Appendix F

IAMP ONE Transport Assessment

IAMP ONE **18/12/2017**

Reference number: IAMP_ONE-SYS 002

TRANSPORT ASSESSMENT

IAMP ONE

TRANSPORT ASSESSMENT

IDENTIFICATION TABLE	
Client/Project owner	Henry Boot Developments Limited
Project	IAMP ONE
Study	Transport Assessment
Date	18/12/2017
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APPROVAL					
Version	**Name**		**Position**	**Date**	**Modifications**
1	Author	AH	Senior	19/12/2017	
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1. INTRODUCTION

1.1 What is IAMP?

1.1.1 The International Advanced Manufacturing Park (IAMP) will become a home to new and expanding automotive and advanced manufacturing businesses. IAMP is planned for land to the west of the A19 and south of the A184, near Nissan. It will help the UK and North East's economy grow and is a key part of the Sunderland City Deal agreed with Government to create thousands of jobs in the region.

1.1.2 The IAMP development will create in excess of 7,000 new jobs in industries such as automotive, advanced manufacturing and other high technology sectors. The IAMP will be an internationally-recognised destination and underpin the continued success of the automotive industry in the North East, attracting over £400 million of private investment.

1.2 IAMP ONE

1.2.1 IAMP ONE represents the first phase of IAMP and seeks planning permission for specialist automotive and manufacturing units. The plans include a new link road from the A1290, associated car parking, service yards, access, landscaping and drainage ponds. The units will be located within the southern area of IAMP within Sunderland City Council's boundary.

1.2.2 Further details regarding the IAMP ONE proposals are provided in later chapters of this report, however IAMP ONE could:

- Provide up to 156,750sqm of gross internal floorspace
- Create around 3,100 jobs

1.3 IAMP LLP and Henry Boot Developments Limited

1.3.1 IAMP LLP is a limited liability partnership set up by Sunderland City Council (SCC) and South Tyneside Council (STC) to promote and develop the IAMP.

1.3.2 South Tyneside and Sunderland City Councils have jointly appointed Henry Boot Developments Limited (HBDL) as development partner for the IAMP. HBDL will be responsible for the development of the site.

1.4 The Commission

1.4.1 HBDL is bringing forward a hybrid planning application, for the proposed IAMP ONE development.

1.4.2 SYSTRA Ltd has been commissioned to provide highways and transport advice in relation to the site, including the preparation of this Transport Assessment to accompany the planning application.

