst development phasing is considered in Chapter 4. This Chapter considers construction traffic impact.
SoS	Information on construction traffic routing, access and parking. Information on whether material would arrive by rail / water	A Demolition and Construction Traffic Management Plan (DCTMP) is included as an appendix to the TA (Technical Appendix 15.1) including routing, traffic volumes, access and parking.
SoS	Information on number and type of rail and vehicle movements generated by the development	Number of vehicle movements is provided in detail in the TA (Technical Appendix 15.1). Information on rail movements is included in the Rail Operations Report (Document 7.3).
SoS	Reference to Carbon Emissions	Chapter 7, Air Quality and the Planning Statement (Document 7.1) considers the carbon emissions of the Proposed Development.
SoS	Impact of waiting HGVs in addition to effects on truck stops, cafes and laybys	The TA sets out proposed on site mitigation to address this. Early arrival bays will be provided on site to mitigate the impact of waiting HGVs.
SoS	Reference to specific sensitive receptors (Cannock Chase SAC, Cannock Extension Canal SAC and Belvide Reservoir) being included in study area	The study area has been set to include traffic on links near to these receptors. These specific receptors are of relevance to the ecological assessment and the impacts to them from a change in traffic is considered in Chapter 10 Ecology and Nature Conservation.
Leicestershire County Council (LCC)	Evidence of agreement with highway stakeholders Reference to rail routing and routing of traffic on the A5	A summary of the liaison carried out to date with relevant stakeholders is included in this chapter. The TA includes a comprehensive review of traffic impact and development traffic routing, including on the A5 whist the ES will look at the environmental impacts of these traffic flows. Information on rail routing is included in the Rail Report (Document 7.3).
SoS	Quantitative review of construction traffic Construction compound location, haul routes and accesses	A review of construction traffic and its impact is included in this chapter whilst identification of haul routes and reference to compound locations is included in the DCTMP (to be secured via a DCO Requirement). A copy of this document is included as an appendix to the TA (Technical Appendix 15.1).
SoS	Mitigation for diversion / closure of PRoW	Replacement with footways along internal roads and permissive paths as shown on the Access and Rights of Way Plans (Document 2.3) submitted with the DCO.
SoS	Assessment of Interim scenarios including construction work and partial operation	An assessment of construction impact is included in this chapter. Consideration has been given to an Interim scenario, prior to the opening of the A449 / A5 link road and further information on this is included in the TA (Technical Appendix 15.1). This has also been considered in this chapter.
SoS	Outline mitigation measures Requirement for a CTMP	Transport mitigation dealt with in the TA (Technical Appendix 15.1) and is summarised in this chapter. DCTMP included as an appendix to the TA (Technical Appendix 15.1) and secured through the DCO Requirements.
HE	Removal of material during construction and HGV movements	Construction routing and traffic volumes will be detailed in the DCTMP (included as an appendix to the TA, Technical Appendix 15.1). Traffic volumes and impact is considered in this ES Chapter.
SSDC	Reference to effect on cycle / pedestrian paths to schools / community facilities	The potential impact on pedestrian and cycle routes has been assessed in this chapter for all relevant links.
SSDC	Reference to content of travel Plan and public transport strategy	A detailed Sustainable Transport Strategy and a SWTP have been developed to provide information on sustainable travel options and are included as appendices to the TA

Table 15.4: Scoping Response		
		(Technical Appendix 15.1). A summary of relevant measures has been included in this chapter.
SSDC	Truck Stop capacity / actions of HGVs that arrive significantly early	A Site Wide HGV Management Plan has been developed and includes details on how HGVs will be managed and is included within the TA (Technical Appendix 15.1). Early arrival bays will be provided on site to prevent parking on street.
SCC	Impacts to include cyclists and equestrians too Changes in travel time for pedestrians, cyclists and equestrians as well impact of noise and air quality	The potential impact on pedestrian and cycle routes has been assessed in this chapter for all relevant links. The impact on equestrians has been considered but no detailed assessment has been considered necessary as set out later in this chapter. Pedestrian and cycle delay has been addressed in the detailed assessment in this chapter whilst Noise and Air Quality are addressed in separate chapters of this ES.
SCC	Construction Impacts	Construction Methodology is considered in Chapter 5 of this ES whilst development phasing is considered in Chapter 4. This Chapter will consider construction traffic impact.
SCC	Interim assessments	Consideration has been given to an Interim scenario, prior to the opening of the A449 / A5 link road and further information on this is included in the TA (Technical Appendix 15.1).
SCC	Impact to truck stops and other facilities such as cafes and laybys	The TA sets out proposed on site mitigation to address this. Early arrival bays will be provided on site to mitigate the impact of waiting HGVs. A Site Wide HGV Management Plan (included as an appendix to the TA (Technical Appendix 15.1)) has also been developed and includes details on how HGVs will be managed.

Significance Criteria

15.94 With regards to transport and access the following conditions on the highway network have been considered:

- Severance;
- driver delay;
- pedestrian and cyclist delay;
- pedestrian and cyclist amenity;
- Equestrian delay and amenity;
- fear and intimidation;
- accidents and safety;
- hazardous loads; and
- dust and dirt.

Insignificant Effects

15.95 There are no bridleways in the immediate vicinity of the Site and traffic flow increases as a result of the Proposed Development on the quiet lanes surrounding the Site, likely to be used by equestrians, have been assessed to be low. Therefore, the existing equestrian network is unlikely to be significantly impacted by the Proposed Development and no further assessment of the impact on equestrians is carried out in this chapter of the ES.

15.96 The Proposed Development is unlikely to contain any land uses that are considered to pose a risk of there being hazardous or dangerous loads on the highway network and therefore no further assessment of this effect is carried out in this chapter of the ES.

Severance

15.97 Severance is defined in the Design Manual for Roads and Bridges (DMRB) as *"the separation of residents from facilities and services they use within their community caused by new or improved roads or by changes in traffic flows"*.

15.98 Several factors are considered in determining the existing level of severance. These include road width, traffic flow and composition, traffic speeds and the availability of pedestrian crossing facilities.

15.99 The DMRB provides a set of measures for the identification of community severance and offers guidance in terms of the two-way flow present on a link. Table 15.5 outlines the thresholds of community severance levels as prescribed by the DMRB.

Table 15.5: Thresholds of Severance Levels		
Severance Level	**Traffic Flow (Annual Average Daily Traffic (AADT))**	**Length of Diversion**
Slight	**<8,000**	**<250m**
Moderate	8-16,000	250-500m
Significant	>16,000	>500m

Source: Design Manual for Roads and Bridges (Volume 11, Section 3, June 1993).

15.100 The DMRB provides guidance on the level of relief of severance that may be afforded by reductions in traffic flows. Table 15.6 below outlines the extent to which severance may be reduced.

Table 15.6: Level of Significance by Changes in Existing Traffic Flow			
Severance Level	**Minor**	**Moderate**	**Significant**
Built-up Area	**<30%**	**30-60%**	**>60%**
Rural Area	60–75%	75%-90%	>90%

Source: Design Manual for Roads and Bridges (Volume 11, Section 3, June 1993).

Driver Stress and Delay

15.101 Driver stress, as outlined in the DMRB has three principal elements: frustration, fear of potential accidents and uncertainty relating to the route being followed. The weight of these factors varies depending on the driver. For example, those who drive for commuting purposes will often have a higher stress threshold due to their experience and knowledge of a route compared to those who may only drive occasionally for leisure or personal purposes.

15.102 The DMRB outlines the thresholds of traffic flow and average journey speeds at which driver stress is perceived to change. These thresholds are summarised for single and dual carriageway roads in Table 15.7 and Table 15.8 respectively. It should be noted that the measure of traffic flow is in Passenger Car Units (PCUs). For the purposes of determining drivers stress, a light vehicle has been considered as one unit and HGV's have been considered as two units.

Table 15.7: Driver Stress Thresholds for Single Carriageway Roads

Average Peak Hourly Flow Per Lane (Units)	Average Journey Speed (KM/H)		
	<50	50 - 70	>70
<1200	**High**	**Moderate**	**Low**
1200– 1600	High	Moderate	Moderate
>1600	High	High	High

Source: Design Manual for Roads and Bridges.

Table 15.8: Driver Stress Thresholds for Dual Carriageway Roads

Average Peak Hourly Flow Per Lane (Units)	Average Journey Speed (KM/H)		
	<60	60 - 80	>80
<1200	**High**	**Moderate**	**Low**
1200– 1600	High	Moderate	Moderate
>1600	High	High	High

Source: Design Manual for Roads and Bridges.

15.103 Thresholds in the DMRB are provided to guide the assessment of driver stress and delay levels. The DMRB suggests that consideration of driver stress incorporates qualitative elements, such as driver views and quantitative assessments, related to vehicle speeds and the ability of drivers to overtake slower vehicles and thereby inform levels of delay.

Pedestrian and Cyclist Delay and Amenity

15.104 As noted in the IEMA guidelines, in general, increases in traffic levels are likely to lead to greater increases in delay experienced by pedestrians and cyclists. Delays will also depend upon the general level of pedestrian and cycle activity, visibility and general physical conditions. Amenity is defined in this document as *"the relative pleasantness of a journey"*.

15.105 The quality of the pedestrian and cycle environment is defined by a criteria scale ranging from poor to excellent which is based on a qualitative assessment involving the following aspects:

- Levels of connectivity (routes should provide a coherent network of links between primary land-uses);
- Safety;
- Crossings (controlled and uncontrolled);
- Lighting (presence of street lighting or light spill);
- Quality of footways and cycleways;
- Barriers (obstructions to desire lines, including topography); and
- Attractiveness.

15.106 Increases in traffic levels as a consequence of a development are likely to lead to a greater degree of delay to pedestrians wishing to cross roads. The degree of pedestrian delay is therefore correlated with severance.

15.107 Few quantitative methods for assessing pedestrian delay exist. IEMA 'Guidance for the Environmental Assessment of Road Traffic' suggest a range of pedestrian crossing times of 10 seconds (lower threshold) to 40 seconds (higher threshold) which equates to a link with no crossing facilities with a two-way peak hour flow of approximately 1,400 vehicles. However, the guidance also recommends that assessments should be based on judgement rather than specific thresholds to determine whether or not there is significant pedestrian delay. Nonetheless, the thresholds described in the IEMA guidance have been used as a starting point. No guidance exists for the assessment of cyclist delay and amenity.

15.108 For the purpose of this assessment, pedestrian and cyclist delay has been categorised as follows:

- Low where traffic flows are less than 1,400 vehicles per average peak hour;
- Moderate where flows are between 1,400 and 2,800 vehicles per average peak hour; and
- High where traffic flows exceed 2,800 vehicles per average peak hour.

15.109 The above categorisation has been applied to all scenarios; baseline, future baseline and with development, in order to understand how pedestrian delay is already affected and how the addition of the development impacts this.

15.110 Pedestrian and cyclist amenity has been rated on a five point scale, ranging from very poor to excellent. It should be noted that the level of amenity is based on the nature of the link. For example, pedestrian amenity along a rural lane without footways could be rated as average, whereas along a residential road this would be classed as poor or very poor.

15.111 For the purpose of determining the magnitude of change (relating to pedestrian and cyclist delay and amenity) the same levels of significance as set out in Table 15.6 have been applied to the changes in traffic flows.

15.112 The sensitivity of pedestrian and cyclist delay and amenity along each link has been based on the nature of the links and the likely pedestrian and cyclist demand.

Fear and Intimidation

15.113 As noted in the IEMA guidelines, the impact of fear and intimidation is dependent on the volume of traffic, its HGV composition, its proximity to people or the lack of protection caused by factors such as narrow pavement widths.

15.114 There is neither formal guidance nor a consensus on thresholds for the assessment of the level of fear and intimidation experienced by pedestrians. However, the degree of fear and intimidation experienced is generally dependent on traffic volumes, composition and the presence of protection such as wide footways or guardrails. Therefore, the assessment of the level of fear and intimidation has been made based on professional judgement taking into account a combination of these factors.

15.115 For the purpose of determining the magnitude of change (relating to fear and intimidation), the same levels of significance as set out in Table 15.6 have been applied to the HGV traffic flows.

15.116 The sensitivity of fear and intimidation along each link has been based on the nature of the links and the likely pedestrian demand.

Accidents and Safety Along Links

15.117 The IEMA guidelines state that an assessment of road safety on the highway network should be undertaken based on recent accident records. Personal Injury Accident (PIA) records have been obtained from the DfT's road safety data for the latest available five year period. Typical annual average accident rates along links are calculated in accordance with guidance provided by the DfT, making use of its COBALT software to carry out accident calculations.

15.118 For the purpose of determining the magnitude of change (relating to accidents and safety) the same levels of significance as set out in Table 15.6 have been applied to the changes in predicted accidents.

15.119 The sensitivity of accidents and safety along each link has been based on the actual average annual accident rate in comparison to the typical average annual accident rate. Where the actual rate was lower than the typical, sensitivity has been classed as low. Where the rates are approximately equal, sensitivity would be classed as medium and where the actual rate is higher than the typical sensitivity would be classed as high.

Dust and Dirt

15.120 Regard has been had to the potential for dust and dirt to be generated by the Proposed Development. In summary this is most likely to take place during the construction period. Dust is commonly generated by on-site construction operations and is covered in Chapter 7: Air Quality of this ES.

Definition of Significance

15.121 The assessment of potential effects of the Proposed Development has taken into account both the construction and operational phases. The significance level attributed to each effect has been assessed based on the magnitude of change due to the Proposed Development and the sensitivity of the affected receptors / receiving environment to change. Magnitude of change is assessed on a scale of Low, Medium or High and the sensitivity of the affected receptor or receiving environment are assessed on a scale of High, Medium or Low.

