

Land at Barnham Eastergate Westergate (BEW Parcel SC1) Environmental Statement

Chapter D: Transportation

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**Pell Frischmann
5 Manchester Square, Marylebone
London W1U 3PD**

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D1.0

Introduction

- D1.1 This Chapter forms part of an Environmental Statement ('ES') which sets out the findings of an Environmental Impact Assessment ('EIA') of the proposed residential led mixed use development of land near the villages of Barnham, Eastergate and Westergate ('BEW') in West Sussex. The proposals also include the realignment of the A29 strategic route south of Barnham Road.
- D1.2 The Proposed Development forms an earlier phase of a wider strategic allocation of land which is known for the purposes of this ES as 'BEW Parcel SC1'. A description of the background to the proposal, including its role as part of the strategic allocation; the relationship of this chapter to the wider ES; and a description of the site and the development is provided at Chapters A to C of this ES.
- D1.3 Chapter N considers cumulative effects including a review of the potential for effects associated with the development of the wider strategic allocation at BEW.
- D1.4 This chapter should be read in conjunction with Chapters A, B, C and N.
- D1.5 This Chapter reports the assessment of the potential for likely significant environmental effects arising from the Proposed Development in relation to transportation. It describes the baseline conditions, and the potential effects of the Proposed Development with respect to transport and highways. This chapter describes the methods used to assess the effects; the baseline conditions currently existing at the application site and surrounding area; the mitigation measures required to prevent, reduce or offset any significant negative adverse effects; and the likely residual effects after these measures have been adopted.
- D1.6 The chapter should be read in conjunction with the following technical appendices provided at Volume 2 to this ES:
- **Appendix D1 - Transport Assessment (TA) (Ref 1)**
 - **Appendix D2 - Framework Travel Plan (FTP) (Ref 2)**

About the Author

- D1.7 This chapter of the Environmental Statement (ES) was prepared by Pearl Ahrens, Transport Planner, and Dr Chris Osowski, Principal Transport Engineer, at Pell Frischmann. Pearl has over 2 years' experience transport planning including preparing Transport Assessments and Environmental Statement chapters for a wide range of development projects across the UK. Chris has over 8 years' experience of transport planning and traffic engineering, and he has an additional 6 years' experience of transportation modelling and simulation design and implementation. This chapter of the ES was reviewed by Stephen Moody, Associate Transport Planner at Pell Frischmann, who has over 17 years' experience in transport planning and engineering, including preparation of transport inputs to planning applications.

D2.0 Policy Context

National Policy

National Planning Policy Framework

- D2.1 The Government's National Planning Policy Framework (NPPF) (Ref 3) sets out the government's planning policies for England and how these should be applied. The NPPF was adopted in February 2019 and last updated in July 2021.
- D2.2 It is meant as high level guidance for local councils to use when defining their local plans and is a material consideration when determining planning applications. This approach allows the planning system to be customised to reflect the needs and priorities of individual communities.
- D2.3 At the heart of the NPPF is a presumption in favour of sustainable development, and the NPPF notes that 'the purpose of the planning system is to contribute to the achievement of sustainable development'. At a very high level, the objective of sustainable development can be summarised as 'meeting the needs of the present without compromising the ability of future generations to meet their own needs'.
- D2.4 The NPPF defines the delivery of sustainable development through three roles:
- "an economic objective;
 - a social objective; and
 - an environmental objective."
- D2.5 Chapter 9 of the NPPF relates to the promotion of sustainable development. Paragraph 104 (page 30) states that:
- "Transport issues should be considered from the earliest stages of plan-making and development proposals, so that:*
- a *the potential impacts of development on transport networks can be addressed;*
 - b *opportunities from existing or proposed transport infrastructure, and changing transport technology and usage, are realised – for example in relation to the scale, location or density of development that can be accommodated;*
 - c *opportunities to promote walking, cycling and public transport use are identified and pursued;*
 - d *the environmental impacts of traffic and transport infrastructure can be identified, assessed and taken into account – including appropriate opportunities for avoiding and mitigating any adverse effects, and for net environmental gains; and*
 - e *patterns of movement, streets, parking and other transport considerations are integral to the design of schemes, and contribute to making high quality places.'*
- D2.6 Paragraph 110 (page 32) states that:
- "In assessing sites that may be allocated for development in plans, or specific applications for development, it should be ensured that:*
- a *appropriate opportunities to promote sustainable transport modes can be – or have been – taken up, given the type of development and its location;*
 - b *safe and suitable access to the site can be achieved for all users;*

- c the design of streets, parking areas, other transport elements and the content of associated standards reflects current national guidance, including the National Design Guide and the National Model Design Code; and
 - d any significant impacts from the development on the transport network (in terms of capacity and congestion), or on highway safety, can be cost effectively mitigated to an acceptable degree.'
- D2.7 Paragraph 111 (page 32) notes that *'development should only be prevented or refused on highways grounds if there would be an unacceptable impact on highway safety, or the residual cumulative impacts on the road network would be severe'*.
- D2.8 Within this context, paragraph 112 notes that *'applications for development should:*
- a *give priority first to pedestrian and cycle movements, both within the scheme and with neighbouring areas; and second – so far as possible – to facilitating access to high quality public transport, with layouts that maximise the catchment area for bus or other public transport services, and appropriate facilities that encourage public transport use;*
 - b *address the needs of people with disabilities and reduced mobility in relation to all modes of transport;*
 - c *create places that are safe, secure and attractive – which minimise the scope for conflicts between pedestrians, cyclists and vehicles, avoid unnecessary street clutter, and respond to local character and design standards;*
 - d *allow for the efficient delivery of goods, and access by service and emergency vehicles; and*
 - e *be designed to enable charging of plug-in and other ultra-low emission vehicles in safe, accessible and convenient locations.'*
- D2.9 Paragraph 131 (page 39) notes that *'trees make an important contribution to the character and quality of urban environments, and can also help mitigate and adapt to climate change. Planning policies and decisions should ensure that new streets are tree-lined, that opportunities are taken to incorporate trees elsewhere in developments (such as parks and community orchards), that appropriate measures are in place to secure the long-term maintenance of newly-planted trees, and that existing trees are retained wherever possible. Applicants and local planning authorities should work with highways officers and tree officers to ensure that the right trees are planted in the right places, and solutions are found that are compatible with highways standards and the needs of different users.'*

Planning Practice Guidance

- D2.10 Planning Practice Guidance (PPG) (Ref 4) was first published in March 2014 and has had regular subsequent updates. The PPG carries across many of the themes contained in the NPPF and makes reference to the use of Transport Assessments and Statements as well as Travel Plans. The "Travel Plan, Transport Assessments and Statements in Decision Making PPG" states that "Transport Assessment and Statements are ways of assessing the potential transport impacts of developments...The Transport Assessment or Transport Statement may propose mitigation measures where these are necessary to avoid unacceptable or "severe" impacts. Travel Plans can play an effective role in taking forward those mitigation measures which relate to on-going occupation and operation of the development".
- D2.11 The use of these Transport Planning tools encourages the use of sustainable transport, assisting in the creation of "accessible, connected, inclusive communities" and in doing so improves the

quality of health and road safety. In the process of this the impact of trip generation is minimised, the impact on the environment is lessened by reducing carbon emissions, and there is less need for new developments to provide additional capacity and new road infrastructure within highway networks.

D2.12 The guidance suggests that when preparing a TA a number of key issues should be considered. These include the following:

- “the planning context of the development proposal;
- appropriate study parameters (i.e. area, scope and duration of study);
- assessment of public transport capacity, walking/cycling capacity and road network capacity;
- road trip generation and trip distribution methodologies and/or assumptions about the development proposal;
- measures to promote sustainable travel;
- safety implications of development; and
- mitigation measures (where applicable) – including scope and implementation strategy.”

D2.13 Provision of parking facilities and the parking strategy for the Proposed Development are also to be included in the Transport Assessment according to the advice of the PPG.

D2.14 The guidance identifies TPs to be “long-term management strategies for integrating proposals for sustainable travel into the planning process. They are based on evidence of the anticipated transport impacts of development and set measures to promote and encourage sustainable travel (such as promoting walking and cycling)”.

D2.15 The guidance suggests that the purpose of a TP is to identify and deliver sustainable transport initiatives revolving around walking, cycling, the use of public transport and, also making use of emerging technology such as telecommuting. When carried out in combination with both proposed and existing developments it is anticipated that this will reduce the demand for travel by the private car.

Department for Transport Circular 02/2013

D2.16 In 2013 the DfT issued Circular 02/2013 ‘The Strategic Road Network and Delivery of Sustainable Development’ (Ref 5) to inform communities and the development industry as to how Highways England (formerly the Highways Agency) would engage with them in order to deliver development in a sustainable manner “and thus economic growth” whilst also safeguarding the primary purpose of the strategic road network in England.

D2.17 The broad policy aims of the Circular in relation to development are included in Paragraph 9 stating that “Development proposals are likely to be acceptable if they can be accommodated within the existing capacity of a section (link or junction) ...or they do not increase demand for use of a section that is already operating at over-capacity levels, taking account of any travel plan, traffic management and/or capacity enhancement measures that may be agreed”. It can be seen from the above that the document reflects many of the principles outlined in the NPPF. Importantly it states that “developments should only be prevented or refused on transport grounds where residual cumulative impacts of developments are severe”.

D2.18 The document goes on – in paragraphs 25-32 – to consider the assessment of development impacts, the use of demand management to minimise this impact and travel planning. Paragraph 26 places an onus on developers “*to put forward initiatives that manage down the traffic impact of proposals to support the promotion of sustainable transport and the*

development of accessible sites". The Circular prioritises travel planning measures in its approach to mitigation, followed by travel demand measure and as a last course of action capacity enhancement measures as stated in paragraph 33 *"Only after travel plan and demand management measures have been fully explored and applied will capacity enhancement measures be considered. While capacity enhancements should normally be addressed at the plan making stage, such measures may be considered at the time when individual planning applications are submitted, subject to the over-riding principle that delivery of the adopted Local Plan proposals should not be compromised"*. It is important to note that the document suggests in paragraph 27 that where extant infrastructure can accommodate the full level of development traffic in the opening year (i.e. when the final building is complete) no mitigation will be sought.

- D2.19 Paragraphs 28 and 29 of the circular address TPs acknowledging that they are *"an effective means of managing the impact of development on the road network, and reducing the need for major transport infrastructure"*. The paragraphs go on to acknowledge the TPs contain a selection of measures that promote the use of sustainable travel measures contributing *"to the ongoing effectiveness of the strategic road network ensuring efficient national and regional connectivity, whilst retaining capacity within the strategic road network and so facilitating provision for further development in future plans"*.

The Strategic Road Network (SRN): Planning for the Future

- D2.20 HE published 'The Strategic Road Network (SRN): Planning for the Future (2015) – A Guide to Working with Highways England on Planning Matters' (Ref 6) in September 2015 to set out the organisation's approach to engaging with the planning system and which issues they look at when reviewing draft planning documents and planning applications. The document suggests what information HE would like to see in planning proposals and outlines the support they can offer as a statutory consultee. The guidance has been written within the current government policy and regulations including, but not limited to, the NPPF and the DfT Circular 02/2013 described above.
- D2.21 Of relevance to the Proposed Development, paragraph 8 of the guidance states that "We will support economic growth, providing the conditions that help businesses to succeed and grow, facilitating new development around the network, and supporting investment and trade. This will take place alongside maintaining a safe and efficient SRN. The document sets out how we, along with those working on our behalf, will work with development promoters to help you to assess and successfully manage the relationship between your Proposed Development and the SRN".
- D2.22 As noted above the guidance is written with respect to Circular 02/2013 and the assessment criteria it contains in relation to determining the scale of impact of developments on the SRN. In paragraph 34 it states that: "Where the Circular tests are not satisfied, additional assessment will be required to enable all parties to understand the scope and scale of the impact that the proposals are likely to have on the SRN. This assessment should:
- 1 demonstrate how the proposals will reduce the need to travel, especially by car;
 - 2 demonstrate how the proposals will improve accessibility by all modes of travel and influence travel behaviours;
 - 3 assess the likely impact of residual trips (i.e. after measures above have been considered); and
 - 4 identify appropriate and proportionate mitigation measures, and ensure that what is proposed promotes sustainable transport outcomes and avoids unnecessary works to the SRN"

- D2.23 Following these additional assessment criteria the guidance goes on to advise local planning authorities that they should only “refuse or place conditions on developments only where the residual cumulative impacts of development on the capacity of the SRN (once proposed mitigations are taken into account) are still assessed to be severe. For example, if development would lead to operating conditions that significantly erode the safe operation of the SRN”.
- D2.24 In order to ensure that highways issues are addressed the guidance provides a staged approach to mitigating any potential impacts. The hierarchy is as follows:
- *“Avoidance – the promoter should take all reasonable steps to minimise the level of physical mitigation required, through the use of measures such as Travel Plans, and travel demand management measures, such as development phasing, HGV booking systems and encouraging flexible working and sustainable travel*
 - *Off-line improvements – before considering to propose changes to the SRN, the promoters of development should assess the potential for alterations to be made to the local road network in the alternative;*
 - *Alterations to the SRN – once all other options have been examined, we will consider the potential for changes to be made to the SRN.”*
- D2.25 The guidance highlights the importance of Transport Assessments in enabling HE to understand the overall forecast demand on the SRN and the road network which surrounds it; emphasising the importance of considering the overall demand for developments and not just the initial phases.
- D2.26 The guidance also acknowledges that Travel Plans are an effective means of reducing the traffic impact of proposals and that they are particularly necessary in locations where the SRN could experience capacity problems in the “foreseeable future”. This is best encapsulated in paragraph 104 which states that *“The preparation, implementation, monitoring and updating of a robust travel plan that promotes the use of sustainable transport modes (such as walking, cycling and public transport) is an effective means of managing the impact of development on the road network, and reducing the need for major transport infrastructure. This contributes to the ongoing effectiveness of the SRN in ensuring swift connections nationally and regionally, minimising delays and congestions. Retaining some network capacity within the SRN facilitates the provision for further developments”*.
- D2.27 In relation to capacity enhancements associated with planning applications the guidance states that *“Where the overall forecast demand in the opening year of the development can be safely accommodated by the existing infrastructure, capacity enhancement will not be sought.”* Any capacity enhancement schemes on the SRN would only be considered after a TP has been incorporated into the development proposals.
- D2.28 In instances where it has been determined that there is still insufficient capacity within the affected section of the SRN to accommodate existing and development specific traffic the development would need to be mitigated. The guidance suggests that works could be undertaken either *“on the SRN or on the adjacent local road network, and both options should be explored, and the impact on and relationship with both networks should be considered.”* Any measures proposed must be capable of accommodating or offsetting the development’s impact on the SRN.

IEA Guidelines for the Environmental Assessment of Road Traffic (1993)

- D2.29 The Institute of Environmental Assessment (now the Institute of Environmental Management and Assessment (IEMA)) published Guidelines for the Environmental Assessment of Road Traffic (Ref 7) in 1993.

D2.30 The guidelines were intended “to provide a basis for a systematic, consistent and comprehensive coverage for the appraisal of traffic impacts for a wide range of development projects.” Whilst many parts of these guidelines have since been superseded by more modern practices, it remains a useful guidance document that, among other items, provides well understood threshold values for the determination of environmental effect significance. These have been used in the production of this chapter and are detailed in the relevant section below.

D2.31 In general, the key points of the guidelines are that:

- *“The environmental impact of traffic will be dependent upon existing conditions and adjacent land uses as well as changes in traffic levels.*
- *Assessments should consider the period (possibly the hour) at which the impact is greatest and the period at which impacts exhibit the greatest change.*
- *Peak environmental impacts may well occur at times other than the ‘peak hour’, and traffic assessments may need to be undertaken for a number of time periods.*
- *Environmental Assessments may need to be undertaken separately for different phases in the life of the project.*
- *Assessment should be undertaken in the year of opening (or first year of a phase) when, generally, the perceived environmental impact is at its greatest, as a guide, highway links should be separately assessed when:*
 - a *Traffic flows have increased by more than 30% or*
 - b *Other sensitive areas are affected by traffic increases of at least 10% or*
 - c *HGV flows have increased significantly.”*

Design Manual for Roads and Bridges: Environmental Assessment and Monitoring (LA104)

D2.32 Design Manual for Roads and Bridges Standard LA 104 (Ref 8) (produced by HE) details the requirements for environmental assessment of projects, including reporting and monitoring of significant adverse environmental effects. This document provides the basis by which transport practitioners are required to consider environmental effects for schemes on the strategic road network.

D2.33 High-level significance and magnitude matrices are provided in LA104 and these have informed the definition of those matrices in this chapter. Of note, LA104 considers that slight significance (and by extension neutral/negligible significances) “are not material in the decision-making process.”

Regional policy

West Sussex Local Transport Plan (2011-2026)

D2.34 The third West Sussex Local Transport Plan (LTP3) (Ref 9) was published in February 2011 and sets out the transport strategy for the county for a 15-year period up to 2026. The document details transport proposals including improvements to the A27 trunk road network. Table D2.1 outlines the key points from the LTP3 and how the Proposed Development supports or complies with these.

Table D2.1 Policy review – LTP3 (2011-2026)

Policy content	Development support/ compliance
Part 1 of the LTP3 is about Long-Term Strategy. Section 1.4 is about Transport Modes in West Sussex. Within 1.4, section 1.4.1 discusses the Strategic Road Network (SRN). The document states the following: <i>“It is vital that strategic roads provide a good level of service to meet the objectives of this Plan and support our aspirations for the three economic areas in the County. [...] Securing delivery of significant new commercial and residential development is also crucial to achieve our objectives and dependent on an SRN that is capable of meeting these needs.”</i>	Improvement to junctions along the SRN were identified in the Arun Transport Study 2016 Stage 3 and The Enterprise Bognor Regis Transport Review 2017 reports. The financial contribution required from the allocated local plan development sites is set out in the WSCC/ADC Local Plan Transport Mitigation Apportionment Study (June 2020). The transport modelling of the junctions along the A27 demonstrates that the mitigation schemes improve the operation of the road network.
Part 2 of the LTP3 is the Implementation Plan, containing a section for each District council within the County. Section 2.2 is the Arun section, and the LTP3 states: <i>“To ensure that the regeneration aspirations of the coastal plain are delivered and the identified transport issues are addressed we will ensure that all new schemes and developments contribute, and support, in some way to the following:</i> <i>• increasing use of sustainable modes of transport</i> <i>• improving network efficiency in order to improve journey times and air quality</i> <i>• improving safety for all road users</i> <i>• discouraging HGVs from using unsuitable roads</i> <i>• improving accessibility between communities within the District”</i>	The Proposed Development would contribute towards transport mitigation measures and these would benefit both residents of the Proposed Development and the surrounding area. The sum payable would be discussed as part of the Section 106 negotiations.
Of the County’s aims for Arun, the most relevant to the Proposed Development are: All new development should provide enough secure cycle parking to meet the needs of the development and be within close proximity to public transport. Parking provision at new residential development should provide enough spaces to accommodate the expected number of vehicles at the site or provide measures such as car clubs which reduce the number of vehicles to match the space available. Safeguarding against traffic generated by new development resulting in the capacity of the highway network being exceeded, by including measures to encourage sustainable travel behaviour.	Car and cycle parking would be provided in accordance with the local policy. The detail of the layout and quantum of spaces would be included in the submissions for reserved matters applications. Discussions have been held with Stagecoach and a preliminary bus strategy has been discussed for the application site. Further discussion would be held post-application. A framework residential travel plan has also been prepared and will be submitted as part of the planning application.

West Sussex County Council: Guidance on Parking at New Developments (September 2020)

D2.35

The West Sussex County Council: Guidance on Parking at New Developments (September 2020) (Ref 10) replaces the County Council’s previous guidance: ‘Standards and Transport Contributions Methodology’ (2003) and ‘Guidance for Parking in New Residential

Developments' (2010). Each local planning authority will decide how to take forward parking policies.

D2.36

The principles set out the County Council's recommended approach to parking in new residential developments and should be used to inform the design of new developments.

- Principle A: Accommodating Parking Demand: Parking provision should be sufficient to accommodate parking demand while exploiting the potential for sustainable travel, minimising adverse effects on road safety, and avoiding increased on-street parking demand.
- Principle B: Electric Vehicle Charging Infrastructure: 'Active' charging points for electric vehicles should be provided at a minimum of 20% of all parking spaces with ducting provided at all remaining spaces where appropriate to provide 'passive' provision for these spaces to be upgraded in future.
- Principle C: Sustainable Transport: In some locations, limiting parking provision should form part of a strategy to exploit the potential for sustainable transport.
- Principle D: Traffic Regulation Orders: In some circumstances, it may be necessary to regulate on-street parking to manage or mitigate the impact of development. If Traffic Regulation Orders (TRO) are required, developers will be expected to fund administration and works costs.
- Principle E: Design Considerations: Good parking design is as important as providing the appropriate number of spaces. Therefore, developers will be expected to provide balanced, mixed, and flexible parking provision and ensure that all spaces are useable without creating highway safety issues such as vehicles overhanging footways.
- Principle F: Sustainable Drainage: Parking areas should adopt sustainable drainage systems (SuDS) to minimise the risk of flooding in the County, as part of a drainage strategy for the development.

D2.37

Section 4.14 of the Guidance provides information on the cycle parking policy, and Table 1 from the report is shown below.

Figure D2.1 Minimum levels of cycle provision

Table 1: Minimum levels of cycle provision

Type	Dwelling Size	Cycle Provision (per unit)
Houses	Up to 4 rooms (1 & 2 bed)	1 space
Houses	5+ rooms (3+ bed)	2 spaces
Houses	Multiple Occupation	1 space
Flats	Up to 3 rooms (1 & 2 bed)	0.5 space (if communal storage otherwise same as 1 & 2 bed house)
Flats	4+ rooms (3+ bed)	1 space

Source: WSCC: Guidance on Parking at New Developments (September 2020)

D2.38

Section 5.2 of the Guidance sets out the different parking requirements based on number of bedrooms and the parking behaviour zone (PBZ), and Table 2 from the report is shown below. The Proposed Development is located in PBZ2, and therefore the standards in the appropriate column of Table 2 would need to be applied. The details of car parking layout would be dealt with as part of reserved matters applications.

Figure D2.2 Residential Parking Demand (spaces per dwelling)

Table 2: Residential Parking Demand (spaces per dwelling)

Number of Bedrooms	Number of Habitable Rooms	PBZ1	PBZ2	PBZ3	PBZ4	PBZ5
1	1 to 3	1.5	1.4	0.9	0.9	0.6
2	4	1.7	1.7	1.3	1.1	1.1
3	5 to 6	2.2	2.1	1.8	1.7	1.6
4+	7 or more	2.7	2.7	2.5	2.2	2.2

Source: WSCC: Guidance on Parking at New Developments (September 2020)

West Sussex Walking and Cycling Strategy 2016 to 2026

- D2.39 The West Sussex Walking and Cycling Strategy 2016 to 2026 (Ref 11) strategy outlines the objectives for cycling and walking between 2016 and 2026, and the design and safety principles for walking and cycling. The strategy also provides a mechanism by which schemes can be identified and prioritised, thereby enabling the County Council to direct future investment (such as contributions from future development) and support future funding bids.
- D2.40 The following design principles are noted as being applicable to infrastructure design:
- Cycling and walking are recognised as a key part of the transport mix.
 - All new (development) and improvement / maintenance schemes will consider, and wherever possible prioritise, the needs of cyclists and walkers.
 - The differing needs of users will be recognised in the design of routes and those needs will, wherever possible, be incorporated e.g. people with pushchairs, equestrians, etc.
 - Deliver sound economic and other benefits.
- D2.41 More recent discussions with WSCC as part of the progression of the Transport Assessment has determined that cycling infrastructure should consider the requirements of LTN 1/20, which is the Department for Transport's latest design guidance for local authorities on cycling infrastructure. This sets out the requirements in terms of lane widths and facility type etc.
- D2.42 In addition, it is noted that the WSCC strategy considers the following categories for infrastructure improvements:
- Segregated inter-community routes that connect places and are designed primarily for utility journeys e.g. commuting and accessing facilities.
 - Off road and / or less busy inter-community routes that enable access to and through the countryside and are designed primarily for leisure.
 - Routes and facilities in built up areas which are designed primarily to:
 - a re-allocate road space and improve safety at junctions on key distributor roads and public transport hubs;
 - b manage traffic speeds (where appropriate with 20mph limits), through traffic and safety at junctions in residential streets;
 - c create safer links to encourage sustainable journeys in particular travel to and from schools, employment sites, leisure destinations and transport hubs; and
 - d Encourage use of public transport (e.g. providing cycle parking).

- D2.43 The Proposed Development's transport strategy includes the provision of cycle infrastructure alongside the realigned A29 and within the application site.

Local Policy

Arun District Council Local Plan 2011-2031 (2018)

- D2.44 The Arun Local Plan 2011-2031 (Ref 12) was adopted in July 2018 and covers the period 2011-2031 for the area of Arun District, excluding the area covered by the South Downs National Park Authority. The purpose of the Local Plan is to encourage sustainable development and manage future growth whilst ensuring that change across the District is appropriate to meet local need.
- D2.45 The Local Plan states that it will support the strategic provision of homes, employment and shops and will look to ensure that these are carefully co-ordinated with the services and facilities that communities rely on and which are essential to wellbeing and quality of life.
- D2.46 The vision for the District stated in the Local Plan is that by 2031 Arun will be a safer, more inclusive, vibrant and attractive place to live, work and visit. Arun's residents will be healthier and better educated, with reduced inequalities between the most and least affluent.
- D2.47 In order to achieve this vision, a number of strategic objectives are set out in the Local Plan. These are summarised in Table D2.2.

Table D2.2 Policy review – Arun District Council Local Plan 2011-2031 (2018)

Policy content	Development support/ compliance
To strengthen Arun's economic base and provide local job opportunities by increasing, diversifying and improving the quality of employment within the District through the provision of appropriate employment sites, better infrastructure including road access, quality affordable accommodation and the development of business support and partnerships.	The Proposed Development would support improved road access.
To reduce the need to travel and promote sustainable forms of transport	The Proposed Development north of the railway also includes a 3FE primary school and local centre to provide local convenience and community services. These are considered to be within walking distance of the homes in the Proposed Development and therefore reduce the need to travel by car.
To plan and deliver a range of housing mix and types in locations with good access to employment, services and facilities to meet the District's housing requirements and the needs of Arun's residents and communities both urban and rural, ensuring that issues of affordability and the provision of appropriate levels of affordable housing are addressed while supporting the creation of integrated communities	The Proposed Development will secure a range of housing types.
To promote strong, well integrated and cohesive communities, through the promotion of healthy lifestyles, provision of good quality accessible community facilities and a safe environment, which delivers an enhanced quality of life to all.	The Proposed Development includes an extensive walking and cycling network.

Policy content	Development support/ compliance
This includes meeting the needs of a growing elderly population	

- D2.48 In Part 2 of the Plan, Sustainable Place, Chapter 6's Policy SD SP1: Sustainable Development sets out the overall approach to development in the District, in line with national policy, thus:
- "When considering development proposals the Council will take a positive approach that reflects the presumption in favour of sustainable development contained in the National Planning Policy Framework. It will work pro-actively with Applicants to jointly find solutions which mean that proposals can be approved wherever possible and to secure development that will contribute to the social, economic and environmental conditions south of the National Park through to the coast and throughout its settlements (both coastal and inland). This presumption will not be applicable where development requires an Appropriate Assessment or where consideration of the need for one is being undertaken."*
- D2.49 The Applicant has worked extensively with ADC and briefed members on the scheme via an Advisory Group. The scope of the Transport Assessment has been discussed and agreed with WSCC and Highways England and the outcomes of the traffic modelling are discussed later in this report.
- D2.50 In Part 4 of the Local Plan, Living Place, the Chapter on Housing Delivery (Chapter 12) discusses Strategic Housing planning and delivery. Chapter 12's section on Housing Supply states in Paragraph 12.1.5:
- "The final policy target takes account of the objectively assessed housing need (OAN) and some housing for other authorities to meet the Duty to Cooperate. Housing supply is stepped across the plan period to match the planned delivery of sites. There are targets for each five-year period in policy H SP1 but these deliver the whole plan target of at least 20,000 homes by 2031."*
- D2.51 A number of strategic urban extensions are included within the Local Plan, which includes the Barnham Eastergate Westergate application site under policy H SP2c, as strategic allocation SD5 Barnham/Eastergate/Westergate. This is allocated to provide at least 2,500 residential units over the plan period.
- D2.52 There are also additional policies within the Arun Local Plan which are of relevance to the Barnham Eastergate Westergate development from a transport perspective. These are summarised in Tables D2.3 to Table D2.5.

Table D2.3: Policy review – Arun District Council Local Plan 2011-2031 (2018) Policy DM1 (Design)

Policy content	Development support/ compliance
Policy D DM1 (Design) Movement – <i>"Utilise existing networks or improve access via delivery of a variety of integrated networks, to and from residential areas, commercial zones, open spaces, facilities and public transport. Development schemes should carefully consider walking and cycling as an integral part of the overall design concept."</i>	Walking and cycling has been considered in the development. PROW through the application site will be accommodated and improved as part of the Proposed Development. The realigned A29 will be designed to accommodate a bus route.