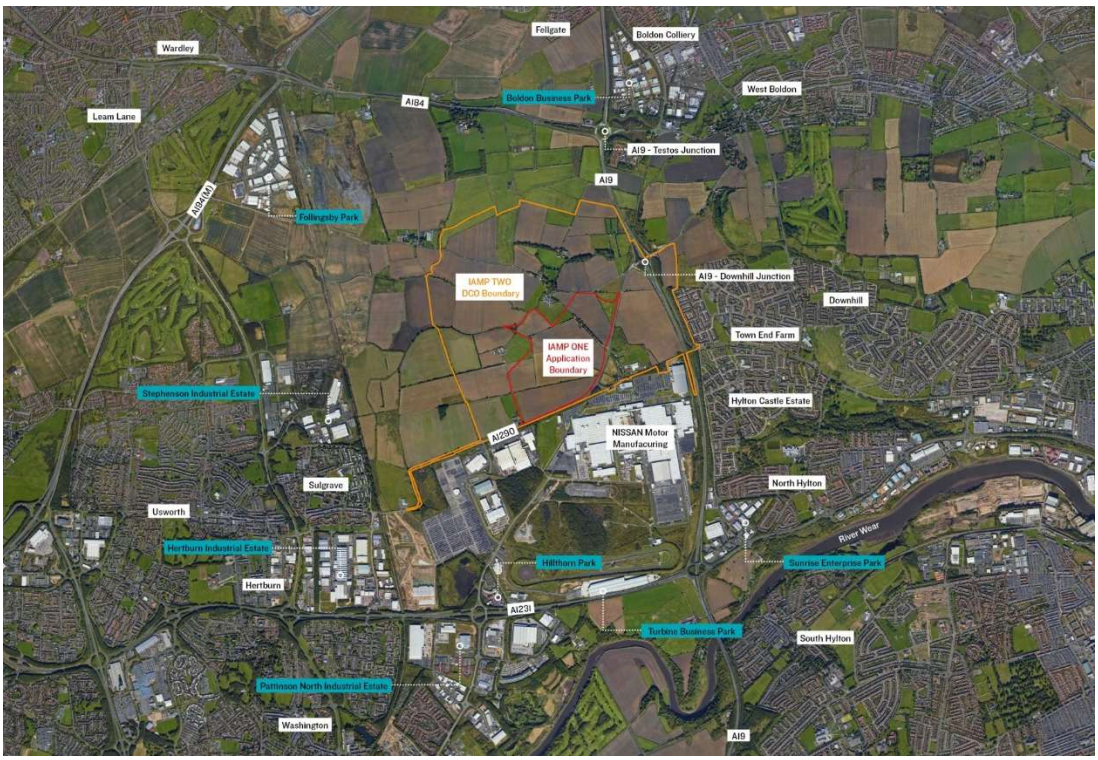
1.5 The Site and Surrounding Area

1.5.1 The application site comprises approximately 61 hectares of farmland. The site is located approximately 6.5km to the north-west of Sunderland, approximately 4.5km to the north-east of Washington and approximately 2.5km to the south of Boldon Colliery. To the south and east it is bounded by the A1290, to the south of which is Nissan. To the north and west

it is bounded by farmland and the River Don. The buildings of West Moor Farm are sited adjacent to the south-western boundary and the A1290.

1.5.2 The site was identified in Sunderland's Draft Core Strategy and Development Plan (2015 – 2033) as an area for future development to expand the manufacturing capability of the area and therefore support local economic growth. South Tyneside Council and Sunderland City Council adopted the IAMP Area Action Plan (AAP) on 30 November 2017. The IAMP AAP is the policy framework to guide the comprehensive development of the IAMP and is a plan for the next 15 years (covering the period 2017 to 2032).

Figure 1. Site Location



1.6 Purpose of this Report

1.6.1 This report is the Transport Assessment for the proposed IAMP ONE development. The report has been commissioned to help understand and analyse the effects of the proposed development from a transport perspective and to inform the proposals for the site.

1.6.2 The purpose of the Transport Assessment to provide a full and systematic review and robust assessment of the transport impacts of the development and identify any mitigations that may be required. Mitigation may include necessary improvements to road network capacity, accessibility and safety for all modes of travel.

1.6.3 The intention of this report is to provide the necessary information to assist Sunderland City Council Local Planning and Highway Authority, determine the planning application. Given the proximity of the site to the Strategic Road Network, it is equally important that sufficient information is contained within this report to satisfy the requirements of Highways England.

1.7 Scoping Discussions

1.7.1 During the production of this Transport Assessment, several discussions have been held with highway officers at SCC and Highways England as part of the pre-application process, at which the key transport issues associated with the proposed development were discussed and some of the methodologies adopted within this Transport Assessment outlined. This report has been prepared in accordance with those discussions, whilst also being mindful of the Scoping Opinion by the Secretary of State for the proposed IAMP Nationally Significant Infrastructure Project, received in September 2016.

1.8 Report Structure

1.8.1 The structure of this report and content broadly follows the national planning policy contained within the National Planning Policy Framework (NPPF) and the Planning Practice Guidance (PPG). Due consideration has also been given to relevant local and national guidance, such as Circular 02/2013.

1.8.2 Following this introductory chapter, the remainder of this TA report is structured as follows:

- **Chapter 2: Policy Context** – reviews the relevant current national, regional and local transport policies, guidance documents and how the proposed IAMP ONE development accords with these documents.
- **Chapter 3: Baseline Conditions** – describes the baseline travel and transport conditions at the site and on the surrounding highway network.
- **Chapter 4: Road Safety Review** - includes a review of personal injury collision records.
- **Chapter 5: Development Proposals** – sets out the development proposals within the context of the wider area. It includes an overview of the access strategy and a review of car parking.
- **Chapter 6: Trip Generation and Distribution** – details the methodology used to ascertain trip generation and how these trips have been assigned to the road network.
- **Chapter 7: Assumptions and Traffic Flows** – outlines the scenarios considered and the approach to background traffic growth and committed developments.
- **Chapter 8: Traffic Impact Assessment –** considers the impact of development traffic at study area junctions in terms of the impacts on queuing and operational capacity;
- **Chapter 9: Summary and Conclusions** – provides a summary and conclusion by highlighting the key points raised within the report.