15.122 The following terms have been used to define the significance of the effects identified:

- Major Effect: where the Proposed Development could be expected to have a very significant effect (either beneficial, neutral or adverse) on transport conditions;
- Moderate Effect: where the Proposed Development could be expected to have a noticeable effect (either beneficial, neutral or adverse) on transport conditions;
- Minor Effect: where the Proposed Development could be expected to result in a small, barely noticeable effect (either beneficial, neutral or adverse) on transport conditions; and
- Negligible: where no discernible effect is expected as a result of the Proposed Development on transport conditions.

15.123 Effects will either be adverse or beneficial, temporary or permanent, direct or indirect, long term, medium term or short term.

15.124 Adverse effects above minor to moderate are considered significant enough to require mitigation.

Assumptions and Limitations

15.125 For the purpose of this ES chapter, it should be noted that the 2021 'Do Minimum' model provides traffic flows that include committed developments, as described above, together with consented transport improvement schemes. This committed development traffic is also included within the 2021 'Do Something' scenario as well as the Proposed Development. The assessment of the effects of the Proposed Development has been carried out by way of a comparison of the changes in traffic between these two scenarios. Therefore, all assessment in this ES Chapter include the cumulative effects.

Baseline Conditions

Current Baseline

Site Location

15.126 The Site lies to the west of M6 J12 as shown on Figure 15.6, close to the A5 and A449.

15.127 Wolverhampton is located approximately 10km south of the Site with residential areas of Coven and Featherstone lying in between. Located 5km north of the Site is the existing community of Penkridge with the larger residential area of Stafford situated approximately 15km north of the Site. Cannock is situated within 8km of the east of the Site with Birmingham and Walsall located further south east of the Site. The A5 runs east to west at the northern boundary of the Site and the M6 Junction 12 is to the north-east.

15.128 The village of Four Ashes, south of the Site, consists of a mix of industrial and residential uses with the industrial site directly bordering the Site.

15.129 The Site is characterised by a large area of sand and gravel mineral extraction within the east known as Calf Heath Quarry; a patchwork of agricultural fields with hedgerows and trees to the west and south of this and an area of mixed woodland known as Calf Heath Wood. The current use of the Site is mainly arable farming and the mineral extraction area covers approximately 38ha, with almost the entirety of this area currently open-cast.

15.130 The Staffordshire and Worcestershire Canal runs roughly north to south through the western part of the Site. The West Coast Main Line (WCML) runs north to south through the Site, near the western edge.

Local Highway Network

15.131 The M6 is the major road in the area as it serves the north and south of the UK and the M6 Toll is approximately 2 miles to the south. The A5 from the M6 J12 connects to the A449 at Gailey and then the A449 continues south to the M54 J2 which provides access to the west and south to Birmingham. All these roads are part of the Strategic Road Network (SRN).

15.132 To the east, the M6 J12 is a large conventional grade separated roundabout with four approach arms and no traffic signals.

15.133 The A5 runs on an east to west alignment along the northern border of the Site and forms part of the SRN from London, England to Holyhead, Wales with Highways England (HE) as the relevant highway authority. The section of A5 to the north of the Site consists of a single carriageway trunk road with a carriageway width of approximately 10m and subject to a 50mph speed limit enforced by cameras. The section of A5 bordering the north of the Site has a number of residential dwellings with direct frontage access mainly on the northern side of the carriageway.

15.134 To the west of the Site the A5 facilitates routes towards the A449 via a priority controlled roundabout junction known locally as the Gailey Roundabout while continuing west towards the A41 and Telford. Gailey Roundabout has development on three corners with individual accesses near the junction itself.

15.135 To the east of the Site the A5 provides a connection to M6 Junction 12, a large conventional grade separated roundabout with four approach arms and no traffic signals. Continuing east the A5 passes Four Cross where the Truckers Rest Café is located and progresses into

Cannock. Beyond Cannock the A5 provides further connection to the M6 Toll and continues east towards Tamworth and onto Northampton.

15.136 The A449 Stafford Road is a rural dual carriageway which in general is bordering the west of the Site which runs in a north-south alignment from Stafford to Wolverhampton and subject to a speed limit of 50mph. A449 Stafford Road has a small number of at grade junctions which are a combination of priority controlled, roundabouts and traffic signals and some direct accesses to properties. A449 Stafford Road has a carriageway width of 7m on each side of the trunk road.

15.137 Approximately 1.1km south of Gailey Roundabout the A449 Stafford Road forms a priority controlled crossroads with Crateford Lane to the West and Gravelly Way to the east which provides access to the existing SI Group site and the Bericote Development as well as access to the Site. Continuing south, the A449 Stafford Road forms a signalised priority controlled crossroads with Station Drive / Four Ashes Road. The A449 Stafford Road then passes though the small residential area of Standeford and onto Coven which is accessible via a roundabout with Brewood Road.

15.138 To the south of the Site, A449 Stafford Road provides a link to the M54 approximately 6km south of Gailey Roundabout. At the M54 Junction 2 there is a large signal controlled grade separated roundabout which has recently been upgraded as part of the i54 Development. At its southern end the A449 provides a direct route to the centre of Wolverhampton and a connection to the A4150 Ring Road.

15.139 To the east of the A449 Station Drive passes through Four Ashes before continuing as Station Road, then Vicarage Road over the M6 towards the traffic signal junction with the A5 to the east of the M6 J12. Station Drive is a single carriageway which is subject to a 30mph speed limit through Four Ashes and is then subject to the national speed limit of 60mph. As Station Drive approaches Four Ashes it passes under the WCML. This bridge has restricted headroom of 3.7 metres.

Pedestrian and Cycle Network

15.140 Opportunities to reach the Site using active modes are available from five principal routes. These routes being via the A449, A5, Station Drive/Vicarage Road, the Staffordshire and Worcestershire Canal and Straight Mile. These routes are described in more detail in the TA (Technical Appendix 15.1).

15.141 These key routes are also illustrated on Figure 15.6.

15.142 Figure 15.7 indicates the existing cycle network that serves the area. This includes segregated off-carriageway facilities, marked on-carriageway facilities and advisory routes.

15.143 From a general perspective, it should be noted that the area surrounding the Site benefits from relatively flat topography which should encourage those wishing to travel to the Site on foot or by bicycle. This would suggest that there should be a greater propensity of take up of travel by these active modes to the Site than at a location which has a more undulating topography.

15.144 Figure 15.8 provides the pedestrian catchment from the Site, which extends to a distance of 2km. Although residences surrounding the Site are limited in number, dwellings located at Standeford, Four Ashes and adjacent to the Gailey Roundabout would fall within the 2km catchment.

15.145 Figure 15.9 provides the cycle catchment of the Site, which extends to a distance of 8km. It can be seen that although the catchment for walking is fairly limited, the cycle catchment areas covers a significant population.

15.146 Currently there is a segregated shared cycle / footway route provided adjacent to both the western and eastern sides of the A449. This route has recently been widened to approximately 3m by Highways England. These routes provide access to the Site from Wolverhampton and Coven to the south and Penkridge to the north. Street lighting is provided along this section of the A449, which within Penkridge is overlooked by residential housing, providing natural surveillance of this element of the route.

15.147 It is possible to cycle to and from Penkridge Railway Station using this cycle route as shown on Figure 15.7. The route also facilitates an interchange with public transport.

15.148 Pedestrian crossing facilities are present at the signal controlled junction of A449/Station Drive.

15.149 There is an existing footway adjacent to the northern side of the A5 and along the section between the A449 Gailey Roundabout and M6 Junction 12. This allows connections to be made between the site and Penkridge to the north-west.

15.150 Station Drive/Station Road/Vicarage Road has footway facilities from its junction with A449 to the canal bridge; a distance of approximately 930m. Street lighting is present along Station Road between the crossing of the canal and the junction with the A449 to the west. Station Road is also overlooked by a mix of residential and industrial properties providing some natural surveillance of the route.

15.151 There is also an existing footpath connecting the A449 and Croft Lane, however, it is proposed to close this route as part of the Proposed Development.

15.152 The Staffordshire and Worcestershire canal runs through the Site. It enters the Site to the north at Gailey Marina where there is a lock and various facilities including toilets. The canal exits the Site to the south where it passes beneath Vicarage Road. It is also possible to exit the canal in the vicinity of the existing bridge with Gravelly Way within the Site. Generally, use of the canal as a route to the site would be expected during day light hours.

15.153 There is a towpath for pedestrians and cyclists along the length of the canal. This is classified as a Sustrans local off-road route.

15.154 The canal connects to the Shropshire Union canal as it heads further south towards Wolverhampton. To the north it heads towards Stafford via Penkridge.

15.155 As can be seen from Figure 15.7, there are significant existing advisory cycle routes within the area to the east of the Site. These cycle routes do not provide designated cycle facilities but are classified by SCC as routes that are suitable for cycling due to lower traffic volumes. They provide the potential for a more enjoyable environment for cyclists as opposed to facilities provided adjacent to routes that experience higher traffic volumes which may be unattractive to some people.

15.156 In terms of the available facilities in the vicinity of the Site, Straight Mile is designated as an advisory cycle route. This connects to Four Crosses Lane to the north-east and ultimately to the A5 to the east of M6 Junction 12.

15.157 Further advisory cycle routes are provided to the north of the A5 which then provide routes towards Cannock itself including to its railway station. These advisory cycle routes are located away from the A5 which does not have designated cycle facilities along the section that runs between M6 Junction 12 and Cannock. It is therefore possible to cycle to and from the Site to Cannock Railway Station using the cycle routes described above; a distance of around 8km.

Public Transport

Bus Services

15.158 Existing bus services operating in the vicinity of the Site are shown on Figure 15.10. There are three bus services between Stafford and Wolverhampton, which operate along the A449. They all stop immediately opposite Gravelly Way, the existing access into the Site. These currently provide a combined 30 minute frequency during the day, offering the opportunity for connectivity.

15.159 The bus services operating in the area consist of the number 54. This bus serves a number of destinations including Stafford, Penkridge and Wolverhampton. The service provides

connections to Wolverhampton and Stafford bus stations which enables interchange opportunities between a number of locations in the area.

15.160 Table 15.9 sets out the service number, route and peak and off-peak frequencies of these services.

Table 15.9: Summary of Existing Bus Services

Service Number	Operator	Route Description	Average Peak Hour Frequency	Average Off Peak Frequency
54	National Express West Midlands	Stafford – Penkridge – i54 – Wolverhampton	1 per hour	1 per hour

Rail

15.161 The nearest railway station is at Penkridge, approximately 5km north from the Site (equivalent to approximately 16 minutes cycle). The station is reachable by cycle via the A5 which borders the north of the Site, the A449, which forms part of a local cycle route and St Michael's Road.

15.162 Services operating out of Penkridge Railway Station are provided by London Midland and enable direct connections to locations shown in Table 15.10 below.

Table 15.10: Rail Services Available from Penkridge Railway Station

Railway Station	Frequency (Per Hr)	Journey Time
Liverpool Lime Street	2	<70 minutes
Crewe	2	<30 minutes
Stafford	2	<10 minutes
Wolverhampton	2	<15 minutes
Birmingham New St	2	<35 minutes

15.163 Although not a direct service, there is a good level of service provided between Penkridge Railway Station and London Euston (south) and Manchester (north).

15.164 Table 15.11 below outlines the train frequencies at Penkridge Railway Station. The Table highlights 23 two way trips during the period of 0700-1000 and 24 in the period of 1600-1900 and a total of 83 trains throughout the study period.

Table 15.11: Penkridge Railway Station Frequencies (0700 – 1900)

Hour AM	Departing	Arriving
0700 – 1000	12	11
1000 – 1600	18	18
1600 – 1900	12	12
Total	42	41

Table 15.11: Penkridge Railway Station Frequencies (0700 – 1900)

Total Two-Way Frequency	83

15.165 The Site is well placed in terms of access to rail services, with a high frequency of service provided to the main local and regional destinations from Penkridge Railway Station.

15.166 In addition to Penkridge railway station; mainline railway stations are also located at Cannock and Wolverhampton. Wolverhampton has the highest level of service provision from local stations with a maximum of nine services per hour operating between Wolverhampton and Birmingham New Street. It is located on the WCML, which provides connections with a number of key cities across the UK. Cannock is served by trains from Birmingham New Street to the south and Rugeley Trent Valley to the north. These services operate at a frequency of two trains per hour in each direction during the peak periods, which reduces to one train per hour in each direction during off peak periods.

Severance

15.167 Table 15.12 details the existing severance levels on the highway network subject to detailed assessment as set out in Tables 15.1 - 3. Severance levels have been calculated using the methodology discussed in the Assessment Methodology and the thresholds provided in Table 15.6.