Table D2.4: Policy review – Arun District Council Local Plan 2011-2031 (2018) Policy SP1 (Transport)

Policy content	Development support/ compliance
Policy T SP1 (Transport)	The Proposed Development includes a mix of land uses, walking and cycling

Policy content	Development support/ compliance
Policy T SP1, on transport and development, within Chapter 15 outlines some requirements which new transport and development must meet in order to receive council support, namely that development: • <i>“Is designed to reduce the need to travel by car by identifying opportunities to improve access to public transport services and passenger transport services whilst making provision for safe access to the highway network through improvements to the existing road network and the promotion of vehicles which use low-carbon energy.</i> • <i>Is incorporated into the District's green infrastructure network and gives priority to pedestrian and cycle movements.</i> • <i>Protects committed and indicative lines of major road schemes from development and, where applicable, contributes towards new road schemes which improve north-south links between Bognor Regis and Littlehampton and the A27, to ensure that they are delivered in line with strategic growth in the District.</i> • <i>Incorporates appropriate levels of parking in line with West Sussex County Council guidance on parking provision and the forthcoming Arun Design Guide taking into consideration the impact of development upon on-street parking.</i> • <i>Is supported by an effective and deliverable Transport Assessment which demonstrates that the transport effects of development on the local and strategic road network can be satisfactorily mitigated and a Travel Plan, which is effective and deliverable.</i> • <i>Explains how the development has been designed to:</i> - i <i>accommodate the efficient delivery of goods and supplies;</i> - ii <i>give priority to pedestrian and cycle movements and have access to high quality public transport facilities;</i> - iii <i>create safe and secure layouts for traffic, cyclists and pedestrians whilst avoiding street clutter;</i> - iv <i>incorporate facilities for charging electric and plug-in hybrid vehicles (where charging facilities are to be omitted from the development, evidence of market demand and viability must be provided); and</i> - v <i>consider the needs of people with disabilities by all modes of transport.”</i>	infrastructure, and a spine road that could accommodate a bus route. The design and access statement provides additional information on the application site layout. The PROW through the application site would be maintained and upgraded as part of the Proposed Development and cycle infrastructure would be provided alongside the realigned A29 through the application site. Car and cycle parking would be provided in line with WSCC and ADC requirements. The detail of these would be considered during reserved matters applications. This Transport Assessment demonstrates that the transport impacts can be appropriately mitigated.

Table D2.5: Policy review – Arun District Council Local Plan 2011-2031 (2018) Policy DM1 (Sustainable Travel and Public Rights of Way)

Policy content	Development support/ compliance
Policy T DM1, on Sustainable Travel and Public Rights of Way, also located within Chapter 15, states that: “New development must ensure ease of movement, prioritising safe pedestrian and cycle access to the green infrastructure network and access to public transport and community transport services where a need has been identified. Access to alternative modes of transport including public transport services, the public right of way and cycle networks, must be available and accessible to all members of the community.” It also states that proposals for new developments must: “Be located within easy access of established public transport service(s), existing pedestrian and cycle networks, the committed and aspirational cycle networks and the green infrastructure network which links the development with key destinations including places of work, education, leisure and town centres; - Where applicable, contribute to the extension of public transport services to serve the development and community transport services to ensure that a wide range of transport services are available to all residents; - Make provision for cycling and pedestrian facilities to meet the County Council Parking Standards, including cycle storage, convenient and secure cycle parking in association with retail and educational uses and sufficient secure parking and changing/showering facilities at places of work; - Contribute towards the provision of a joined up cycle network and Public Rights of Way network, taking into account the aspirational cycle network, which provides convenient, accessible, safe, comfortable and attractive routes for pedestrians and cyclists and; where appropriate, horse riders, both within the development and in the form of links between the development and; places of work, education, leisure and food retail; the South Downs National Park, along the coast particularly between Bognor Regis and Littlehampton, along the coast to Chichester, Bognor Regis to Arundel, and Littlehampton to Goring.”	The Proposed Development includes a mix of land uses, walking and cycling infrastructure, and the realigned A29 that could accommodate a bus route. The design and access statement provides additional information on the application site layout. The PROW through the application site would be maintained and upgraded as part of the Proposed Development and cycle infrastructure would be provided alongside the realigned A29 and through the application site. Car and cycle parking would be provided in line with WSCC and ADC requirements. The detail of these would be considered during reserved matters applications.

Arun District Council – Parking Standards Supplementary Planning Document (January 2020)¹

D2.53

In October 2018, West Sussex County Council consulted upon the 'West Sussex County Council Guidance on Parking at New Developments May 2019' (WSCC GPND). The purpose of this document was to provide guidance across the County on parking standards and to update the standards that were adopted in 2010.

¹The ADC Parking Standards SPD was officially adopted at the Full Council meeting of 15th January 2020.

D2.54 Arun District Council prepared a Supplementary Planning Document (SPD) for Arun District which was adopted in January 2020 and will be used in the determination of planning applications. This SPD takes the WSCC Guidance on Parking at New Developments (GPND) approach to parking standards with the exception that:

- Standards for electric vehicle provision take a hybrid approach using both the Arun Electric Vehicle Infrastructure Study (2017) requirements alongside the WSCC GPND approach.
- Rounded figures are given in table 3.1 of the study 'Expected level of provision for new residential developments'.
- Lower stepped percentage electrical vehicle charging points requirements are required from 2018 to 2030 but include 100% provision of active electric charging facilities target by 2033.
- Cycle provision rounded from 0.5 to 1 space for flats with up to 3 rooms (1 & 2 bed).

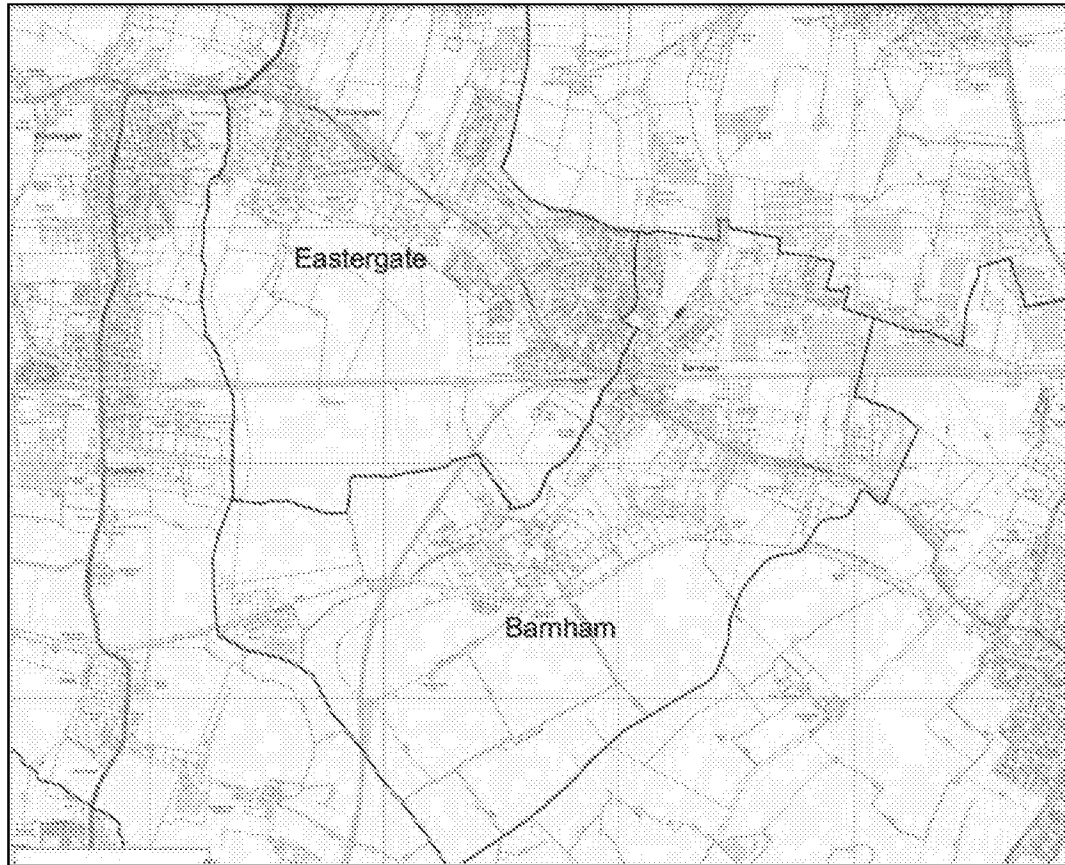
Barnham & Eastergate Neighbourhood Development Plan (2014-2029)

D2.55 The Barnham & Eastergate Neighbourhood Development Plan was passed by referendum in May 2014 for the Plan period of 2014-2029.

D2.56 The Neighbourhood Plan is under review as of 2019 due to becoming out of date, however no recommendations for amendments or adjustments have been presented publicly yet.

D2.57 The image below (Figure D2.3) indicates a section of the Neighbourhood Plan's coverage.

Figure D2.3 Section of Barnham & Eastergate Neighbourhood Plan Map



- D2.58 Chapter 2.5 of the Neighbourhood Plan's evidence section, on Getting Around, is most relevant of the evidence chapters to the Proposed Development and its integration into existing transport networks.
- D2.59 The villages of Barnham and Eastergate are characterised by *"compact, walkable areas but further out there are poor links and villagers are very reliant on their cars. Around 23% of residents travel between five and ten kilometres to work. The two most significant transport features of the Barnham & Eastergate parishes are the Network Rail mainline station and the B2233 road."*
- D2.60 In terms of rail, Paragraph 2.5.1. states that *"Barnham station is a hub for Network Rail and Southern Railway. It provides direct commuter links to London, Chichester, Southampton, Brighton and beyond. The station serves Barnham and Eastergate and the other villages in the area (from Climping through to Aldingbourne), some 25,000+ residents."*
- D2.61 More space is devoted to discussion of traffic and local roads, such as *"The B2233 carries local traffic between the villages and links the A259 (Littlehampton bypass) and to the A27 trunk road (Chichester). It is a direct shortcut for significant through traffic avoiding the longer, circuitous routes via Arundel and Bognor Regis. Traffic levels, over 7000 vehicles per day, are greater than the north/south flow along the A29 Fontwell Avenue."*
- D2.62 Discussion of the B2233 Barnham Road includes mention that *"Pavements are limited and pedestrians and vehicles pass closely, particularly near the schools, shops and the south from the railway bridge/underpass. [...] There have been several accidents and there is anecdotal*

evidence of frequent “near misses”. Residents’ concerns are that new developments will increase the danger from traffic and worsen the queuing, whilst road safety improvements are needed.”

D2.63 The Plan briefly mentions parking in the villages and bus access before going on to talk about Footpaths and Cycleways at Paragraph 2.5.5:

“Walking is an everyday part of village life. There is an existing network of pavements, footpaths, bridleways and a cycle trail linking Felpham to Barnham and Eastergate that provide good travel round the villages and increasing access to farmlands for cyclists and walkers. These are all heavily used and well supported by both residents and visitor alike. Residents would like to see further foot and cycle access to the countryside.”

D2.64 In Chapter 6, Getting Around, Policies GA1 to GA5 could affect the Proposed Development.

D2.65 With the objective to “*Improve transport infrastructure and efficiency*”, Policy GA1 on Connection to Sustainable Transport states that:

“New developments should integrate with the current green infrastructure network and provide access to public and community transport, to connect with the social, community and retail facilities of the villages.”

D2.66 The explanatory notes in Paragraphs 6.1.1. and 6.1.2. state that:

- *“Connections within and between the villages are important as they share a range of community facilities such as shops, medical facilities and schools. More than that the social fabric of life in the villages revolves around movement along the B2233 and any reduction in traffic on this route must be encouraged.*
- *Where possible, signage will be improved to encourage a high level of the green infrastructure network. And improvements to public and community transport will be encouraged, particularly in view of the age profile of local residents and the need for traffic reduction.”*

D2.67 With the objective to “*Improve footways, footpaths and cycleways and promote the use of walking and cycling routes*”, Policy GA2 on Footpath and cycle path network states that:

- *“Support will be given to proposals that improve and extend the existing footpath and cycle path network, allowing greater access to new housing, the village centres, green spaces and the open countryside. The loss of existing footpaths and cycle paths will be resisted.”*

D2.68 The explanatory notes in Paragraphs 6.1.3. and 6.1.4. state that:

- *“There is much movement around the two villages and reasonable access to the surrounding countryside, but improving the network of footpaths and cycle paths would encourage walking and cycling. If this could be more safely achieved there would be health benefits as well as a reduction in traffic levels.*
- *Opportunities to provide cycle hire at Barnham Station will be encouraged.”*

D2.69 With the same objective, Policy GA3 on Contributions to maintain and improve the network states that:

- *“Funds raised from the Community Infrastructure Levy (CIL) will be put towards the costs of maintaining and improving the network of footpaths and cycle paths. Developer contributions towards those costs will be sought in appropriate cases.”*

- D2.70 With the objective to “*Improve car parking*”, Policy GA4 on Parking and new development states that:
- “*Development proposals will be supported only if they include the maximum level of offstreet[sic] parking consistent with the current standards under the Local Plan. Developments that reduce the amount of off-street parking currently available will only be supported if they make enforceable provision for equivalent off-street parking nearby. Parking spaces provided in connection with such proposals will be required to be made available in perpetuity*”
- D2.71 And with the same objective, Policy GA5 on Commuter parking states that:
- “*Proposals that increase the use of railway land to expand affordable commuter parking will be supported.*”
- D2.72 The explanatory notes in Paragraph 6.2.1. state that:
- “*Car parking in the villages is at breaking point. The major commuter rail link in Barnham sees huge numbers of vehicles arrive every day from outlying towns and villages which clog up the village centre and all adjoining roads on both a short and long term basis.*”

Other background transport reports

A29 Realignment Transport Business Case (April 2019)

- D2.73 There is an ongoing proposal to realign a section of the A29 to a new location, approximately 1km east of its current routing through Woodgate. The realignment will unlock the Barnham Eastergate Westergate site (the proposed application site) for large-scale residential development by opening up new highway capacity.
- D2.74 The reason given for the realignment is “*the existing A29 currently experiences traffic congestion during peak periods, especially at the Woodgate level crossing. This has led to unreliable journey times and queuing vehicles, affecting air quality,*”² according to the February 2020 update on the West Sussex County Council website.
- D2.75 The length of the completed road will be approximately 4.34km and will be delivered in two phases. The first phase will be a road leading from the existing A29 to the north side of the Barnham Road, and the second phase will be from the south side of the Barnham Road, leading south through currently arable farmland, and curving back west to meet the existing A29 again. The second phase is that which is submitted in detailed form in this planning application.
- D2.76 The Transport Business Case states that in total, “*the A29 Realignment will support the delivery of around 11,400 new dwellings and 104,000sqm of commercial development on permitted or planned development sites in this part of Arun District.*”
- D2.77 It also claims that the three existing problems of:
- “*Congestion - during the peak periods, notably at the Woodgate level crossing and War Memorial junctions;*
 - *Journey time unreliability - at busy times, journey times can vary considerably during peak periods, making it difficult for road users to predict the time needed for their journeys; and*
 - *Road Accidents – experienced along the entire A29 route particularly at locations such as the Lidsey Bends*

² February 2020 update on the West Sussex County Council website

would all worsen in the “Do Nothing” future scenario, i.e. if the A29 does not get realigned. In contrast, all three problems are alleviated if the road is realigned, allowing future development to occur on the Strategic Sites surrounding the A29.”

WSCC/ADC Local Plan Transport Mitigation Apportionment Study (June 2020)

- D2.78 In early 2019, WSP was commissioned by West Sussex County Council (WSCC) in partnership with Arun District Council, to review and update the apportionment of development traffic impacts upon the strategic transport mitigation schemes identified in the Arun Transport Study 2016 and Enterprise Bognor Regis Transport Review 2017. This resulted in the WSCC/ADC Local Plan Transport Mitigation Apportionment Study (June 2020) (Ref 14).
- D2.79 The study concluded that developments within the Barnham Eastergate Westergate Strategic Allocation would be expected to contribute towards the following schemes:
- A27 Nyton Road junction
 - A27 Fontwell East Roundabout
 - Barnham Village Centre Enhancements
 - A29 Realignment
 - A259 Oystercatcher junction
 - A259 Corridor Improvement Bognor Regis-Littlehampton
- D2.80 The total level of contribution for the allocation expected by ADC and WSCC is set out in the apportionment study. Given the Proposed Development is part of a wider site allocation with other landowners, the costs stated in the apportionment study would be apportioned across developments within the allocation. This would be undertaken as part of the Section 106 negotiations.

Arun Transport Study 2016 Stage 3 report

- D2.81 The Arun Transport Study 2016 Stage 3 report (ATS) (Ref 15) examined a series of development sites to inform refinement of the local plan. The Barnham Eastergate Westergate Strategic Allocation was included in the technical analysis undertaken and the highway schemes identified as mitigation are understood to be those used in the apportionment study. The mitigation schemes are discussed where appropriate in the junction modelling chapter of the Transport Assessment.

The Enterprise Bognor Regis Transport Review 2017

- D2.82 The 2017 Enterprise Bognor Regis (EBR) Transport Review (Ref 16) built upon work initially undertaken as part of both the EBR Transport Assessment (2015) and the ATS. This included an update of the modelling assumptions and enhancements to the model detail in the EBR area. The relevance to this assessment is that WSCC advised that the scheme identified in the EBR Transport Review report for the A27 Whyke Roundabout should be considered the mitigation scheme for the junction.

WSCC Comet Corner and Oystercatcher Report December 2019

- D2.83 The WSCC Comet Corner and Oystercatcher Report December 2019 (Ref 17) was written by WSP. WSP was commissioned by West Sussex County Council (WSCC), to provide highway, transport consultancy services, assessment and provision of highway concept design for the A259 Road junctions with B2132 Yapton Road (Comet Corner) and the B2233 Climping Street

(Oystercatcher). The outcome of this study was a mitigation scheme for the Oystercatcher junction, and this has been considered in the Transport Assessment.

West Sussex Cycling Design Guide August 2019

- D2.84 The County Council adopted the West Sussex Walking & Cycling Strategy 2016-2026 (Ref 18) as an integral part of the West Sussex Transport Plan 2011-2026. This cycle design guide was prepared to help deliver the aims and aspirations of the strategy.
- D2.85 It is noted that the document is intended to be a 'live document' and be updated when required. However, discussions with WSCC highways officers determined that LTN 1/20 should also be a point of reference when designing cycle infrastructure. This sets out the requirements in terms of lane widths and facility type etc.

D3.0 **Assessment Methodology & Significance Criteria**

Assessment Scope

Introduction

D3.1 The following section outlines the methodologies applied to identify and assess the net impact of the Proposed Development, as summarised below:

- The baseline section sets out existing transport conditions at the application site. This allows the identification of the net effect of the proposed development on the surroundings.
- The proposed development and potential effects are then set out.
- Mitigation measures have been identified as part of the Transport Assessment (Appendix D1), where appropriate, to avoid, reduce or offset any adverse effects.
- A summary of the likely significant residual effects of the development will follow in the document, having regard to any remaining effects after the mitigation is in place.

D3.2 The assessment presented takes into account the legislative and policy context detailed above, both directly and through the scoping process described below. It is informed by current and best practice, including that evolved from the Institute of Environmental Assessment (IEA) document 'Guidance Notes No. 1: Guidelines for the Environmental Assessment of Road Traffic', 1993 (Ref 7).

Baseline Sources and Surveys

D3.3 The main baseline source is the updated WSCC A29 CATM model operated by WSP. WSCC has a strategic traffic model (operated by WSP) for the study area, known as the Chichester Area Transport Model (CATM). The CATM is a SATURN model and was recently updated to inform the business case for the A29 realignment scheme which was completed in April 2019. This model was updated by WSP on behalf of WSCC for use to inform the assessment of the Proposed Development. Henceforth in this report this is referred to as the "updated WSCC A29 CATM model (operated by WSP)".

D3.4 The updated WSCC A29 CATM model (operated by WSP) was used as the source of the operational year vehicle trip rates, generation and distribution, and the outputs in the form of per-link flows and junction turning counts have been used throughout this ES Chapter.

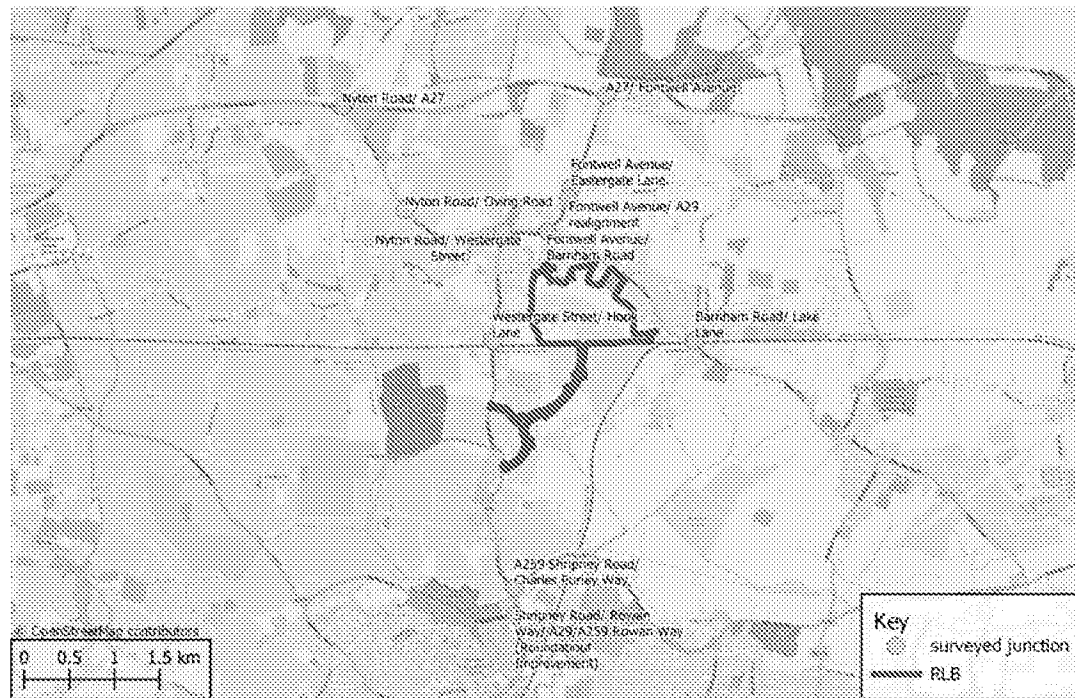
D3.5 The turning counts have been inputted into individual Junctions 9 / LinSig models, which gives assessments of junction capacity. To calibrate the models, a selection of surveys were undertaken in November 2019. These surveys included manual classified counts, automatic traffic counts and queue length surveys. Junctions included in the manual classified counts and queue length surveys are listed below and in Figure D3.1.

Table D3.1: Junctions surveyed

Junction name
A27/ A259/ Vinnetrow Road (Bognor Road Roundabout)
A259/ B2144 Drayton Lane
Vinnetrow Road/ B2166/ Mill Lane
B2166/ Pagham Road
A259/ Elbridge Avenue/ B2259

Junction name
A259/ Rowan Way
B2259/ North Bersted Street/ Chalcraft Lane
West Meads Drive/ Chalcraft Lane
Chalcraft Lane/ Hewarts Lane/ B2166
West Meads Drive/ Hawthorn Road/ B2166/ Aldwick Fields
B2166/ Aldwick Fields
A259 Shripney Road / Charles Purley Way
Shripney Road / Rowan Way / A29 / A259 Rowan Way

Figure D3.1: Locations of Junctions Surveyed



- D3.6 Other data sources collated to inform the assessment include mapping information (Ordnance Survey and Open Street Map), public transport operator information and publicly-available highway injury-accident records (STATS19) (Ref 19). Certain mode splits have been calculated using the industry-standard TRICS trip rate database.

Assessment scenarios

- D3.7 Assessment of the effect of the Proposed Development was made by comparing pairs of future scenarios; one in which the development is assumed not to occur, and one in which it is delivered. These are described as “Do Minimum” and “Do Something”, respectively. The difference between the scenarios allows the identification of the net effect of the Proposed Development, and in the context of the wider changes expected in the area.
- D3.8 The scope of the modelling assessment was discussed and it was agreed with WSCC that forecast years of 2031 and 2038 would be used. 2031 was chosen because it is the end of the Local Plan period, and 2038 had already been chosen as the forecast year for the A29 realignment business case, therefore model data was available.

- D3.9 This is considered appropriate for the Proposed Development as it shows the effect of the full residential and commercial development comprised Proposed Development after completion in 2033, and the effect of the fully realigned A29 after completion in 2038. This means that the assessment years does not assess the individual impacts of construction phases 1, 2 and 3. However, as mentioned previously, the assessment years were agreed with WSCC as being robust and acceptable for the Proposed Development. For a detailed explanation of the phases, see the Chapter C of this ES document. For clarity, the 2031 assessment only includes the northern sections of the new A29 (sections north of the railway).
- D3.10 For the purposes of this assessment, a base year of 2017 is used for comparison with the future years. 2017 was chosen because it is the year of calibration for the updated WSCC A29 CATM model (operated by WSP), and therefore model data is available.
- D3.11 The scenarios assessed are listed below:
- **Base year 2017:** updated WSCC A29 CATM model (operated by WSP) base year (validation year for strategic model) (A surveyed base year of 2019 was used for the purposes of calibrating junction modelling only).
 - **Do minimum 2031:** background growth + committed developments + wider infrastructure changes + other local plan developments and associated infrastructure
 - **Do something 2031:** background growth + committed developments + wider infrastructure changes + other local plan developments and associated infrastructure + BEW development (scope of this outline application) + BEW infrastructure (section of the A29 north of the railway)
 - **Do minimum No Cala 2031:** background growth + committed developments + wider infrastructure changes + other local plan developments and associated infrastructure, no Cala development and no east-west link connection
 - **Do something No Cala 2031:** background growth + committed developments + wider infrastructure changes + other local plan developments and associated infrastructure + BEW development (scope of this outline application) + BEW infrastructure (section of the A29 north of the railway) but no Cala development and no east-west link connection
 - **Do minimum future year 2038:** background growth + committed developments + wider infrastructure changes + other local plan developments and associated infrastructure
 - **Do something future year 2038:** background growth + committed developments + wider infrastructure changes + other local plan developments and associated infrastructure + BEW development (whole allocation) + BEW infrastructure (full extent of the realigned A29)
- D3.12 The assessment time periods were agreed with WSCC based on the principles of assuring a consistent assessment across the network and utilising the most robust assessment hours (in terms of the busiest hours of the day), and the constraint of the existing model calibration hours in the updated WSCC A29 CATM model (operated by WSP). These are:
- Weekday AM peak (8am to 9am)
 - Weekday PM peak (5pm to 6pm)
- D3.13 The updated WSCC A29 CATM model (operated by WSP) output numbers were inputted into standalone junction models to assess the operation and capacity of junctions within the agreed scope. The scope was agreed with WSCC, based on the location of the application site, proximal junctions, and junctions listed for improvement in the Arun Transport Study. Afterwards the scope was expanded to include additional junctions requested by Highways England. The

baseline for junctions, where data was not collected as part of surveys undertaken in 2019, was constructed from existing third-party planning application surveys.

- D3.14 The standalone assessments use the Transport Research Laboratory's (TRL) PICADY and ARCADY junction modelling modules, contained within the JUNCTIONS 9 package, and JCT Consultancy computer modelling package LinSig 3.2. The models were calibrated using the 2019 surveys (mentioned above) and the future year sources were derived wholly from the updated WSCC A29 CATM model (operated by WSP).

Methodology

Assessment of Construction Effects

- D3.15 The effects of construction related to methodology and phasing are discussed in the construction chapter of this ES (Chapter C).
- D3.16 The effects of construction are assessed through professional judgement. The effects being assessed are traffic volume, HGV volume, and closure to footways. The scale and volume of construction traffic is likely to be significantly less than the traffic of the completed development, so this chapter focuses on the latter. Additionally, the effects of construction are temporary, and last only for the length of time the construction phases are ongoing.

Assessment of Operational Effects

Local Highway Network and Existing Traffic

- D3.17 Effects on the local highway network due to traffic changes were assessed in the context of the individual assessment items. The anticipated effects of any traffic changes will be considered in detail through modelling, rather than a pure assessment of numerical change as is IEMA Guidance.
- D3.18 Annual Average Daily Traffic (AADT) and Annual Average Weekday Traffic (AAWT) counts are a recognised format used to compare numbers consistently across assessment years.
- D3.19 AADTs, AAWTs, HGV traffic proportions and speed data, were calculated by WSP from the traffic data in the updated WSCC A29 CATM model (operated by WSP).
- D3.20 Effects on the road network are quantified in this chapter in terms of junction effects (see below) as these are generally the determinant of the quality of network operations.

Pedestrian Movement, Capacity and Delay

- D3.21 Pedestrian movement, capacity and delay has been assessed through a desktop study, in conjunction with professional judgement based on the industry-standard TRICS database and mode share estimates produced as part of the Transport Assessment.

Pedestrian Severance, Fear and Intimidation

- D3.22 Pedestrian severance, fear and intimidation are measured using traffic flows.
- D3.23 For severance, the 2031 Do Minimum AADT flows were compared to the 2031 Do Something AADT flows. This is in order to isolate the effect of the Proposed Development in terms of percentage increase (or decrease).
- D3.24 The 2017 AAWTs are stated in Chapter D4.0 for reference only, as they are not used in the comparison forming the assessment (which focuses on a comparison between the forecast year do minimum and do something scenarios).