1.8.3 All technical appendices are included at the end of this TA for further information.

2. POLICY CONTEXT

2.1 Introduction

2.1.1 Before considering the proposed development, it is important to examine the context of the site and how this relates to relevant planning policies and guidelines. This section of the report sets out these elements, providing an overall spatial and planning context for the development proposal.

2.1.2 Policies have been adopted in national guidelines, such as the most recent Transport White Paper (2011), that seek to encourage more sustainable modes than the car. A planning system which places greater emphasis on the link between transport and land use planning policies has also been adopted to encourage transport decisions at a local level that are compatible with environmental and community goals and best reflect local circumstances and requirements.

2.1.3 The following national, regional and local planning documents have been reviewed:

- The Transport White Paper (2011);
- The National Planning Policy Framework (NPPF);
- Planning Practice Guidance (PPG) (2016);
- North East Combined Authority Transport Manifesto (2016);
- LTP3: The Third Local Transport Plan for Tyne and Wear (2011 - 2021);
- The North East Regional Spatial Strategy (RSS);
- Sunderland City Council Draft Core Strategy and Development Plan (2015-2033); and
- International Advanced Manufacturing Park Area Action Plan (2017 – 2032).

2.2 National Planning Policy

The Future of Transport White Paper (2011)

2.2.1 The Government's vision for a sustainable local transport system is set out in the January 2011 Transport White Paper: "Creating Growth, Cutting Carbon – Making Sustainable local Transport Happen."

2.2.2 The White Paper acknowledges that transport provision is essential for economic growth if the Government is to improve the economic deficit which it is currently facing. The Paper also recognises however, that the current levels of carbon emissions from transport cannot be sustained if the nation is to meet its national commitments on climate change as well as creating a safer and cleaner environment in which to live. With this in mind, the Government highlights sustainable transport solutions as a means by which the economy can grow which will also see a positive impact on the local environment.

2.2.3 Whilst the Paper outlines the funding options which will be available for sustainable transport schemes, it also recognises that investment alone will not be enough and that help needs to be given to people to ensure that the transport choices they make are good for society as a whole. The Paper recognises that it is at the local level where most can be done to encourage sustainable transport modes and implement sustainable transport schemes. Solutions should be developed for the places they serve, tailored for the specific needs and behaviour patterns of individual communities.

2.2.4 Within the Paper, sustainable transport considers more than just public transport, walking and cycling schemes and acknowledges that it is not feasible for some trips to be undertaken by these modes. There is therefore a realisation that the car will continue to be an important mode of transport and a focus should be given to making car travel greener through electric and other low emission vehicles

National Planning Policy Framework (NPPF)

2.2.5 The National Planning Policy Framework (NPPF) superseded the Planning Policy Statements (PPS) that governed national policy and principles relating to specific aspects of the town planning framework. In replacing the previous guidance notes and remaining a material consideration in planning applications; the NPPF provides a framework for local communities and Authorities to development relevant local development plans and strategies.

2.2.6 The NPPF has two key themes:

- Providing a greater level of integration and simplification of the planning policies governing new development nationally;
- Contribute to the achievement of sustainable development from an economic, social and environmental perspective.

2.2.7 One of the key changes relating to the NPPF is the presumption in favour of sustainable development, which should be reflected in local development plans and frameworks to ensure that sustainable development and the needs of an area are identified and subsequently approved without delay.

2.2.8 The NPPF is based on a range of core planning principles, which are aimed at supporting the focus on sustainable plan-led development. Many of these core principles also formed part of the previous planning guidance notes.

2.2.9 Transport specific policies play a key role in supporting and achieving the core planning principles and are intrinsically linked to the objective of sustainable development. The NPPF specifically states that development should only be prevented or refused on transport grounds where the residual cumulative impacts of development are severe.