Table 15.12: 2015 Base Severance Levels

Link		AADT	Facilities (Crossings)	Severance Level
2	A449 Stafford Road (between M6 J13 and Pinfold Lane)	12970	Puffin crossing in Penkridge. Pedestrian refugee islands north of Penkridge.	Moderate
3	Cannock Road (between Wolgarston Way and A34)	10778	None	Moderate
4	A5 Watling Street (between M6 J12 and Proposed Site Access)	18936	Uncontrolled pedestrian crossing provides foot access to some houses on the south side of the A5.	Significant
5	A5 Watling Street (between Vicarage Road and M6 J12)	17760	Uncontrolled pedestrian crossing where A5 joins M6 junction 12.	Significant
8	A5 Watling Street (between A449 and Proposed Site Access)	20747	None	Significant
9	A5 Watling Street (between A449 and A41)	14676	None	Moderate
11	A449 (between A5 and Gravelly Way)	18114	Uncontrolled pedestrian refuge island across the A449 arm of the A449/A5 roundabout.	Significant
12	A449 (between Gravelly Way and Station Drive)	17453	None	Significant

Table 15.12: 2015 Base Severance Levels

13	Vicarage Road (between Site Access and A5)	5723	None	Slight
15	Vicarage Road between Enterprise Drive and Proposed Site Access	7192	None	Slight
17	Four Ashes Road between A449 and Claygates Road	1859	None	Slight
18	A449 (between Station Drive and Brewood Road)	25997	Puffin crossing south of Station Road. Uncontrolled refuge crossings.	Significant
20	A449 Stafford Road (between M54 J2 and Brewood Road)	21944	Uncontrolled pedestrian refuge crossing across the central reservation.	Significant
21	A449 Stafford Road (between M54 J2 and Wobaston Road)	31190	Pelican crossing south of Broadlands Lane. Uncontrolled pedestrian refuge crossing.	Significant
23	A449 Stafford Road (between Wobaston Road and A460)	27639	Pelican crossing south of Bee Lane.	Significant
25	A449 Wolverhampton Road (between Boscomoor Lane and Pinfold Lane)	16720	Pelican crossing with refugee island south of St Michael's Square. Several uncontrolled pedestrian refuge islands.	Significant
26	A449 Wolverhampton Road (between Boscomoor Lane and A5)	19713	Several uncontrolled pedestrian refuge islands.	Significant

15.168 Table 15.12 shows that the amount of traffic along each link results in varying levels of severance with three links displaying a slight level of severance, three links displaying a moderate level of severance and 11 links displaying a significant level of severance.

Driver Stress and Delay

15.169 Existing driver stress and delay has been evaluated using the methodology discussed above and the thresholds set out in Tables 15.7 and 15.8. 2015 link flows have been obtained from the traffic surveys carried out. Table 15.13 details the existing driver stress levels on the highway network subject to detailed assessment as set out in Tables 15.1 - 3and the vehicle speeds gathered from surveys.

Table 15.13: 2015 Base Driver Stress and Delay

Link		Average Peak Hourly Flow Per Lane	Average Speed (KM/Hr)	Driver Stress and Delay
2	A449 Stafford Road (between M6 J13 and Pinfold Lane)	639	76	Moderate
3	Cannock Road (between Wolgarston Way and A34)	591	53	Moderate
4	A5 Watling Street (between M6 J12 and Proposed Site Access)	780	64	High
5	A5 Watling Street (between Vicarage Road and M6 J12)	797	59	High
8	A5 Watling Street (between A449 and Proposed Site Access)	810	46	High
9	A5 Watling Street (between A449 and A41)	619	78	Moderate
11	A449 (between A5 and Gravelly Way)	400	85	Low
12	A449 (between Gravelly Way and Station Drive)	419	85	Low
13	Vicarage Road (between Site Access and A5)	356	62	Low
15	Vicarage Road between Enterprise Drive and Proposed Site Access	435	69	Moderate
17	Four Ashes Road between A449 and Claygates Road	121	56	Moderate
18	A449 (between Station Drive and Brewood Road)	622	85	Low
20	A449 Stafford Road (between M54 J2 and Brewood Road)	517	79	Moderate
21	A449 Stafford Road (between M54 J2 and Wobaston Road)	710	45	High
23	A449 Stafford Road (between Wobaston Road and A460)	587	54	High

Table 15.13: 2015 Base Driver Stress and Delay				
25	A449 Wolverhampton Road (between Boscomoor Lane and Pinfold Lane)	808	51	High
26	A449 Wolverhampton Road (between Boscomoor Lane and A5)	953	51	High

Pedestrian Delay and Amenity

15.170 The existing pedestrian facilities in the vicinity of the Proposed Development are identified in the TA (Technical Appendix 15.1) and summarised above. The existing facilities such as crossings and footways, along the links assessed in this chapter, are set out in Table 15.14.

15.171 Pedestrian delay has been categorised based on the thresholds set out in the Assessment Methodology section. An attempt has been made to assess the pedestrian amenity along the links, where pedestrian amenity has been classified as 'very poor', 'poor', 'average', 'good' or 'excellent'. This assessment is based on professional judgement and experience rather than fixed thresholds.

15.172 Table 15.14 shows the average peak hour traffic flows along with existing pedestrian facilities along the links which have been assessed in this chapter.

Table 15.14: 2015 Base Pedestrian Delay and Amenity					
Link		**Average Peak Hourly Flow**	**Pedestrian Delay**	**Pedestrian Facilities**	**Pedestrian Amenity**
2	A449 Stafford Road (between M6 J13 and Pinfold Lane)	1277	Low	Footway continually present on the eastern side. Largely separated from carriageway by a verge. Puffin crossing in Penkridge. Pedestrian refugee islands present. Largely no street lighting present.	Average
3	Cannock Road (between Wolgarston Way and A34)	1181	Low	Footway present on one side until Pillaton - varying width, separated by a verge in places. No footway between Pillaton and Cannock. No street lighting after Cannock Road junction with Pottal Pool Road.	Poor
4	A5 Watling Street (between M6 J12 and Proposed Site Access)	1559	Moderate	Footway on at least one side, separated with a grass verge in places. No street lighting is present. Uncontrolled ped crossing where A5 joins M6 junction 12. No street lighting.	Average
5	A5 Watling Street (between Vicarage Road and M6 J12)	1594	Moderate	Footway on the northern side separated by a grass verge. Uncontrolled ped crossing where A5 joins M6 junction 12. No street lighting.	Average
8	A5 Watling Street (between A449 and Proposed Site Access)	1620	Moderate	Footway continually present on the northern side, separated by a grass verge. Partially footway provision on southern side. No crossing facilities. No street lighting.	Poor
9	A5 Watling Street (between A449 and A41)	1239	Low	Intermittent narrow footway in places. No crossing facilities. No street lighting.	Poor
11	A449 (between A5 and Gravelly Way)	1599	Moderate	Footway on both sides. Separated from carriageway by a verge. Uncontrolled pedestrian refuge island across the A449. Street lighting.	Good
12	A449 (between Gravelly Way and Station Drive)	1677	Moderate	Footway on both sides. Separated from the carriageway by a verge in places. No crossing facilities. Street lighting present.	Good
13	Vicarage Road (between Site	711	Low	No footways. No crossing facilities. No street	Very Poor

Table 15.14: 2015 Base Pedestrian Delay and Amenity					
	Access and A5)			lighting. 60mph speed limit.	
15	Vicarage Road between Enterprise Drive and Proposed Site Access	870	Low	No footways. No crossing facilities. No street lighting.	Very Poor
17	Four Ashes Road between A449 and Claygates Road	242	Low	No footways, crossing facilities or street lighting.	Very Poor
18	A449 (between Station Drive and Brewood Road)	2490	Moderate	Shared footways on both sides, separated from the carriageway by a verge in places. Puffin crossing south of Station Road. Uncontrolled refuge crossings. Lighting present.	Good
20	A449 Stafford Road (between M54 J2 and Brewood Road)	2069	Moderate	Footways on both sides, separated from the carriageway by a grass verge in places. Uncontrolled pedestrian refuge crossing. Street lighting present.	Good
21	A449 Stafford Road (between M54 J2 and Wobaston Road)	2841	High	Footways on both sides. Pelican crossing south of Broadlands Lane. Uncontrolled pedestrian refuge crossing. Street lighting present.	Good
23	A449 Stafford Road (between Wobaston Road and A460)	2347	Moderate	Footways on both sides. Various puffin, pelican and toucan crossings. Street lighting present.	Excellent
25	A449 Wolverhampton Road (between Boscomoor Lane and Pinfold Lane)	1617	Moderate	Footways on both sides.1 pelican crossing. Several uncontrolled pedestrian refuge islands. Street lighting present. Overlooked by properties.	Excellent
26	A449 Wolverhampton Road (between Boscomoor Lane and A5)	1906	Moderate	Footways on both sides. Then footway only present along the eastern side. Several uncontrolled pedestrian refuge islands. Street lighting is present.	Good

Cyclist Delay and Amenity

15.173 The existing cycle facilities in the vicinity of the Site are identified in the TA (Technical Appendix 15.1) and summarised above, whilst the existing facilities such as crossings, cycleways and lighting along the links assessed in this chapter are set out in Table 15.15.

15.174 Cyclist delay, as with pedestrian delay, is difficult to quantify and for the purpose of this assessment, the same thresholds of traffic flows have been applied to cyclist delay as for pedestrian delay. This is justified by the fact that usually cyclists use toucan crossings (pedestrian and cycle crossings combined) or pedestrian crossings where they have to push their bikes across the road.

15.175 Therefore, the assessment of existing cyclist delay along the links considered is the same as pedestrian delay, as set out previously.

15.176 Cyclist amenity can be measured through the provision of facilities such as crossings, cycle ways and street lighting. A review of these facilities is included in Table 15.15 along with levels of cyclist amenity.

Table 15.15: 2015 Base Cyclist Delay and Amenity					
Link		**Average Peak Hourly Flow**	**Cyclist Delay**	**Cycling Facilities**	**Cyclist Amenity**
2	A449 Stafford Road (between M6 J13 and Pinfold Lane)	1277	Low	No cycleway or cycle lanes. Cycling on carriageway. No street lighting. Speed limits of 40mph, 50mph and 60mph.	Poor
3	Cannock Road (between	1181	Low	No cycleway or cycle lanes. Cycling on carriageway. No street	Poor

Table 15.15: 2015 Base Cyclist Delay and Amenity

	Wolgarston Way and A34)			lighting. 50mph speed limit.	
4	A5 Watling Street (between M6 J12 and Proposed Site Access)	1559	Moderate	No cycleway or cycle lanes. Cycling on carriageway. Carriageway width of approximately 9m. No street lighting. 50mph speed limit.	Poor
5	A5 Watling Street (between Vicarage Road and M6 J12)	1594	Moderate	No cycle way or cycle lanes. Cycling on carriageway. No street lighting.	Poor
8	A5 Watling Street (between A449 and Proposed Site Access)	1620	Moderate	No cycleway or cycle lanes. Cycling on carriageway. Carriageway width of approximately 9m. No street lighting. 50mph speed limit.	Poor
9	A5 Watling Street (between A449 and A41)	1239	Low	No cycle way or cycle lanes. Majority of the route has no street lighting. Speed limits of 40mph, 50mph, 60mph.	Poor
11	A449 (between A5 and Gravelly Way)	1599	Moderate	Shared footway / cycle way on both sides of the dual. Separated from the carriageway by a grass verge. No crossing formal facilities. Street lighting present. Speed limit of 60mph.	Average
12	A449 (between Gravelly Way and Station Drive)	1677	Moderate	Shared footway / cycle way on both sides of the dual carriageway. Separated from the carriageway by a grass verge. No crossing formal facilities. Street lighting present. Speed limit of 60mph.	Average

Table 15.15: 2015 Base Cyclist Delay and Amenity

13	Vicarage Road (between Site Access and A5)	711	Low	No cycleway or cycle lanes. Cycling on carriageway. No street lighting. Speed limit of 60mph.	Poor
15	Vicarage Road between Enterprise Drive and Proposed Site Access	870	Low	No cycleway or cycle lanes. Cycling on carriageway. Street lighting through industrial area. Speed limits of 60, 50, 40, 30 mph.	Poor
17	Four Ashes Road between A449 and Claygates Road	242	Low	No cycleway. Cycling on carriageway. Speed limit of 60mph. No street lighting.	Very Poor
18	A449 (between Station Drive and Brewood Road)	2490	Moderate	Shared footway / cycle way on both sides of the dual carriageway. Separated from the carriageway by a grass verge. Street lighting present. Speed limit of 60mph.	Average
20	A449 Stafford Road (between M54 J2 and Brewood Road)	2069	Moderate	Shared footway / cycle way on both sides of the dual carriageway. Separated from the carriageway by a grass verge. Street lighting present Speed limit of 60mph.	Average
21	A449 Stafford Road (between M54 J2 and Wobaston Road)	2841	High	A449 shared footway / cycleway ends and cyclists are required to travel on carriageway. Speed limit is 40mph. Street lighting is present.	Poor
23	A449 Stafford Road (between Wobaston	2347	Moderate	Cyclists are required to travel on carriageway.	Poor

Table 15.15: 2015 Base Cyclist Delay and Amenity					
	Road and A460)			Speed limit is 40mph. Street lighting is present.	
25	A449 Wolverhampton Road (between Boscomoor Lane and Pinfold Lane)	1617	Moderate	Shared footway / cycleway along the eastern side of the carriageway. The speed limit is 30mph. Separated from the carriageway by a grass verge. Street lighting present.	Good
26	A449 Wolverhampton Road (between Boscomoor Lane and A5)	1906	Moderate	Shared footway / cycelway continually present along the eastern side of the carriageway. Street lighting is present. Speed limits of 40mph and 50mph.	Good

Fear and Intimidation

15.177 As set out above, there is neither formal guidance nor a consensus of thresholds for the assessment of the level of fear and intimidation experienced by pedestrians, However, the degree of fear and intimidation experienced is generally dependent on traffic volumes, composition and the presence of protection such as wide footways or guardrails. Therefore, the assessment of the level of fear and intimidation has been made based on professional judgement taking into account the combination of these factors.

15.178 The level of fear and intimidation along the links has been assessed on an individual basis, using a scale of low, moderate or high. This is shown in Table 15.16. It should be noted that the level of fear and intimidation assessed in this chapter relates to traffic rather than personal security in general.