- D3.25 The IEMA Guidelines are referenced to assess any increase in fear and intimidation (due to traffic changes). For each link, AAWTs for all traffic, HDVs and mean speeds are compared for the relevant scenarios. The assessment considers the links where there is a change in the category of effect due to the proposed development.

Cycling Facilities

- D3.26 The effect upon cycle facilities and public transport (bus and rail networks) will be assessed using professional judgement. The existing cycle facilities have been determined through site observation and desktop study. The potential number of additional cyclist movements has been calculated as a part of the trip generation exercise for the Proposed Development using the industry-standard TRICS database and mode share estimates, and compared against the cycle network and planned provision.

Public Transport

- D3.27 The potential effect of the development on public transport services has been assessed by calculating the likely additional number of passengers for both the AM peak hour and the PM peak hour.

Junction Capacity and Delay

- D3.28 Junction assessments were undertaken using industry-standard junction modelling tools (LinSig for signalised junctions, and Junctions 9 for roundabout/priority junctions) to determine capacity, operations and the anticipated changes due to the Proposed Development.

Road Traffic Accident and Safety Data

- D3.29 Data for road traffic accidents resulting in personal injury ('accident data') for the roads surrounding the application site has been obtained and assessed qualitatively using professional judgement to establish any trends in causation factors.

Significance Criteria

General

- D3.30 The assessment process identifies the potential effects pre-mitigation that may arise as a result of the development and appropriate mitigation measures to reduce any identified effects. The changes (i.e. the likely significant residual effects) that are predicted to take place to affect the existing condition of the environment as a result of the construction and operation of the Proposed Development have also been considered.
- D3.31 Guidance provided by the Institute of Environmental Management and Assessment (IEMA) and the Department for Transport (DfT) have been consulted in order to identify the significance criteria applicable to the assessment. For a number of residual effects, there are no established thresholds of significance, in which case interpretation and professional judgement will be applied based on prior knowledge of the application site or quantitative data where available. The approach to each is described in the following sections.
- D3.32 In the assessment of transport effects, 'significance' often arises where the effect of a development causes infrastructure demand to approach or exceed the capacity available. With regard to roads this may relate to link capacity, or as is more common, junction capacity. More widely, public transport capacity, pedestrian infrastructure capacity and cycle infrastructure effects may be of concern.
- D3.33 The magnitude for assessing an effect is characterised as either:

- **Major** – Total loss or major/substantial alteration to key elements / features of the without development conditions, such that due to the Proposed Development, character / composition / attributes will be fundamentally changed. These effects will usually be of measurable effect and may be expected to have a substantive impact on the capacity and / or capability of existing / proposed infrastructure;
- **Moderate** – Loss or alteration to one or more key elements / features of the without development conditions such that due to the Proposed Development, character / composition / attributes will be materially changed. These effects will usually be of measurable effect and may be expected to have a noticeable impact on the capacity and / or capability of existing / proposed infrastructure;
- **Minor** – A minor shift away from without development conditions. Change arising from the loss / alteration will be discernible / detectable but not material. The underlying character / composition / attributes of the without development condition will be similar to the without development circumstances / situation. These effects will usually be of measurable effect but would be expected to be substantially within the capacity and / or capability of existing / proposed infrastructure; or,
- **Negligible** – Very little or nil change from without development conditions. Change barely or not distinguishable, of no consequence, being or approximating to a 'no change' situation. Effects would be within the range of daily variation.

D3.34 In EIA terms, the Proposed Development is required to provide mitigation for any 'significant effect'. A 'significant effect' here means '**moderate**' or '**major**' using the categories immediately above. Any other effect may be mitigated, but this is not required.

D3.35 Transport effects may be either beneficial or adverse, and may apply in the short, medium or longer terms:

- Beneficial effect – One that is generally considered a positive aspect for users, receptors and/or the environment, such as a reduction in motor vehicle traffic or an improvement in the sustainability of transport undertaken;
- Adverse effect – One that is generally considered to be a negative aspect for users, receptors and/or the environment, such as an increase in motor vehicle traffic or a degradation in the accessibility of a site;
- Short term – Of limited (i.e. temporary) duration that does not last for a majority of the period of construction (i.e. substantively less than 5 years);
- Medium term – Of limited (i.e. temporary) duration in the order of the majority (or all of) the period of construction (i.e. in the order of 5 to 10 years); or,
- Long term – Of indefinite (i.e. > than 10 years or permanent) duration, i.e. extends beyond the period of construction and can be considered either practically or actually permanent.

Specific criteria

Significance Criteria: Effects during construction

D3.36 Effects due to construction are assessed on the basis of professional judgement and experience of comparable developments of similar scales and land use mixes. Assessment items include the effects of the delivery of the accesses to the application site itself and the consideration of the effect of construction traffic on the local and wider area.

D3.37 In this case, determining significance involves the physical and operational effects of the construction of the realigned A29, the construction of the new accesses into the Proposed

Development, the effect of construction traffic on existing residents and businesses around (and within) the application site, and the wider effect of construction traffic over the local area on road users. As noted, the level of significance of effects will be assessed on the basis of professional judgement.

Significance Criteria: Local Highway Network and Existing Traffic

- D3.38 A significant increase is defined as a 30% or above increase in AADT and/or a 30% or above increase in HGV (or the equivalent category, 'HDV'³) traffic. Those links which experience said 30% or above increase – in any of the scenario pairs – form the study area for the assessment items below. The scenario pairs are
- 2031 Do Minimum (DM) & 2031 Do Something (DS)
 - 2031 No Cala DM & 2031 No Cala DS
 - 2038 DM & 2038 DS
- D3.39 The AADTs and HDVs were provided by WSP from the updated WSCC A29 CATM model operated by WSP, as described above. These flows are also used elsewhere in this ES for the determination of air quality and noise effects (see respective chapters).

Significance Criteria: Pedestrian Movement, Capacity and Delay

- D3.40 The significance of the increase in pedestrian flow has been assessed using professional judgement in conjunction with the TRICS assessment and mode share estimates. Given the low quantity of expected pedestrians relative to the scale of the highway network, assessment is generally qualitative with significance determined where there are likely to be good or poor pedestrian experiences (such as reduced ability to be able to cross roads, and footway congestion).
- D3.41 In line with the significance definitions defined above, significance is achieved where non-trivial changes are considered likely to be noticeable to the average user.

Significance Criteria: Pedestrian Severance, Fear and Intimidation

- D3.42 Significance thresholds for assessing **severance** are based on the range of indicators referred to in the IEMA Guidelines, where changes in traffic flow of 30%, 60% and 90% are regarded as producing “slight”, “moderate” and “substantial” changes in severance respectively. These are based on AADTs.
- D3.43 The IEMA Guidelines have been referenced to assess any increase in **fear and intimidation** based on AAWT divided by 18. The thresholds for identification of degree of hazard are set out in Table D3.2.

Table D3.2: IEMA definitions of degrees of hazard relating to pedestrian severance and vehicle flow

Degree of Hazard	Average traffic flow over 18-hour day (vehicles/hour)	Total 18-hour HGV flow	Average speed over 18-hour day (miles/hr)
Extreme	1,800+	3,000+	20+
Great	1,200 – 1,800	2,000 – 3,000	15 – 20
Moderate	600 – 1,200	1,000 – 2,000	10 - 15

³ HDV – Heavy Duty Vehicles are vehicles with a gross weight in excess of 3.5 tonnes

Significance Criteria: Cycling Facilities

- D3.44 The effect upon cycle facilities has been assessed using professional judgement on a qualitative basis with regard to the scope and types of provision within and around the application site, and the capacity of existing and proposed facilities.
- D3.45 In line with the significance definitions defined above, significance is achieved where non-trivial changes are considered, on the basis of professional judgment, likely to be noticeable to the average user.

Significance Criteria: Public Transport

- D3.46 Professional judgement has been used to assess the effect of the additional trips on the bus and rail networks. In both cases, a quantitative estimate of future users is used as a base to establish the additional capacity requirements (if any) in relation to existing service frequencies and capacity.
- D3.47 Professional judgement is used to determine what the effect of the Proposed Development would be, in light of the reasonably foreseeable actions of public transport operators, the current policy and operational environment of the given services (and operators), and the commerciality of current and future services.
- D3.48 For the avoidance of doubt, this significance assessment is based exclusively on professional judgement and is not the result of negotiation with any one or more public transport service operators.

Significance Criteria: Junction Capacity and Delay

- D3.49 The assessment of the junction capacity of the local road network has been undertaken via quantitative modelling using specialist traffic junction modelling software.
- D3.50 Junction capacity assessment results are presented, in terms of 'Ratio of Demand Flow to Capacity' ('RFC'), expressed as a factor. An RFC of less than 0.85 indicates that the junction is operating within its theoretical capacity; an RFC of equal to or greater than 0.85 but less than 1.00 indicates that the junction is approaching its capacity; and an RFC of equal to or greater than 1.00 indicates that it has either reached or exceeded its capacity. These calculations are performed on a per-junction basis.
- D3.51 Driver delay is directly related to the capacity of the road network and junction modelling software provides a computation of the expected level of delay at a junction given the calculated RFCs.
- D3.52 Significance is determined on balance, and in light of professional judgement of the overall effect of the Proposed Development on junction capacity and delay, and across all assessed junctions. In line with the general levels of significance detailed above, changes to junction operations within the range of daily traffic variation (including no change) are considered negligible.

Significance Criteria: Road Traffic Accident and Safety Data

- D3.53 Professional judgement has been used to assess the significance of the Proposed Development on road safety. Significance occurs when changes are expected that would be anticipated, on balance, to cause a noticeable change in the underlying rates of accidents for a given type of road.

Receptor Sensitivity

D3-54 As well as the significance criteria, 'Sensitive Receptors' are also key in determining the significance of the transport effects of a new development. The sensitivity of a receptor is based on a number of factors such as the vulnerability or activity of the user. The IEMA Guidelines for the Environmental Assessment of Road Traffic document was used to consider the sensitivity and significance of traffic changes. This includes guidance on how the sensitivity of receptors should be assessed. Using that as a base, professional judgement is used to develop a classification of sensitivity for various receptors. This is summarised in Table D3.3 along with the IEMA definitions of receptor sensitivity grading.

D3-55 The surrounding area to the application site is almost entirely rural, or where the links are adjacent to a residential area, they are set-back behind greenspace and with minimal frontage occupiers. Therefore, the sensitivity of all relevant local receptors is considered low, unless otherwise stated.

Table D3.3: Classification of Receptor Sensitivity

Sensitivity Receptor	Negligible	Low	Medium	High
IEMA definition:	Receptors with no sensitivity to traffic flows and those sufficiently distant from affected roads and junctions.	The receptor / resource is tolerant of change without detriment to its character, is of low importance	The receptor / resource has moderate capacity to absorb change without altering its present character, or is of high importance	The receptor / resource has little ability to absorb change without altering its present character, or is of international or national importance.
Receptor examples				
Location - Local Settlements	Individual dwellings or scattered settlements with no facilities	Small rural settlement, few community or public facilities or services	Intermediate sized rural settlement, containing some community or public facilities and services	Large rural settlement containing a high number of community and public services and facilities
Road network and associated users	Roads with no adjacent settlements including new strategic trunk roads that would be little affected by additional traffic and suitable for abnormal indivisible loads	Little or no traffic calming or traffic management measures	Some traffic calming or traffic management measures	Traffic control signals, waiting and loading restrictions, traffic calming measures
Road structure and classification	New strategic trunk road junctions capable of accommodating abnormal indivisible loads	Trunk or A-class road, constructed to accommodate significant HGV composition	Local A or B class roads, capable of regular use by HGV traffic	Minor rural roads, not constructed to accommodate frequent use by HGVs

D3.56

The IEMA Guidelines identify the key impacts that are most important when assessing the magnitude of traffic effects from an individual development: Table 3.4N of LA 104 Environmental assessment and monitoring sets out five levels against which the magnitude of change should be assessed - major, moderate, minor, negligible and no change. This is summarised in Table D3.4.

Table D3.4: Magnitude of impact and typical descriptions

Magnitude of impact (change)		Typical description
Major	Adverse	Loss of resource and/or quality and integrity of resource; severe damage to key characteristics; features or elements.
	Beneficial	Large scale or major improvement of resource quality; extensive restoration; major improvement of attribute quality.
Moderate	Adverse	Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements.
	Beneficial	Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality.
Minor	Adverse	Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements.
	Beneficial	Minor Benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring.
Negligible	Adverse	Very minor loss or detrimental alteration to one or more characteristics, features or elements.
	Beneficial	Very minor benefit to or positive addition of one or more characteristics, features or elements.
No change		No loss or alteration of characteristics, features or elements; no observable impact in either direction.

D3.57

A significance of environmental effect can also be determined by the interaction of magnitude and sensitivity, whereby the effects can be beneficial or adverse. The criteria assessed will include severance, driver delay, pedestrian delay, pedestrian amenity, fear/intimidation and accidents and safety. To determine the overall significance of the effects, the results from the receptor sensitivity and magnitude of change are correlated and classified using a scale set out in Table 3.8.1 of LA 104 Environmental assessment and monitoring and summarised in Table D3.5.

Table D3.5: Significance Matrix

		Magnitude of impact (degree of change)				
		No change	Negligible	Minor	Moderate	Major
Environmental value (sensitivity)	Very high	Neutral	Slight	Moderate or large	Large or very large	Very large
	High	Neutral	Slight	Slight or moderate	Moderate or large	Large or very large
	Medium	Neutral	Neutral or slight	Slight	Moderate	Moderate or large
	Low	Neutral	Neutral or slight	Neutral or slight	Slight	Slight or moderate

	Negligible	Neutral	Neutral	Neutral or slight	Neutral or slight	Slight
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- D3.58 Where mitigation is required, these measures have been identified. Should junction capacity need to be increased in order to cater for the traffic flows generated by the Proposed Development, or to cater for safe pedestrian/cycle movements, then scale plans of the appropriate highway improvements would be expected to be provided. Any amended junction arrangements were also assessed to ensure that they are appropriate.
- D3.59 In addition to the above, a framework travel plan setting out the potential measures that could be considered appropriate for the application site during the operational phase has been produced to assist in mitigating the effects of development related traffic. This includes the provision of information covering non-car travel opportunities and other appropriate measures in accordance with best practice guidance. During the construction phase, a Construction Traffic Management Plan (CTMP) will guide works undertaken.

Likely receptors to be affected

- D3.60 Receptors are identified within the chapter through the initial study area investigations. The following sensitive receptors are identified:
- Local highway network and existing traffic – medium;
 - Pedestrian movement, capacity and delay – medium;
 - Pedestrian severance, fear and intimidation – medium;
 - Cycling facilities – medium
 - Public transport (bus and rail) – medium
 - Junction capacity and delay – medium; and
 - Road traffic accident and safety data – medium.

Consultation

- D3.61 Arun District Council (ADC), in their position as Local Planning Authority (LPA), were engaged through the ES scoping process. In parallel and combination with that process, WSCC Highways and Highways England were engaged directly with a transport scoping document which sought to detail and agree the relevant parameters, inputs and methodologies that would be undertaken to determine the impact of the Proposed Development. Further information on this is included in the TA at Appendix D1 (Ref 1).
- D3.62 A summary of the scoping opinion comments received is included in Table D3.6.

Table D3.6: Summary of scoping opinions

Summary of Scoping Opinion Item	Response / Action
WSCC advised as local highway authority that the impact on the highway network should be reviewed as part of the Transport Assessment.	A Transport Assessment is appended to this report.
The LPA will expect consideration of Chichester District Council's Local Plan proposals (plus committed development) and the agreed necessary junction mitigations on the A27, coupled with the cumulative impacts of Arun's committed development and that from its adopted Local Plan. It will be necessary to undertake the assessment at the end of both Local	The requirements of the Transport Assessment, including cumulative impacts and junction assessment (including local plan junction mitigation schemes) was agreed as part of the scoping discussions and these have been included in the strategic and junction traffic modelling. Assessments have been undertaken

Summary of Scoping Opinion Item	Response / Action
Plan period which is currently 2031 as well as year of opening at full occupancy.	for 2031 and 2038. The year of opening at full occupancy is likely to be sooner than 2038 and therefore assessing this forecast is considered to represent a robust analysis.
Within the 2017 Scoping Opinion WSCC recommended that the employment uses at Enterprise Bognor Regis should be incorporated. This remains the case in this response.	The committed and planned developments (including local plan allocations) have all been included in the strategic traffic modelling.
As part of the EIA process it will be the responsibility of the applicant to demonstrate that the in-combination effects of increased dwelling yield can be accommodated acceptably.	The housing is the outline part of application and is for up to 1,200 homes. The detailed part of the application is for the full extent of the realigned A29 and the full build out of the site allocation has been considered to determine that the new road infrastructure through the allocated site can accommodate forecast year traffic volumes.
Highways England has raised concerns on the implications of the development traffic on the operation of the strategic road network and the severity of the congestion at junctions.	The strategic and junction modelling has considered the operation of these junctions and further information is included in the Transport Assessment report.

Assumptions and Limitations

D3.63

To enable an assessment of the effects of the Proposed Development, a number of reasonable assumptions have been made on the basis of professional judgement and standard practice. The assumptions and limitations are:

- Traffic surveys undertaken in November 2019 are considered representative of conditions on the local network. Due to the Covid19 pandemic the use of 2019 surveys has been agreed with WSCC;
- Future network and development traffic increase and distribution is according to the updated WSCC A29 CATM model (operated by WSP) for all future assessment years (2031 and 2038);
- Traffic is distributed using the updated WSCC A29 CATM model (operated by WSP), including determining distribution across all site access points;
- In the absence of the Proposed Development, the current application site would be left 'as is' (i.e. there is a without development scenario);
- The 2031 No Cala scenario pair includes the same committed developments as the 2031 [with Cala] scenario pair, except for the Cala development which has been removed;
- The future years (both Do Minimum and Do Something) include other Local Plan growth; and
- Construction will be phased, and is at this stage expected to be delivered continuously from 2022/3 through to completion in 2033/4 (over a 11-year period; see details within Chapter C of this ES).

D3.64

The assessment utilises information from the WSCC A29 CATM model (operated by WSP) and therefore the information received is based on the assumptions and limitations associated with any strategic model. These have been minimised through calibration and validation of the strategic model by WSCC's consultant WSP in line with national guidance set out in WebTAG.

Assumptions relating the trip generation, trip distribution, mode share and assignment are outlined in full in the Transport Assessment included in Appendix D1.

D4.0 Baseline Conditions

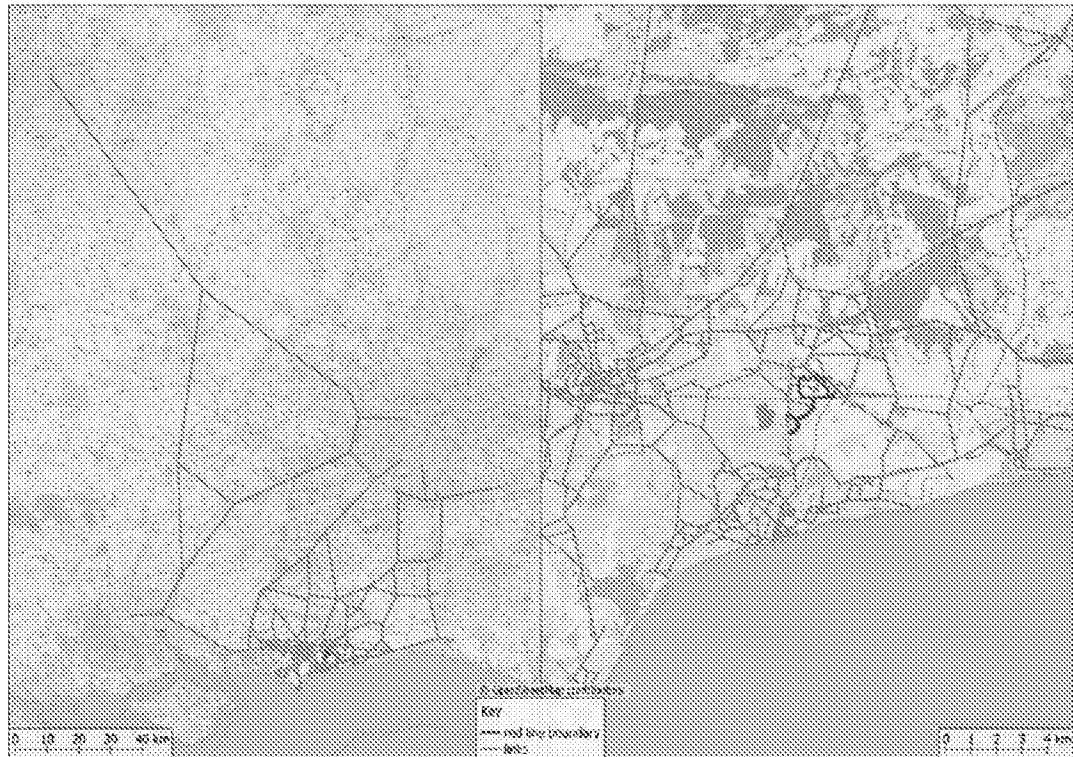
Existing Conditions

- D4.1 The existing application site use (as agricultural land) generates a negligible number of trips. Conditions are explained in detail below.

Local Highway Network and Existing Traffic

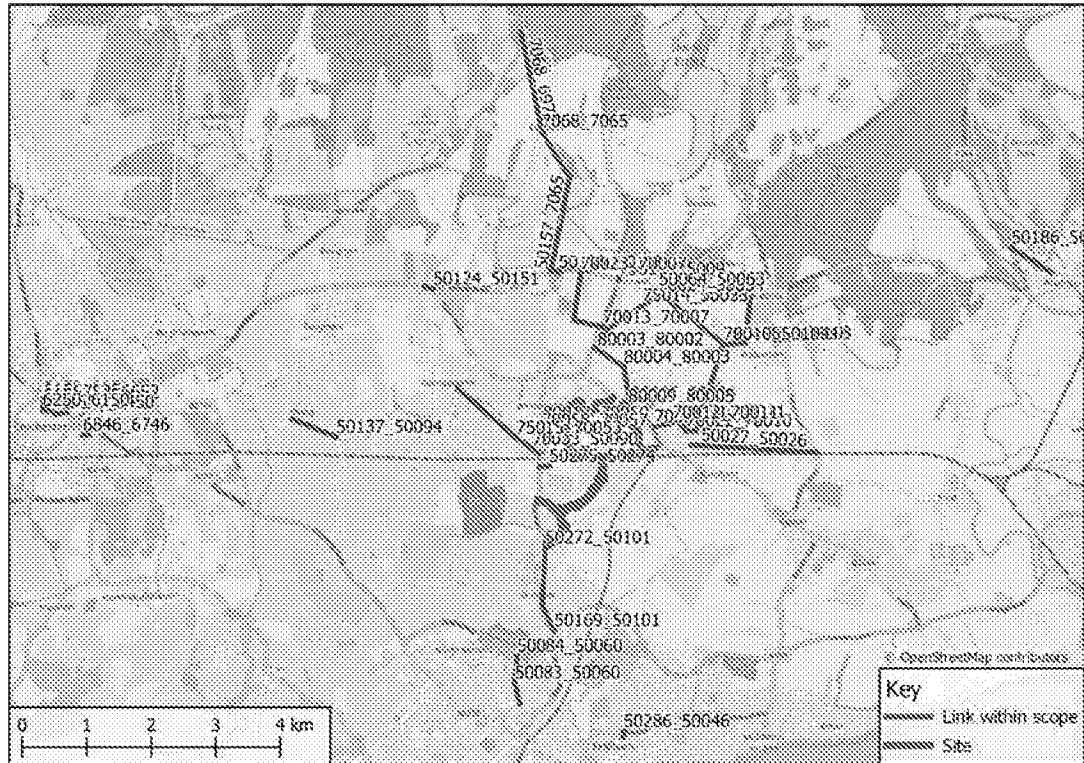
- D4.2 Existing traffic flows are derived from the updated WSCC A29 CATM model (operated by WSP). There are thousands of links across the model, shown in Figure D4.1.

Figure D4.1: Whole updated WSCC A29 CATM model network (close-up of links proximal to the application site shown on right)



- D4.3 Of these, 51 links are forecast to experience an increase above 30% as a result of the Proposed Development (across any of the three future year scenario pairs). This is the threshold used to determine which links are likely to be subject to significant effects for the purposes of the assessment, therefore only these 51 links are shown below in Table D4.1 and Figure D4.2.

Figure D4.2: All links within scope



D4.4

The precise increases for all links with 30% or above increase are stated in Table D5.1 and Table D5.2 in the next section, and for information only, the 2017 flows are contained in Table D4.1 immediately below.

Table D4.1: Baseline conditions – 2017 flows

No.	Link	2017 Base Flow (AADT)	2017 Base Flow (AADT HDV)	2017 Base Flow (AAWT)	2017 Base Flow (AAWT HDV)
1	6250_6150	633	82	596	92
2	6153_6151	1508	100	1426	113
3	6152_6151	1411	149	1337	168
4	6150_6152	633	82	596	92
5	6350_6250	1268	136	1207	153
6	6450_6350	1268	136	1207	153
7	6550_6450	1312	83	1258	95
8	6752_6652	201	39	200	44
9	6846_6746	0	0	0	0
10	7068_6973	2433	58	2239	69
11	50157_7065	2417	58	2219	69
12	7068_7065	2433	58	2239	69
13	50019_50018	1959	120	1790	141
14	70016_50019	2588	149	2372	174
15	50027_50026	262	24	241	27

No.	Link	2017 Base Flow (AADT)	2017 Base Flow (AADT HDV)	2017 Base Flow (AAWT)	2017 Base Flow (AAWT HDV)
16	75014_50033	0	0	0	0
17	50104_50034	1105	104	1041	120
18	70024_50034	1849	124	1613	144
19	50064_50034	2816	221	2528	255
20	50286_50046	3579	119	3287	135
21	50083_50060	1192	3	1067	4
22	50084_50060	1471	12	1328	14
23	50064_50063	1556	187	1352	217
24	70053_50090	1404	56	1299	64
25	75015_50091	0	0	0	0
26	50137_50094	1294	60	1192	69
27	50169_50101	13117	474	12112	550
28	50272_50101	13010	471	12010	547
29	70026_50104	2655	146	2453	171
30	70010_50104	1891	134	1741	158
31	50124_50151	5037	104	4534	119
32	50159_50157	1105	18	1005	22
33	50186_50185	461	129	448	146
34	50275_50274	515	16	471	18
35	70023_70007	237	2	195	2
36	70013_70007	237	2	195	2
37	70022_70010	2445	170	2254	194
38	70021_70011	2631	140	2422	161
39	70012_70011	2803	126	2580	146
40	70020_70012	3030	116	2791	135
41	70026_70016	2550	143	2344	168
42	70022_70021	2631	140	2422	161
43	75014_70024	0	0	0	0
44	80013_70050	0	0	0	0
45	75015_70053	0	0	0	0
46	70058_70057	875	31	802	36
47	75010_75009	0	0	0	0
48	80003_80002	0	0	0	0
49	80004_80003	0	0	0	0
50	80005_80004	0	0	0	0
51	80009_80005	0	0	0	0

D4.5

Also, for information, the below Table D4.2 contains the names of the links in the above table. It should be noted that the below road names are approximations and do not necessarily line up with the exact road, nor the entire road. They may represent a section of that road, or that road in combination with another road.