2.2.10 The NPPF seeks to encourage solutions to support reductions in gas emissions and reducing congestion which should be enshrined in Local Plans, including:

2.2.11 Supporting key interchange facilities;

- Provision of viable infrastructure to support sustainable development;
- Prioritise sustainable modes of transport and support development with good access to public transport; and
- Provide a balanced land-use approach encouraging mixed use development which reduce the need to travel;

2.2.12 The core planning principles above provide a framework to provide inclusive, accessible, well connected and sustainable development.

The proposed development is consistent with the NPPF. The site will be served by public transport services, this in conjunction with proposed measures to improve pedestrian and cycling connectivity, will significantly enhance the accessibility of the site by sustainable modes.

Safe and Suitable site access solutions will be installed from the A1290 and any off-site traffic impacts can be satisfactorily mitigated.

A robust Transport Assessment has been prepared for the development. Once mitigation proposals are taken in to account, the residual cumulative impact on the highway network is not considered to be severe within the context of Paragraph 32 of NPPF.

Planning Practice Guidance (PPG) (2016)

2.2.13 In March 2014 the Department for Communities and Local Government (DCLG) launched the planning practice guidance web-based resource. Included within the PPG is "Travel plans, transport assessments and statements in decision-taking" superseding the DfT's Guidance on Transport Assessments. The PPG document provides advice on when transport assessments and transport statements are required and what they should typically contain.

2.2.14 PPG outlines that Travel Plans, Transport Assessments and Statements can positively contribute to:

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

2.2.15 Key issues to consider at the start of preparing a Transport Assessment or Statement may include:

- 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

The content and structure of this Transport Assessment has been prepared in accordance of the PPG.

2.3 Regional Planning Policy

North East Combined Authority Transport Manifesto (2016)

2.3.1 The NECA Transport Manifesto - "Our Journey" – feeds into the emerging Local Transport Plan for the North East Combined Authority and sets out how the Combined Authority intends to deliver on its ambition *"to provide affordable, attractive, reliable, safe, healthy transport choices for businesses, residents and visitors while enhancing the environment".*

2.3.2 The vision in the North East is for transport to be:

- **Accessible**: it should run as near as possible to where people live and want to travel to, and where businesses are (or want to be) located. It should be usable by everyone.
- **Affordable**: as far as possible, transport should be provided at a reasonable cost relative to the journey being undertaken.
- **Reliable:** the transport network should be one that we can rely on to work, with buses and trains running on time and congestion at a minimum.
- **Easy to use**: it should be easy to plan safe journeys, find out the best way to travel, pay for tickets and get all the essential information for your journey.
- **Safe**: the transport network should be, and be seen to be, safe regarding both road safety and crime and fear of crime on public transport. Vulnerable users should be given greater protection than they currently are.
- **Sustainable**: the attractiveness of sustainable modes of transport should be improved. Transport should not have an adverse impact on the environment.
- **Integrated**: the transport network should be connected so that people can switch easily between modes, and timings and methods of payment complement each other.

2.3.3 The themes above are expanded into a set of guiding principles, which govern what the North East Combined Authority are trying to achieve:

- Good access to workplaces, services, shops and leisure.
- Well-maintained, climate-resilient and safe transport networks.
- Less road congestion.
- More sustainable travel.
- Growth in economic activity.
- Better air quality and lower carbon emissions.
- Healthy, active lifestyles.
- Efficient use of transport assets.
- Land use planning that favours sustainable travel.
- Equality of opportunity.
- Better cycling network.
- Better connectivity across the UK.
- Expand the public transport network

The development will support the vison for transport in the North East by providing access to the local sustainable transport network.

The Third Local Transport Plan for Tyne and Wear (LTP3) (2011 - 2021)

2.3.4 The five local authorities in Tyne and Wear, and Nexus, have produced a statutory joint Local Transport Plan. This is the third Local Transport Plan, which covers the period between 2011 and 2021.

2.3.5 The third Local Transport Plan provides a ten-year strategy for transport, along with three year delivery plans which will be reviewed annually. It replaces the previous Local Transport Plan 2006-2011.