Table 15.16: 2015 Base Fear and Intimidation Levels				
Link		**Average Peak Hourly Flow**	**Existing Facilities / Conditions**	**Level of Fear and Intimidation**
2	A449 Stafford Road (between M6 J13 and Pinfold Lane)	1277	Footway present on the eastern side of the carriageway. Largely separated from the carriageway by a grass verge. Puffin crossing in Penkridge. Pedestrian refugee islands north of Penkridge. No street lighting along the majority of the route.	Moderate

Table 15.16: 2015 Base Fear and Intimidation Levels				
3	Cannock Road (between Wolgarston Way and A34)	1181	Footways present on the eastern side of the carriageway until Pillaton. A Verge present in places. No footway between Pillaton and Cannock. No street lighting after Cannock Road junction with Pottal Pool Road. No street lighting.	High
4	A5 Watling Street (between M6 J12 and Proposed Site Access)	1559	Footway on at least one side of the carriageway, separated from carriageway by a grass verge. No street lighting present. Uncontrolled pedestrian crossing where A5 joins M6 junction 12. No street lighting.	Moderate
5	A5 Watling Street (between Vicarage Road and M6 J12)	1594	Footway on the northern side separated from the carriageway by a grass verge. Uncontrolled pedestrian crossing where A5 joins M6 junction 12. No street lighting.	Moderate
8	A5 Watling Street (between A449 and Proposed Site Access)	1620	Footway continually present on the northern side of the carriageway, separated by a grass verge. Partially present along the southern side of the carriageway. No crossing facilities. No street lighting.	Moderate
9	A5 Watling Street (between A449 and A41)	1239	Intermittent narrow footway in places. No crossing facilities. No street lighting.	High
11	A449 (between A5 and Gravelly Way)	1599	Footway on both sides of the dual carriageway. Separated from the carriageway by a verge. Uncontrolled pedestrian refuge island. Street lighting.	Low
12	A449 (between Gravelly Way and Station Drive)	1677	Footway on both sides of the dual carriageway. Separated from the carriageway by a verge in places. No crossing facilities. Street lighting.	Low

Table 15.16: 2015 Base Fear and Intimidation Levels				
13	Vicarage Road (between Site Access and A5)	711	No footways. No crossing facilities. No street lighting.	High
15	Vicarage Road between Enterprise Drive and Proposed Site Access	870	No footways. No crossing facilities. No street lighting.	High
17	Four Ashes Road between A449 and Claygates Road	242	No footways. No crossing facilities. No street lighting.	High
18	A449 (between Station Drive and Brewood Road)	2490	Shared footways on both sides of the carriageway. Footways separated from carriageway by a grass verge in places. Puffin crossing present. Uncontrolled refuge crossings. Lighting present.	Low
20	A449 Stafford Road (between M54 J2 and Brewood Road)	2069	Footways on both sides of the carriageway. Footways separated from the carriageway by a grass verge in places. Uncontrolled pedestrian refuge crossing. Street lighting present.	Low
21	A449 Stafford Road (between M54 J2 and Wobaston Road)	2841	Footways on both sides of the carriageway. Pelican crossing present. Uncontrolled pedestrian refuge crossing. Street lighting present.	Low
23	A449 Stafford Road (between Wobaston Road and A460)	2347	Footways on both sides. Various puffin, pelican and toucan crossings. Street lighting present.	Low
25	A449 Wolverhampton Road (between Boscomoor Lane and Pinfold Lane)	1617	Footways on both sides.1 pelican crossing. Several uncontrolled pedestrian refuge islands. Street lighting present. Overlooked by properties.	Low
26	A449 Wolverhampton Road (between Boscomoor Lane and A5)	1906	Footways on both sides. Then footway only present along the eastern side. Several uncontrolled pedestrian refuge islands. Street lighting is present.	Moderate

Accidents

15.179 PIAs occurring on the local highway network are considered in general to be attributable to traffic flows, such that an increase in traffic flows will result in a corresponding increase in PIAs. Table 15.17 summarises the existing annual average accident rates and the corresponding typical annual accident rates along the links considered within this chapter.

Table 15.17: 2015 Base Observed and Typical Annual Average Accident Rates			
Link		**Typical Annual Accidents (as Calculated by Cobalt)**	**Actual Observed Annual Accidents**
2	A449 Stafford Road (between M6 J13 and Pinfold Lane)	3.8	4.4
3	Cannock Road (between Wolgarston Way and A34)	4	4.6
4	A5 Watling Street (between M6 J12 and Proposed Site Access)	1.1	1
5	A5 Watling Street (between Vicarage Road and M6 J12)	0.6	2.6
8	A5 Watling Street (between A449 and Proposed Site Access)	1.3	2
9	A5 Watling Street (between A449 and A41)	12.5	11.6
11	A449 (between A5 and Gravelly Way)	0.6	2.2
12	A449 (between Gravelly Way and Station Drive)	0.6	1
13	Vicarage Road (between Site Access and A5)	0.3	0
15	Vicarage Road between Enterprise Drive and Proposed Site Access	0.8	0.4
17	Four Ashes Road between A449 and Claygates Road	0.2	0.4
18	A449 (between Station Drive and Brewood Road)	1.6	2.2

Table 15.17: 2015 Base Observed and Typical Annual Average Accident Rates			
20	A449 Stafford Road (between M54 J2 and Brewood Road)	6.5	1.8
21	A449 Stafford Road (between M54 J2 and Wobaston Road)	6.1	3
23	A449 Stafford Road (between Wobaston Road and A460)	20.3	13.2
25	A449 Wolverhampton Road (between Boscomoor Lane and Pinfold Lane)	3.7	1.2
26	A449 Wolverhampton Road (between Boscomoor Lane and A5)	4.1	3

15.180 Table 15.17 shows that compared to actual accident rates the predicted rates are higher on 9 links and lower on 6 links. Links where the observed accident rate is notably higher than the calculated typical rate for that link type are links 5 and 11. Links where the observed accident rate is notably lower than the calculated typical rate for that link type are links 20, 21, 23 and 25. The Cobalt assessment does not take into account link geometry, signage or lighting; all factors which can influence the occurrence of accidents.

Future Baseline

15.181 The assessment in this Chapter is based on a future year of 2021 as set out in the Assessment Methodology. This section sets out the baseline conditions for this future year and discusses any changes from the 2015 base year which will be attributable to changes in traffic flows as a result of general growth and new development in the area.

Walking and Cycling

15.182 It is anticipated that the local pedestrian and cycle network will not significantly change in the future baseline scenario without the Proposed Development.

Public Transport

15.183 It is anticipated that the public transport provision would not change significantly by 2021 without the Proposed Development.

Highway Network

15.184 It is anticipated that the local highway infrastructure would not change significantly by 2021 without the Proposed Development.

Severance

15.185 Severance in 2021 remains the same on all links apart from links 2 and 9 where it increases from moderate to significant and on link 25 where is reduces from significant to moderate.

Driver Stress and Delay

15.186 Driver Stress and delay remains the same by 2021 on all links apart from 2, 3, 9, 13, 15, 17 and 20. Links 2, 3, 9, 15 and 17 increase from moderate to high, link 13 increases from low to high and link 20 reduces from high to low as a result of changes in predicted traffic flows.

Pedestrian Delay and Amenity

15.187 Pedestrian amenity remains unchanged on all links by 2021; however, pedestrian delay has increased from low to moderate on links 2, 3 and 9 and from moderate to high on link 23. On link 25 it has reduced from moderate to low. These changes are as a result of changes in traffic flows.

Cycle Delay and Amenity

15.188 Cycle amenity remains unchanged on all links by 2021; however, cycle delay has increased from low to moderate on links 2, 3 and 9 and from moderate to high on link 23. On link 25 it has reduced from moderate to low. These changes are as a result of changes in traffic flows.

Fear and Intimidation

15.189 Fear and intimidation remains the same by 2021 on all links except for links 20, 21 and 23 where it increases from low to moderate. These changes are as a result of changes in the volume of HGVs.

Accidents and Safety

15.190 The predicted accident rates for 2021 without the Proposed Development are shown in Table 15.18.

Table 15.18: 2021 Base Annual Average Accident Rates		
Link		**Typical Annual Accidents**
2	A449 Stafford Road (between M6 J13 and Pinfold Lane)	3.7
3	Cannock Road (between Wolgarston Way and A34)	4.2
4	A5 Watling Street (between M6 J12 and Proposed Site Access)	1.0
5	A5 Watling Street (between Vicarage Road and M6 J12)	0.5
8	A5 Watling Street (between A449 and Proposed Site Access)	1.1
9	A5 Watling Street (between A449 and A41)	13.5
11	A449 (between A5 and Gravelly Way)	0.6
12	A449 (between Gravelly Way and Station Drive)	0.6
13	Vicarage Road (between Site Access and A5)	0.2
15	Vicarage Road between Enterprise Drive and Proposed Site Access	0.5
17	Four Ashes Road between A449 and Claygates Road	0.2
18	A449 (between Station Drive and Brewood Road)	1.4
20	A449 Stafford Road (between M54 J2 and Brewood Road)	7.0

Table 15.18: 2021 Base Annual Average Accident Rates		
21	A449 Stafford Road (between M54 J2 and Wobaston Road)	6.3
23	A449 Stafford Road (between Wobaston Road and A460)	22.5
25	A449 Wolverhampton Road (between Boscomoor Lane and Pinfold Lane)	2.4
26	A449 Wolverhampton Road (between Boscomoor Lane and A5)	3.8

15.191 Typical accident rates increase on links (2, 20, 21, 23) and decrease on 11 links (3, 4, 5, 8, 9, 13, 15, 17, 18, 25, 26) compared to the 2015 base. The accident rate remains the same on links 11 and 12. These changes are due to the changes in traffic flows predicted by the models.

Potential Effects

Operational Development

15.192 The future "with development" conditions are assessed within the following paragraphs. The highway mitigation measures are provided in order to reduce the effect of the Proposed Development and are included in the traffic modelling, as set out in the Traffic Data section of this Chapter. Therefore, the highway mitigation measures are already reflected in the traffic flows.

15.193 The likely significant effects of the operational traffic flows have been measured against the 2021 base flows.

Walking and Cycling

15.194 Pedestrian and cycle infrastructure within the Proposed Development will primarily comprise a comprehensive network of footway and cycleway routes facilitating a high degree of permeability and enabling non-motorised users to move around with ease.

15.195 Off site, additional infrastructure is proposed on the surrounding highway network and this has been considered in the operation assessment of amenity for pedestrians and cyclists. Further details on this are provided in the TA (Technical Appendix 15.1) and later on in this chapter.

Public Transport

15.196 The overall provision of public transport will be improved to serve the Proposed Development and secured through the DCO Requirements. A public transport strategy has been developed as part of a comprehensive Sustainable Transport Strategy (STS), included as an appendix to the TA (Technical Appendix 15.1). It is proposed to provide shuttle services to key employee locations such as Cannock Chase, Walsall and Wolverhampton as well as increase the frequency of appropriate existing services. This increase in public transport provision and the proposals set out in the STS and SWTP have not been accounted for in the operational assessment and are considered further in the Mitigation and Residual Effects section.

Highway Network

15.197 The Proposed Development includes the provision of an adopted road through the Site between the proposed A5 and A449 accesses. In addition, it is proposed to modify the A449 / Station Drive junction to ban traffic turning right into Station Drive. It is also proposed to place a restriction on WMI HGVs using the A449 through Penkridge. These highway works have been included in the traffic modelling and therefore are accounted for in the assessment of transport effects.

Severance

15.198 Table 15.19 details the predicted severance levels with the Proposed Development on the assessed highway network. Severance levels have been calculated using the methodology set out above.

Table 15.19: 2021 With Development Severance Levels						
Link		**2021 With Development AADT**	**Facilities (Crossings)**	**2021 Baseline Severance Level**	**2021 With Development Severance Level**	**Proposed Development Impact**
2	A449 Stafford Road (between M6 J13 and Pinfold Lane)	18168	As described in baseline.	Significant	Significant	Negligible to Minor Adverse
3	Cannock Road (between Wolgarston Way and A34)	16566	As described in baseline.	Moderate	Significant	Negligible to Minor Adverse
4	A5 Watling Street (between M6 J12 and Proposed Site Access)	33104	As described in baseline.	Significant	Significant	Minor Adverse
5	A5 Watling Street (between Vicarage Road and M6 J12)	24833	As described in baseline.	Significant	Significant	Minor Adverse

Table 15.19: 2021 With Development Severance Levels

8	A5 Watling Street (between A449 and Proposed Site Access)	22960	As described in the baseline and a new crossing at the site access roundabout to connect with internal footway/cycleway network.	Significant	Significant	Negligible to Minor Adverse
9	A5 Watling Street (between A449 and A41)	21453	As described in baseline.	Significant	Significant	Negligible to Minor Adverse
11	A449 (between A5 and Gravelly Way)	21772	As described in baseline and a new pedestrian crossing at the A449 site access roundabout to provide access to bus stops.	Significant	Significant	Negligible to Minor Adverse
12	A449 (between Gravelly Way and Station Drive)	27404	As described in baseline.	Significant	Significant	Minor Adverse
13	Vicarage Road (between Site Access and A5)	9633	As described in baseline.	Slight	Moderate	Minor Adverse
15	Vicarage Road between Enterprise Drive and Proposed Site Access	5265	Crossing facilities will be provided for pedestrians at the new site access roundabout on Vicarage Road.	Slight	Slight	Negligible to Minor Beneficial

Table 15.19: 2021 With Development Severance Levels

17	Four Ashes Road between A449 and Claygates Road	2096	As described in baseline.	Slight	Slight	Negligible to Minor Adverse
18	A449 (between Station Drive and Brewood Road)	34481	As described in baseline.	Significant	Significant	Negligible to Minor Adverse
20	A449 Stafford Road (between M54 J2 and Brewood Road)	32298	As described in baseline.	Significant	Significant	Negligible to Minor Adverse
21	A449 Stafford Road (between M54 J2 and Wobaston Road)	41483	As described in baseline.	Significant	Significant	Minor Adverse
23	A449 Stafford Road (between Wobaston Road and A460)	39434	As described in baseline.	Significant	Significant	Minor Adverse
25	A449 Wolverhampton Road (between Boscomoor Lane and Pinfold Lane)	15258	As described in baseline.	Moderate	Moderate	Minor to Moderate Adverse
26	A449 Wolverhampton Road (between Boscomoor Lane and A5)	23943	As described in baseline.	Significant	Significant	Negligible to Minor Adverse

Severance

15.199 Table 15.19 shows that there is no change in severance levels between the 2021 baseline and the 2021 with development scenarios except on links 3 and 13 where severance goes from moderate to significant and slight to moderate respectively.