Table D4.2: Link names (estimated)

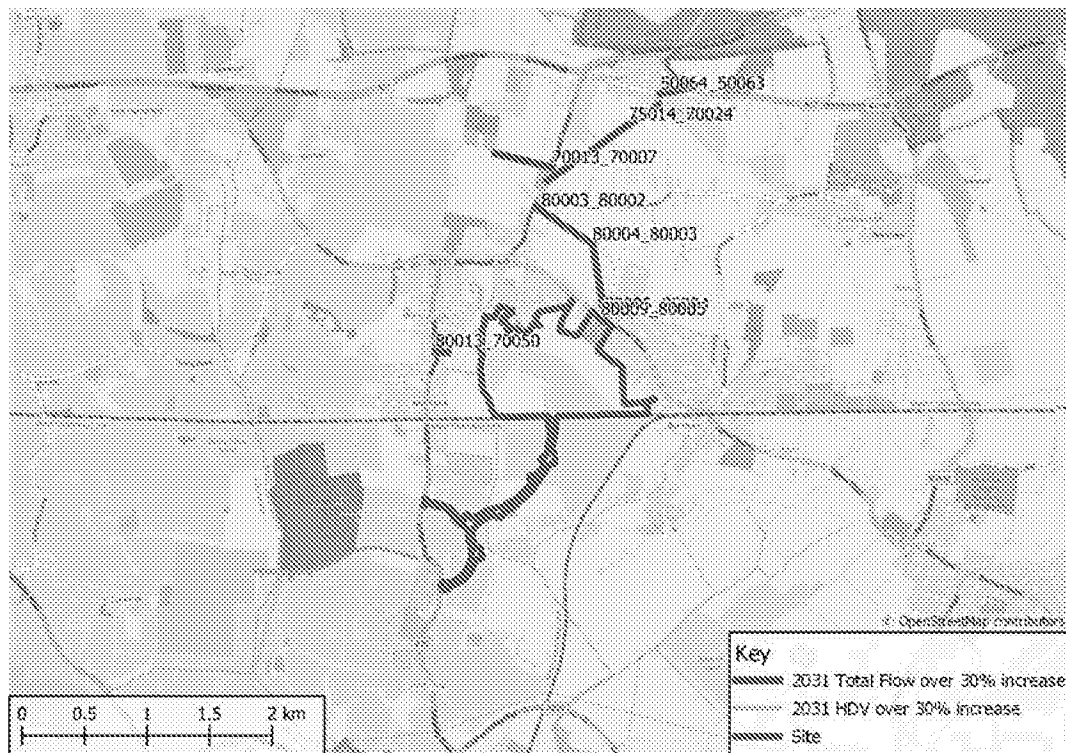
No.	Link	Road name
1	6250_6150	St Peter's
2	6153_6151	North Street
3	6152_6151	North Street
4	6150_6152	North Street
5	6350_6250	Priory Road
6	6450_6350	Priory Road
7	6550_6450	Priory Road
8	6752_6652	Melbourne Road
9	6846_6746	Velyn Avenue
10	7068_6973	Eartham Lane
11	50157_7065	Britten's Lane
12	7068_7065	Britten's Lane
13	50019_50018	Tye Lane
14	70016_50019	The Street
15	50027_50026	Lake Lane
16	75014_50033	Wandley's Lane
17	50104_50034	West Walberton Lane
18	70024_50034	Wandley's Lane
19	50064_50034	West Walberton Lane
20	50286_50046	Felpham Road
21	50083_50060	Ash Grove
22	50084_50060	Ash Grove
23	50064_50063	Arundel Road
24	70053_50090	Hook Lane
25	75015_50091	Hook Lane
26	50137_50094	Oving Road / High Street
27	50169_50101	Shripney Road
28	50272_50101	Shripney Road
29	70026_50104	The Street
30	70010_50104	Barnham Lane
31	50124_50151	B2233 Nyton Road
32	50159_50157	A27 Arundel Road
33	50186_50185	London Road
34	50275_50274	Woodgate Road
35	70023_70007	Denmans Lane
36	70013_70007	Level Mare Lane
37	70022_70010	Kingsmill Road
38	70021_70011	Orchard Way
39	70012_70011	Orchard Way
40	70020_70012	Elm Grove
41	70026_70016	The Street
42	70022_70021	Orchard Way
43	75014_70024	Wandley's Lane

No.	Link	Road name
44	80013_70050	East-West Link
45	75015_70053	Hook Lane
46	70058_70057	Elmcroft Place
47	75010_75009	A29 Fontwell Avenue
48	80003_80002	Realigned A29
49	80004_80003	Realigned A29
50	80005_80004	Realigned A29
51	80009_80005	Realigned A29

2031 with Cala

D4.6 Figure D4.3 shows the links forecast to experience a link flow increase of over 30% in 2031 with Cala, shown in Table D5.1. There are no links with an HDV increase over 30%.

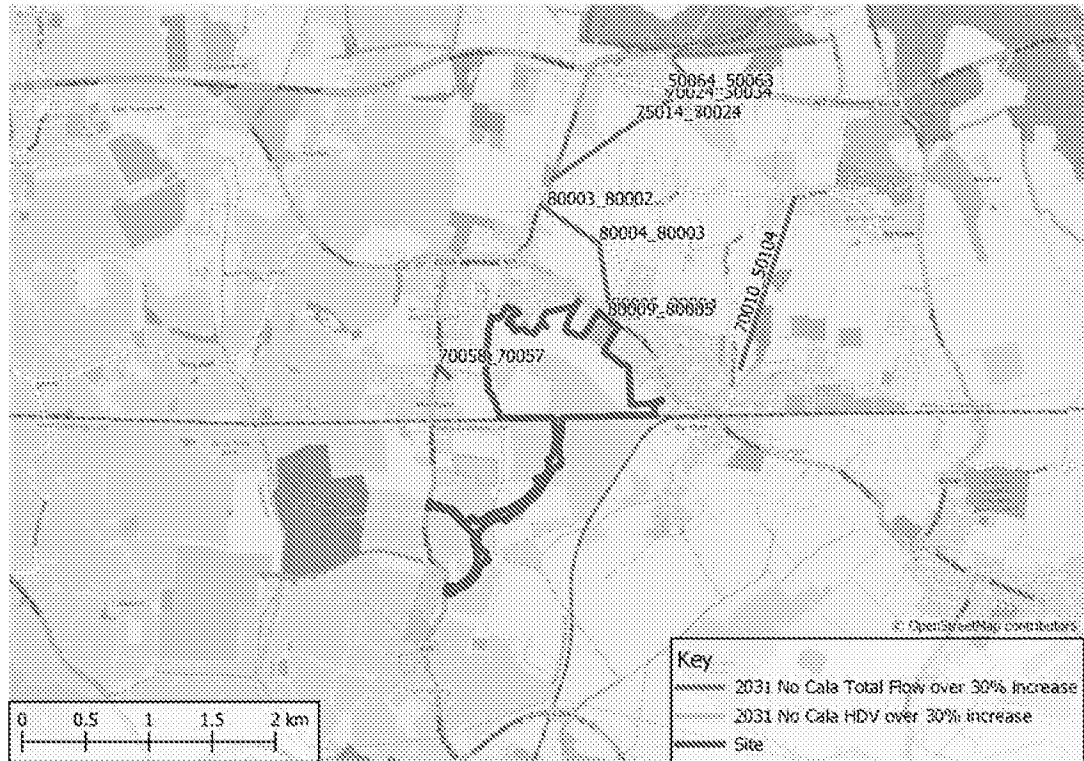
Figure D4.3: 2031 with Cala over 30% increases



2031 No Cala

D4.7 Figure D4.4, refers to the increases in 2031 No Cala, shown in Table D5.1. The links with a total flow increase over 30% are shown on the image, and there are no links with an HDV increase over 30% so these cannot be shown.

Figure D4.4: 2031 No Cala over 30% increases

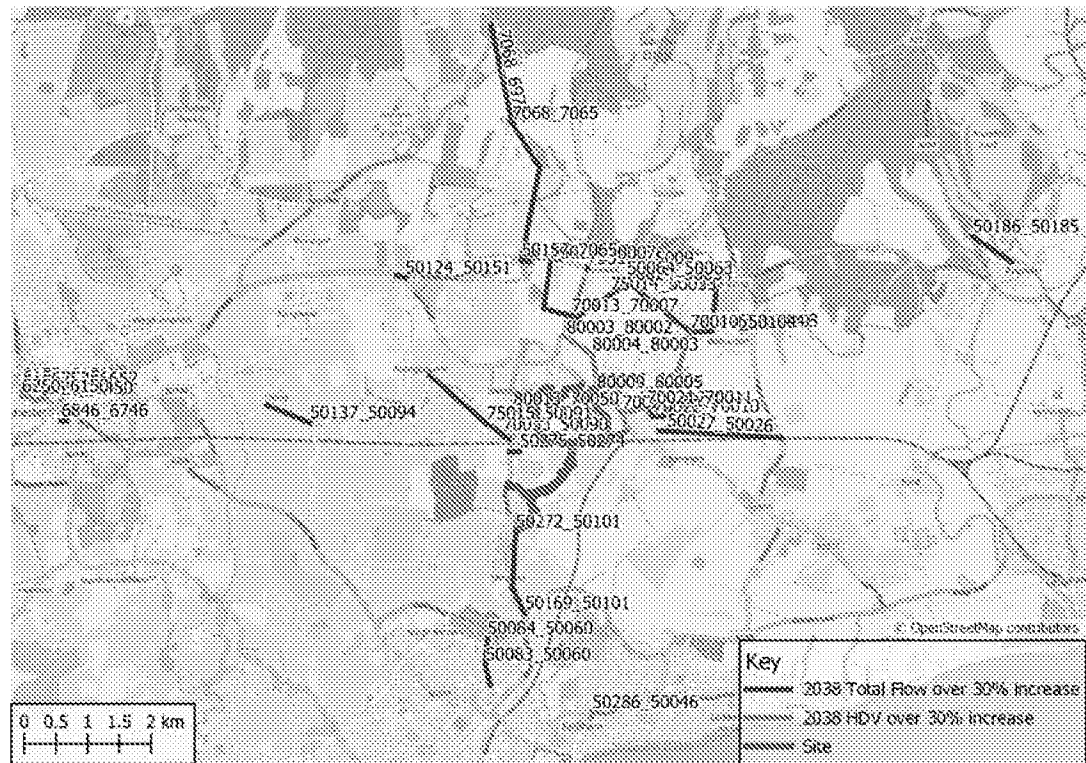


2038

D4.8

Figure D4.5 refers to the increases in 2038, shown in Table D5.1. The links with a total flow increase over 30% are shown in dark purple, and those with an HDV increase over 30% are shown in light purple.

Figure D4.5: 2038 over 30% increases

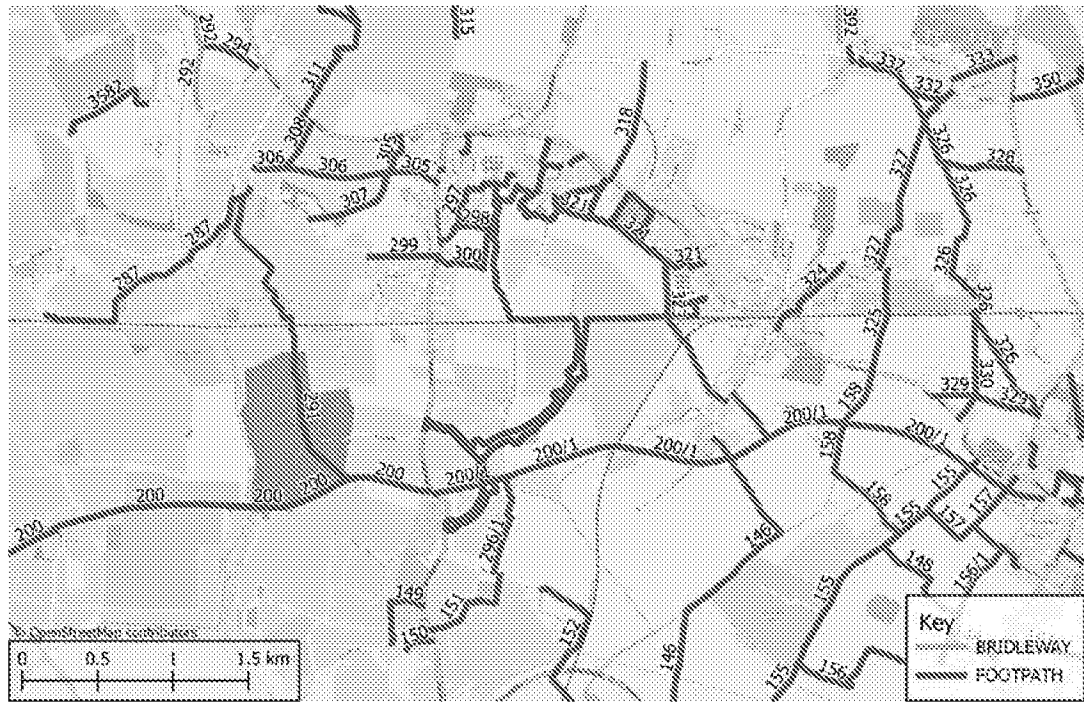


Pedestrian Movement, Capacity and Delay

D4.9

A number of Public Rights of Way (PROW) pass through the site (PROW 200/1, 296/1, 151, 152, 323, 321, 300), which provide connections to the existing A29, B2233 Barnham Road and Yapton Road, and the A259 Charles Purley Way. These paths form part of the local pedestrian network of Barnham, Eastergate, Westergate and Lidsey, and enable the movement of pedestrians throughout the local area. These PROWs will be maintained with no diversions after the Proposed Development. Figure D4.6 illustrates the location of the PROWs within and around the site, and the linkages they provide.

Figure D4.6: Public Rights of Way

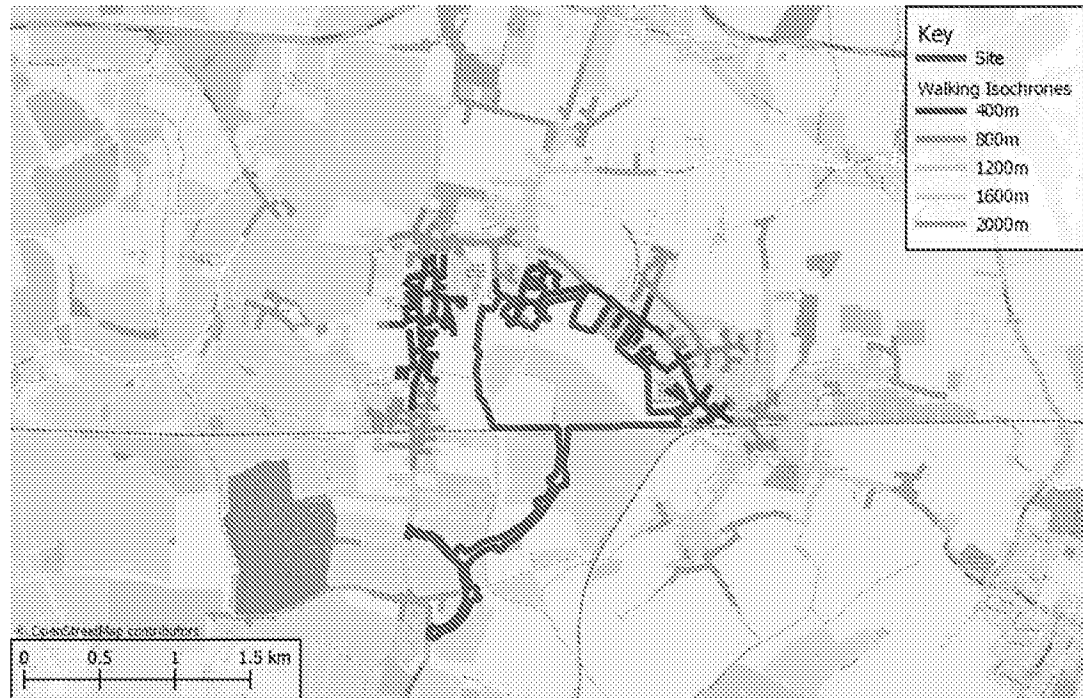


D4.10

The site is located to the south and east of the residential neighbourhoods of Barnham, Eastergate, Westergate and Lidsey. The streets within this area are predominantly residential in character and as such, benefit from footways and street lighting. In addition, pedestrians benefit from the PROW network described previously.

Figure D4.7 illustrates the walking distances from the centre of the site, at five-minute intervals (400m) to 25 minutes' walk away.

Figure D4.7: Walking Isochrones from site boundary



- D4.11 Given the location of the site, and the development mix proposed, it is considered that it is well suited to encourage some trips generated by the site to be undertaken by walking. Existing pedestrian facilities are located within close proximity of the site which encourages the movement of pedestrians to/ from adjacent residential areas and the local facilities contained within Barnham.

Pedestrian Severance, Fear and Intimidation

- D4.12 It should be noted that all roads in the assessment scope are either rural or suburban in nature, therefore they have limited existing pedestrian crossing demand.

Severance

- D4.13 IEMA guidance on pedestrian severance (as detailed above) is focused on the effect of a relative change in traffic flow, rather than an appreciation of the existing state of a network and the resulting effects of any change on that basis. Similarly, a consideration of percentage changes in traffic flow does not take into account the existing level of flow: for example, a 90% increase in a very low level of traffic may still objectively result in a very low level of traffic, whereas a 90% increase in traffic on a well-used major road is unlikely to have any practical effect on severance when the existing level of severance is already likely to be substantial.
- D4.14 Consequently, there are no baseline measurements of severance specifically. However, for the purpose of baseline, the following severance details are noted:
- As a 30mph single carriageway road with intermittent crossing points, the Barnham Road is likely to provide a moderate severance between properties on either side of the road.
 - As a single carriageway road with some crossing points, the existing A29 is likely to provide a moderate severance between properties on either side of the road.

Fear and intimidation

D4.15 The below Table D4.3 outlines fear and intimidation conditions for the 51 links within scope as defined above.

D4.16 Those links that are greyed out do not have a speed value for 2017, as they do not exist in that year.

Table D4.3: Baseline conditions – Pedestrian fear and intimidation measures in 2017

No.	Link	2017 AAWT Avg. per hour	Fear / intim. based on flow	2017 AAWT HDV flow	Fear / intim. based on HDVs	2017 AAWT Mean speed (kph)	Fear / intim. based on speed
1	6250_6150	33	N/A	5	N/A	2	N/A
2	6153_6151	79	N/A	6	N/A	1	N/A
3	6152_6151	74	N/A	9	N/A	2	N/A
4	6150_6152	33	N/A	5	N/A	2	N/A
5	6350_6250	67	N/A	8	N/A	2	N/A
6	6450_6350	67	N/A	8	N/A	2	N/A
7	6550_6450	70	N/A	5	N/A	1	N/A
8	6752_6652	11	N/A	2	N/A	2	N/A
9	6846_6746	0	N/A	0	N/A	0	0
10	7068_6973	124	N/A	4	N/A	3	N/A
11	50157_7065	123	N/A	4	N/A	3	N/A
12	7068_7065	124	N/A	4	N/A	3	N/A
13	50019_50018	99	N/A	8	N/A	3	N/A
14	70016_50019	132	N/A	10	N/A	3	N/A
15	50027_50026	13	N/A	2	N/A	3	N/A
16	75014_50033	0	N/A	0	N/A	0	0
17	50104_50034	58	N/A	7	N/A	2	N/A
18	70024_50034	90	N/A	8	N/A	1	N/A
19	50064_50034	140	N/A	14	N/A	2	N/A
20	50286_50046	183	N/A	7	N/A	2	N/A
21	50083_50060	59	N/A	0	N/A	2	N/A
22	50084_50060	74	N/A	1	N/A	2	N/A
23	50064_50063	75	N/A	12	N/A	2	N/A
24	70053_50090	72	N/A	4	N/A	2	N/A
25	75015_50091	0	N/A	0	N/A	0	0
26	50137_50094	66	N/A	4	N/A	3	N/A
27	50169_50101	673	Moderate	31	N/A	3	N/A
28	50272_50101	667	Moderate	30	N/A	3	N/A
29	70026_50104	136	N/A	9	N/A	2	N/A
30	70010_50104	97	N/A	9	N/A	3	N/A
31	50124_50151	252	N/A	7	N/A	3	N/A
32	50159_50157	56	N/A	1	N/A	2	N/A
33	50186_50185	25	N/A	8	N/A	3	N/A
34	50275_50274	26	N/A	1	N/A	2	N/A

No.	Link	2017 AAWT Avg. per hour	Fear / intim. based on flow	2017 AAWT HDV flow	Fear / intim. based on HDVs	2017 AAWT Mean speed (kph)	Fear / intim based on speed
35	70023_70007	11	N/A	0	N/A	2	N/A
36	70013_70007	11	N/A	0	N/A	3	N/A
37	70022_70010	125	N/A	11	N/A	2	N/A
38	70021_70011	135	N/A	9	N/A	3	N/A
39	70012_70011	143	N/A	8	N/A	3	N/A
40	70020_70012	155	N/A	8	N/A	2	N/A
41	70026_70016	130	N/A	9	N/A	3	N/A
42	70022_70021	135	N/A	9	N/A	3	N/A
43	75014_70024	0	N/A	0	N/A	0	0
44	80013_70050	0	N/A	0	N/A	0	0
45	75015_70053	0	N/A	0	N/A	0	0
46	70058_70057	45	N/A	2	N/A	2	N/A
47	75010_75009	0	N/A	0	N/A	0	0
48	80003_80002	0	N/A	0	N/A	0	0
49	80004_80003	0	N/A	0	N/A	0	0
50	80005_80004	0	N/A	0	N/A	0	0
51	80009_80005	0	N/A	0	N/A	0	0
51	80009_80005	0	N/A	0	N/A	0	0

D4.17 Based on the AAWT per hour, the links within the scope provide negligible fear and intimidation to pedestrians, with only two links classed as 'Moderate' meaning above 600 and below 1200 vehicles.

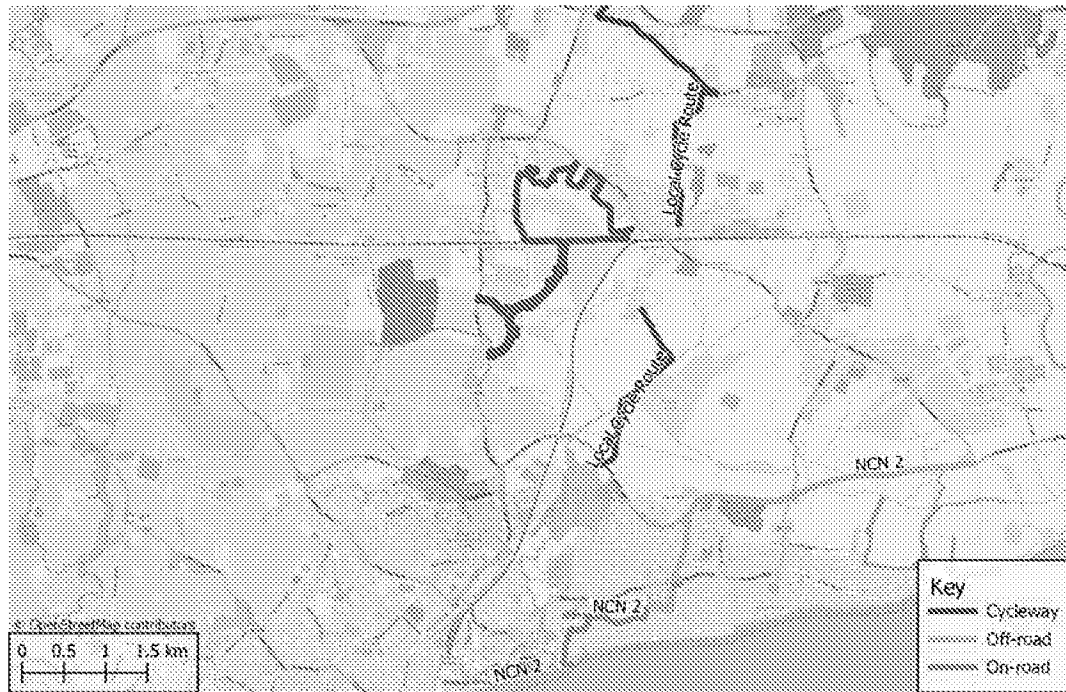
D4.18 Based on the HDV flows, the links within the scope provide negligible fear and intimidation to pedestrians.

D4.19 Based on speeds, the links within the scope provide negligible fear and intimidation to pedestrians, and many of them do not yet exist.

Cycling Facilities

D4.20 The site is located within proximity of existing cycle network routes. There are a number of cycle-specific routes in the vicinity of the site, as shown in Figure D4.8. The majority of the cycle network is integrated with the general road network.

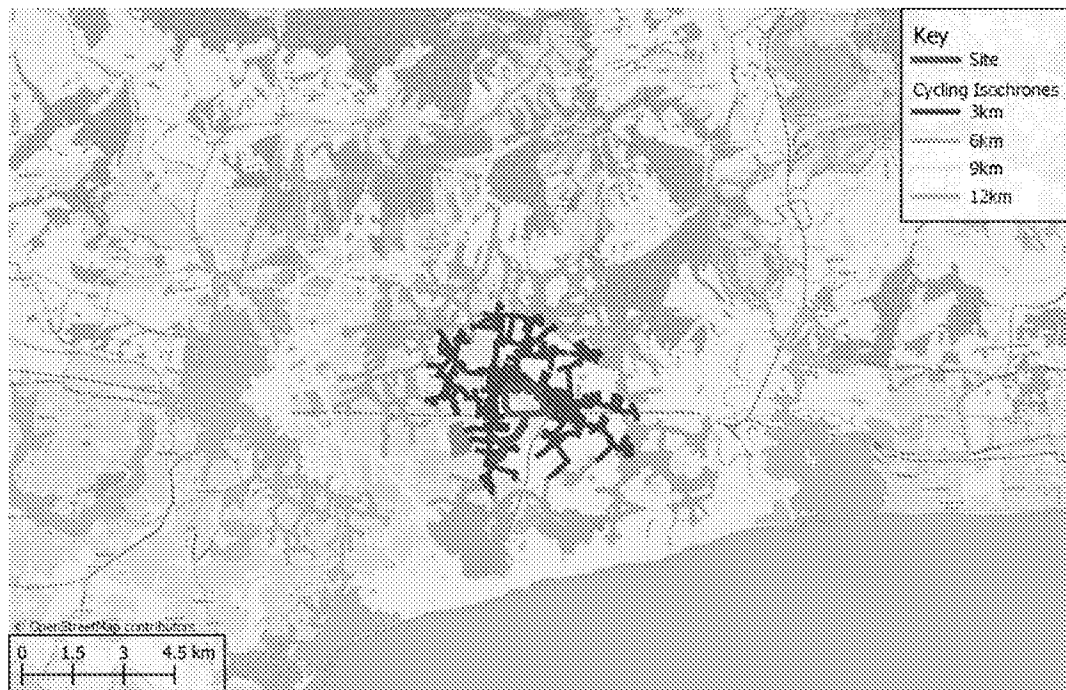
Figure D4.8: Cycle routes



D4.21

Figure D4.9 illustrates the cycling distances from four points around the edge of the site, at 15 minute intervals to 60 minutes' cycle away. This is based on a cycling speed of 12 km/h.

Figure D4.9: Cycling Isochrones

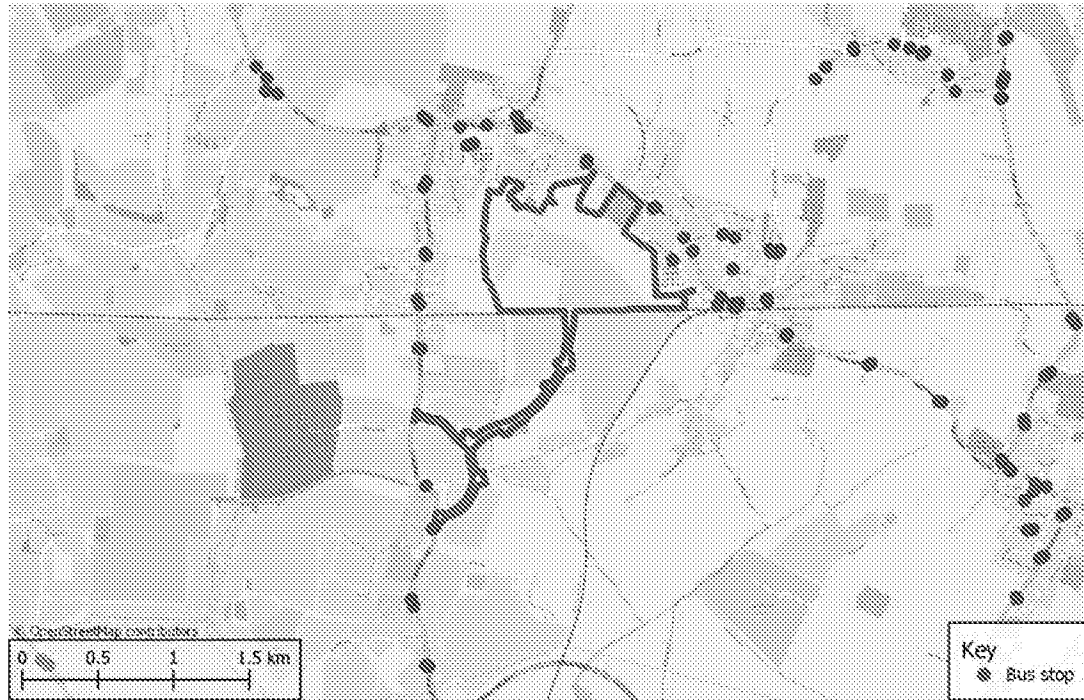


Public Transport

Bus

D4.22 There are numerous bus stops around the periphery of the allocation site, these are located along the current A29 and B2233 Barnham Road. These are shown on Figure D4.10.

Figure D4.10: Bus stops



D4.23 Bus services which operate within the vicinity of the site are included on Table D4.4 below, which provide connections to Arundel, Bognor Regis and Chichester, via a number of intermediary stops which include Bognor Regis Railway Station. Figure D4.11 illustrates the routing of these services within the local area.