2.3.6 The third Local Transport Plan aims to show how transport can address some of the key challenges of the area, including;

- economic regeneration;
- climate change;
- equality of opportunity; and
- safety, security, health and quality of life.
- Walking, cycling, public transport, freight, and car travel are all considered, and transport proposals for 2011 to 2021 are set out.

2.3.7 Development of the third Local Transport Plan involved working with public and private sector organisations. Residents and businesses in Sunderland and across Tyne and Wear were given the opportunity to have their say as part of the Public Consultation on the draft third Local Transport Plan, which took place between October and December 2010. Responses to the consultation were taken into account in the final version of the third Local Transport Plan.

2.3.8 The third Local Transport Plan comprises two documents, the Third Local Transport Strategy 2011 to 2021 and Third Local Transport Delivery Plan 2011 to 2021.

The A1290 is specifically mentioned as an opportunity corridor in LTP3 for improvement of non-motorised user travel, the development will support this buy providing enhanced pedestrian infrastructure.

2.4 Local Planning Policy

Sunderland City Council's Core Strategy and Development Plans (2015-2033)

2.4.1 The Core Strategy and Development Plan once adopted will set out the long-term plan for development across the city to 2033. It will ensure that the right type of development is focused in the right places to meet the needs for local people and businesses.

2.4.2 The Draft Core Strategy and Development Plan includes development policies and site allocations, land use designations and development management policies.

2.4.3 The Sunderland City Council Draft Core Strategy and Development Plan states that:

"Sunderland City Council in partnership with South Tyneside Council are seeking to deliver IAMP on land to the north of the existing Nissan plant to build upon the inherent strengths of the area in manufacturing, and particularly the automotive sector. The IAMP will cover an area of 100 hectares, with a further 50 hectares of land safeguarded for future development. It is anticipated that the IAMP will create over 5,000 jobs directly on the site with many more in the wider area."

2.4.4 **Policy CC1: Sustainable travel** states that the council will promote sustainable travel and seek to enhance connectivity for all users by:

1. Focusing development close to public transport links and enhancing opportunities for walking and cycling;
2. Enhancing the city's transport network to improve connectivity from homes to employment sites, designated centres, and to other key trip generators;
3. Utilising traffic management measures in order to manage congestion and mitigate against the environmental and health impacts of traffic;
4. Ensuring that transport initiatives support the development of safer, cleaner and more inclusive centres and neighbourhoods; and
5. Working with the North East Combined Authority (NECA), neighbouring councils and other partners to promote cross-boundary transport initiatives.

2.4.5 **Policy CC2: Connectivity and transport network** stated that to improve connectivity and enhance the city's transport network. Of relevance to this study, the council and its partners will seek to:

1. Deliver new highways schemes and initiatives including key junctions on the A19 and providing access to IAMP.
2. Improve the existing main transport routes to reduce congestion and encourage walking and cycling, including A1231 Sunderland Highway (west of the A19), Washington Road (east of A19).
3. Improve the operating conditions for buses throughout the city, through securing improvements to the major bus corridors; and
4. Improve and extend the cycle network within the city.

Sunderland City Council are striving for both sustainability and continued economic success. The development is in keeping with the strategic guidelines for economic growth in Sunderland's Local Development Framework. The IAMP ONE development site will encourage greater investment in the region.

International Advanced Manufacturing Park Area Action Plan (2017 – 2032)

2.4.6 The IAMP Area Action Plan (AAP) is the adopted policy document to guide the comprehensive development of the DCO Site. The AAP was prepared jointly by Sunderland City Council and South Tyneside Council, in support of the Sunderland City Deal (in partnership with South Tyneside), and was adopted on 30 November 2017. The IAMP AAP is a plan for the next 15 years (covering the period 2017 to 2032).