Magnitude of Change

15.200 On the basis of changes in traffic flow, the magnitude of change was assessed to be low for all links assessed with the exception of links 4, 12 and 13, which were assessed to experience a medium magnitude of change.

Sensitivity to Change

15.201 The majority of links assessed were adjudged to have low sensitivity to changes in severance levels. The links where sensitivity was adjudged to be low were mainly rural routes where pedestrian demand was likely to be low, or the pedestrian crossing facilities provided were deemed appropriate for the level of pedestrian demand and traffic flow expected. Links 21 and 23 were adjudged to have a medium level of sensitivity to changes in severance levels. These links were adjudged to have a medium level of sensitivity due to their location in suburban areas which are more likely to experience higher pedestrian demand than the links located in rural areas.

Overall Assessment

15.202 Therefore, there is likely to be a permanent, direct and long-term effect on the level of severance of **negligible to minor adverse significance** on links **2, 3, 8, 9, 11, 17, 18, 20 and 26**. There is likely to be a permanent, direct and long-term effect on the level of severance of **minor adverse significance** on links **4, 5, 12, 13, 21 and 23**. There is likely to be a permanent, direct and long-term effect on the level of severance of **minor to moderate adverse significance** on link **25**. Due to reductions in traffic flows, there is likely to be a permanent, direct and long-term effect on the level of severance of **negligible to minor beneficial significance** on link **15**.

Driver Stress and Delay

15.203 Table 15.20 details the predicted driver stress levels on the assessed highway network and the estimated vehicle speeds which have been obtained from either the VISSIM or SATURN models.

Table 15.20: 2021 With Development Driver Stress and Delay

Link		Average Peak Hourly Flow Per Lane	Estimated Speed (Km/h)	2021 Baseline Driver Stress and Delay	2021 With Development Driver Stress and Delay	Proposed Development Impact (Stress / Delay)
2	A449 Stafford Road (between M6 J13 and Pinfold Lane)	883	74	High	High	Minor Adverse
3	Cannock Road (between Wolgarston Way and A34)	891	61	High	High	Minor Adverse
4	A5 Watling Street (between M6 J12 and Proposed Site Access)	1257	51	High	High	Moderate to Major Adverse
5	A5 Watling Street (between Vicarage Road and M6 J12)	1037	54	High	High	Moderate to Major Adverse
8	A5 Watling Street (between A449 and Proposed Site Access)	873	54	High	High	Minor to Moderate Beneficial
9	A5 Watling Street (between A449 and A41)	885	68	High	High	Minor Adverse
11	A449 (between A5 and Gravelly Way)	463	95	Low	Low	Minor to Moderate Adverse
12	A449 (between Gravelly Way and Station Drive)	492	76	Low	Moderate	Moderate to Major Adverse
13	Vicarage Road (between Site Access and A5)	385	48	High	High	Moderate Adverse
15	Vicarage Road between Enterprise Drive and Proposed Site Access	272	48	High	High	Minor beneficial
17	Four Ashes Road between A449 and Claygates Road	136	50	High	Moderate	Negligible to minor Adverse
18	A449 (between Station Drive and Brewood Road)	779	87	Low	Low	Minor to Moderate Adverse
20	A449 Stafford Road (between M54 J2 and Brewood Road)	720	92	Low	Low	Minor to Moderate Adverse
21	A449 Stafford Road (between M54 J2 and Wobaston Road)	918	47	High	High	Minor to Moderate Adverse
23	A449 Stafford Road (between Wobaston Road and A460)	816	51	High	High	Minor to Moderate Adverse

Table 15.20: 2021 With Development Driver Stress and Delay						
25	A449 Wolverhampton Road (between Boscomoor Lane and Pinfold Lane)	734	41	High	High	Minor Adverse
26	A449 Wolverhampton Road (between Boscomoor Lane and A5)	1135	92	High	High	Minor Adverse

Level of Driver Stress and Delay

15.204 Table 15.20 shows there is very little change between the 2021 baseline and the 2021 with development scenarios. In 2021 with the full Proposed Development Driver stress and delay is predicted to be high on links 2, 3, 4, 5, 8, 9, 13, 15, 21, 23, 25 and 26. Driver stress is predicted to be moderate on links 12 and 17 and low on links 11, 18 and 20.

Magnitude of Change

15.205 The magnitude of change is based on changes in peak hour traffic flows between the 2021 Baseline and 2021 with development scenarios and was assessed as low on links 2, 3, 8, 9, 11, 15, 17, 18, 21, 23, 25 and 26. The magnitude of change was assessed to be medium on links 4, 5, 12, and 13.

Sensitivity

15.206 With the exception of Link 17, all links assessed were deemed to have a medium to high sensitivity to increases in traffic volumes and driver stress and delay as they are rural A roads which are likely to be commuter routes. Links with a medium sensitivity are 2, 3, 9, 13, 15, 25 and 26. Links with a high sensitivity are 4, 5, 8, 11, 12, 18, 20, 21 and 23. Link 17 was assessed to have a low level of sensitivity to changes in driver stress and delay as they are local roads which are likely to be lightly trafficked.

Overall Effect

15.207 Link **17** is predicted to experience a permanent, direct, long-term effect on driver stress and delay of **negligible to minor adverse significance**. A permanent, direct, long-term effect on driver stress and delay of **minor adverse significance** is forecast on links **2, 3, 9, 25 and 26**. A permanent, direct, long-term effect on driver stress and delay of **minor to moderate adverse significance** is forecast on links **8, 18, 20, 21 and 23.** On link **13**, a permanent, direct, long-term effect on driver stress and delay of **moderate adverse significance** is forecast. Links **4, 5, and 12** are predicted to experience a permanent, direct, long-term effect of driver stress and delay of **moderate to major adverse significance.** A permanent, direct, long-term effect on driver stress and delay of **minor beneficial significance** is forecast on link **15**. A permanent, direct, long-term effect on driver stress and delay of **minor to moderate beneficial significance** is forecast on link **11**.

Pedestrian Delay and Amenity

15.208 Pedestrian delay and amenity has been calculated using the methodology described earlier in this chapter.

15.209 Table 15.21 shows the average peak hour flows in 2021 with the Proposed Development, along with pedestrian facilities along the links which have been assessed.

Table 15.21: 2021 With Development Pedestrian Delay and Amenity						
Link		**Average Peak Hourly Flow**	**Pedestrian Facilities**	**2021 Baseline Pedestrian Delay/Amenity**	**2021 With Development Pedestrian Delay/Amenity**	**Proposed Development Impact**
2	A449 Stafford Road (between M6 J13 and Pinfold Lane)	1766	As described in baseline.	Moderate /Average	Moderate / Average	Minor Adverse
3	Cannock Road (between Wolgarston Way and A34)	1782	As described in baseline.	Moderate / Poor	Moderate / Poor	Minor Adverse
4	A5 Watling Street (between M6 J12 and Proposed Site Access)	2513	As described in baseline.	Moderate / Average	Moderate / Average	Minor Adverse
5	A5 Watling Street (between Vicarage Road and M6 J12)	2074	As described in baseline.	Moderate / Average	Moderate / Average	Minor Adverse
8	A5 Watling Street (between A449 and Proposed Site Access)	1746	As baseline plus new shared footway / cycleway on northern side of A5 between A449 and the Site access and new crossing at the Site access roundabout to connect with internal footway/cycleway network.	Moderate / Poor	Moderate / Good	Negligible to Minor Adverse
9	A5 Watling Street (between A449 and A41)	1770	As described in baseline.	Moderate / Poor	Moderate / Poor	Negligible to Minor Adverse

Table 15.21: 2021 With Development Pedestrian Delay and Amenity						
11	A449 (between A5 and Gravelly Way)	1853	As baseline plus upgrade of existing shared use cycle /footway to 3.5m wide between Gailey Roundabout and Station Drive junction to the south. New pedestrian crossing at the A449 site access roundabout to provide access to bus stops.	Moderate / Good	Moderate / Excellent	Negligible to Minor Beneficial
12	A449 (between Gravelly Way and Station Drive)	2485	As baseline plus upgrade existing shared use cycle /footway to 3.5m wide between Gailey Roundabout and Station Drive junction to the south.	Moderate / Good	Moderate / Excellent	Minor Adverse
13	Vicarage Road (between Site Access and A5)	770	As described in baseline.	Low / Very Poor	Low / Very Poor	Minor Adverse
15	Vicarage Road between Enterprise Drive and Proposed Site Access	544	As baseline plus a new pedestrian crossing at the new four arm site access roundabout junction with Vicarage Road.	Low / Very Poor	Low / Good	Minor Beneficial
17	Four Ashes Road between A449 and Claygates Road	273	As described in baseline.	Low / Very Poor	Low / Very Poor	Negligible to Minor Adverse
18	A449 (between Station Drive and Brewood Road)	3118	As described in baseline.	Moderate / Good	High / Good	Negligible to Minor Adverse
20	A449 Stafford Road (between M54 J2 and Brewood Road)	2879	As described in baseline.	Moderate / Good	High / Good	Negligible to Minor Adverse
21	A449 Stafford Road (between M54 J2 and Wobaston Road)	3674	As described in baseline.	High / Good	High / Good	Negligible to Minor Adverse
23	A449 Stafford Road (between Wobaston Road and A460)	3266	As described in baseline.	High / Excellent	High / Excellent	Negligible to Minor Adverse
25	A449 Wolverhampton Road (between Boscomoor Lane and Pinfold Lane)	1444	As described in baseline.	Low/Excellent	Moderate / Excellent	Negligible to Minor Adverse
26	A449 Wolverhampton Road (between Boscomoor Lane and A5)	2271	As described in baseline.	Moderate / Good	Moderate / Good	Negligible to Minor Adverse

Pedestrian Delay and Amenity

15.210 Table 15.21 shows there is very little change between the 2021 baseline and the 2021 with development scenarios. Pedestrian delay is predicted to be low on links 13, 15 and 17, moderate on links 2, 3, 4, 5, 8, 9, 11, 12, 25 and 26 and high on links 18, 20, 21, and 23. Pedestrian amenity is judged to be very poor on links 13 and 17, poor on links 3 and 9, average on links 2, 4 and 5, good on links 8, 15, 18, 20, 21 and 26 and excellent on links 11, 12, 23 and 25.

Magnitude of Change

15.211 The magnitude of change for pedestrian delay and amenity is calculated using changes in traffic. The magnitude of change was adjudged to be low on all links apart from links 4, 5, 12 and 13 which were adjudged to be medium.

Sensitivity

15.212 The sensitivity to change was adjudged to be low on all links apart from links 2, 3 and 15 where the sensitivity to change was adjudged to be medium.

Overall Effect

15.213 Therefore a permanent, direct, long-term effect on pedestrian delay and amenity of **negligible to minor adverse significance** is forecast on links **8, 9, 17, 18, 20, 21, 23,**

25 and 26. A permanent, direct, long-term effect on pedestrian delay and amenity of **minor adverse significance** is forecast on links **2, 3, 4, 5, 12 and 13**. Link **11** is forecast to experience a permanent, direct, long-term effect on pedestrian delay and amenity of **negligible to minor beneficial significance**. Link **15** is forecast to experience a permanent, direct, long-term effect on pedestrian delay and amenity of **minor beneficial significance**.

Cyclist Delay and Amenity

15.214 Table 15.22 shows the average peak hour flows in 2021 with the Proposed Development, along with cycle facilities along the links which have been assessed.