Figure D4.11: Bus routes

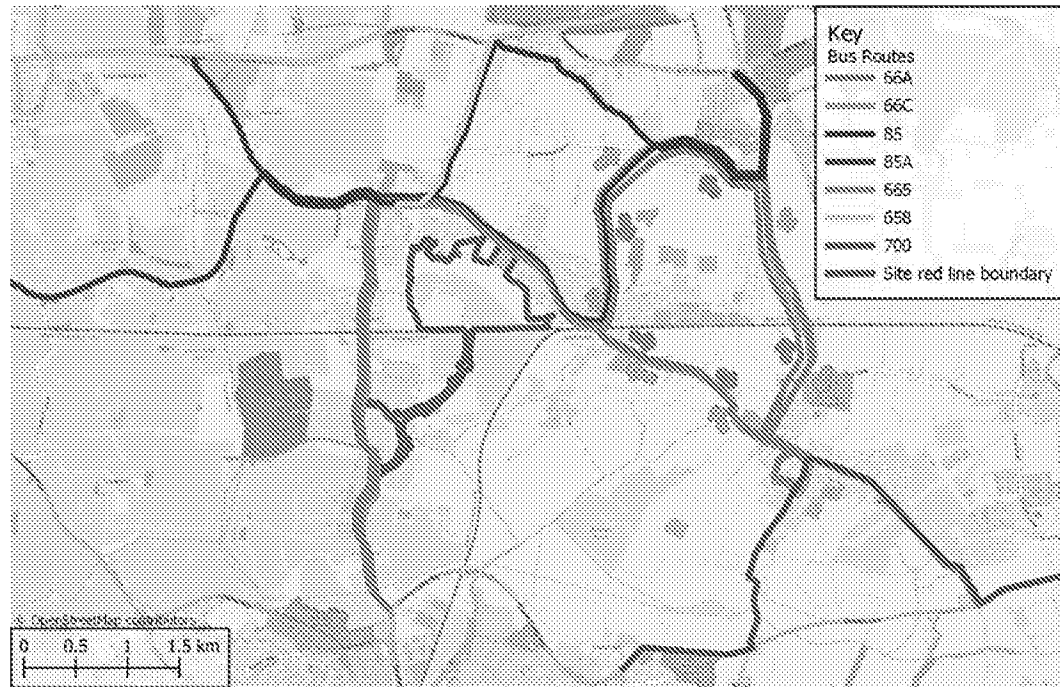


Table D4.4: Bus routes

Operator	Route number	Route destinations	Days of Operation	Time of Operation	Average Frequency
Compass	66A	Bognor Regis – Yapton – Bognor Regis	Mon – Sat	07:30 – 18:00	Four per day
Compass	66C	Bognor Regis – Yapton – Bognor Regis	Mon – Sat	08:30 – 17:00	Three per day
Compass	85A	Arundel – Barnham – Chichester	Mon – Fri	10:00 – 17:00	Two per day
Compass	85	Arundel – Westergate – Chichester	Mon – Fri	07:00 – 16:00	Four per day
Stagecoach	658	Chichester – Westergate	Mon – Fri	07:30 – 15:30	Two per day (school bus)
Stagecoach	665	Wick – Westergate	Mon – Fri	07:30 – 15:30	Two per day (school bus)
Stagecoach	700	Littlehampton – Yapton – Chichester	Mon – Fri	07:30 – 16:30	Every 10 mins

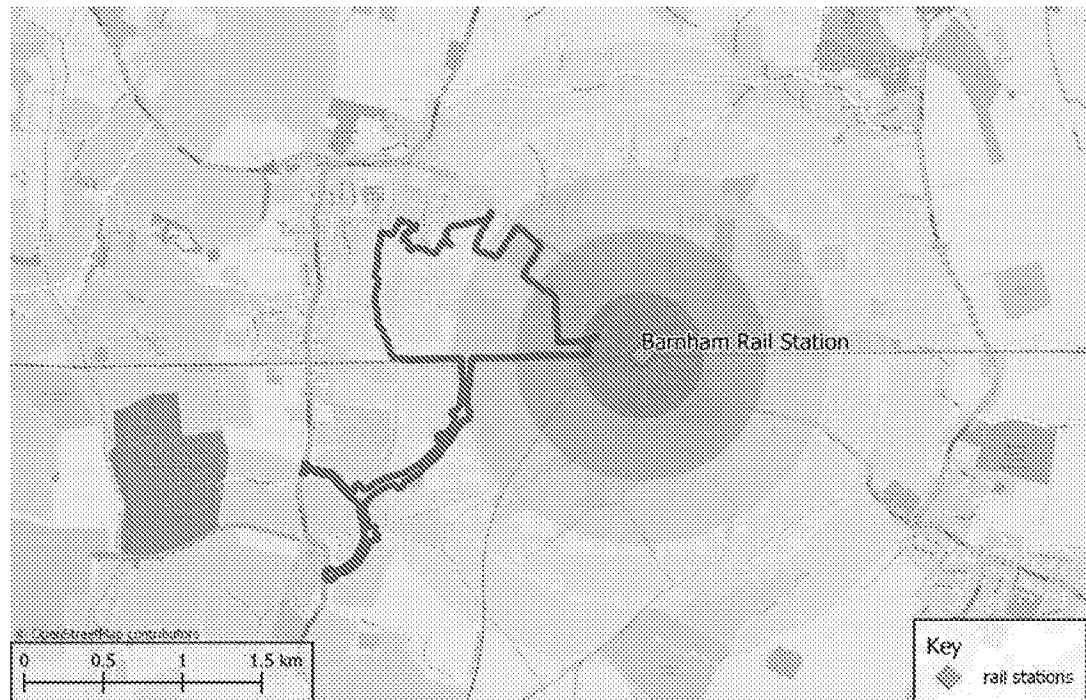
D4.24 It should be noted that the Proposed Development would include in its infrastructure the ability to accommodate a new bus route. Initial discussions with Stagecoach suggest a route could be provided between Chichester and Littlehampton via the Proposed Development.

Rail

D4.25 The nearest railway station to the site is Barnham Railway Station. Nearby are also Bognor Regis and Chichester, which are reachable by train from Barnham, or by road from the site.

- D4.26 Barnham is shown on Figure D4.12, along with the site boundary and approximate walking boundaries from the station at 400m increments up to 2km. This shows that all the site within the application boundary should be accessible within a 25-minute walk of the station.

Figure D4.12: Rail stations



- D4.27 Barnham railway station (and Chichester) is on the south coast mainline, providing easy access to London Victoria, Brighton, Portsmouth and Southsea, as well as Littlehampton and Southampton Central. Barnham also provides access to Bognor Regis station. Barnham station benefits from accessible toilets, self-service ticket machines, and refreshment facilities, as well as 62 cycle parking spaces.
- D4.28 Barnham station provides frequent services (approximately every 30 minutes) to the above destinations. It is therefore considered that the development could facilitate a number of trips to be made by rail, due to the stations being easily accessible.

Junction Capacity and Delay

- D4.29 The key junctions within the local and wider highway networks assessed within this report have been identified through discussions with WSCC and Highways England. The junctions are shown in Figure D4.13.
- D4.30 The modelling assessment has considered the impact of the Proposed Development on the highway network. Surveys were undertaken in November 2019 to inform calibration of the junction models. This is discussed in more detail within the Transport Assessment, at Appendix D1.

Figure D4.13: Junctions within scope



D4.31

A table demonstrating the baseline Ratios of Flow to Capacity (RFCs) of the worst performing arm of each junction is below in Table D4.5.

Table D4.5: Baseline RFCs junction capacity

Area	Junction name	2019 Base: Maximum RFC
Realigned A29 junctions	Fontwell Avenue / A29 realignment	Not modelled in 2019*
	Barnham Road / A29 realignment	Not modelled in 2019*
	Realigned A29 / E-W Link roundabout	Not modelled in 2019*
	Westergate Street / Northern Access	Not modelled in 2019*
	Realigned A29 / Link to Woodgate Roundabout A (modelled in 2038 only)	Not modelled in 2019*
	Woodgate Road / Lidsey Road / Southern Access	Not modelled in 2019*
	Lidsey Road / Site Access (parcels R33 and R34) (modelled in 2038 only)	Not modelled in 2019*
	Realigned A29 / Link to Woodgate Roundabout B (modelled in 2038 only)	Not modelled in 2019*
	Lidsey Road / Site Access (Parcel R35) (modelled in 2038 only)	Not modelled in 2019*
	Realigned A29 / links to southernmost parcels	Not modelled in 2019*
Existing A29 junctions	Lidsey Road / A29 Realignment (modelled in 2038 only)	Not modelled in 2019*
	A27 / Fontwell Avenue	0.96
	Fontwell Avenue / Eastergate Lane	0.20
	Fontwell Avenue / Barnham Road	LoS E**

Area	Junction name	2019 Base: Maximum RFC
	Nyton Road / Westergate Street	0.90
	Westergate Street / Hook Lane	0.28
	Shripney Road / Charles Purley Way	0.28
	Shripney Road / Rowan Way	0.74
Apportionment Study junctions	Nyton Road / A27	0.93
	A27 / A29 (Fontwell Eastern Roundabout)	0.72
	B2233 Yapton Road / A259 Crookthorn Lane / Gravatt's Lane (Oystercatcher junction)	Not modelled in 2019***
Other junctions modelled	B2145 / A27 Whyke Roundabout	0.98
	A27 / A259 / Vinnetro Road (Bognor Road Roundabout)	0.96
	Nyton Road / Oving Road	0.62
	Barnham Road / Lake Lane	0.50
	A27 / A284 Ford Road / Arundel Bypass	0.98
	A27 / The Causeway Roundabout, Arundel	0.91

*Junction does not exist in base year as Proposed Development does not yet exist

** Lane simulation model shows Level of Service (LoS) instead of RFC

*** No survey flows available for base year so not modelled (junction not part of the 2019 data collection and no survey information available from other applications)

Road Traffic Accident and Safety Data

D4.32

There were 804 collisions found within the study area agreed with WSCC, which includes both modelled junctions and IDP junctions, in the last 10 years (01/08/2010 – 31/07/2020). They are shown on the map in Figure D4.14.

Figure D4.14: All collisions for 10 previous years



- D4.33 Within this timeframe, there were 13 fatal collisions, 145 serious collisions, and 646 slight collisions.
- The collisions note considered all junctions within scope of the traffic modelling
 - 26 junctions were discussed as part of the modelling scope and of these, 10 had one or more serious collisions within a 50 metre radius
 - The analysis reviewed the causation factors and none of the collisions were due to the junction geometry
- D4.34 The full collision data is available as an appendix to the Transport Assessment report, at Appendix D1 of this ES.

Future Baseline

- D4.35 The future baseline is defined collectively as the 2031 do minimum, 2031 do minimum No Cala and 2038 do minimum assessment scenarios.
- D4.36 Future baseline conditions will differ from the 2017 baseline conditions, as the former include likely changes in transport trends, road infrastructure and committed developments (not including the Proposed Development). Committed developments (including their associated road infrastructure) are embedded in the updated WSCC A29 CATM model operated by WSP's do minimum assessment scenarios.

D5.0 Potential Effects

- D5.1 To note on construction phasing: the overwhelming majority of dwellings will be delivered between 2023 and 2030 (Phase 1 of 920 homes along with associated commercial and road infrastructure) with the remaining 330 homes delivered after this (Phase 2). This totals 1250, which is the number of homes assessed for the scenario year 2031. The 2031 scenarios are therefore a robust assessment of the traffic generated by the Proposed Development.
- D5.2 The No Cala scenarios (all development minus the infrastructure of the east-west link) are assessed in detail with the Transport Assessment and this shows that the effect of traffic on surrounding roads differs only minimally if the western (Cala) link is not built.
- D5.3 The 2038 scenarios are intended to assess the impact of the realigned A29 road, which will be delivered as part of the development of land south of the railway. , This includes the remainder of the A29 south of the railway line and the Hanbury Spur.

Built In Mitigation Measures

- D5.4 Some mitigation measures are built-in to the Proposed Development. These are listed here:
- The Proposed Development will include the realigned A29 (north of the railway) which will be designed to accommodate a bus route, increasing bus accessibility for site users and neighbours
 - The green links built into the development will provide nature-oriented routes around the site for non-motorised users
 - The Proposed Development will improve the internal PRowS, and also provide pedestrian footways on both sides of the main internal roads (e.g. realigned A29 and East-West Link), to encourage pedestrian travel and provide a safe walking environment for all.
 - It will also provide pedestrian crossing points at major junctions internal to the Proposed Development in order to improve pedestrian connectivity.
 - The Proposed Development provides for cycling via the cycle route across the site. The internal cycle routes will be designed to LTN 1/20 standards and the detail will be confirmed as part of reserved matters applications. The application site access junctions connecting to external roads, and the application site's internal junctions, will consider appropriate protection for cyclists according to latest guidance. In addition, the Proposed Development's internal road links will all contain cycle facilities designed to standard and protected from traffic where required by latest guidance.

During Construction

- D5.5 These are short term effects.
- D5.6 The temporary construction phase associated with the Proposed Development would result in:
- Temporary increases in HGV movements on the highway network in the vicinity of the application site; and
 - Introduction of construction workers to the application site.
- D5.7 Phases 1 and 2 have been assessed together. Due to the overwhelming majority of homes being delivered during Phase 1, it is not considered that assessing Phase 1 and Phase 2 separately would materially change the effect of construction traffic.

D5.8 An indicative, high level construction programme has been prepared based on build out rates for the development. This construction programme can be viewed in the Chapter C of this ES.

D5.9 An initial phasing strategy is also provided in the Construction Management Plan (Appendix C2) and this sets out the anticipated phasing of the residential-led development.

Construction traffic: general

D5.10 Other transportation and access related effects that have the potential to otherwise arise during the construction stages would comprise temporary disruption to road users at specific times of day when vehicles access or egress the application site.

- .

D5.11 Given the nature of the application site's immediate surroundings, it is unlikely that any effect of the construction would be discernible to wider receptors such as residential areas to the northwest of the application site.

Construction traffic: access

D5.12 The following effects may occur which are specific to access. Temporarily there may be disruption to existing traffic, and pedestrians and cyclists, around the application site due to construction of these new accesses and movement of vehicles into and out of the new junctions.

D5.13 However, this construction is expected to have ceased by 2038 when the realigned A29 is completed, and traffic will be able to enter through the application site completely.

Conclusion

D5.14 The traffic already on the road is of a level that the addition of the anticipated levels of construction traffic is unlikely to create a noticeable impact. However absent any management, disruption to the users of access points means this would be expected to have a **moderate adverse short-term effect**, which is considered to be a **significant effect**. This is expected to be the worst-case and a temporary impact, as the construction of the accesses and use by construction vehicles will only occur for a part of the construction phasing (outlined in Chapter C of this ES).

During Operation

D5.15 These are long-term effects.

D5.16 The Proposed Development would have the potential to generate the following broad transport effects:

- Increased trips to and from the application site and an associated demand on pedestrian, cycle, public transport facilities and the local road network

D5.17 The remainder of this section considers these items in detail.

Local Highway Network and Existing Traffic

D5.18 The assessment of the effects of changes on the local highway network are considered more fully in terms of their effects on the given category in subsequent sections.

D5.19 Phases 1 and 2 have been assessed together here. Due to the overwhelming majority of homes being delivered during Phase 1, it is not considered that assessing Phase 1 and Phase 2 separately would materially change the effect on the local highway network and existing traffic.

2031 with Cala

D5.20

Table D5.1 shows the increase as a result of the Proposed Development in 2031 in the with Cala scenario pair.

Table D5.1: 2031 DM vs. 2031 DS AADT flow increases

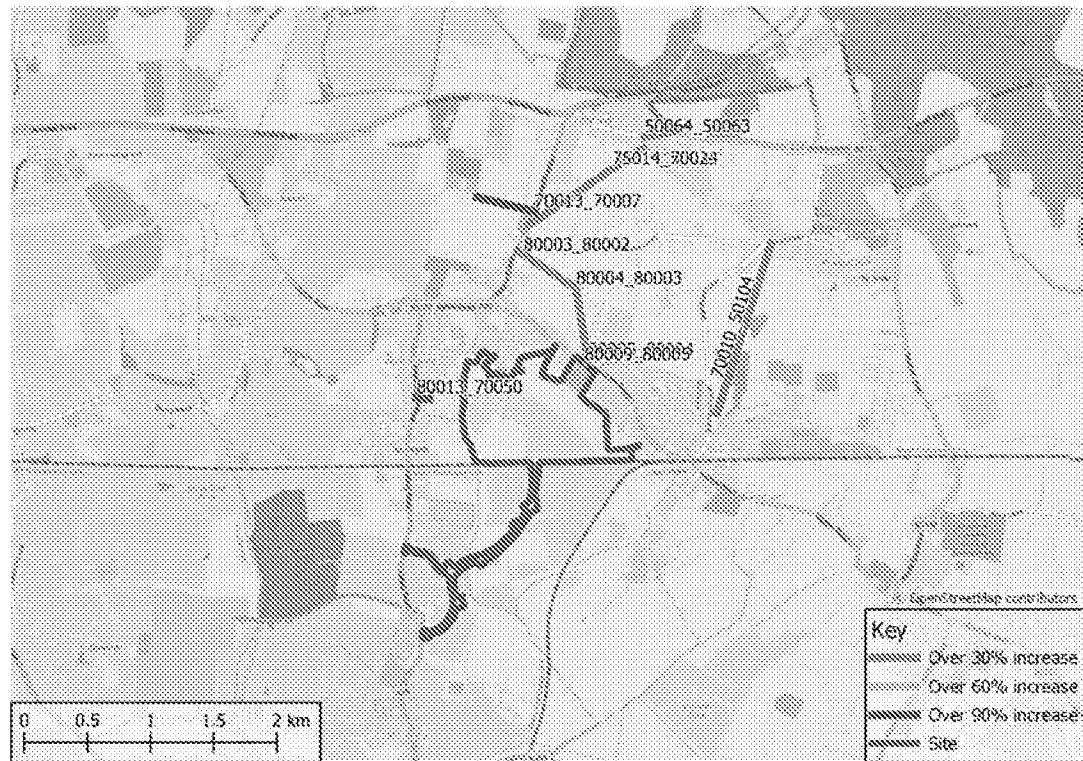
No.	Link	2031 DM AADT total flow	2031 DS AADT total flow	2031 DM to 2031 DS increase in total flow	2031 DM AADT HDV flow	2031 DS AADT HDV flow	2031 DM to 2031 DS increase in HDV flow
1	6250_6150	886	919	4%	102	103	1%
2	6153_6151	1601	1595	0%	121	121	0%
3	6152_6151	1814	1908	5%	173	174	0%
4	6150_6152	886	919	4%	102	103	1%
5	6350_6250	1673	1767	6%	160	161	0%
6	6450_6350	1673	1767	6%	160	161	0%
7	6550_6450	1748	1865	7%	108	108	0%
8	6752_6652	470	529	12%	33	33	2%
9	6846_6746	0	0	-33%	0	0	
10	7068_6973	2773	3238	17%	61	59	-3%
11	50157_7065	3281	3747	14%	59	57	-4%
12	7068_7065	2773	3238	17%	61	59	-3%
13	50019_50018	2147	2554	19%	116	117	1%
14	70016_50019	2739	3189	16%	139	141	2%
15	50027_50026	214	255	19%	90	93	4%
16	75014_50033	1592	2230	40%	84	84	0%
17	50104_50034	890	929	4%	83	85	3%
18	70024_50034	2263	2894	28%	122	122	0%
19	50064_50034	2837	3504	24%	197	199	1%
20	50286_50046	3908	4024	3%	117	150	28%
21	50083_50060	1205	1318	9%	0	0	
22	50084_50060	1387	1498	8%	42	42	-1%
23	50064_50063	1226	1790	46%	155	153	-1%
24	70053_50090	3121	3182	2%	102	100	-2%
25	75015_50091	2692	2738	2%	97	95	-2%
26	50137_50094	2532	2714	7%	90	92	2%
27	50169_50101	17355	18624	7%	566	560	-1%
28	50272_50101	15817	17071	8%	534	527	-1%
29	70026_50104	3175	3486	10%	140	142	2%
30	70010_50104	1718	2230	30%	100	103	3%
31	50124_50151	5925	6627	12%	127	128	1%
32	50159_50157	1281	1586	24%	19	19	1%
33	50186_50185	1039	1039	0%	213	213	0%
34	50275_50274	1359	1757	29%	17	17	0%
35	70023_70007	0	1		0	0	

No.	Link	2031 DM AADT total flow	2031 DS AADT total flow	2031 DM to 2031 DS increase in total flow	2031 DM AADT HDV flow	2031 DS AADT HDV flow	2031 DM to 2031 DS increase in HDV flow
36	70013_70007	0	3	8450%*	0	0	
37	70022_70010	2202	2567	17%	190	195	3%
38	70021_70011	2427	2808	16%	158	163	3%
39	70012_70011	2605	2987	15%	146	151	3%
40	70020_70012	2842	3231	14%	137	142	4%
41	70026_70016	2806	3264	16%	131	133	2%
42	70022_70021	2427	2808	16%	158	163	3%
43	75014_70024	1818	2457	35%	83	84	0%
44	80013_70050	1720	5556	223%	0	132	
45	75015_70053	2763	2816	2%	97	95	-2%
46	70058_70057	898	902	1%	33	33	0%
47	75010_75009	4289	4663	9%	155	149	-3%
48	80003_80002	5850	8112	39%	68	65	-4%
49	80004_80003	5850	8112	39%	68	65	-4%
50	80005_80004	4052	6314	56%	68	65	-4%
51	80009_80005	4052	6314	56%	68	65	-4%

* This is 0.0313 in the DM and 2.6787 in the DS, rounded to 0 and 3 respectively, so appears as 8450% increase. This is included for completeness however the effect of this increase would not be noticeable.

- D5.21 With reference to Table D5.1, which includes only the links experiencing an increase of 30% or more as defined previously in Table D4.1, there is, as expected, an increase in total flows.
- D5.22 Most notable are the increases over 90% on the 36th and 44th links. These are shown on Figure D5.1 which shows that the 36th link is the western end of the East-West link through the Cala site, which is intended to link through Cala to the site, so it is expected to experience an uplift in traffic. The 44th link increases from '0' to '3' (actually 0.0313 in the DM and 2.6787 in the DS) so appears as an 8450% increase despite the real numbers being very small.

Figure D5.1: Potential Effects: Local Highway Network 2031 links over 30% Total Flow



D5.23 For the HDV flows, none are above 30% increases.

2031 No Cala

D5.24 Table D5.2 shows the increase as a result of the Proposed Development in 2031 in the No Cala scenario pair.

Table D5.2: 2031 DM No Cala vs. 2031 DS No Cala AADT flow increases

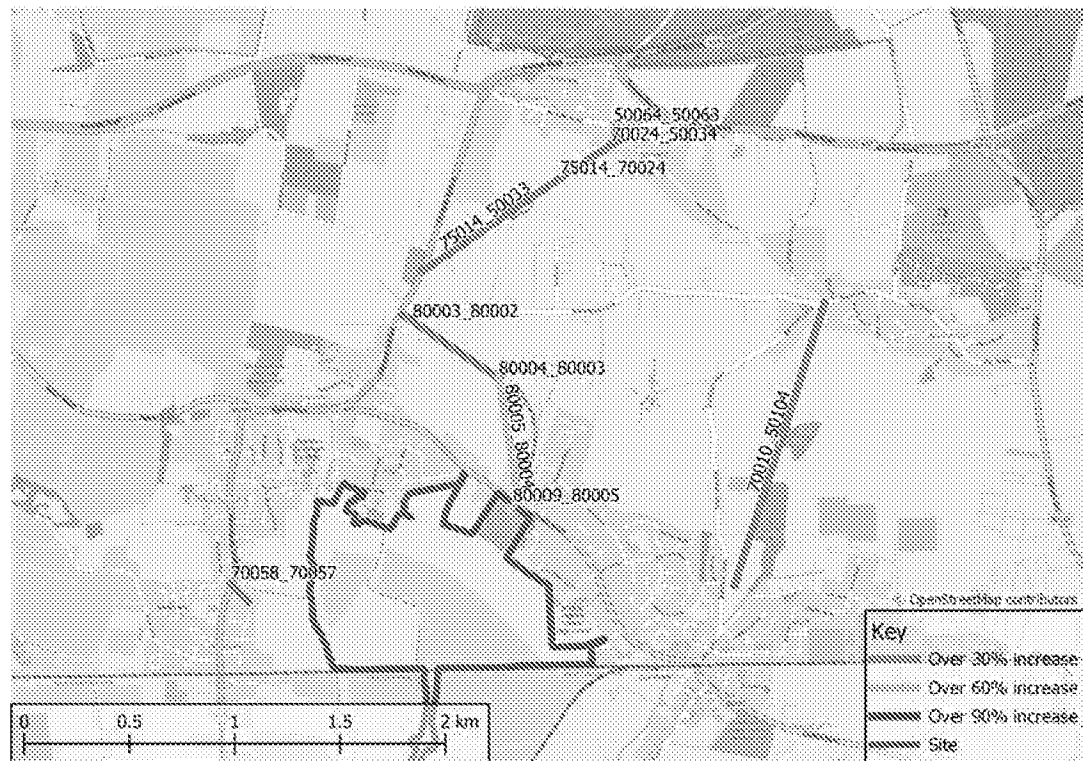
No.	Link	2031 DM AADT total flow	2031 DS AADT total flow	2031 DM to 2031 DS increase in total flow	2031 DM AADT HDV flow	2031 DS AADT HDV flow	2031 DM to 2031 DS increase in HDV flow
1	6250_6150	875	914	4%	102	104	2%
2	6153_6151	1600	1602	0%	121	123	2%
3	6152_6151	1813	1879	4%	173	175	1%
4	6150_6152	875	914	4%	102	104	2%
5	6350_6250	1671	1738	4%	160	163	1%
6	6450_6350	1671	1738	4%	160	163	1%
7	6550_6450	1734	1818	5%	108	108	0%
8	6752_6652	467	511	9%	32	36	11%
9	6846_6746	0	0		0	0	
10	7068_6973	2748	3169	15%	59	59	0%
11	50157_7065	3256	3680	13%	57	57	0%
12	7068_7065	2748	3169	15%	59	59	0%

No.	Link	2031 DM AADT total flow	2031 DS AADT total flow	2031 DM to 2031 DS increase in total flow	2031 DM AADT HDV flow	2031 DS AADT HDV flow	2031 DM to 2031 DS increase in HDV flow
13	50019_50018	2130	2559	20%	116	117	1%
14	70016_50019	2717	3201	18%	139	142	2%
15	50027_50026	210	252	20%	90	90	1%
16	75014_50033	1508	2330	54%	83	85	2%
17	50104_50034	862	936	9%	83	85	3%
18	70024_50034	2157	2970	38%	122	124	1%
19	50064_50034	2728	3612	32%	197	201	2%
20	50286_50046	3893	4033	4%	117	141	20%
21	50083_50060	1180	1236	5%	0	0	
22	50084_50060	1362	1416	4%	42	42	0%
23	50064_50063	1145	1875	64%	155	154	0%
24	70053_50090	2972	3090	4%	102	101	-2%
25	75015_50091	2548	2659	4%	98	96	-2%
26	50137_50094	2395	2487	4%	89	89	0%
27	50169_50101	17073	18195	7%	568	567	0%
28	50272_50101	15533	16656	7%	536	534	0%
29	70026_50104	3157	3495	11%	140	143	2%
30	70010_50104	1674	2224	33%	100	103	3%
31	50124_50151	5851	5929	1%	128	130	2%
32	50159_50157	1267	1569	24%	19	19	0%
33	50186_50185	1035	1029	-1%	214	213	0%
34	50275_50274	1357	1754	29%	17	17	0%
35	70023_70007	0	2		0	0	
36	70013_70007	0	4		0	0	
37	70022_70010	2239	2515	12%	190	191	1%
38	70021_70011	2463	2754	12%	158	159	1%
39	70012_70011	2641	2932	11%	146	149	2%
40	70020_70012	2876	3173	10%	137	140	2%
41	70026_70016	2782	3275	18%	131	134	2%
42	70022_70021	2463	2754	12%	158	159	1%
43	75014_70024	1727	2544	47%	83	85	2%
44	80013_70050	706	0	-100%	0	0	
45	75015_70053	2620	2734	4%	98	96	-2%
46	70058_70057	897	1196	33%	33	33	0%
47	75010_75009	4314	4515	5%	155	148	-5%
48	80003_80002	5819	8590	48%	67	72	7%
49	80004_80003	5819	8590	48%	67	72	7%
50	80005_80004	4018	6791	69%	67	72	7%
51	80009_80005	4018	6791	69%	67	72	7%

D5.25 With reference to Table D5.2, which includes only the links experiencing an increase of 30% or more as defined previously in Table D4.1, there is, as expected, an increase in total flows.

D5.26 Most notable are the increases over 60% on the 23rd, 50th and 51st links. These are shown on Figure D5.2. The 23rd link is at the eastern end of Arundel Road as it runs through Fontwell cutting between two sections of the A27. An uplift in traffic is expected as this is a strategic route. The links south of this experience increases over 30%, suggesting some traffic continues from/along this Arundel Road section and some travels towards/away from the application site. The 50th and 51st links experience an uplift in traffic, as they are part of the realigned A29 whose purpose is to reassign traffic away from the existing A29, so this is not considered to be an issue.

Figure D5.2: Potential Effects: Local Highway Network 2031 No Cala links over 30% Total Flow



D5.27 For the HDV flows, none are above 30% increases.

2038

D5.28 Table D5.3 shows the increase as a result of the Proposed Development in 2038.