2.4.7 Within the IAMP AAP, the following policies are applicable to Infrastructure, Transport and Access:

- Policy S1(4)(iv): Spatial Strategy for Comprehensive Development - Requires Masterplans, Design Codes and Phasing Plans to be submitted, demonstrating how development will contribute fully, in a proportionate and timely manner, towards providing the infrastructure.
- Policy S4(A)(vii): The Hub and Ancillary Uses – A multi-modal transport interchange accommodating public transport, cycling and pedestrian access.
- Policy D1(A)(i)(ii): Public Realm – A public realm strategy is required to mark key gateways into the site and a comprehensive, wayfinding strategy for cyclists and pedestrians.
- Policy T1: Highway Infrastructure – A public realm strategy is required to accompany the development proposals along with a supported Transport Assessment to assess highway improvements.
- Policy T2: Walking, Cycling and Horse Riding – The development must promote walking, cycling and horse riding by design and connecting to the surrounding network.
- Policy T3: Public Transport – The development must promote sustainable transport by enhancing the existing provisions and consider new improvements as appropriate; and
- Policy T4: Parking – The development must ensure that appropriate provision for car parking is provided in accordance with the Councils' standards.
- Policy Del2: Securing Mitigation – Outlines that mitigation required will be secured through articles and requirements within a DCO, planning conditions or planning obligations. Developer contributions will be sought to mitigate the impact of IAMP, where necessary

The development will conform to the transportation policies set out in the AAP document by providing any necessary highway infrastructure improvements to accommodate increased traffic demand whilst also encouraging sustainable travel. Walking and cycling provisions have been considered throughout the masterplan process. Parking for the IAMP ONE will be provided in accordance with the necessary policy requirements.

2.5 Road Investment Strategy: 2015 to 2020

2.5.1 These documents set out a long-term approach to improve England's motorways and major roads. The first 'Road Investment Strategy' (RIS 1) outlines a long-term programme for motorway and major roads with the funding needed to plan ahead,

2.5.2 The RIS 1 comprises:

- a long-term vision for England's motorways and major roads, outlining how we will create smooth, smart and sustainable roads
- a multi-year investment plan that will be used to improve the network and create better roads for users
- high-level objectives for the first roads period 2015 to 2020

2.5.3 Included within the Road Investment Strategy are improvement measures at the A19 Testo's junction and A19 Downhill Lane junction. These schemes are considered nationally significant infrastructure projects (NSIP) and will, therefore, be considered by the Planning Inspectorate.

2.6 Summary

2.6.1 In summary, as it can be seen that there are a number of integrated land use and transport planning policies and policy guidance documents that support and underpin the proposed IAMP ONE development. A Travel Plan has also been produced alongside this Transport Assessment and submitted with the planning application which supports and promotes the sustainable operation of the proposed IAMP ONE development.

2.6.2 A summary of IAMP ONE's response to the applicable Infrastructure, Transport and Access policies within the IAMP AAP is presented below.

Summary of Predicted Impacts of IAMP ONE on Access and Transport

Policy	IAMP ONE Response
Policy S1(4)(iv): Spatial Strategy for Comprehensive Development	The IAMP ONE proposals have been comprehensively designed to ensure that they will not prejudice the wider IAMP TWO DCO project.
Policy S4(A)(vii): The Hub and Ancillary Uses	The IAMP ONE proposals provide new connections to public transport connections, along with links to existing pedestrian and cycle infrastructure. The masterplan for IAMP ONE has been designed to provide suitable connections through to The Hub.
Policy D1(A)(i)(ii): Public Realm	The Public Realm Strategy for IAMP ONE considers the key gateways into the site along with a wayfinding strategy for cyclists, equestrians and pedestrians.

Policy T1: Highway Infrastructure	The IAMP ONE proposals ensure they will not prejudice the wider IAMP TWO DCO project, which includes reserving land for the future widening of the A1290 and providing road connections which can be extended in the future. A TA accompanies the planning submission and identifies specific highway improvements. A Framework Travel Plan also supports the application and outlines measures to promote sustainable travel.
Policy T2: Walking, Cycling and Horse Riding	Measures are included within the IAMP ONE proposals to support walking, cycling and horse riding, with high quality new routes reflecting desire lines.
Policy T3: Public Transport	New bus stops and improved waiting facilities will be provided as part of IAMP ONE. The IAMP ONE proposals have been designed to not prejudice future enhancements to bus services which will come forward as part of the IAMP TWO DCO project.
Policy T4: Parking	The indicative masterplan for IAMP ONE demonstrates that the car parking can be provided in accordance with the Council's standards and meet the requirements for electric charging points, car sharing and disabled badge holders.
Policy Del2: Securing Mitigation	The proposed mitigation for IAMP ONE will be secured through planning conditions or planning obligations, as appropriate.