Table 15.22: 2021 With Development Cyclist Delay and Amenity

Link		Average Peak Hourly Flow	Cyclist Facilities	2021 Baseline Cyclist Delay/Amenity	2021 With Development Delay/Amenity	Proposed Development Impact
2	A449 Stafford Road (between M6 J13 and Pinfold Lane)	1766	As described in baseline.	Moderate / Poor	Moderate /Poor	Negligible to Minor Adverse
3	Cannock Road (between Wolgarston Way and A34)	1782	As described in baseline.	Moderate /Poor	Moderate /Poor	Negligible to Minor Adverse
4	A5 Watling Street (between M6 J12 and Proposed Site Access)	2513	As described in baseline.	Moderate /Poor	Moderate /Poor	Minor Adverse
5	A5 Watling Street (between Vicarage Road and M6 J12)	2074	As described in baseline.	Moderate /Poor	Moderate /Poor	Minor Adverse
8	A5 Watling Street (between A449 and Proposed Site Access)	1746	As baseline plus a 3m wide shared cycleway /footway on the A5 between Gailey Roundabout and the northern site access. A crossing at the access roundabout on the A5.	Moderate /Poor	Moderate /Good	Minor Adverse
9	A5 Watling Street (between A449 and A41)	1770	As described in baseline.	Moderate /Poor	Moderate /Poor	Negligible to Minor Adverse
11	A449 (between A5 and Gravelly Way)	1853	As baseline plus the upgrade of existing shared cycle /footway to 3.5m width east of A449 between Gailey Roundabout and the junction with Station Drive to the south.	Moderate /Average	Moderate /Good	Negligible to Minor beneficial
12	A449 (between Gravelly Way and Station Drive)	2485	As baseline plus upgrade of existing shared cycle /footway to 3.5m width east of A449 between Gailey Roundabout and the junction with Station Drive to the south.	Moderate /Average	Moderate /Good	Minor Adverse
13	Vicarage Road (between Site Access and A5)	770	As described in baseline.	Low /Poor	Low /Poor	Minor Adverse
15	Vicarage Road between Enterprise Drive and Proposed Site Access	544	As baseline plus a 3m cycleway as shown on the General Arrangement Drawings and the provision of pedestrian crossing facilities at the new four arm site access roundabout junction with vicarage road.	Low /Poor	Low /Average	Minor Beneficial
17	Four Ashes Road between A449 and Claygates Road	273	As described in baseline.	Low /Very Poor	Low /Very Poor	Negligible to Minor Adverse
18	A449 (between Station Drive and Brewood Road)	3118	As described in baseline.	Moderate /Average	High /Average	Negligible to Minor Adverse
20	A449 Stafford Road (between M54 J2 and Brewood Road)	2879	As described in baseline.	Moderate /Average	High /Average	Negligible to Minor Adverse

Table 15.22: 2021 With Development Cyclist Delay and Amenity						
21	A449 Stafford Road (between M54 J2 and Wobaston Road)	3674	As described in baseline.	High /Poor	High /Poor	Negligible to Minor Adverse
23	A449 Stafford Road (between Wobaston Road and A460)	3266	As described in baseline.	High /Poor	High /Poor	Negligible to Minor Adverse
25	A449 Wolverhampton Road (between Boscomoor Lane and Pinfold Lane)	1444	As described in baseline.	Low /Good	Moderate /Good	Minor Adverse
26	A449 Wolverhampton Road (between Boscomoor Lane and A5)	2271	As described in baseline.	Moderate /Good	Moderate /Good	Minor Adverse

Cyclist Delay and Amenity

15.215 Table 15.22 shows there is very little change between the 2021 baseline and the 2021 with development scenarios. Cyclist delay is calculated using the same methodology and traffic flows as for pedestrian delay therefore cyclist delay is predicted to be low on links 13, 15 and 17, moderate on links 2, 3, 4, 5, 8, 9, 11, 12, 25 and 26 and high on links 18, 20, 21, and 23. Cyclist amenity is judged to be very poor on link 17, poor on links 2, 3, 4, 5, 9, 13, 21 and 23, average on links 15, 18 and 20 and good on links 8, 11, 12, 25 and 26.

Magnitude of Change

15.216 The magnitude of change to cyclist delay and amenity is forecast to be low on all links except links 4, 5, 12 and 13 where the magnitude of change is expected to be medium.

Sensitivity to Change

15.217 Sensitivity of change in cyclist delay and amenity was adjudged to be low on all links except 8, 15, 25 and 26 where the sensitivity is adjudged to be medium.

Overall Effect

15.218 Therefore, links **2, 3, 9, 17, 18, 20, 21 and 23** are forecast to experience a permanent, direct, long-term effect on cyclist delay and amenity of **negligible to minor adverse significance**. Links **4, 5, 8, 12, 13, 25 and 26** are forecast to experience a permanent, direct, long-term effect on cyclist delay and amenity of **minor adverse significance**. Link **11,** is forecast to experience a permanent, direct, long-term effect on cyclist delay and amenity of **negligible to minor beneficial significance**. Link **15** is forecast to experience a permanent, direct, long-term effect on cyclist delay and amenity of **minor beneficial significance**.

Fear and Intimidation

15.219 As with the baseline conditions, an attempt has been made to assess the level of fear and intimidation along the links for the 2021 with Proposed Development scenario on an individual basis, using a scale of low, moderate or high levels of fear and intimidation (see Table 15.16). It should be noted that the level of fear and intimidation assessed in this chapter relates to traffic rather than personal security.

15.220 Table 15.23 shows the average peak hour flows in 2021 with the Proposed Development, along with pedestrian facilities along the links which have been assessed.

Table 15.23: 2021 With Development Fear and Intimidation						
Link		**Average Peak Hourly Flow**	**Existing Facilities/Conditions**	**2021 Baseline Level of Fear and Intimidation**	**2021 With Development Level of Fear and Intimidation**	**Proposed Development Impact**
2	A449 Stafford Road (between M6 J13 and Pinfold Lane)	1766	As described in the baseline.	moderate	moderate	Minor Adverse
3	Cannock Road (between Wolgarston Way and A34)	1782	As described in the baseline.	high	high	Negligible to Minor
4	A5 Watling Street (between M6 J12 and Proposed Site Access)	2513	As described in the baseline.	moderate	moderate	Minor to Moderate Adverse
5	A5 Watling Street (between Vicarage Road and M6 J12)	2074	As described in the baseline.	moderate	moderate	Minor Adverse

Table 15.23: 2021 With Development Fear and Intimidation						
8	A5 Watling Street (between A449 and Proposed Site Access)	1746	As baseline plus the provision of a 3m wide shared cycleway /footway on the A5 between Gailey Roundabout and the northern site access. A crossing will be provided at the access roundabout on the A5.	moderate	low	Minor Adverse
9	A5 Watling Street (between A449 and A41)	1770	As described in baseline.	high	high	Minor Adverse
11	A449 (between A5 and Gravelly Way)	2485	As baseline plus the upgrade of existing shared cycle /footway to 3.5m width east ofA449 between Gailey Roundabout and the junction with Station Drive to the south.	low	low	Minor Adverse
12	A449 (between Gravelly Way and Station Drive)	770	As baseline plus upgrade of existing shared cycle/footway to 3.5m width east of A449 between Gailey Roundabout and the junction with Station Drive to the south.	low	low	Minor to Moderate Adverse
13	Vicarage Road (between Site Access and A5)	544	As described in baseline.	high	high	Minor to Moderate Adverse
15	Vicarage Road between Enterprise Drive and Proposed Site Access	3118	As baseline plus the provision of pedestrian crossing facilities at the new four arm site access roundabout junction with vicarage road.	high	low	Minor Adverse
17	Four Ashes Road between A449 and Claygates Road	3674	As described in baseline.	high	high	Minor Adverse
18	A449 (between Station Drive and Brewood Road)	3266	As described in baseline.	low	low	Minor to Moderate Adverse

Table 15.23: 2021 With Development Fear and Intimidation						
20	A449 Stafford Road (between M54 J2 and Brewood Road)	1444	As described in baseline.	moderate	moderate	Minor to Moderate Adverse
21	A449 Stafford Road (between M54 J2 and Wobaston Road)	2271	As described in baseline.	moderate	moderate	Minor to Moderate Adverse
23	A449 Stafford Road (between Wobaston Road and A460)	3265	As described in baseline.	moderate	moderate	Minor to Moderate Adverse
25	A449 Wolverhampton Road (between Boscomoor Lane and Pinfold Lane)	1492	As described in baseline.	low	low	Minor Adverse
26	A449 Wolverhampton Road (between Boscomoor Lane and A5)	2287	As described in baseline.	moderate	moderate	Minor Adverse

Fear and Intimidation

15.221 Table 15.23 shows there is very little change between the 2021 baseline and the 2021 with development scenarios. Several links are forecast to experience a high level of fear and intimidation with the Proposed Development including links 3, 9, 13 and 17. Links 2, 4, 5, 20, 21, 23 and 26 are expected to experience a moderate level of fear and intimidation and links 8, 11, 12, 15, 18, and 25 are expected to experience a low level of fear and intimidation.

Magnitude of Change

15.222 On the basis of changes in HGV traffic flow, a low magnitude of change in fear and intimidation levels are forecast on links 3, 25 and 26. The magnitude of change is forecast to be medium on several links including links 2, 5, 8, 9, 11, 15 and 17. The magnitude of change is forecast to be high on a number of links including links 4, 12, 13, 18, 20, 21 and 23.

Sensitivity

15.223 All of the links assessed were adjudged to have a low level of sensitivity to changes in fear and intimidation levels, with the exception of links 25 and 26 which were adjudged to have a medium level of sensitivity. The majority of routes were adjudged to have low levels of sensitivity to changes in fear and intimidation levels because the links assessed are largely

rural routes where pedestrian and cyclist demand are likely to be low, or the facilities present were deemed suitable for the level of demand expected. Links 25 and 26 were adjudged to have a medium level of sensitivity to changes in fear and intimidation levels because of their location in the sub-urban area of Penkridge.

Overall Effect

15.224 Therefore, it is forecast that link **3** will experience a permanent, direct, long-term effect on fear and intimidation levels of **negligible to minor adverse significance**. It is forecast that links **2, 5, 8, 9, 11, 15, 17, 25 and 26** will experience a permanent, direct, long-term effect on fear and intimidation levels of **minor adverse significance**. It is forecast that links **4, 12, 13, 18, 20, 21 and 23** will experience a permanent, direct, long-term effect on fear and intimidation levels of **minor to moderate adverse significance**.

Accidents and Safety

15.225 Table 15.24 summarises the forecast annual average accident rates in 2021 with the Proposed Development along the links considered within this chapter.

Table 15.24: 2021 With Development Annual Average Accident Rates

Link		2021 Baseline Typical Annual Accidents	2021 Typical Annual Accidents With Proposed Development	Proposed Development Impact
2	A449 Stafford Road (between M6 J13 and Pinfold Lane)	3.7	4.2	Minor Adverse
3	Cannock Road (between Wolgarston Way and A34)	4.2	4.3	Minor Adverse
4	A5 Watling Street (between M6 J12 and Proposed Site Access)	1.0	1.6	Minor Adverse
5	A5 Watling Street (between Vicarage Road and M6 J12)	0.5	0.7	Minor to Moderate Adverse
8	A5 Watling Street (between A449 and Proposed Site Access)	1.1	1.1	Negligible
9	A5 Watling Street (between A449 and A41)	13.6	14.6	Negligible to Minor Adverse
11	A449 (between A5 and Gravelly Way)	0.6	0.6	Negligible
12	A449 (between Gravelly Way and Station Drive)	0.6	0.8	Minor Adverse
13	Vicarage Road (between Site Access and A5)	0.2	0.3	Minor Adverse
15	Vicarage Road between Enterprise Drive and Proposed Site Access	0.4	0.3	Minor Beneficial
17	Four Ashes Road between A449 and Claygates Road	0.2	0.2	Negligible
18	A449 (between Station Drive and Brewood Road)	1.4	1.6	Minor Adverse
20	A449 Stafford Road (between M54 J2 and Brewood Road)	7.5	8.8	Negligible to Minor Adverse
21	A449 Stafford Road (between M54 J2 and Wobaston Road)	6.3	6.9	Negligible to Minor Adverse
23	A449 Stafford Road (between Wobaston Road and A460)	22.5	24.4	Negligible to Minor Adverse

Table 15.24: 2021 With Development Annual Average Accident Rates				
25	A449 Wolverhampton Road (between Boscomoor Lane and Pinfold Lane)	2.4	2.7	Negligible to Minor Adverse
26	A449 Wolverhampton Road (between Boscomoor Lane and A5)	3.8	4.0	Negligible to Minor Adverse

15.226 With the introduction of the Proposed Development predicted accident rates have increased on 14 links when compared to the 2021 Do Minimum. On the other links they have either remained the same or decreased.

Magnitude of Change

15.227 On the basis of change in traffic flow a low magnitude of change is forecast on all links except 4, 13 and 15 where it is forecast to be medium.

Sensitivity

15.228 Links 4, 9, 13, 15, 20, 21, 23, 25 and 26 are judged to have a low level of sensitivity due to the number of actual accidents on those links being much lower than the 2015 predicted accidents. Links 2, 3, 8, 12, 17 and 18 are judged to have a medium level of sensitivity due to the number of actual accidents on those links being similar to the 2015 predicted accidents and links 5 and 11 were judged to have a high level of sensitivity due to the number of actual accidents on those links being higher than the 2015 predicted accidents.

Overall Effect

15.229 Therefore, it is forecast that links 8, 11 and 17 will experience a negligible effect on accidents and safety. It is forecast that links **9, 20, 21, 23, 25 and 26** will experience a permanent, direct, long-term effect on accidents and safety of **negligible to minor adverse significance**. It is forecast that links **2, 3, 4, 12, 13 and 18** will experience a permanent, direct, long-term effect on accidents and safety of **minor adverse significance**. It is forecast that link **5** will experience a permanent, direct, long-term effect on accidents and safety of **minor to moderate adverse significance**. There is also likely to be a permanent, direct and long-term effect on accidents and safety of **minor beneficial significance** on link **15.**

Demolition and Construction

15.230 An indicative phasing based on an assumed construction methodology has been adopted to inform an assessment of anticipated construction activities and traffic movements. This informs a quantitative and qualitative assessment of the likely transport effects of the construction phase. Indicative phasing of the Proposed Development is described in Chapter 4 'Description of the Proposed Development'.

15.231 The majority of construction and demolition traffic movements will be generated by construction workers' cars and vans. The installation of the primary infrastructure associated with the Proposed Development will result in appreciably greater construction traffic, typically occurring in the early years of the Proposed Development. It should be noted that the temporary effects of construction traffic have been considered prior to mitigation and that the effects are considered to be medium term as a consequence of the overall construction period (approximately 15 years, although construction is phased). Construction is anticipated to start in 2020.