Table D5.3: 2038 Do Minimum vs. 2038 Do Something AADT flow increases

No.	Link	2031 DM AADT total flow	2031 DS AADT total flow	2031 DM to 2031 DS increase in total flow	2031 DM AADT HDV flow	2031 DS AADT HDV flow	2031 DM to 2031 DS increase in HDV flow
1	6250_6150	1178	1254	7%	120	167	40%
2	6153_6151	1769	1867	6%	137	197	44%
3	6152_6151	2440	2645	8%	195	255	31%
4	6150_6152	1178	1254	7%	120	167	40%
5	6350_6250	2297	2508	9%	182	243	34%

No.	Link	2031 DM AADT total flow	2031 DS AADT total flow	2031 DM to 2031 DS increase in total flow	2031 DM AADT HDV flow	2031 DS AADT HDV flow	2031 DM to 2031 DS increase in HDV flow
6	6450_6350	2297	2508	9%	182	243	34%
7	6550_6450	2354	2567	9%	128	193	51%
8	6752_6652	615	719	17%	30	48	62%
9	6846_6746	0	0	100%*	0	0	
10	7068_6973	2869	4039	41%	62	62	0%
11	50157_7065	3419	4585	34%	60	60	0%
12	7068_7065	2869	4039	41%	62	62	0%
13	50019_50018	2359	3168	34%	117	144	23%
14	70016_50019	2948	4027	37%	144	180	25%
15	50027_50026	228	536	135%	93	103	10%
16	75014_50033	1778	3116	75%	85	87	2%
17	50104_50034	737	1020	38%	86	95	10%
18	70024_50034	2481	3830	54%	124	126	2%
19	50064_50034	2889	4456	54%	201	212	5%
20	50286_50046	4061	3911	-4%	118	154	31%
21	50083_50060	1410	2486	76%	0	0	
22	50084_50060	1578	2663	69%	43	42	-1%
23	50064_50063	1425	2524	77%	156	157	1%
24	70053_50090	3343	5151	54%	110	114	3%
25	75015_50091	2906	4673	61%	106	109	3%
26	50137_50094	2898	3852	33%	113	116	3%
27	50169_50101	18359	24437	33%	588	612	4%
28	50272_50101	16844	22970	36%	556	582	5%
29	70026_50104	3214	4321	34%	146	174	19%
30	70010_50104	1756	4087	133%	102	166	63%
31	50124_50151	5819	8032	38%	133	133	0%
32	50159_50157	1332	2081	56%	19	19	-1%
33	50186_50185	1053	1432	36%	214	214	0%
34	50275_50274	1363	2145	57%	17	18	8%
35	70023_70007	0	164	261026%	0	1	
36	70013_70007	0	311	495726%	0	1	
37	70022_70010	2432	4621	90%	193	222	15%
38	70021_70011	2675	4958	85%	160	207	29%
39	70012_70011	2862	5190	81%	150	200	34%
40	70020_70012	3116	5420	74%	141	198	40%
41	70026_70016	3013	4125	37%	137	171	25%
42	70022_70021	2675	4958	85%	160	207	29%
43	75014_70024	2002	3381	69%	85	87	2%
44	80013_70050	1715	2426	41%	0	21	

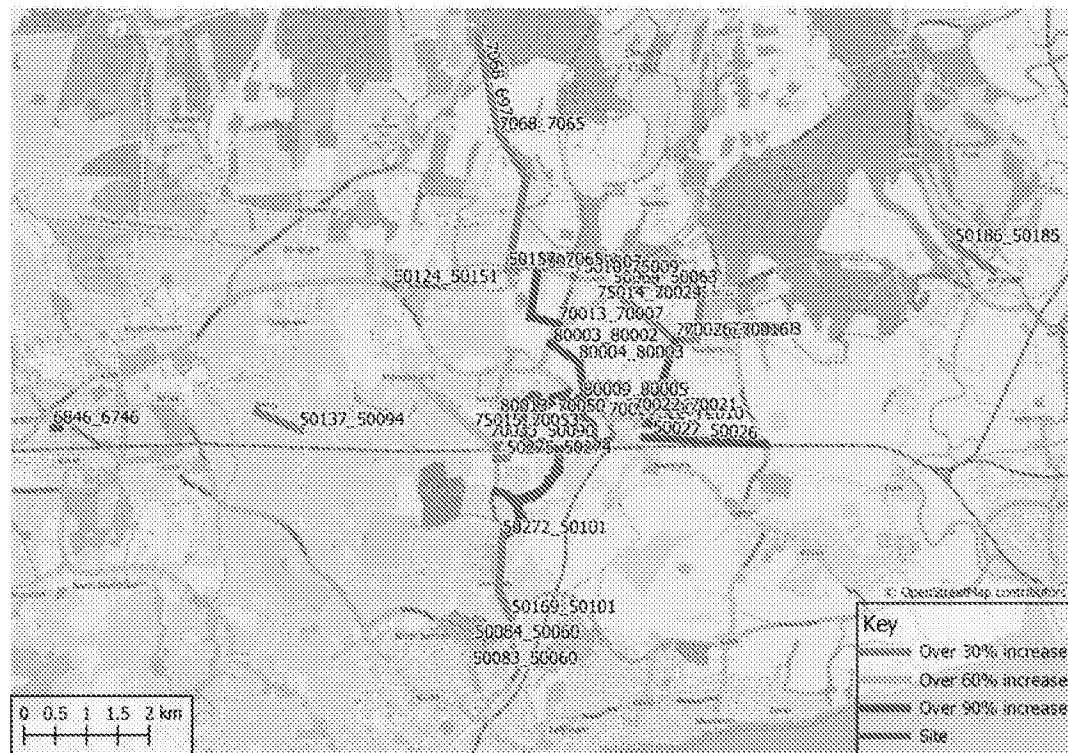
No.	Link	2031 DM AADT total flow	2031 DS AADT total flow	2031 DM to 2031 DS increase in total flow	2031 DM AADT HDV flow	2031 DS AADT HDV flow	2031 DM to 2031 DS increase in HDV flow
45	75015_70053	2978	4763	60%	106	109	3%
46	70058_70057	926	938	1%	34	34	0%
47	75010_75009	4162	5486	32%	157	119	-24%
48	80003_80002	6414	15218	137%	72	107	49%
49	80004_80003	6414	15218	137%	72	107	49%
50	80005_80004	4621	14677	218%	72	107	49%
51	80009_80005	4621	14677	218%	72	107	49%

*This appears because the DM 0 is rounded down from 0.0325 and the DS 0 is rounded down from 0.0650, giving a 100% increase. This is included for completeness however the effect of this increase would not be existent.

D5.29

With reference to Table D5.3, which includes only the links experiencing an increase of 30% or more as defined previously in Table D4.1, there is, as expected, an increase in total flows.

Figure D5.3: Potential Effects: Local Highway Network 2038 links over 30% Total Flow



D5.30

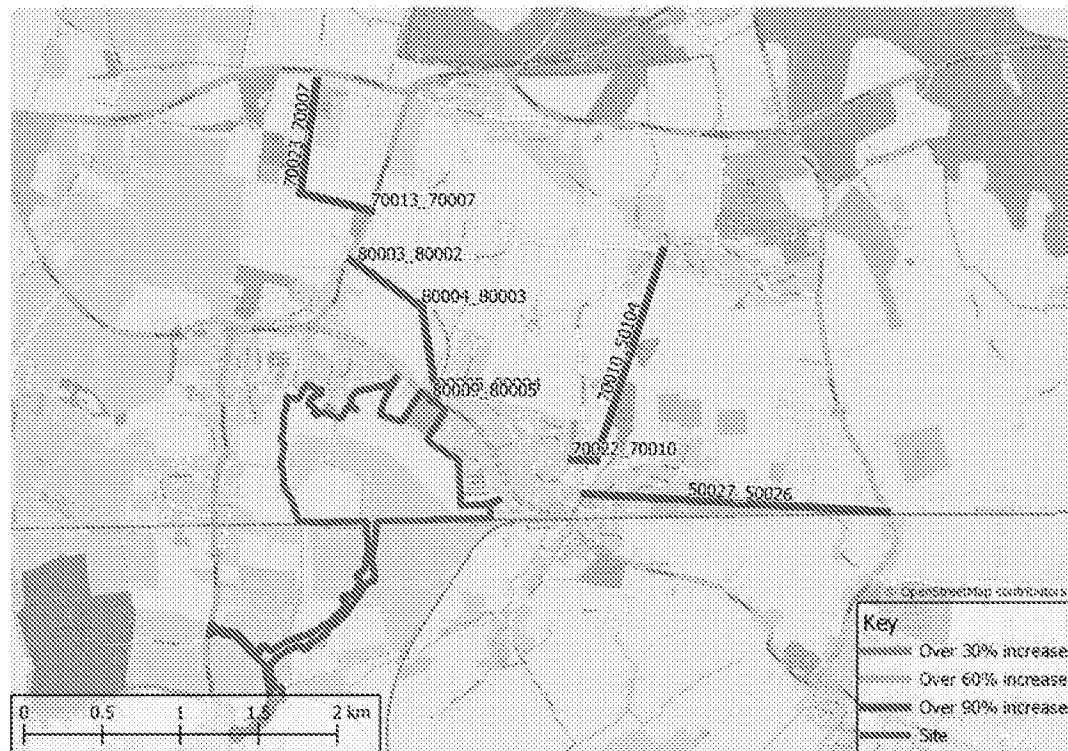
Most notable are the increases over 90% on the 9th, 15th, 30th, 35th, 36th and 37th links, as well as the 48th to 51st. These are shown on Figure D5.3, and on Figure D5.4 which shows that the 48th to 51st links form the northern section of the realigned A29, which is intended to reassign traffic from the existing A29. It is expected and intended that they will experience an uplift of this magnitude.

D5.31

The 9th link is in Chichester, and as is explained above this appears because the DM 0 is rounded down from 0.0325 and the DS 0 is rounded down from 0.0650, giving a 100% increase. This is not significant and is not shown on Figure D5.4.

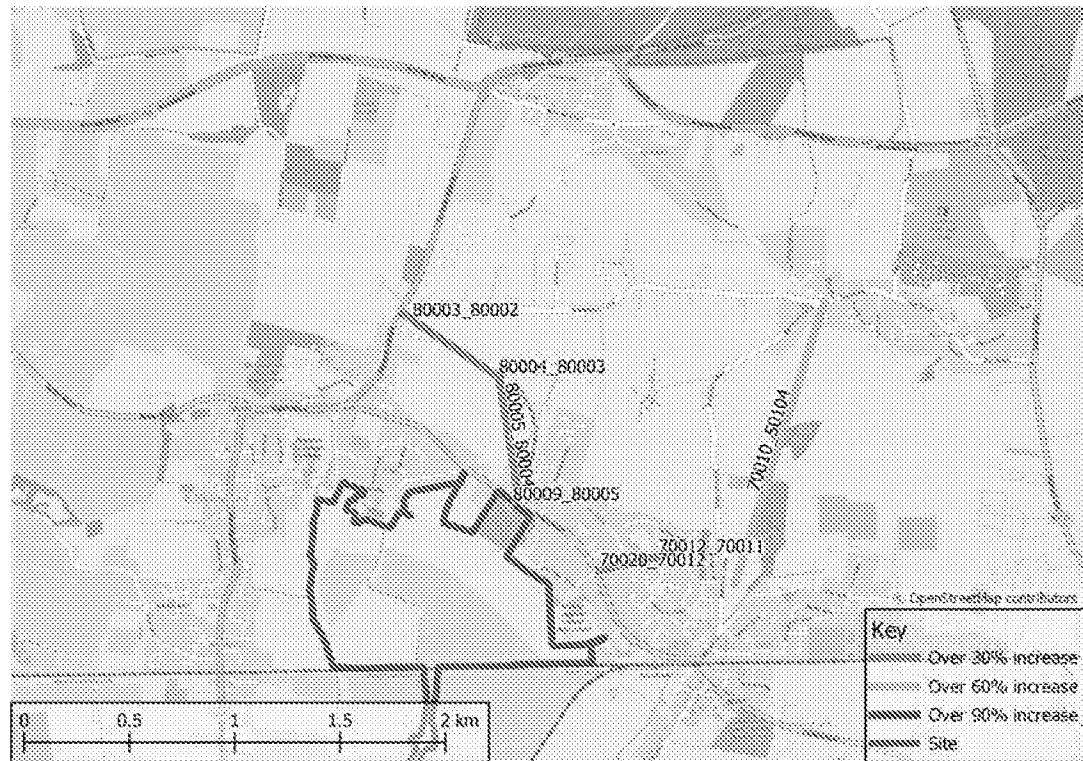
- D5.32 The 15th link, shown on Figure D5.4 is Lake Lane, which is located in Barnham, and the 30th link is Barnham Lane, which runs between Barnham and Walberton. These are both rural in character however in such close proximity to the application site, it would be expected that they could experience some uplift.
- D5.33 The 35th and 36th links are shown to experience a major uplift, but it should be noted that these had a traffic flow of 0 vehicles in the DM scenario, giving rise to a large % increase, and a resultant AADT of less than 350 vehicles per day would not constitute a major traffic flow.
- D5.34 The 37th link's traffic, at the east end of Orchard Way, doubles from the DM to the DS scenario modelling.

Figure D5.4: Potential Effects: Local Highway Network 2038 links over 90% Total Flow



- D5.35 With reference to Table D5.3, which includes only the links experiencing an increase of 30% or more as defined previously in Table D4.1, there is an increase in HDV flows. These are shown on Figure D5.5.
- D5.36 Most notable are the 8th and 30th links, which are in Chichester and Barnham respectively. On the 8th link, an increase of 62% represents a real-term increase of 18 HDVs throughout the day, which is considered unlikely to be a perceptible change. As mentioned above, the 30th link is Barnham Lane, which runs between Barnham and Walberton. The HDVs in the DS scenario would form 4% of the total traffic on that road, which again is considered unlikely to be noticeable.

Figure D5.5: Potential Effects: Local Highway Network 2038 links over 30% HDV



Conclusion

- D5.37 Amongst a network of several thousand links, the 51 listed in the above table are the few which experience an uplift that requires further consideration. They are, as expected, mainly located in the surrounding area of the application site, and along the realigned A29 specifically. It is expected that the application site will increase traffic due to being developed from its existing use as arable land which generates few trips, and the reassignment of traffic being an intentional result of the A29 realignment.
- D5.38 The flow increases are not expected to create any link-specific issues, as distinct from junction operation, see section below. The absolute increases are not considered to create any specific issues relative to the capacity of the link. These increases are also unlikely to reduce the scope for links to absorb further flows in the future beyond 2038. Therefore, on balance and in the absence of mitigation, the Proposed Development is expected to have a **minor adverse long-term (not significant) effect** on link flows. It is however reiterated that link operation is generally determined by the junctions at either end. The effects of traffic changes at those junctions (established through modelling) is considered below.

Pedestrian Movement, Capacity and Delay

- D5.39 The significance of the increase in pedestrian flow has been assessed using professional judgement in conjunction with the TRICS assessment (summarised below) and mode share (approximately 26% of overall trips aggregated over all uses).
- D5.40 In the No Cala scenario, although there is no east-west vehicle link, there are still pedestrian connections to the west and so the absence of the Cala link would not materially affect pedestrian movement and capacity. Additionally, in line with the robust assessment based on the Local Plan years and the WSCC A29 CATM model (operated by WSP) as discussed above,

Phases 1 and 2 have been assessed together here. Due to the overwhelming majority of homes being delivered during Phase 1, it is not considered that assessing Phase 1 and Phase 2 separately would materially change the effect on pedestrian movement, capacity and delay.

D5.41 The following table summarises the 2031 trip generation for the site.

Table D5.4: Pedestrian trips in 2031

Land use	% on foot	AM peak trips	PM peak trips
Residential	6%	39	41
School	50%	114	12
Care home	22%	3	3
Average Total	26%	156	57

*Numbers in the table reflect rounding.

D5.42 These are the peak hour trips for the full site build-out for the application on land north of the railway, so are estimates for how many trips will occur at the agreed peak hours of 08:00-09:00 and 17:00-18:00. As the Proposed Development is on the edge of town, it is not expected that there will be a large amount of through-trips made by pedestrians at peak hours. These may be made at other times when the pedestrian footway network usually has more free space.

D5.43 The pedestrian network consists of the dedicated footpaths as part of PRow and footways alongside roads as outlined in Section 4 of this Chapter.

D5.44 The Proposed Development will improve these PRow within the site, and also provide pedestrian footways on both sides of all the main internal roads (e.g. realigned A29 and East-West Link), to encourage pedestrian travel and provide a safe walking environment for all. It will also provide some pedestrian crossing points at locations within the development in order to improve pedestrian connectivity.

D5.45 In this way, it is expected that the overall amount of pedestrian movements generated by the full development (estimated at 156 in the AM peak and 57 in the PM peak) should not be constrained by the capacity of the footways, which are adequate for the increase in pedestrian footfall being proposed.

D5.46 Therefore, the effect on pedestrian movement, capacity and delay is expected to be a **negligible (not significant) effect**.

Pedestrian Severance, Fear and Intimidation

Severance

D5.47 The IEMA Guidelines have been used to determine the effect of traffic flows on pedestrian severance. The IEMA Guidelines state that the flows should be assessed when traffic flows have increased by more than 30% (or in sensitive area of increases of 10%).

D5.48 In line with the robust assessment based on the Local Plan years and WSCC A29 CATM model (operated by WSP) as discussed above, Phases 1 and 2 have been assessed together here. Due to the overwhelming majority of homes being delivered during Phase 1, it is not considered that assessing Phase 1 and Phase 2 separately would materially change the effect on pedestrian severance, fear and intimidation.

2031 with Cala

D5.49

The effect of the 2031 with Cala do minimum and do something scenarios when compared against the 2017 baseline is shown in Table D5.5.

Table D5.5: Potential effects – pedestrian severance, 2031 with Cala

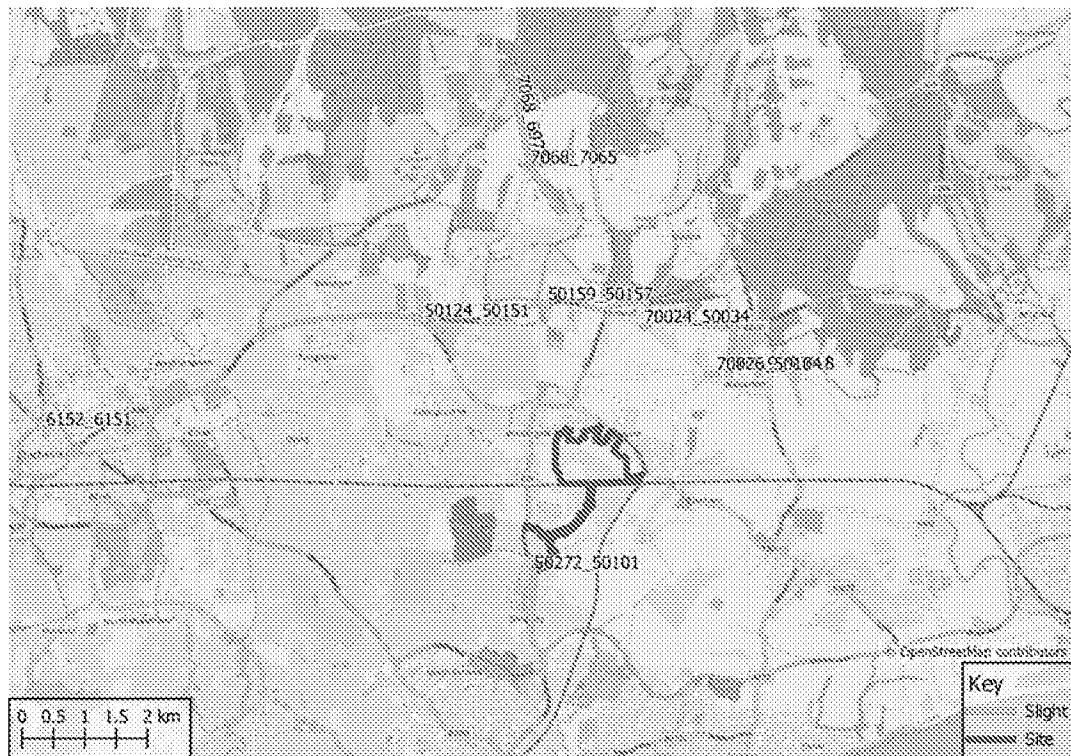
No.	Link	2031 DM % increase over 2017	Pedestrian severance measure	2031 DS % increase over 2017	Pedestrian severance measure	Change between 2031 DM and 2031 DS (DS shown)
1	6250_6150	40%	Slight	45%	Slight	N/A
2	6153_6151	6%	N/A	6%	N/A	N/A
3	6152_6151	29%	N/A	35%	Slight	Slight
4	6150_6152	40%	Slight	45%	Slight	N/A
5	6350_6250	32%	Slight	39%	Slight	N/A
6	6450_6350	32%	Slight	39%	Slight	N/A
7	6550_6450	33%	Slight	42%	Slight	N/A
8	6752_6652	134%	Substantial	163%	Substantial	N/A
9	6846_6746		N/A		N/A	N/A
10	7068_6973	14%	N/A	33%	Slight	Slight
11	50157_7065	36%	Slight	55%	Slight	N/A
12	7068_7065	14%	N/A	33%	Slight	Slight
13	50019_50018	10%	N/A	30%	Slight	Slight
14	70016_50019	6%	N/A	23%	N/A	N/A
15	50027_50026	-18%	N/A	-3%	N/A	N/A
16	75014_50033		N/A		N/A	N/A
17	50104_50034	-19%	N/A	-16%	N/A	N/A
18	70024_50034	22%	N/A	57%	Slight	Slight
19	50064_50034	1%	N/A	24%	N/A	N/A
20	50286_50046	9%	N/A	12%	N/A	N/A
21	50083_50060	1%	N/A	11%	N/A	N/A
22	50084_50060	-6%	N/A	2%	N/A	N/A
23	50064_50063	-21%	N/A	15%	N/A	N/A
24	70053_50090	122%	Substantial	127%	Substantial	N/A
25	75015_50091		N/A		N/A	N/A
26	50137_50094	96%	Substantial	110%	Substantial	N/A
27	50169_50101	32%	Slight	42%	Slight	N/A
28	50272_50101	22%	N/A	31%	Slight	Slight
29	70026_50104	20%	N/A	31%	Slight	Slight
30	70010_50104	-9%	N/A	18%	N/A	N/A
31	50124_50151	18%	N/A	32%	Slight	Slight
32	50159_50157	16%	N/A	44%	Slight	Slight
33	50186_50185	126%	Substantial	126%	Substantial	N/A
34	50275_50274	164%	Substantial	241%	Substantial	N/A
35	70023_70007	-100%	N/A	-99%	N/A	N/A
36	70013_70007	-100%	N/A	-99%	N/A	N/A

No.	Link	2031 DM % increase over 2017	Pedestrian severance measure	2031 DS % increase over 2017	Pedestrian severance measure	Change between 2031 DM and 2031 DS (DS shown)
37	70022_70010	-10%	N/A	5%	N/A	N/A
38	70021_70011	-8%	N/A	7%	N/A	N/A
39	70012_70011	-7%	N/A	7%	N/A	N/A
40	70020_70012	-6%	N/A	7%	N/A	N/A
41	70026_70016	10%	N/A	28%	N/A	N/A
42	70022_70021	-8%	N/A	7%	N/A	N/A
43	75014_70024		N/A		N/A	N/A
44	80013_70050		N/A		N/A	N/A
45	75015_70053		N/A		N/A	N/A
46	70058_70057	3%	N/A	3%	N/A	N/A
47	75010_75009		N/A		N/A	N/A
48	80003_80002		N/A		N/A	N/A
49	80004_80003		N/A		N/A	N/A
50	80005_80004		N/A		N/A	N/A
51	80009_80005		N/A		N/A	N/A

D5.50

The links experiencing a change between DM and DS are shown on Figure D5.6.

Figure D5.6: Potential effects: Pedestrian severance, 2031, DS shown.



D5.51

By the IEMA categories, severance is seen to increase to 'slight' or 'substantial' on various links in the Do Minimum scenario as a result of background growth and other committed

developments. Nine other links increase to 'slight' as a result of the DS scenario, and these are shown on Figure D5.6.

D5.52 However, these increases must be framed in the context of very low levels of existing rural pedestrian demand in the area (the measure, by definition, takes no account of pedestrian demand). The increase in traffic as a result of the development may increase crossing times for pedestrians. However, the built-in mitigation provided includes new pedestrian crossings at junctions along the realigned A29.

2031 No Cala

D5.53 The effect of the 2031 No Cala do minimum and do something scenarios when compared against the 2017 baseline are shown in Table D5.6.

Table D5.6: Potential effects – pedestrian severance, 2031 No Cala

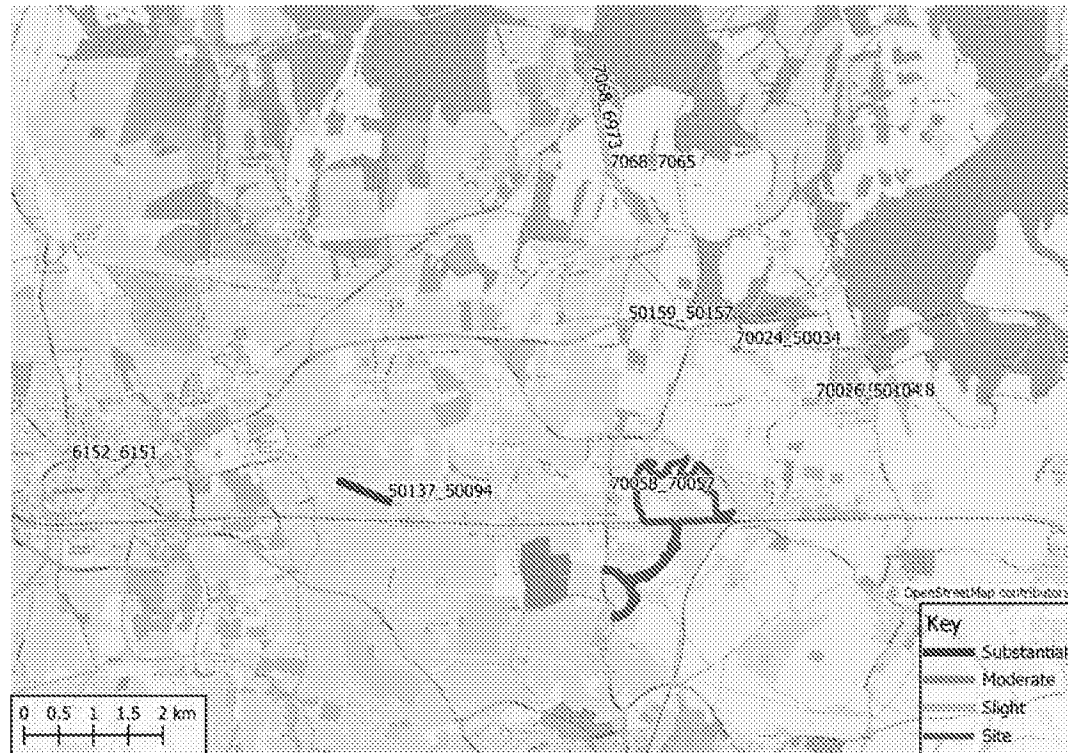
No.	Link	2038 DM % increase over 2017	Pedestrian severance measure	2038 DS % increase over 2017	Pedestrian severance measure	Change between 2031 DM No Cala and 2031 DS No Cala (DS shown)
1	6250_6150	38%	Slight	44%	Slight	N/A
2	6153_6151	6%	N/A	6%	N/A	N/A
3	6152_6151	28%	N/A	33%	Slight	Slight
4	6150_6152	38%	Slight	44%	Slight	N/A
5	6350_6250	32%	Slight	37%	Slight	N/A
6	6450_6350	32%	Slight	37%	Slight	N/A
7	6550_6450	32%	Slight	39%	Slight	N/A
8	6752_6652	132%	Substantial	154%	Substantial	N/A
9	6846_6746		N/A		N/A	N/A
10	7068_6973	13%	N/A	30%	Slight	Slight
11	50157_7065	35%	Slight	52%	Slight	N/A
12	7068_7065	13%	N/A	30%	Slight	Slight
13	50019_50018	9%	N/A	31%	Slight	Slight
14	70016_50019	5%	N/A	24%	N/A	N/A
15	50027_50026	-20%	N/A	-4%	N/A	N/A
16	75014_50033		N/A		N/A	N/A
17	50104_50034	-22%	N/A	-15%	N/A	N/A
18	70024_50034	17%	N/A	61%	Moderate	Moderate
19	50064_50034	-3%	N/A	28%	N/A	N/A
20	50286_50046	9%	N/A	13%	N/A	N/A
21	50083_50060	-1%	N/A	4%	N/A	N/A
22	50084_50060	-7%	N/A	-4%	N/A	N/A
23	50064_50063	-26%	N/A	20%	N/A	N/A
24	70053_50090	112%	Substantial	120%	Substantial	N/A
25	75015_50091		N/A		N/A	N/A
26	50137_50094	85%	Moderate	92%	Substantial	Substantial
27	50169_50101	30%	Slight	39%	Slight	N/A
28	50272_50101	19%	N/A	28%	N/A	N/A
29	70026_50104	19%	N/A	32%	Slight	Slight

No.	Link	2038 DM % increase over 2017	Pedestrian severance measure	2038 DS % increase over 2017	Pedestrian severance measure	Change between 2031 DM No Cala and 2031 DS No Cala (DS shown)
30	70010_50104	-11%	N/A	18%	N/A	N/A
31	50124_50151	16%	N/A	18%	N/A	N/A
32	50159_50157	15%	N/A	42%	Slight	Slight
33	50186_50185	125%	Substantial	123%	Substantial	N/A
34	50275_50274	164%	Substantial	241%	Substantial	N/A
35	70023_70007	-100%	N/A	-99%	N/A	N/A
36	70013_70007	-100%	N/A	-98%	N/A	N/A
37	70022_70010	-8%	N/A	3%	N/A	N/A
38	70021_70011	-6%	N/A	5%	N/A	N/A
39	70012_70011	-6%	N/A	5%	N/A	N/A
40	70020_70012	-5%	N/A	5%	N/A	N/A
41	70026_70016	9%	N/A	28%	N/A	N/A
42	70022_70021	-6%	N/A	5%	N/A	N/A
43	75014_70024		N/A		N/A	N/A
44	80013_70050		N/A		N/A	N/A
45	75015_70053		N/A		N/A	N/A
46	70058_70057	3%	N/A	37%	Slight	Slight
47	75010_75009		N/A		N/A	N/A
48	80003_80002		N/A		N/A	N/A
49	80004_80003		N/A		N/A	N/A
50	80005_80004		N/A		N/A	N/A
51	80009_80005		N/A		N/A	N/A

D5.54

The links showing a change between DM and DS are shown on Figure D5.7.