3. BASELINE CONDITIONS

3.1 Introduction

3.1.1 The previous chapter of the report set out the relevant policy background with respect to the development proposals. This chapter provides a general overview of the site and the existing transport conditions, including a description of the local highway and strategic road network and a commentary of existing traffic flow and road network operations. A review of the road safety history for the surrounding area is considered in the next chapter.

3.2 Study Area

3.2.1 The extent of the study area to be included within this Transport Assessment was discussed and agreed with SCC and Highways England at the outset. The junctions included within this report are identified on Figure 2.

Strategic Road Network

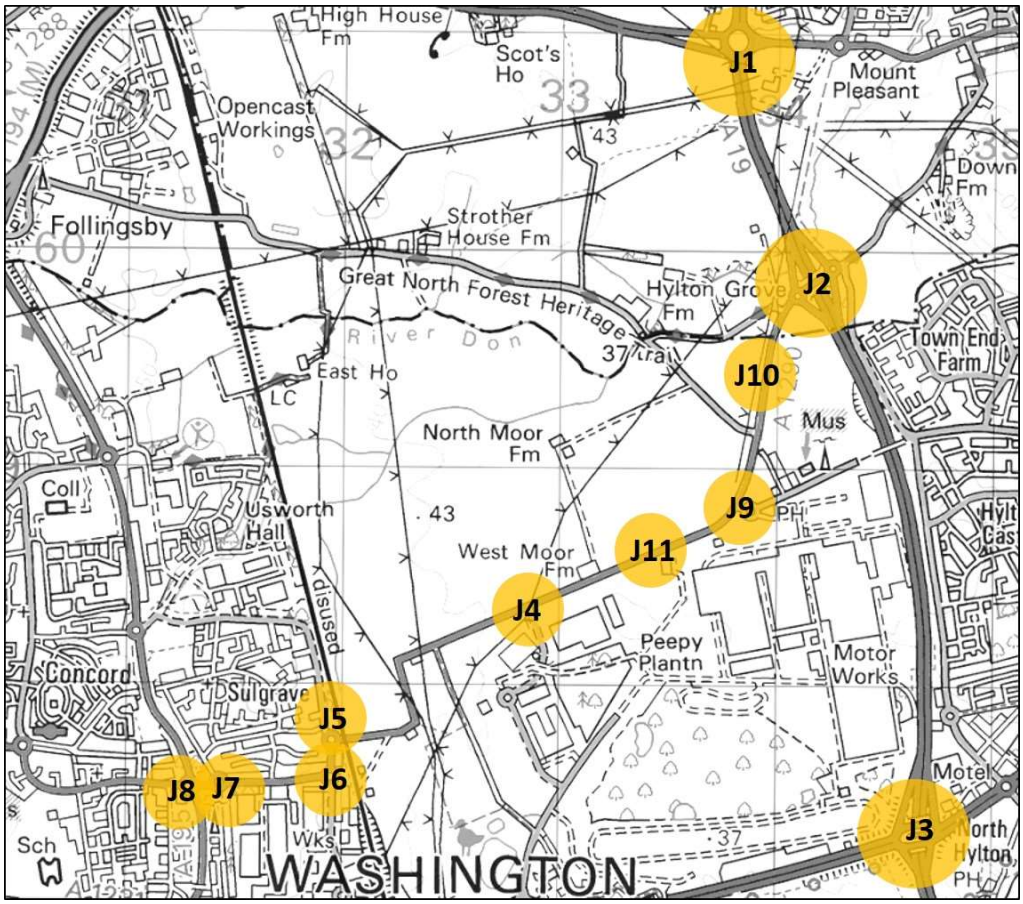
3.2.2 On the Strategic Road Network (SRN), the study area focuses on the A19 to the east of the site and includes the following junctions:

- Junction 1 – A19 / A184 (Testos Roundabout);
- Junction 2 – A19 / Downhill Lane;
- Junction 3 – A19 / A1231 / Wessington Way