15.232 The calculation of construction traffic (HGVs and cars/vans) is based on previous experience and predicted phasing and buildout rates, however it should be noted that the actual number of trips associated with construction can vary according to the method of construction and phasing.

15.233 For the purpose of calculating construction flows it has been assumed that the following construction works could be carried out simultaneously:

- Up to 120,500sqm of warehouse construction in Development Zone A4 as shown on the Development Zone Parameters Plan (Document 2.5);
- Rail Freight Interchange in Development Zone C as shown on the Development Zone Parameters Plan (Document 2.5); and
- Internal link road between the A5 and A449, including bridges.

15.234 On the basis of the above construction activity being carried out simultaneously it is estimated that there will be a total of 426 vehicular movements to and from the Site in any one day. Of these, 240 will be HGVs with the remainder cars and vans.

15.235 Construction traffic will be managed through a Demolition and Construction Traffic Management Plan (DCTMP). A copy of this is included as an appendix to the TA (Technical Appendix 15.1). A Demolition and Construction Environmental Management Plan (DCEMP) will also be developed. An outline version is included as Technical Appendix 2.3. This will include, but not be limited to, the following basic commitments:

- Construction will take place on five weekdays and on half of each Saturday;
- A full working day is likely to start at 7am and finish at 7pm; and
- Construction traffic would be controlled as far as possible to times outside the peak traffic hours.

15.236 It is intended that construction HGV traffic will approach and leave the Proposed Development via the Strategic Road Network (SRN). For the purposes of this assessment it has been assumed that all HGVs will travel from the M6 or M54 motorways using the A5 or A449 to access the Site.

15.237 As previously established in Table 15.1, traffic flow changes on the local highway network are not above the IEMA assessment thresholds, which are set out in the Method of Assessment section, therefore there are no significant effects attributable to the construction phase of the development.

15.238 Consideration has been given to the construction methodology and impact of the off-site highway works. Works to construct all three site access junctions and the new laybys on the A449 will require temporary traffic management and restrictions to traffic flow. The actual traffic management will need to be agreed with HE and SCC prior to construction taking place.

15.239 The A5 access roundabout has been designed so it can largely be constructed off line allowing two way traffic to be maintained. However, there is likely to be some impact to speed and lane width. It is expected that construction could take between 9 – 12 months. As a result, there should be limited traffic impact and re-assignment with only a short term negligible adverse effect.

15.240 The A449 access junction involves the conversion of the existing signal junction into a roundabout. This roundabout will be constructed on line and is likely to involve temporarily reducing the speed limit and number of lanes in each direction on the A449 in the vicinity of the junction to one. It may also be necessary to temporarily close access to Crateford Lane. The reduction in operational lanes and speed limit is likely to cause traffic to temporarily re-

assign away from the A449. The exact routes this traffic would use depends on their destinations, however, the more strategic movements are likely to re-assign onto other SRN or major roads such as the A460 or M6. Local traffic is likely to be temporarily displaced onto the local roads surrounding the area. The works could take between 9 – 12 months and therefore could result in a short term minor adverse effect to some of the local routes nearby.

15.241 Similar to the A5 access roundabout, the Vicarage Road Roundabout has been designed so it can mainly be constructed off line allowing two way traffic to be maintained. However, there is likely to be some impact to speed and lane width. It is expected that construction could take between 9 – 12 months. As a result, there should be limited traffic impact and re-assignment should be minimal as traffic flows are lower on this road than the SRN. Therefore there should only be a short term negligible adverse effect.

Interim Assessment

15.242 The future interim conditions are assessed within the following paragraphs. No highway mitigation measures are proposed for the Interim scenario.

15.243 The likely significant effects of the operational traffic flows have been measured against the 2021 base flows.

Severance

15.244 Table 15.25 details the predicted severance levels on Links 8, 11, 15 and 16 with the Interim Development. Severance levels have been calculated using the methodology set out above.

Table 15.25: 2021 Interim Development Severance Levels

Link		2021 Interim Assessment AADT	Facilities (Crossings)	2021 Baseline Severance Level	2021 With Interim Development Severance Level	Proposed Development Impact
8	A5 Watling Street (between A449 and Proposed Site Access)	23986	As existing. None Proposed.	Significant	Significant	Negligible to Minor Adverse
11	A449 (between A5 and Gravelly Way)	22443	As existing. None proposed during interim development.	Significant	Significant	Negligible to Minor Adverse
15	Station Road / Vicarage Road (between Enterprise Drive and Proposed Site Access)	6193	As existing. None proposed during interim development.	Slight	Slight	Negligible to Minor Adverse
16	Station Drive (between A449 and Enterprise Drive)	9480	As existing. None proposed during interim development.	Moderate	Moderate	Minor Adverse

Severance

15.245 Table 15.25 shows that there is no change in the level of severance on Links 8, 11, 15 and 16 between the 2021 Baseline Scenario and the 2021 Interim Development scenario.

Magnitude of Change

15.246 On the basis of changes in traffic flow, the magnitude of change was assessed to be low for all links assessed.

Sensitivity to Change

15.247 Links 8, 11 and 15 were adjudged to have a low level of sensitivity to changes in severance levels during the 2021 Interim Development Scenario as they are all rural routes which are expected to experience a low level of pedestrian activity. Link 16 was adjudged to have a medium level of sensitivity due to the presence of residential properties along this link.

Overall Assessment

15.248 Therefore links 8, 11 and 15 are expected to experience a temporary direct and long-term effect on the level of severance of **negligible to minor adverse significance** and link 16 is forecast to experience a permanent, direct long-term effect on the level of driver stress and delay of **Minor adverse significance**.

Driver Stress and Delay

15.249 Table 15.26 details the predicted changes in the level of Driver Stress and Delay on Links 8, 11, 15 and 16 for the 2021 Interim Development scenario. Levels of Driver Stress and Delay have been calculated using the method set out above.

Table 15.26: 2021 Interim Development Driver Stress and Delay

Link		Average Peak Hourly Flow Per Lane	Estimated Speed (Km/h)	2021 Baseline Driver Stress and Delay	2021 Interim Development Driver Stress and Delay	Proposed Development Impact (Stress / Delay)
8	A5 Watling Street (between A449 and Proposed Site Access)	1049	53	High	High	Minor to moderate adverse
11	A449 (between A5 and Gravelly Way)	541	96	Low	Low	Minor to moderate adverse
15	Vicarage Road between Enterprise Drive and Proposed Site Access	405	46	High	High	Minor adverse
16	Station Drive (between A449 and Enterprise Drive)	617	46	High	High	Minor adverse

Driver Stress and Delay

15.250 Table 15.26 shows that there is no significant change in the level of driver stress and delay on Links 8, 11, 15 and 16 when the 2021 Baseline and 2021 Interim Development scenarios are compared.

Magnitude of Change

15.251 The magnitude of change is based on changes in peak hour traffic flows between the 2021 Baseline and the 2021 Interim Development scenarios. The magnitude of change was assessed as low on links 8, 11, 15 and 16.

Sensitivity to Change

15.252 Links 8 and 11 were deemed to have high sensitivity to changes in the level of driver stress and delay as they are potential commuter routes. Links 15 and 16 were deemed to have a medium sensitivity to changes in driver stress and delay.

Overall Assessment

15.253 Therefore links 8 and 11 are forecast to experience a temporary, direct long-term effect on the level of driver stress and delay of **Minor to Moderate adverse significance** and links 15 and 16 are forecast to experience a permanent, direct long-term effect on the level of driver stress and delay of **Minor adverse significance**.

Pedestrian Delay and Amenity

15.254 Table 15.27 details the predicted changes in the level of Pedestrian Delay on Link 8, Link 11, Link 15 and Link 16 during the 2021 Interim Development scenario. Levels of Pedestrian Delay have been calculated using the method set out above.

Table 15.27: 2021 Interim Development Pedestrian Delay

Link		Average Peak Hourly Flow	Pedestrian Facilities	2021 Baseline Pedestrian Delay / Amenity	2021 Interim-Development Pedestrian Delay / Amenity	Proposed Development Impact
8	A5 Watling Street (between A449 and Proposed Site Access)	1854	As existing. None proposed during Interim Development Scenario.	Moderate / Poor	Moderate / Poor	Negligible to Minor Adverse
11	A449 (between A5 and Gravelly Way)	1963	As existing. None proposed during Interim Development Scenario.	Moderate / Good	Moderate / Good	Negligible to Minor Adverse
15	Station Road / Vicarage Road between Enterprise Drive and Proposed Site Access	735	As existing. None proposed during Interim Development Scenario.	Low / Very Poor	Low / Very Poor	Minor Adverse
16	Station Drive (between A449 and Enterprise Drive)	1134	As existing. None proposed during Interim Development Scenario.	Low / Average	Low / Average	Minor Adverse

Pedestrian Delay and Amenity

15.255 Table 15.27 shows that there is no change in pedestrian delay and amenity between the 2021 Baseline and the 2021 Interim Development scenarios.

Magnitude of Change

15.256 The magnitude of change in pedestrian delay and amenity is calculated using changes in overall traffic flow. The magnitude of change was adjudged to be low on links 8, 11, 15 and 16.

Sensitivity

15.257 The sensitivity to change was adjudged to be low on links 8 and 11 on the basis that these links are rural routes which are unlikely to experience a high level of pedestrian demand. On links 15 and 16 it was adjudged to be medium.

Overall Assessment

15.258 Therefore a temporary, direct, long-term effect on pedestrian delay and amenity of **negligible to minor adverse significance** is forecast on links 8 and 11. Links 15 and 16 are forecast to experience a permanent, direct, long term effect of **minor adverse significance**.

Cyclist Delay and Amenity

15.259 Table 15.28 details the predicted changes in the level of Cyclist Delay and Amenity on Link 8, Link 11, Link 15 and Link 16 for the 2021 Interim Development scenario. Levels of Cyclist Delay have been calculated using the method set out above.

Table 15.28: 2021 Interim Development Cyclist Delay and Amenity

Link		Average Peak Hourly Flow	Cyclist Facilities	2021 Baseline Cyclist Delay/Amenity	2021 Interim Development Delay/Amenity	Proposed Development Impact
8	A5 Watling Street (between A449 and Proposed Site Access)	1854	As existing. None proposed in the Interim development scenario.	Moderate / Poor	Moderate / Poor	Minor adverse
11	A449 (between A5 and Gravelly Way)	1963	As existing. None proposed in the Interim development scenario.	Moderate / Average	Moderate / Average	Negligible to Minor adverse
15	Vicarage Road between Enterprise Drive and Proposed Site Access	735	As existing. None proposed in the Interim development scenario.	Low / Poor	Low / Poor	Minor adverse
16	Station Drive (between A449 and Enterprise Drive)	1134	As existing. None proposed in the Interim development scenario.	Low / Poor	Low / Poor	Minor adverse

Cyclist Delay and Amenity

15.260 Table 15.28 shows that there is no change in cyclist delay and amenity between the 2021 Baseline Scenario and the 2021 Interim Development scenarios.

Magnitude of Change

15.261 The magnitude of change to cyclist delay and amenity is forecast to be low on all links due to the low changes traffic flow forecast on links 8, 11, 15 and 16.

Sensitivity

15.262 The sensitivity to changes in cyclist delay and amenity was adjudged to be low on link 11 and medium on links 8, 15 and 16.

Overall Assessment

15.263 Therefore links 8, 15 and 16 are forecast to experience a temporary, direct long-term effect of **minor adverse significance** and link 11 is forecast to experience a permanent, direct long-term effect of **negligible to minor adverse significance**.

Fear and Intimidation

15.264 Table 15.29 details the predicted changes in the level of Fear and Intimidation experienced on Link 8, Link 11, Link 15 and Link 16 for the 2021 Interim Development scenario. Levels of Fear and Intimidation have been calculated using the method set out above.

Table 15.29: 2021 Interim Development Fear and Intimidation

Link		Average Peak Hourly Flow	Existing Facilities /Conditions	2021 Baseline Level of Fear and Intimidation	2021 Interim Development Level of Fear and Intimidation	Proposed Development Impact
8	A5 Watling Street (between A449 and Proposed Site Access)	1854	As existing. None proposed during Interim Development Scenario.	Moderate	Moderate	Minor adverse

Table 15.29: 2021 Interim Development Fear and Intimidation						
11	A449 (between A5 and Gravelly Way)	1963	As existing. None proposed during Interim Development Scenario.	Low	Low	Minor to moderate adverse
15	Vicarage Road between Enterprise Drive and Proposed Site Access	735	As existing. None proposed during Interim Development Scenario.	High	High	Minor adverse
16	Station Drive (between A449 and Enterprise Drive)	1134	As existing. None proposed during Interim Development Scenario.	Moderate	Moderate	Minor adverse

Fear and Intimidation

15.265 Table 15.29 shows that there is forecast to be no change in the level of fear and intimidation experienced by road users when 2021 Baseline and 2021 Interim Development are compared.

Magnitude of Change

15.266 On the basis of changes in HGV traffic flow, a medium magnitude of change is forecast on links 8, 15 and 16. A magnitude of change of high is predicted on link 11.

Sensitivity

15.267 The links assessed were adjudged to have a low level of sensitivity to changes in the level of fear and intimidation.

Overall Assessment

15.268 Therefore, it is forecast that links 8, 15 and 16 will experience a temporary, direct, long-term effect on fear and intimidation levels of **minor adverse significance**. Link 11 is forecast to experience a permanent, direct, long-term effect on fear and intimidation levels of **minor to moderate adverse significance**.

Accidents and Safety

15.269 Table 15.30 details the predicted changes in the number of typical accidents on Link 8, Link 11, Link 15 and Link 16 during the 2021 Interim Development scenario.