Figure D5.7: Potential effects: Pedestrian severance, 2031 No Cala, DS shown.



- D5.55 As in 2031 with Cala, in 2031 No Cala by the IEMA categories, severance is seen to increase to 'slight', 'moderate' or 'substantial' on various links in the Do Minimum scenario as a result of background growth and other committed developments, and then increase to 'slight', 'moderate' or 'substantial' on nine more links in the Do Something scenario.
- D5.56 The increase to 'moderate' from below threshold on the 18th link stems from an increase from 1849 vehicles in 2017 to 2157 in the DM scenario, and then up to 2970 in the DS scenario. The increase to 'substantial' on the 26th link stems from an increase from 1294 vehicles in 2017 to 2397 in the DM scenario ('moderate') to 2487 in the DS scenario, pushing it over into 'substantial'. It's considered that an extra 92 vehicles is unlikely to form a noticeable difference amongst almost 2500 vehicles.
- D5.57 These increases must be framed in the context of very low levels of existing rural pedestrian demand in the area (the measure, by definition, takes no account of pedestrian demand). The increase in traffic as a result of the development may increase crossing times for pedestrians. However, the built-in mitigation provided includes new pedestrian crossings at site-related junctions along the realigned A29.

2038

- D5.58 The effect of the 2038 do minimum and do something scenarios when compared against the 2017 baseline are shown in Table D5.7.

Table D5.7: Potential effects – pedestrian severance, 2038

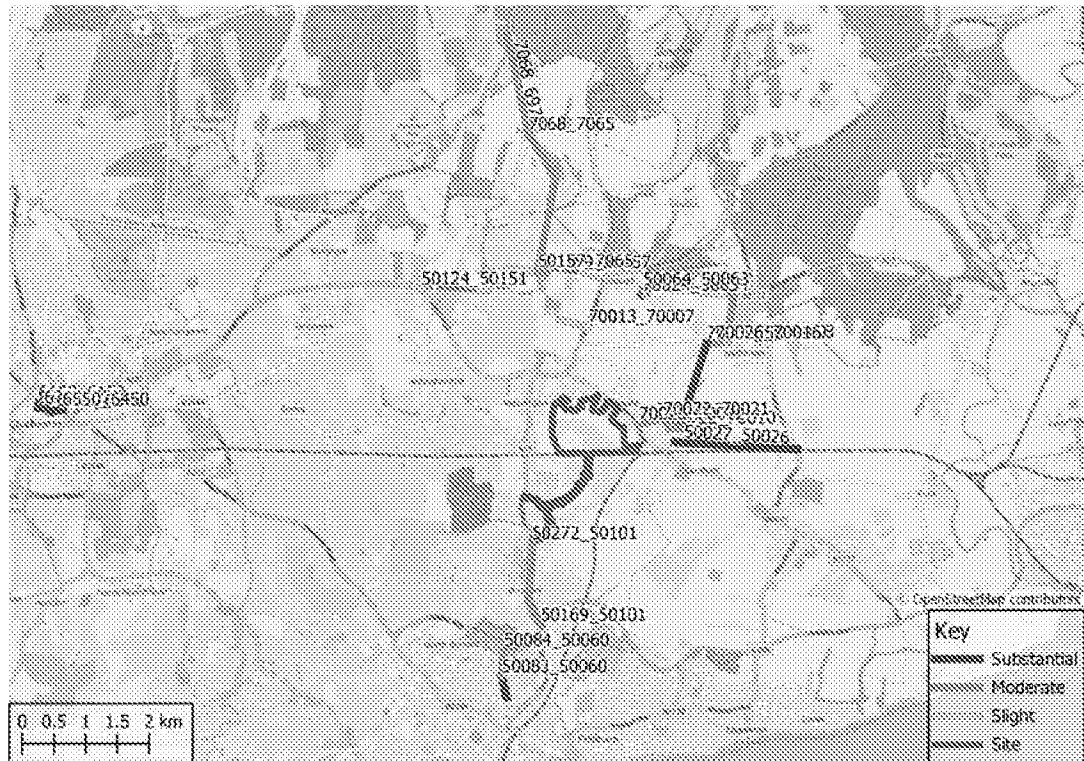
No.	Link	2038 DM % increase over 2017	Pedestrian severance measure	2038 DS % increase over 2017	Pedestrian severance measure	Change between 2038 DM and 2038 DS (DS shown)
1	6250_6150	86%	Moderate	98%	Substantial	Substantial
2	6153_6151	17%	N/A	24%	N/A	N/A
3	6152_6151	73%	Moderate	87%	Moderate	N/A
4	6150_6152	86%	Moderate	98%	Substantial	Substantial
5	6350_6250	81%	Moderate	98%	Substantial	Substantial
6	6450_6350	81%	Moderate	98%	Substantial	Substantial
7	6550_6450	79%	Moderate	96%	Substantial	Substantial
8	6752_6652	206%	Substantial	257%	Substantial	N/A
9	6846_6746		N/A		N/A	N/A
10	7068_6973	18%	N/A	66%	Moderate	Moderate
11	50157_7065	41%	Slight	90%	Moderate	Moderate
12	7068_7065	18%	N/A	66%	Moderate	Moderate
13	50019_50018	20%	N/A	62%	Moderate	Moderate
14	70016_50019	14%	N/A	56%	Slight	Slight
15	50027_50026	-13%	N/A	105%	Substantial	Substantial
16	75014_50033		N/A		N/A	N/A
17	50104_50034	-33%	N/A	-8%	N/A	N/A
18	70024_50034	34%	Slight	107%	Substantial	Substantial
19	50064_50034	3%	N/A	58%	Slight	Slight
20	50286_50046	13%	N/A	9%	N/A	N/A
21	50083_50060	18%	N/A	109%	Substantial	Substantial
22	50084_50060	7%	N/A	81%	Moderate	Moderate
23	50064_50063	-8%	N/A	62%	Moderate	Moderate
24	70053_50090	138%	Substantial	267%	Substantial	N/A
25	75015_50091		N/A		N/A	N/A
26	50137_50094	124%	Substantial	198%	Substantial	N/A
27	50169_50101	40%	Slight	86%	Moderate	Moderate
28	50272_50101	29%	N/A	77%	Moderate	Moderate
29	70026_50104	21%	N/A	63%	Moderate	Moderate
30	70010_50104	-7%	N/A	116%	Substantial	Substantial
31	50124_50151	16%	N/A	59%	Slight	Slight
32	50159_50157	21%	N/A	88%	Moderate	Moderate
33	50186_50185	129%	Substantial	211%	Substantial	N/A
34	50275_50274	165%	Substantial	316%	Substantial	N/A
35	70023_70007	-100%	N/A	-31%	N/A	N/A
36	70013_70007	-100%	N/A	31%	Slight	Slight
37	70022_70010	-1%	N/A	89%	Moderate	Moderate
38	70021_70011	2%	N/A	88%	Moderate	Moderate
39	70012_70011	2%	N/A	85%	Moderate	Moderate

No.	Link	2038 DM % increase over 2017	Pedestrian severance measure	2038 DS % increase over 2017	Pedestrian severance measure	Change between 2038 DM and 2038 DS (DS shown)
40	70020_70012	3%	N/A	79%	Moderate	Moderate
41	70026_70016	18%	N/A	62%	Moderate	Moderate
42	70022_70021	2%	N/A	88%	Moderate	Moderate
43	75014_70024		N/A		N/A	N/A
44	80013_70050		N/A		N/A	N/A
45	75015_70053		N/A		N/A	N/A
46	70058_70057	6%	N/A	7%	N/A	N/A
47	75010_75009		N/A		N/A	N/A
48	80003_80002		N/A		N/A	N/A
49	80004_80003		N/A		N/A	N/A
50	80005_80004		N/A		N/A	N/A
51	80009_80005		N/A		N/A	N/A

D5.59

The links showing a change between DM and DS are shown on Figure D5.8.

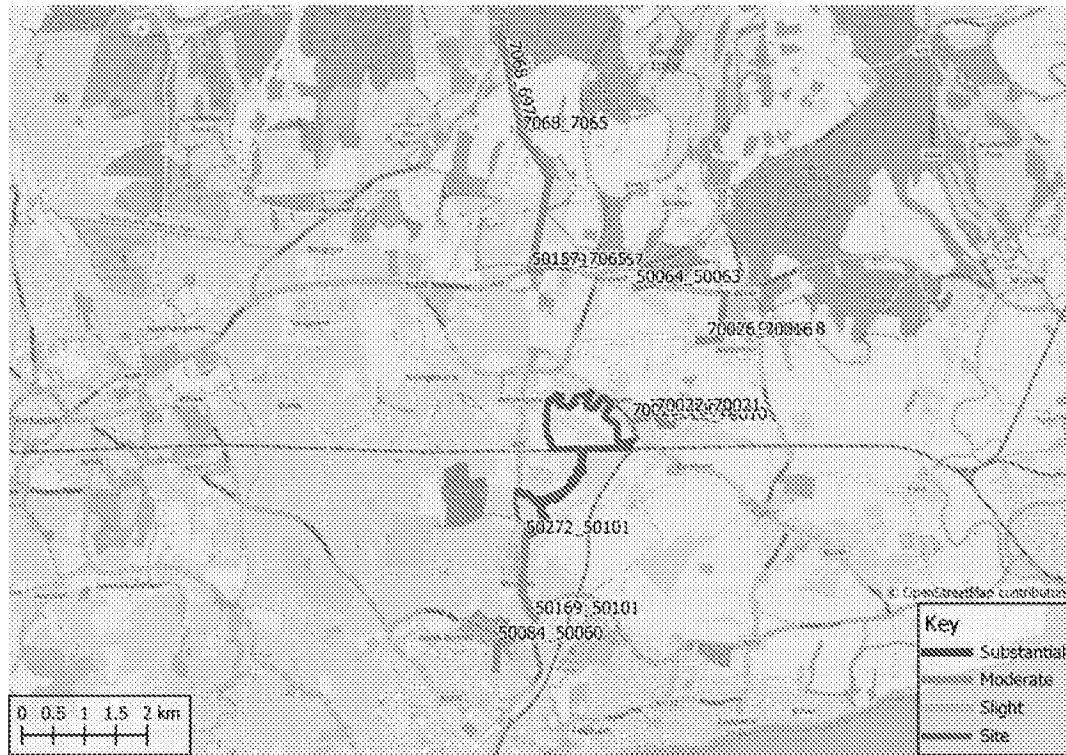
Figure D5.8: Potential effects: Pedestrian severance, 2038, DS shown.



D5.60

As is to be expected, by the IEMA categories, severance is seen to increase on more links in 2038 DS than in 2031 DS (either scenario). This is due to many more dwellings being included in that assessment scenario. Overall, 37 links do not cross the threshold into slight, from 2017 to 2038 DM, and 16 of those remain below the threshold into 2038 DS. Of those links experiencing a change between 2038 DM and 2038 DS, the majority (14) go from below any threshold to 'moderate'. These are shown on Figure D5.9.

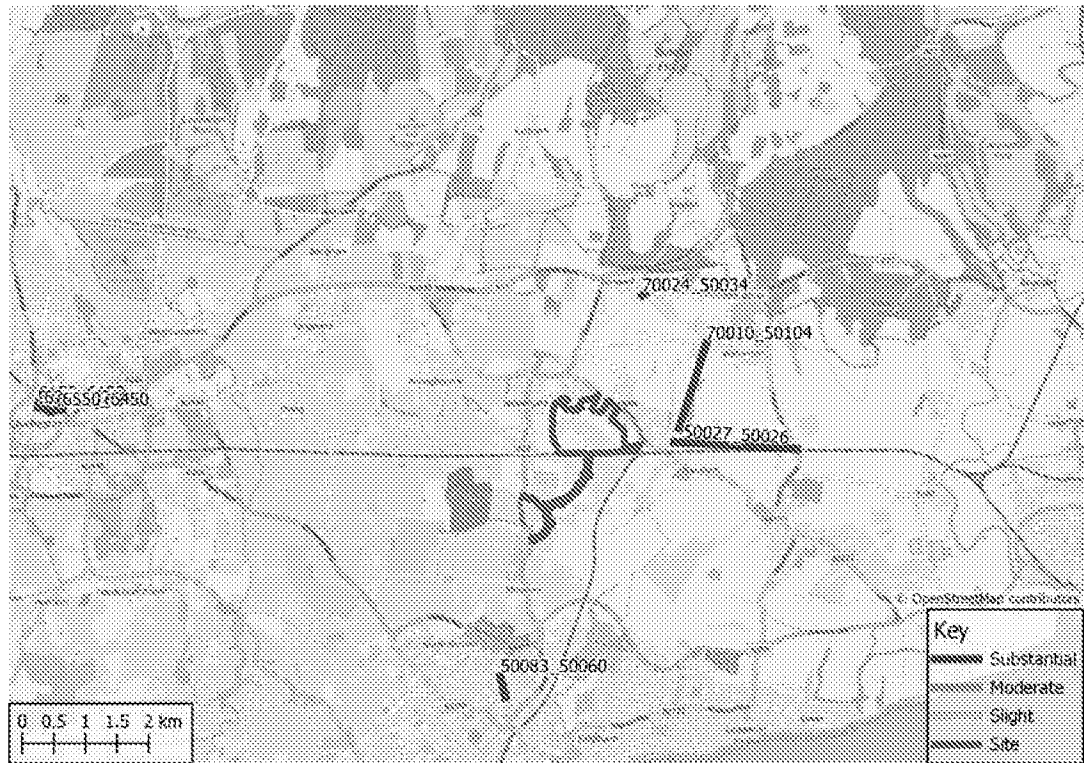
Figure D5.9: Potential effects: Pedestrian severance, 2038, DS shown, Moderate only.



D5.61

Of those links experiencing a change between 2038 DM and 2038 DS, five go from 'moderate' to 'substantial' and four others go from any other threshold to 'substantial'. These are shown on Figure D5.10.

Figure D5.10: Potential effects: Pedestrian severance, 2038, DS shown, Substantial only.



- D5.62 These increases must be framed in the context of very low levels of existing rural pedestrian demand in the area (the measure, by definition, takes no account of pedestrian demand). The increase in traffic as a result of the additional development may increase crossing times for pedestrians. However, the built-in mitigation provided includes new pedestrian crossings at site-related junctions along the realigned A29.
- D5.63 It is also noted that the application is only for the homes north of the railway, and therefore any impacts due to housing growth beyond this will need to be considered as part of future planning applications.
- Conclusion**
- D5.64 There are 'slight', 'moderate' and 'substantial' increases from 2017 in both 2031 Do Minimum scenarios and the 2038 Do Minimum scenario, illustrating the effect of background traffic.
- D5.65 As noted in Section 5.2.1, amongst a network of several thousand links, the 51 identified in this section of the report (Table D5.7) are those which will experience a slight - substantial uplift in severance as a result of the Proposed Development. They are, as expected, mainly in the surrounding area of the application site.
- D5.66 Pedestrian severance is not based on a consideration of existing pedestrian levels of demand and it is not expected that this will be of any practical significance near the application site. However, based on the data presented in this section of the report, the effect on pedestrian severance absent of mitigation is expected to be **minor adverse (not significant)**.

Fear and Intimidation

- D5.67 Fear and intimidation effects are considered as a function of the degree of hazard due to flow volumes, heavy vehicle volumes, and vehicle speeds. These are defined in absolute terms, not in terms of a net Proposed Development effect.
- D5.68 To isolate and identify those effects due to the Proposed Development, the following considers only those links where there is a change in the category of effect due to the Proposed Development. Note that this approach is likely to over-estimate the effect of the Proposed Development as if the given measure is close to a threshold value, even a small increase could result in a category change.
- D5.69 Note that (comparing to Baseline Table D4.3) no links experienced a change in category for total flow from 2017 to 2031 DM nor 2031 DM No Cala. No links experienced a change in category for HDV from 2017 to 2031 DM nor 2031 DM No Cala. However, most links experienced a change in category for speed from 2017 to 2031 DM or 2031 No Cala.

2031 with Cala

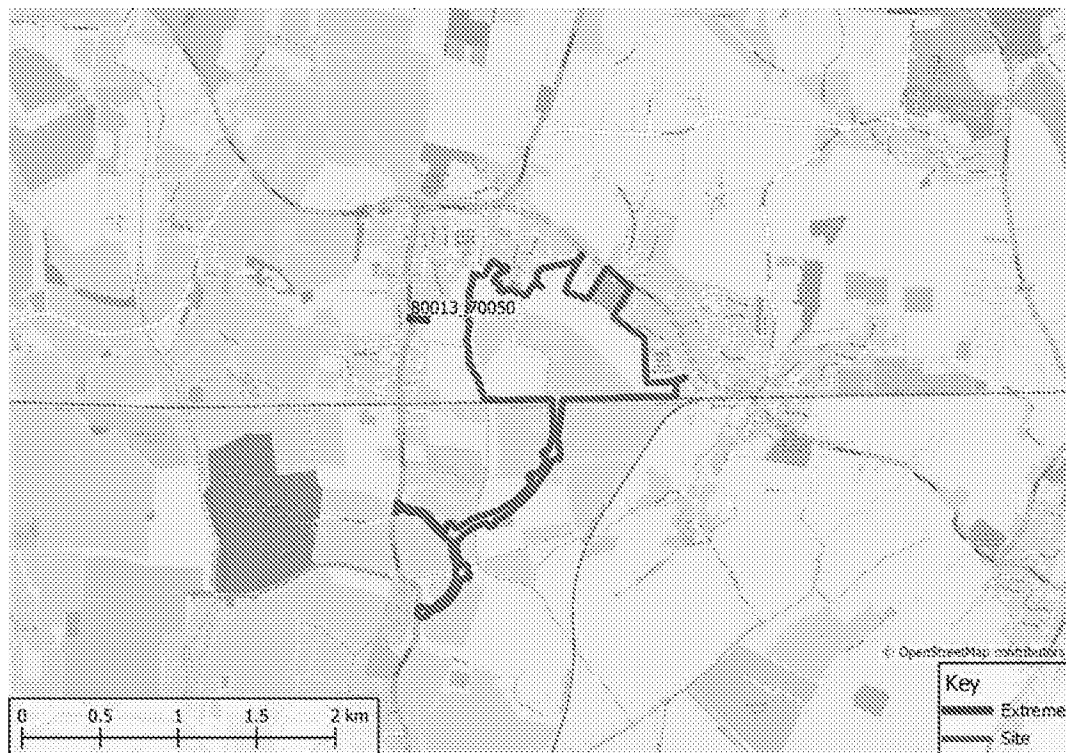
- D5.70 Only one of the 51 links within scope experienced a change in category in one or both of the assessment scenarios. This is shown in Table D5.8.

Table D5.8: Potential effects – pedestrian fear and intimidation, 2031

No.	Link	AAWT fear / intim.	AAWT HDV fear / intim.	AAWT mean speed fear / intim.
44	80013_70050			Extreme

- D5.71 This link is shown on Figure D5.11.

Figure D5.11: Pedestrian fear and intimidation, increased links only, 2031



- D5.72 This link forms the westernmost end of the East-West Link through the Cala site, which will connect through to the realigned A29.
- D5.73 It should be noted here that works to mitigate pedestrian fear and intimidation such as green buffers between the road and footway, and pedestrian crossings, will be provided and are described later in this Chapter in the 'Mitigation' section.
- D5.74 It should also be noted that this link experiences a change only in the speed category, and not in any of the other two (total flow and HDV).

2031 No Cala

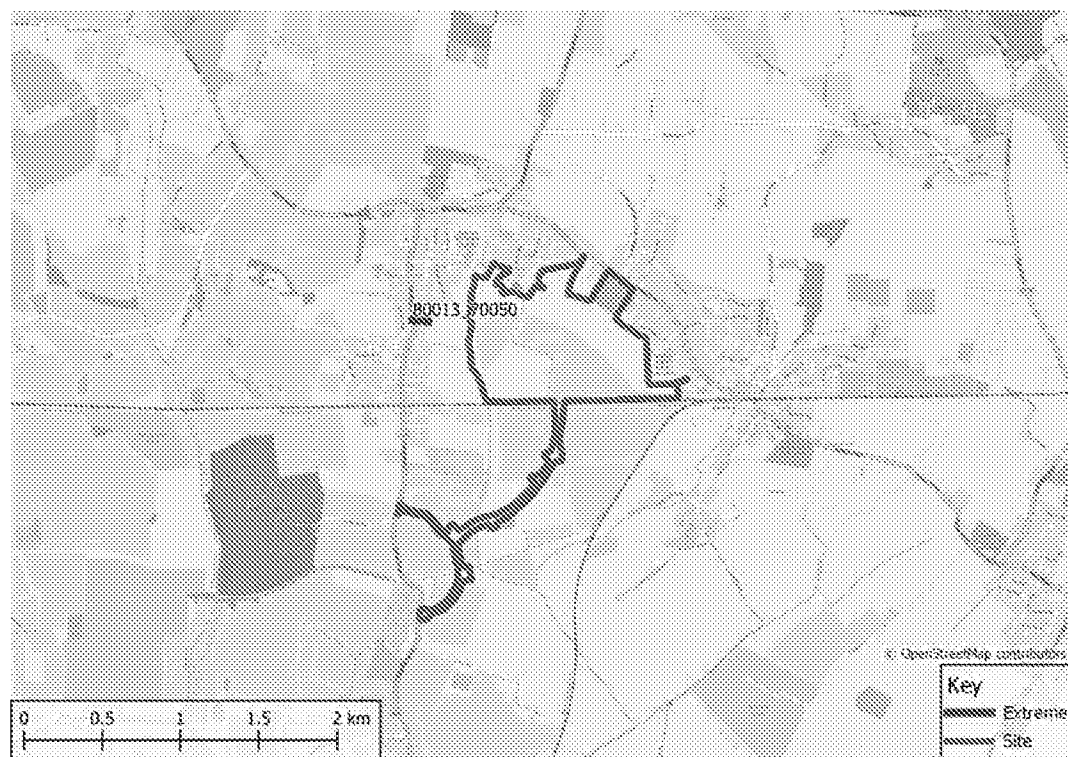
- D5.75 As in 2031 with Cala, only one of the 51 links within scope experienced a change in category in one or both of the assessment scenarios. This is shown in Table 5.9.

Table 5.9: Potential effects – pedestrian fear and intimidation, 2031 No Cala

No.	Link	AAWT fear / intim.	AAWT HDV fear / intim.	AAWT mean speed fear / intim.
44	80013_70050			Extreme

- D5.76 This link is shown on Figure 5.12.

Figure 5.12: Pedestrian fear and intimidation, increased links only, 2031 No Cala



- D5.77 This link is discussed above, but in this scenario there is no connection through the realigned A29. The impact is defined as extreme to the changes in mean traffic speed.

2038

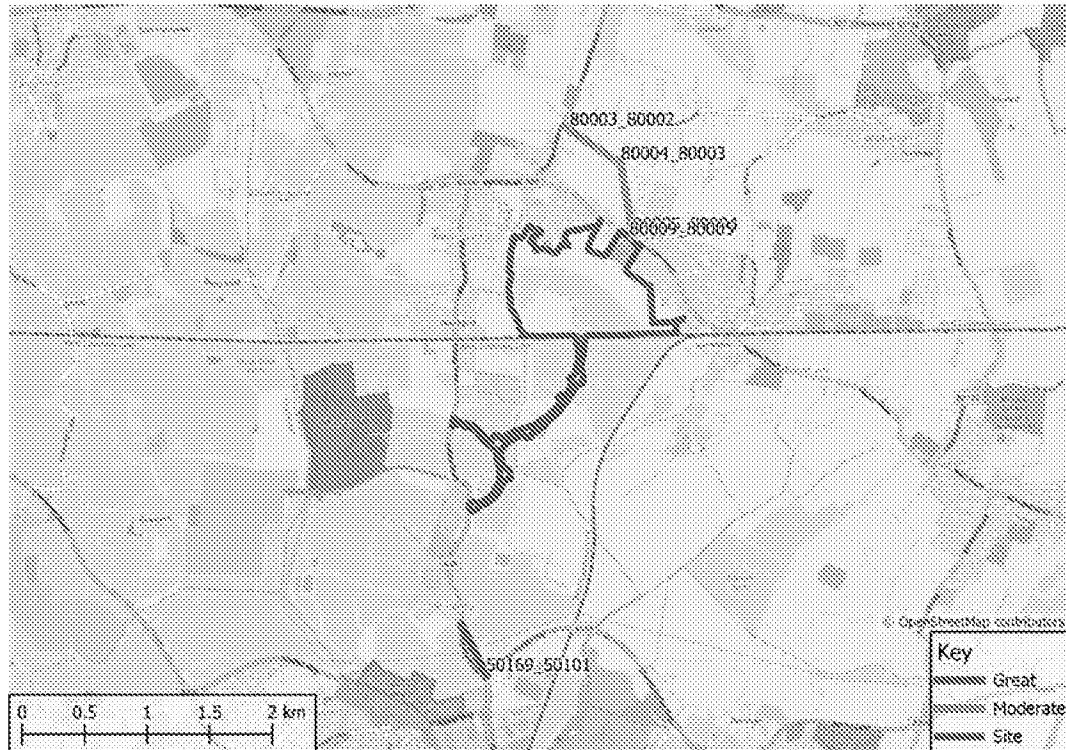
Table D5.10: Potential effects – pedestrian fear and intimidation, 2038

No.	Link	AAWT per hour fear / intimid.	AAWT HDV fear / intimid.	AAWT mean speed fear / intimid.
27	50169_50101	Great		
32	50159_50157			Moderate
48	80003_80002	Moderate		
49	80004_80003	Moderate		
50	80005_80004	Moderate		
51	80009_80005	Moderate		

D5.78 For an explanation of these terms, see the Significance Criteria section in Chapter D3.0 above.

D5.79 The links in the first column in Table D5.10 are shown on Figure D5.13. It's clear that the four 'moderate' flows (AAWT) are on the northern section of the realigned A29, which is to be expected as it is intended to reassign traffic from the existing A29. The 'great' flows are on the Shripney Road, increasing from 940 vehicles ('moderate') in the DM to 1250 ('great') in the DS scenario. This road is unlikely to have a high pedestrian flow on or near it as it is a 40mph dual carriageway of a rural character and its footway is only on one side.

Figure D5.13: Pedestrian fear and intimidation, increased links only, 2038, Total Flow

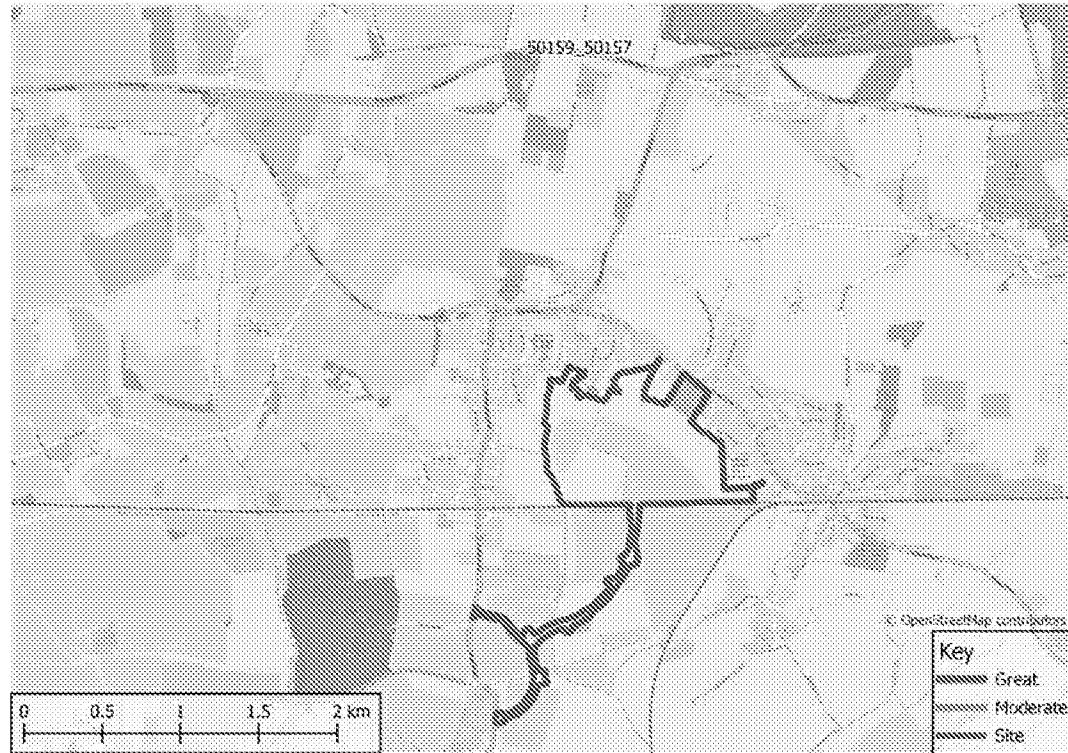


D5.80 There are no changes in the HDV category.

D5.81 In the final column (speed category), the link experiencing a change is shown on Figure 5.14. This link actually decreases in average speed by two categories as a result of the Proposed

Development, being 20kmph or above in all other DM and DS scenarios, it is 14kmph in 2038 DS.

Figure 5.14: Pedestrian fear and intimidation, increased links only, 2038, Speed



Conclusion

- D5.82 Combining the considerations for pedestrian fear and intimidation based on overall levels of flow, volumes of HDV traffic and vehicular speeds, and framing it in light of the low levels of existing pedestrian demand in the rural areas surrounding the application site, it is considered that the Proposed Development will have a **minor adverse long term (not significant) effect** on pedestrian fear and intimidation, absent of mitigation.

Cycling Facilities

- D5.83 Within the application site, a new network of roads and incorporated cycle facilities within the Proposed Development is considered to represent an improvement on the current situation, though clearly much of the usage demand will be due to the Proposed Development itself given the application site's current agricultural use and location on the edge of existing settlement.
- D5.84 In the No Cala scenario, although there is no east-west vehicle link, there are still pedestrian connections to the west and so the absence of the Cala link would not materially affect pedestrian movement and capacity. Additionally, in line with the robust assessment based on the Local Plan years and WSCC A29 CATM model (operated by WSP) as discussed above, Phases 1 and 2 have been assessed together here. Due to the overwhelming majority of homes being delivered during Phase 1, it is not considered that assessing Phase 1 and Phase 2 separately would materially change the effect on the cycling facilities.
- D5.85 Based on existing site surveys from the industry-standard TRICS database, it is expected that the application site will carry a cycling mode share of 2% (average across all modes), see Table D5.11.

Table D5.11: Cycling mode share

Land use	% cycling	AM peak trips	PM peak trips
Residential	3%	19	20
School	1%	3	0
Care home	2%	0	0
Average Total	2%	22	21

*Numbers in the table reflect rounding.

D5.86 The wider effects of the Proposed Development relate mainly to new users.

D5.87 The Proposed Development provides for cycling via the widespread cycle routes. The internal cycle routes would be designed with consideration to LTN 1/20 and the detail would be confirmed as part of reserved matters applications (except for the cycle infrastructure along the realigned A29). The routes will enable all homes safe and direct access to the school and local centres. 'Green links' for walking and cycling will link to areas of the application site.

D5.88 It is considered that the Proposed Development will have a **negligible (not significant) effect** on existing cycling facilities, neither naming specific existing facilities to upgrade, nor providing enough additional cyclists which could lead to capacity constraints.

Public transport

D5.89 In line with the robust assessment based on the Local Plan years and WSCC A29 CATM model (operated by WSP) as discussed above, Phases 1 and 2 have been assessed together here. Due to the overwhelming majority of homes being delivered during Phase 1, it is not considered that assessing Phase 1 and Phase 2 separately would materially change the effect on the public transport.

Bus

D5.90 The complete, operational development is expected to have approximately 5% of trips undertaken by bus and aggregated across all uses, see Table D5.12.

Table D5.12: Bus mode share

Land use	% bus	AM peak trips	PM peak trips
Residential	1%	4	5
School	9%	20	2
Care home	7%	1	1
Average Total	5%	25	8

*Numbers in the table reflect rounding.

D5.91 There have been preliminary discussions with Stagecoach regarding the bus strategy for the site, and the feedback given is that they would consider providing a new bus route between Chichester and Littlehampton. The realigned A29 would be designed to accommodate a bus route, and will have stops along sections of its new route. This would increase access to buses for both new residents in the Proposed Development and existing residents in surrounding neighbourhoods.

D5.92 On this basis, it is considered that any potential detriment due to increased service crowding and excess demand would be naturally mitigated through any new bus routes which may come forward over the period of Proposed Development delivery. The detail of bus service provision

and demand is a matter of ongoing dialogue between the Applicant, the bus operator (Stagecoach) and WSCC.

- D5.93 On balance, the effect on buses due to the Proposed Development is likely to be **negligible (not significant)**.

Rail

- D5.94 The complete and operational development is expected to have approximately 5% of trips undertaken by rail and aggregated across all uses.

Table D5.13: Rail mode share

Land use	% rail	AM peak trips	PM peak trips
Residential	9%	67	71
School	1%	2	0
Care home	4%	0	1
Average Total	5%	70	72

*Numbers in the table reflect rounding.

- D5.95 For a more comprehensive detailing of rail information, the reader is directed to the Transport Assessment.
- D5.96 With four potential service destinations (Southampton, Portsmouth, Brighton and London) from Barnham, and between two and four trains in the AM peak going to each destination, the estimated AM peak number of trips adds a maximum of an additional 9 persons (approximately) to each train. As this is in the likely range of daily variation in absence of the Proposed Development, it is not expected that this will cause a noticeable difference.
- D5.97 The Proposed Development is not expected to generate many long-distance trips for which the train would be most suitable. On the basis of the above, rail effects of the Proposed Development are likely to be **negligible (not significant)**.

Junction Capacity and Delay

- D5.98 In line with the robust assessment based on the Local Plan years and WSCC A29 CATM model (operated by WSP) as discussed above, Phases 1 and 2 have been assessed together here. Due to the overwhelming majority of homes being delivered during Phase 1, it is not considered that assessing Phase 1 and Phase 2 separately would materially change the effect on Junction Capacity and Delay.
- D5.99 The junction capacity assessment of the local road network has been assessed using Junctions 9 (ARCADY and PICADY). The reader is referred to the Transport Assessment for further detail.
- D5.100 The below table summarises all the above junctions' greatest ratios of flow to capacity (RFC), levels of service (LoS) or degree of saturation (DoS) in the peak hours.

Table D5.14: Summary table of junctions' arm with greatest RFCs, LoSs or DoSs in the peak hours

Worst performing arm's Ratio of Flow to Capacity (RFC) or Degree of Saturation (DoS) or Level of Service (LoS)						
Junction name	2031 Do Minimum	2031 Do Something	2031 Do Minimum No Cala	2031 Do Something No Cala	2038 Do Minimum	2038 Do Something
Realigned A29 and site allocation access junctions						

Worst performing arm's Ratio of Flow to Capacity (RFC) or Degree of Saturation (DoS) or Level of Service (LOS)						
Junction name	2031 Do Minimum	2031 Do Something	2031 Do Minimum No Cala	2031 Do Something No Cala	2038 Do Minimum	2038 Do Something
Fontwell Avenue / A29 realignment	0.52	0.56	0.50	0.57	0.54	0.60
Barnham Road / A29 realignment	0.44	0.44	0.45	0.47	0.45	0.77
Realigned A29 / E-W Link roundabout	N/A	0.26	N/A	0.21	N/A	0.67
Westergate Street / Northern Access	88%*	100%*	N/A	N/A	90%*	55%*
Realigned A29 / Link to Woodgate Roundabout A	(modelled in 2038 only)				N/A	0.62
Woodgate Road / Lidsey Road / Southern Access	0.34	0.47	0.33	0.46	0.36	0.38
Lidsey Road / Site Access (parcels R33 and R34)	(modelled in 2038 only)				N/A	0.05
Realigned A29 / Link to Woodgate Roundabout B	(modelled in 2038 only)				N/A	0.53
Lidsey Road / Site Access (Parcel R35)	(modelled in 2038 only)				N/A	0.29
Realigned A29 / links to southernmost parcels	(modelled in 2038 only)				N/A	0.74
Lidsey Road / A29 Realignment	(modelled in 2038 only)				N/A	0.73
Existing A29 junctions						
A27 / Fontwell Avenue	2.00	2.05	1.98	2.05	2.00	1.90
Fontwell Avenue / Eastergate Lane	0.25	0.28	0.25	0.27	0.28	0.16
Fontwell Avenue / Barnham Road	C**	C**	C**	C**	D**	A**
Nyton Road / Westergate Street	0.75	0.87	0.79	0.83	0.80	0.92
Westergate Street / Hook Lane	0.83	0.90	0.70	0.87	0.92	1.02
Shripney Road / Charles Purley Way	0.83	0.10	0.70	0.87	1.14	1.39
Shripney Road / Rowan Way	0.89	0.89	0.88	0.89	0.91	0.95
Apportionment Study junctions						
Nyton Road / A27	0.86	0.89	0.86	0.86	0.86	0.92

Worst performing arm's Ratio of Flow to Capacity (RFC) or Degree of Saturation (DoS) or Level of Service (LOS)						
Junction name	2031 Do Minimum	2031 Do Something	2031 Do Minimum No Cala	2031 Do Something No Cala	2038 Do Minimum	2038 Do Something
A27 / A29 (Fontwell Eastern Roundabout)	0.84	0.87	0.83	0.89	0.88	0.97
B2233 Yapton Road / A259 Crookthorn Lane / Gravatt's Lane (Oystercatcher junction)	***	***	***	***	***	***
Other junctions modelled						
B2145 / A27 Whyke Roundabout	0.84	0.85	0.84	0.85	0.99	1.21
A27 / A259 / Vinnetrow Road (Bognor Road Roundabout)	2.22	2.33	2.27	2.33	2.58	2.76
Nyton Road / Oving Road	0.69	0.84	0.69	0.68	0.75	1.17
Barnham Road / Lake Lane	0.96	0.84	0.96	1.07	0.96	0.97
A27 / A284 Ford Road / Arundel Bypass	0.91	0.91	0.92	0.91	0.94	0.97
A27 / The Causeway Roundabout, Arundel	0.78	0.79	0.78	0.79	0.79	0.82

* LinSig model shows Degree of Saturation (DoS) instead of RFC

** Lane simulation model shows Level of Service (LoS) instead of RFC

*** operates significantly over capacity.

D5.101 Table D5.14 summarises key statistics for the junctions within the study area agreed with WSCC (and described further in the Transport Assessment), absent of mitigation.

D5.102 For each junction, a modelling exercise was undertaken using surveyed traffic data and Ordnance Survey mapping to produce calibrated models to replicate the current situation in 2019 (or other years where relevant). Then, in the future years 2031 and 2038, those models are used to test scenarios as per the assessment scenarios.

D5.103 In light of this, when Proposed Development traffic is added to junctions already at or over capacity, existing or anticipated issues are exacerbated, and as an overall result traffic levels at a number of the considered junctions are taken beyond the point of capacity/operability that is usually considered acceptable. If highway capacity is to be expanded to cater for forecast flows, some mitigation may be necessary. In the absence of such mitigation and bearing in mind the context of the current ability of the network to accommodate future growth regardless of the Proposed Development, the Proposed Development itself would be expected to have an additional overall **major adverse long-term (significant) effect**. This is considered to be a significant effect, which could be mitigated.

Road Traffic Accident and Safety Data

- D5.104 In line with the robust assessment based on the Local Plan years and WSCC A29 CATM model (operated by WSP) as discussed above, Phases 1 and 2 have been assessed together here. Due to the overwhelming majority of homes being delivered during Phase 1, it is not considered that assessing Phase 1 and Phase 2 separately would materially change the effect on Road Traffic Accident and Safety Data.
- D5.105 It is not anticipated that the Proposed Development would have any specific effects with regard to highway safety. The delivery of the Proposed Development is proposed on land which is currently undeveloped, any new roads provide potential for accidents to occur where that was not possible previously. The realigned A29 will be designed in line with prevailing standards in the Design Manual for Roads and Bridges, and Manual for Streets. The practical effect for existing people in the area is likely to be **negligible**.
- D5.106 Traffic increases are expected as a result of the Proposed Development, however these are not generally through residential areas. Where new junctions are introduced or where changes to the existing highway are made, the designs would undergo a series of road safety audits to ensure design proposals are acceptable in highway safety terms. Given that new access junctions will be designed to current modern standards, it is reasonable to expect that the effect of the creation of such junctions will be negligible compared to the Do Minimum Development scenarios. More widely, it is not expected that new traffic would display noticeably different collision rates compared to existing.
- D5.107 The overall effect of the Proposed Development on road safety is therefore considered **negligible (not significant)**.

D6.0 Mitigation and Monitoring

- D6.1 Due to the 2031 scenarios assessing Phase 1 and Phase 2 together, and the above section concluding that each potential effect does not differ between Phase 1 and Phase 2, the mitigations are not split out between Phase 1 and Phase 2.

During Construction

- D6.2 The assessment above indicates that works due to construction are likely to result in a moderate adverse impact.
- D6.3 It is anticipated that a Construction Environmental Management Plan (CEMP) will be prepared and implemented as described in Chapter C to this ES. This will include measures to address adverse traffic impacts in accordance with best practice. Measures may include avoiding delivery trips in the peak traffic hours and defined routes for contractors so as to avoid the most sensitive receptors/roads.
- D6.4 The application site is located along the realigned A29 and therefore it is considered that the majority of construction traffic will be able to avoid using the residential and B-class roads in the area.

During Operation

Local Highway Network and Existing Traffic

- D6.5 Link flows over the study area were assessed to have a minor adverse long-term effect. This is mainly due to the fact that increases are substantial but generally on links with a low existing flow, or on links that form an intrinsic part of the Proposed Development.
- D6.6 Link operation is generally determined by the operations of the junctions at either end, and no specific link capacity mitigations are proposed.
- D6.7 It is also noted that the Framework Travel Plan which will be in place for the Proposed Development would be aiming (among other aims) to reduce the number of vehicle trips being deposited onto the road network. The Framework Travel Plan provides the mechanism by which the ongoing transport effects of the Proposed Development are monitored. It defines targets and monitoring processes by which mode shares, travel measures and other interventions are planned and implemented. For further details on this please see the 'Monitoring' sub-section at the end of this section.

Pedestrian Movement, Capacity and Delay

- D6.8 As the Proposed Development was assessed to have a negligible net effect on pedestrian capacity, no mitigation is necessary or proposed.

Pedestrian Severance, Fear and Intimidation

- D6.9 The assessment has determined that there would be a minor adverse effect on severance, fear and intimidation.
- D6.10 The pedestrian links are widespread across the development and the public rights of way across the application site will be maintained after the development is built. Pedestrian crossings will be provided at internal junctions where necessary.

Cycling Facilities

- D6.11 The assessment has determined that there will be a negligible effect in terms of cycling facilities.
- D6.12 Despite this, additional mitigations are being proposed as a result of the Proposed Development. The cycle infrastructure (except that along the realigned A29) would be agreed as part of the reserved matters applications, and will be designed to be coherent, direct, safe, comfortable, and attractive, as per latest LTN 1/20 guidance.
- D6.13 These will support, and be supported by, the FTP which refers to measures post-delivery of the Proposed Development. It will be put in place and would be expected to identify and deliver relevant improvements to cycling facilities, amongst other aims. However, this is not expected to have a material impact on the effect specified as 'negligible' above, therefore this effect remains negligible.

Public Transport

- D6.14 The assessment has determined that there will be a negligible effect in terms of bus services and a negligible effect on rail services.
- D6.15 Discussions are ongoing with Stagecoach regarding the bus strategy for the Site. The provision of the bus service is subject to agreement and further discussions post-application. The realigned A29 has been designed so that it can accommodate a bus route.

Junction Capacity and Delay

- D6.16 The assessment has shown that there is a major adverse long-term effect on junction capacity and delay which requires mitigation.
- D6.17 Overall, the conclusion that can be drawn is that the junctions are either operating within capacity, or there is a strategy that mitigates the impact of the Proposed Development. The mitigations for each junction (if necessary) are listed below. For further details on the exact nature of these schemes are discussed in the Transport Assessment.
- D6.18 The A27/ Fontwell Avenue junction reports RFCs/ DoSs greater than 1 or 100%, however the performance of the junction is generally improved with the mitigation scheme, with the peak value of the DoS generally being lower than the RFCs reported above. In addition, when the average queues reported in the Junctions 9 model for the existing layout are compared with the mean maximum queues reported in the LinSig modelling, it is observed that there is forecast to be an overall reduction in the number of vehicles reported as queuing across the two peak hours.
- D6.19 A local constraint to development growth is the Fontwell Avenue/ Barnham Road junction (War Memorial Roundabout). The construction of the northern section of the new A29 (off-site through the northern-most part of the wider development allocation) is included in the 2031 do minimum and do something modelling scenarios and it is observed from the modelling that overall queuing and delay is forecast to reduce at the junction.
- D6.20 The Barnham Road/ Lake Lane junction is reported to be operating over capacity in the 2031 do something scenarios, however this is for a single 15 minute period within the hour and by only 11 PCUs. There is approximately 70 PCUs of spare capacity at other times of the day. The Barnham Eastergate Westergate site is identified in the Apportionment Study as being required to make a financial contribution towards Barnham Village Centre enhancements and therefore no further mitigation is proposed.
- D6.21 The Nyton Road/ Oving Road and Westergate Street/ Hook Lane junction modelling results show that in the AM peak hour the junction is forecast to operate within capacity in all of the

scenarios. In the PM peak hour, Oving Road operates within capacity, except in the 2038 do something scenario. However, a mitigation scheme is not proposed here as this would potentially encourage further traffic to route along Oving Road, and this is considered likely to be undesirable to WSCC.

- D6.22 The results from the 2038 do minimum and do something scenarios for the Westergate Street/ Hook Lane junction show that in the PM peak hour, Hook Lane operates within capacity, except in the 2038 do something scenario. It is noted from the model output file that the RFC of 1.02 is in a single 15 minute period, where capacity is exceeded by 3 PCUs only. There is over 100 PCUs of capacity shown by the model to be available at other times within the hour, and therefore it is considered that no mitigation scheme is required.
- D6.23 The modelling results for the A29 Steyning Road/ Rowan Way junction show that the mitigation scheme improves the performance of the roundabout in the AM peak hour. In the PM peak hour A29 Shripney Road North and South is forecast to operate with spare capacity, however Steyning Way operates over capacity in only the 2038 do something scenario. This is during a single 15 minute period and there is spare capacity within the other 45 minutes of the hour. The 2038 do something scenario includes the homes that would be on land south of the railway development, and it is noted that these are not the subject of this planning application.
- D6.24 The Shripney Road/ Charles Purley Way junction shows that the mitigation scheme improves the performance of the roundabout in the AM peak hour. In the PM peak hour A259 Felpham Relief Road and A29 Shripney Road South currently operate with spare capacity and it is considered that therefore there is an overall improvement to the operation of the junction compared to the without mitigation scenario. However the David Purley Memorial arm still operates over capacity in the 2031 do minimum and do something scenarios. It is considered that this is due to the traffic generated by the Oldlands Farm site rather than the Proposed Development. In the 2038 do something scenario the A29 Shripney Road North operates over capacity for part of the hour, however further interrogation of the results shows that there is sufficient spare capacity across the hour.
- D6.25 The modelling of the Whyke Roundabout shows that the mitigation scheme results in congestion being spread across the junction rather than focused on the B2145 (N) arm of the junction. The junction is shown to operate within capacity in the AM peak in all scenarios, but close to or over capacity on all arms during the PM peak hour. It is understood that other local plan development sites would be making financial contributions to improvements at this junction and therefore no further mitigation is proposed.
- D6.26 The Bognor Road Roundabout has been modelled with both the existing geometry and the mitigation scheme included in the Arun Transport Study Stage 3 Report. The results from this modelling shows that the performance of the junction is improved overall as a result of the junction improvement scheme. It is understood that other local plan development sites would be making financial contributions to improvements at this junction and therefore no further mitigation is proposed.
- D6.27 The existing geometry of the Oystercatcher junction is forecast to operate over capacity in 2031 and 2038. There is a mitigation scheme for this junction that is presented in the WSCC Comet Corner and Oystercatcher report (December 2019). The mitigation scheme includes a junction redesign to realign the Yapton Road and provide a new roundabout junction. The results from the junction modelling of this scheme show that the junction is forecast to operate within capacity.

Road Traffic Accident and Safety Data

- D6.28 As the Proposed Development was assessed to have a negligible effect on road safety, no mitigation is necessary or proposed.

Monitoring

- D6.29 A Travel Plan Coordinator (TPC) will be appointed prior to first occupation and they will be the main point of contact between WSCC and the Proposed Development occupiers. The TPC is responsible for managing the Travel Plan within the Proposed Development, and is also responsible for regular reporting to stakeholders.
- D6.30 Monitoring within the Travel Plan takes the form of baseline (and subsequent) travel behaviour surveys to collect data and set appropriate targets. Travel Plan measures are then reviewed, implemented and adjusted to make progress against the targets set. As targets are regularly reviewed within the scope of the Travel Plan and TPC role, this provides a mechanism by which WSCC can exercise ongoing monitoring of the alignment of the Proposed Development's operation with wider WSCC objectives.
- D6.31 The Travel Plan will be secured by planning condition. Though appropriate wording is a matter for future negotiation, such conditions typically require that the Travel Plan (and future iterations) be developed in partnership with, and to the approval of, WSCC.

D7.0 Residual Effects

- D7.1 Due to the 2031 scenarios assessing Phase 1 and Phase 2 together, and the above section concluding that each potential effect does not differ between Phase 1 and Phase 2, the residual effects are not split out between Phase 1 and Phase 2. It is also noted that in all the 2031 do something scenarios the residual effects are the same regardless of whether the east-west link comes forward, and whether or not the road is built south of the railway.

During Construction

- D7.2 With the CEMP in place, it is expected the residual effect of the construction of the Proposed Development is therefore considered to be a **minor adverse (not significant) effect**.

During Operation

Local Highway Network and Existing Traffic

- D7.3 Link operation is generally a function of the junctions on a given link, and the effect of the Proposed Development on junction operation is considered separately. There are no proposed mitigations for this effect so it remains minor adverse. The residual effect of the Proposed Development is therefore considered to be **minor adverse (not significant)**.

Pedestrian Movement, Capacity and Delay

- D7.4 As the Proposed Development was assessed to have a negligible net effect on pedestrian capacity, no mitigation is necessary or proposed. The residual effect remains **negligible (not significant)**.

Pedestrian Severance, Fear and Intimidation

- D7.5 The assessment has determined that there would be a minor adverse impact on severance and fear and intimidation.
- D7.6 It is expected that with mitigation measures in place, not only will the adverse effects of the Proposed Development be mitigated, but that the existing pedestrian experience in the area would be improved (through schemes identified in the Arun District Stage 3 Transport Study, and contributed towards via the methodology set out in the Arun District Apportionment Study). The residual effect of the Proposed Development, with mitigation, is therefore considered to be **minor beneficial long-term (not significant) effect**.

Cycling Facilities

- D7.7 The residual effect on cycling facilities remains **negligible (not significant)**.

Public Transport

- D7.8 The assessment has determined that there will be a negligible effect on bus and rail services and there are therefore only the built-in mitigation measures will be provided for this. The residual impact on bus and rail services remains **negligible (not significant)**.

Junction Capacity and Delay

- D7.9 It is expected, with the appropriate mitigations in place (also with financial contributions from other sites), that the net effect on junctions would be reduced to a **minor adverse long-term**

(not significant) effect. Whilst the mitigation schemes achieve a nil-detriment position there are some arms that are forecast to operate over capacity.

D7.10

The below Table D7.1 shows the RFCs after mitigation, for the junctions which have pre-designed mitigation schemes (e.g. those approved as part of the Arun District Local Plan). The results were discussed in the previous chapter of this report, and in more detail in the Transport Assessment.

Table D7.1: Junction Capacity Results after mitigation

Junction name	2031 Do Something	2031 No Cala Do Something	2038 Do Something
A27/ Fontwell Avenue	122%	123%	169%
Shripney Road / Charles Purley Way	1.12	1.08	1.47
Shripney Road / Rowan Way	0.90	0.90	1.08
A27 / A29 / Fontwell Eastern Roundabout	89%	89%	97%
B2233 Yapton Road / A259 Crookthorn Lane / Grevatt's Lane (Oystercatcher Junction)	0.79	0.79	0.78
B2145/ A27 (Whyke Roundabout)	108%	113%	119%
A27/ A259/ Vinnetrov Road (Bognor Road Roundabout)	1.13	1.13	1.22
A27/ A284 Ford Road / Arundel Bypass	0.91	0.91	0.94
A27 / The Causeway Roundabout, Arundel	0.79	0.79	0.82

Road Traffic Accident and Safety Data

D7.11

The residual effect on road safety remains **negligible (not significant)**.

D8.0 Summary & Conclusions

D8.1 The below Table D8.1 summarises the Transport chapter of the ES.

D8.2 This Chapter (Chapter D, and its associated Appendices) has assessed the transport impacts of the Proposed Development at the application site, Barnham Eastergate Westergate.

D8.3 The below table shows that although some potential effects start out as significant effects, no effects remain above the threshold for significance (being 'Major' or 'Moderate' as defined at Paragraph D3.33 and D3.34 above) after mitigation. These are:

- Construction, which absent mitigation is Moderate adverse, and after mitigation would be Minor adverse; and
- Junction Capacity and Delay, which absent mitigation is Major adverse, and after mitigation would be Minor adverse.

Table D8.1 Summary of Effects

Element		Potential effect	Length of effect	Mitigation	Residual Effect
Construction		Moderate adverse	Short-term	Construction Management Plan and measures contained therein	Minor adverse
Local Highway Network and Existing Traffic		Minor adverse	Long-term	N/A	Minor adverse
Pedestrian Movement, Capacity and Delay		Negligible	N/A	N/A	Negligible
Pedestrian Severance, Fear and Intimidation	Severance	Minor adverse	Long-term	New pedestrian links and crossings within and around site	Minor beneficial
	Fear and Intimidation	Minor adverse	Long-term		Minor beneficial
Cycling Facilities		Negligible	N/A	N/A	Negligible
Public Transport	Bus	Negligible	N/A	N/A	Negligible
	Rail	Negligible	N/A	N/A	Negligible
Junction Capacity and Delay		Major adverse	Long-term	Various junction layout adjustments as set out in the Arun Transport Study and Bognor Regis Enterprise study and discussed with WSCC, and the delivery of these would be through financial contributions.	Minor adverse

Road Traffic Accident and Safety Data	Negligible	N/A	N/A	Negligible
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D9.0 **Abbreviations & Definitions**

- 1 Transport Assessment (TA)
- 2 Framework Travel Plan (FTP)
- 3 Construction Management Plan (CMP)
- 4 Environmental Statement (ES)
- 5 National Planning Policy Framework (NPPF)
- 6 West Sussex County Council (WSCC)
- 7 Chichester Area Transport Model (CATM)
- 8 Department for Transport (DfT)
- 9 Institute of Environmental Management & Assessment (IEMA)
- 10 Local Transport Note 1/20 (LTN 1/20)
- 11 Heavy Goods Vehicle (HGV) / Heavy Duty Vehicle (HDV)
- 12 Annual Average Daily Traffic (AADT)
- 13 Annual Average Weekday Traffic (AAWT)
- 14 Public Right of Way (PROW)
- 15 Ratio of Flow to Capacity (RFC)
- 16 Degree of Saturation (DoS)

D9.2 Significance thresholds are defined as:

- Major – Total loss or major/substantial alteration to key elements / features of the without development conditions, such that due to the Proposed Development, character / composition / attributes will be fundamentally changed. These effects will usually be of measurable effect and may be expected to have a substantive impact on the capacity and / or capability of existing / proposed infrastructure;
- Moderate – Loss or alteration to one or more key elements / features of the without development conditions such that due to the Proposed Development, character / composition / attributes will be materially changed. These effects will usually be of measurable effect and may be expected to have a noticeable impact on the capacity and / or capability of existing / proposed infrastructure;
- Minor – A minor shift away from without development conditions. Change arising from the loss / alteration will be discernible / detectable but not material. The underlying character / composition / attributes of the without development condition will be similar to the without development circumstances / situation. These effects will usually be of measurable effect but would be expected to be substantially within the capacity and / or capability of existing / proposed infrastructure; or,
- Negligible – Very little or nil change from without development conditions. Change barely or not distinguishable, of no consequence, being or approximating to a 'no change' situation. Effects would be within the range of daily variation.

D9.3 In EIA terms, the Proposed Development is required to provide mitigation for any 'significant effect'. A 'significant effect' here means 'moderate' or 'major' using the categories immediately above. Any other effect may be mitigated, but this is not required.

D10.0 **References**

- 1 Appendix D1: Transport Assessment (TA)
- 2 Appendix D2: Framework Travel Plan (FTP)
- 3 Government's National Planning Policy Framework (NPPF)
- 4 Planning Practice Guidance (PPG)
- 5 Circular 02/2013 'The Strategic Road Network and Development'
- 6 The Strategic Road Network (SRN): Planning for the Future – A Guide to Working with Highways England on Planning Matters'
- 7 IEMA Guidelines for the Environmental Assessment of Road Traffic
- 8 Design Manual for Roads and Bridges Standard LA 104
- 9 West Sussex Local Transport Plan (LTP3)
- 10 West Sussex County Council: Guidance on Parking at New Developments (September 2020)
- 11 West Sussex Walking and Cycling Strategy 2016 to 2026
- 12 Arun Local Plan 2011-2031
- 13 Arun District Council – Parking Standards Supplementary Planning Document (January 2020)
- 14 WSCC/ADC Local Plan Transport Mitigation Apportionment Study (June 2020)
- 15 Arun Transport Study 2016 Stage 3 report (ATS)
- 16 2017 Enterprise Bognor Regis (EBR) Transport Review
- 17 WSCC Comet Corner and Oystercatcher Report December 2019
- 18 West Sussex Walking & Cycling Strategy 2016-2026
- 19 Highway injury-accident records (STATS19)