Table 15.30: 2021 Interim Development Annual Average Accident Rates				
Link		**2021 Baseline Typical Annual Accidents**	**2021 Typical Annual Accidents With Interim Development**	**Interim Development Impact**
8	A5 Watling Street (between A449 and Proposed Site Access)	1.1	1.2	Minor adverse
11	A449 (between A5 and Gravelly Way)	0.6	0.6	Negligible
15	Vicarage Road between Enterprise Drive and Proposed Site Access	0.4	0.4	Negligible
16	Station Drive (between A449 and Enterprise Drive)	0.6	0.7	Negligible to minor adverse

Accidents and Safety

15.270 With the presence of the Interim Development, there is little change in predicted accident rates on links 8, 11, 15 and 16 when the 2021 Baseline and the 2021 Interim Development scenarios are compared.

Magnitude of Change

15.271 The magnitude of change in accident rates is forecast on the basis of changes in predicted accidents. A low magnitude of change is forecast for accident rates on all links assessed.

Sensitivity

15.272 Link 8 is adjudged to have a medium level of sensitivity and Link 11 is adjudged to have a high level of sensitivity to changes in accident rates due to the difference in actual accidents rates compared to the 2015 predicted accidents. Links 15 and 16 are adjudged to have a low level of sensitivity to changes in accident rates due to the actual number of accidents during 2015 being lower than the 2015 predicted accidents.

Overall Assessment

15.273 Overall, link 8 is forecast to experience a temporary, direct long-term effect on accidents and safety of minor adverse significance. Links 11 and 15 are forecast to experience a negligible effect on accidents and safety and link 16 is forecast to experience a permanent, direct, long-term effect on accidents and safety of negligible to minor adverse significance.

Mitigation and Residual Effects

Operational Development

15.274 The following additional mitigation is proposed as part of the Proposed Development and will be secured either through the DCO requirements or Development Consent Obligations;

15.275 Adopted public highway through the Site between the A5 and A449 to improve performance and provide resilience at Gailey Roundabout;

15.276 Closure of Crateford Lane to westbound traffic;

15.277 Banned right turn into Station Drive from the A449;

15.278 enforcement to prevent development HGVs from using the A449 north of Gailey Roundabout through Penkridge, except for local access;

15.279 Site Wide HGV Management Plan, including:

- Early arrival bays; and
- Vehicle booking system.

15.280 Sustainable Transport Strategy to include:

- Provision of new and extended bus services which could include:
  - Increase frequency and divert existing services; and
  - New shuttle buses between employee clusters and the Site, anticipated to be to Cannock Chase, Walsall and Wolverhampton.

15.281 New and improved pedestrian and cycle facilities including:

- Upgrade the existing shared use cycle/footway to a 3m wide shared cycle/footway along the east of the A449 between Gailey Roundabout and the junction with Station Drive to the south;
- Provide pedestrian crossing facilities at the proposed A449 Site access roundabout to facilitate access to bus facilities on the west side;
- Upgrade the existing footway to the west of the A449 in the vicinity of the proposed Site access roundabout to provide a width of 2m;
- Alter the existing footway adjacent to the north of the A5 between Gailey Roundabout and the proposed Site access to provide, where feasible, a 3m wide shared cycle/footway;
- Provide a 2m footway to the south of the A5 to connect the Proposed Development to Gailey Marina;
- Provide pedestrian crossing facilities at the proposed A5 site access roundabout;
- Provide a 3m cycleway along a section of Vicarage Road as shown on the General Arrangement Drawings;
- Provide 3m wide cycleways / footways adjacent to the roads through the Site;
- Provide a network of permissive paths within the areas of public open space. Crossing facilities would be provided across Straight Mile plus footway improvements would be provided at the junction of Straight Mile / Kings Lane / Woodlands Lane in order to allow access to these permissive paths; and
- Improvements to the canal tow path to support an increase in use and connectivity to the footpaths.

15.282 Site Wide and Individual Occupier Travel Plans (SWTP is included as an Appendix to the TA (Technical Appendix 15.1)) to encourage a reduction in single occupancy car journeys. This will be achieved using measures such as:

- Appointment of a Travel Plan Co-ordinator;
- Development of a smart phone app to provide information on bus times and capacity;
- Provision of sustainable travel information packs for employees;
- Personalised travel planning for employees;
- Travel Plan website and social media feeds;
- Bus taster tickets;
- Employee discounts for bus services or sustainable transport related purchases;
- Car sharing portal;
- Staggered working hours; and
- Remote / home and flexible working.

Residual Effects

15.283 The potential effects assessment of the operation included an allowance for the proposed highway mitigation, however, the remaining mitigation will ensure that overall traffic generation is reduced and traffic is using appropriate routes, particularly HGVs. The residual effects for those assessed to be moderate adverse or worse in the potential effects section are re-considered with the mitigation below.

Severance

15.284 No links were considered to have potential effect of moderate adverse or above however, the proposed mitigation for reductions in total traffic generation and HGV routing will assist in minimising the impact on severance. Over all there will be a permanent, direct, long-term effect on severance of **negligible to minor adverse** significance.

Driver Stress and Delay

15.285 There is potential for moderate to major adverse significance on links 4, 5 and 12. However, with the introduction of the HGV Management Plan, Sustainable Transport Strategy and Travel Plans traffic impact on these routes is expected to reduce from the levels currently predicted therefore the significance of effect should reduce to **minor to moderate adverse significance**.

15.286 There is potential for moderate adverse significance on link 13. However, with the introduction of the HGV Management Plan, Sustainable Transport Strategy and Travel Plans traffic impact on this route is expected to reduce from the levels currently predicted therefore the significance of effect should reduce to **minor to moderate adverse significance**.

15.287 Overall there will be a permanent, direct, long-term effect on driver stress and delay of **minor adverse** significance.

Pedestrian Delay and Amenity

15.288 No links were considered to have potential effect of moderate adverse or above however, the proposed mitigation for reductions in total traffic generation and HGV routing will assist in minimising the impact on pedestrian delay and amenity. Over all there will be a permanent, direct, long-term effect on pedestrian delay and amenity of **negligible to minor adverse significance**.

Cyclist Delay and Amenity

15.289 No links were considered to have potential effect of moderate adverse or above however, the proposed mitigation for reductions in total traffic generation and HGV routing will assist in minimising the impact on cyclist delay and amenity. Overall there will be a permanent, direct, long-term effect on cyclist delay and amenity of **negligible to minor adverse significance**.

Fear and Intimidation

15.290 No links were considered to have potential effect of moderate adverse or above however, the proposed mitigation for reductions in total traffic generation and HGV routing will assist in minimising the impact on fear and intimidation. Overall there will be a permanent, direct, long-term effect on fear and intimidation of **minor adverse significance**.

Accidents and Safety

15.291 There is potential for minor to moderate adverse significance on link 5, without any additional mitigation. However, with the introduction of the HGV Management Plan, Sustainable Transport Strategy and Travel Plan, traffic impact on these routes is expected to reduce from the levels currently predicted therefore the significance of effect should reduce to **minor adverse significance**.

15.292 Over all there will be a permanent, direct, long-term effect on accidents and safety of minor adverse significance.

Demolition and Construction Phase

15.293 No significant effects are anticipated based on an assessment of the construction traffic. The construction traffic will be managed through a Demolition and Construction Traffic Management Plan (DCTMP), a copy of which is included as an appendix to the TA.

15.294 The DCTMP will set out the procedures that will be put in place to ensure that the impact of traffic associated with the construction phase of the Proposed Development will be managed correctly and minimised. It will include construction traffic routing; monitoring and enforcement of the routing and methods to encourage construction workers to arrive on site by sustainable modes. In addition it will identify the sensitive locations that are to be avoided by heavy goods vehicles, based on the locations identified as such in this ES Chapter.

15.295 The impact of the construction of the off-site highway works has also been considered. As a result there is likely to be a **short term minor adverse effect** on local roads as a result of traffic re-assignment away from the A449 whilst the Site access roundabout is constructed.

Residual Effects

15.296 There are no significant effects on the network from the construction phase, therefore residual effects after implementation of the DCTMP with be negligible.

Interim Development

15.297 Whilst no significant highway mitigation works are proposed for the Interim scenario it is intended to provide other forms of mitigation as set out below:

15.298 An improved public bus service as well as private shuttle buses for employees.

15.299 HGV Management Plan, including:

- Early arrival bays; and
- Vehicle booking system.

15.300 Site Wide Travel Plan (SWTP is included as an Appendix to the TA (Technical Appendix 15.1)) to encourage a reduction in single occupancy car journeys.

Residual Effects

15.301 The potential effects assessment of the Interim development did not include an allowance for the above measures therefore the mitigation will ensure that overall traffic generation is reduced and traffic is using appropriate routes, particularly HGVs.

Severance

15.302 Overall there will be a temporary direct, long-term effect on severance of **negligible to minor adverse significance**.

Driver Stress and Delay

15.303 Overall there will be a temporary, direct, long-term effect of **minor adverse significance** on driver stress and delay.

Pedestrian Delay and Amenity

15.304 Overall there will be a temporary, direct, long-term effect of **negligible to minor adverse significance** on pedestrian delay.

Cyclist Delay and Amenity

15.305 Overall there will be a temporary, direct, long-term effect of **minor adverse significance** on levels of cyclist delay.

Fear and Intimidation

15.306 Overall there will be a temporary, direct, long-term effect of **minor adverse significance** on fear and intimidation levels.

Accidents and Safety

15.307 Overall there will be a temporary, direct, long-term effect of **minor adverse significance** on the typical number of accidents.

Summary of Residual Effects

15.308 Table 15.31 provides a tabulated summary of the outcomes of the Transport and Access assessment of the Proposed Development.

Table 15.31: Table of Significance – Transport

Receptor*	**Nature of Residual Effect****					
	Significance***	**+ / –**	**D / I**	**P / T**	**R / IR**	**St / Mt / Lt**
Completed Development						
Severance						
Link 2, Link 3, Link 8, Link 9, Link 17, Link 18, Link 20, Link 26.	Negligible to Minor	-	D	P	R	Lt
Link 4, Link 5 Link 12, Link 13, Link 21, Link 23.	Minor	-	D	P	R	Lt
Link 25.	Minor to Moderate	-	D	P	R	Lt

Table 15.31: Table of Significance – Transport						
Link 11, Link 15.	Negligible to Minor	+	D	P	R	Lt
Driver Stress and Delay						
Link 17.	Negligible to Minor	-	D	P	R	Lt
Link 2, Link 3, Link 9, Link 25, Link 26.	Minor	-	D	P	R	Lt
Link 4, Link 5, Link 8, Link 12, Link 13, Link 18, Link 20, Link 21, Link 23.	Minor to Moderate	-	D	P	R	Lt
Link 15.	Minor	+	D	P	R	Lt
Link 11.	Minor to Moderate	+	D	P	R	Lt
Pedestrian Delay and Amenity						
Link 8, Link 9, Link 17, Link 18, Link 20, Link 21, Link 23, Link 25, Link 26.	Negligible to Minor	-	D	P	R	Lt
Link 2, Link 3, Link 4, Link 5, Link 12, Link 13.	Minor	-	D	P	R	Lt
Link 11.	Negligible to Minor	+	D	P	R	Lt
Link 15.	Minor	+	D	P	R	Lt
Cyclist Delay and Amenity						
Link 2, Link 3, Link 9, Link 17, Link 18, Link 20, Link 21, Link 23.	Negligible to Minor	-	D	P	R	Lt
Link 4, Link 5, Link 8, Link 12, Link 13, Link 25, Link 26.	Minor	-	D	P	R	Lt
Link 11.	Negligible to Minor	+	D	P	R	Lt
Link 15.	Minor	+	D	P	R	Lt
Fear and Intimidation						
Link 3.	Negligible to Minor	-	D	P	R	Lt
Link 2, Link 5, Link 8, Link 9, Link 11, Link 15, Link 17, Link 25, Link 26.	Minor	-	D	P	R	Lt
Link 4, Link 12, Link 13, Link 18, Link 20, Link 21, Link 23.	Minor to Moderate	-	D	P	R	Lt
Accidents and Safety						
Link 8, Link 11, Link 17.	Negligible	-	D	P	R	Lt
Link 9, Link 20, Link 21, Link 23, Link 25, Link 26.	Negligible to Minor	-	D	P	R	Lt
Link 2, Link 3, Link 4, Link 5, Link 9, Link 12, Link 13, Link 17, Link 18.	Minor	-	D	P	R	Lt
Link 15	Negligible to Minor	+	D	P	R	Lt

Notes:
* - For link locations, refer to Figure 15.1.
** - = Adverse/ + = Beneficial; D = Direct/ I = Indirect; P = Permanent/ T = Temporary; R=Reversible/ IR= Irreversible; St- Short term/ Mt –Medium term/ Lt –Long term.
***Negligible/Minor/Moderate/Major

Likely Significant Environmental Effects

15.309 Following the application of proposed mitigation there are no moderate or major adverse residual significant effects.

15.310 There will be beneficial effects as a result of reductions in overall traffic on the A449 south of Gailey Roundabout and on Station Drive / Station Road following implementation of the right turn ban.

Cumulative Effects

15.311 The traffic data used in the assessment of effects has been obtained from traffic models which include all committed and consented development and infrastructure schemes as agreed with the relevant authorities. Additional developments were added to the models at the request of Highways England to ensure the overall impact could be assessed. It can therefore be concluded that the cumulative effects have been accounted for in the main assessment and no further assessment is required.

15.312 Overall, this chapter has demonstrated that there are no significant transport effects resulting from the Proposed Development which cannot be mitigated.