3.2.3 On the Local Road Network (LRN), the study area extends to the following junctions:

- Junction 4 – A1290 / Cherry Blossom Way three-arm signalised Junction.
- Junction 5 – A1290 / Sulgrave Road / Glover Road three-arm priority roundabout.
- Junction 6 – Glover Road / Spire Road four-arm priority roundabout.
- Junction 7 – Glover Road / Silverstone Road four-arm priority roundabout.
- Junction 8 – Glover Road / A195 four-arm priority roundabout.
- Junction 9 – A1290 / Nissan site access signalised junction
- Junction 10 – New Eastern Site Access on A1290
- Junction 11 – New Western Site Access on A1290

Figure 2. Study Area



3.3 Description of Road Network

A19 Strategic Road Network

3.3.1 The A19(T) is a de-restricted all-purpose dual carriageway route around the eastern limits of the city of Sunderland.

3.3.2 To the west of the Testo's junction, the A184 is a de-restricted all-purpose dual carriageway route linking Newcastle / Gateshead with the A19(T) route. To the east of the Testo's junction the A184 is a predominantly single carriageway road through built up areas, connecting to the A1018 and Sunderland City Centre.

3.3.3 Testo's is located where the A184 and the A19(T) meet at a signalised roundabout, approximately 3 miles south of the New Tyne Crossing. To the east of the junction there is access to the residential area of Boldon Colliery.

3.3.4 The A19(T) Downhill Lane junction is grade-separated and provides access to Nissan . To the east of this junction there is access to the residential areas of Town End Farm, Downhill and Hylton Castle Estate.

3.3.5 The A1231 Sunderland Highway meets the A19(T) at North Hylton / Castletown to form a grade-separated junction. The junction is signalised on all approaches and has a three-lane circulatory carriageway. The northbound off-slip has a free-flow left turn lane onto the A1231.

3.3.6

Image – Looking south from Testo's

Image – Looking north toward Downhill Lane

Local Road Network

3.3.7 The A184 is a major arterial commuter route into South Tyneside and Gateshead and runs in an east-west direction to the north of the site. To the immediate west of Testo's, the A184 is a dual carriageway with two lanes in each direction, flaring to three lanes on the approach to Testo's roundabout.

3.3.8 To the east of Testo's, the A184 is a single carriageway and subject to 40 mph speed limit. A footway is present along the northern side of the carriageway. Pedestrians cross the Testo's roundabout by using at-grade signal controlled pelican crossings with dropped kerbs and tactile paving. A bus stop is present on the A184 to the west of Testo's roundabout.

3.3.9 To the east of the A19(T), Washington Road is a single carriageway road with a derestricted speed limit as it approached the Downhill Lane junction. As Washington Road passes the residential area of Town End Farm after Ferryboat Lane, the speed limit is 40 mph. Eastwards of the Ferryboat Lane junction, bus stops are present and there are footways and street lighting. To the west of the A19(T), Washington Road is a no-through road from its junction with the A1290, becoming a shared footway/cycleway at its eastern end before meeting the footbridge over the A19. The North East Land, Sea and Air Museum is located on Washington Road and also the Three Horse Shoes Public House.

3.3.10 The A1231 is a dual carriageway which runs parallel to the River Wear, passing the Sunrise Enterprise Park, the Sunderland Enterprise Park and Hylton Riverside Retail Park. Wessington Way ends at the junction with the Queen Alexandra Bridge.

3.3.11 Nissan Way is the main access to Nissan from the A1231. Nissan Way is a single carriageway road with a footway on its eastern side. This footway has guard railing to separate

pedestrians from the traffic and street lighting. Signalised pedestrian crossings with dropped kerbs and tactile paving are available on Nissan Way.

3.3.12 The A195 runs in a north-south direction to the west of the site and meets the A194 (M) to the north. It is a single carriageway which flares to two lanes on the approach to the A195 / A1231 roundabout and this section is subject to a derestricted speed limit. Street lighting is present along the route.

3.3.13 The A1290 runs in an east-west direction and provides access to several commercial areas via series of roundabouts and junctions. The road is a single carriageway and is subject to a 40mph speed limit as it passes the site. A shared use footway is available to the eastern side of the carriageway as it leads away from the Downhill Lane junction.

3.3.14 Glover Road runs in an east–west direction and is a single carriageway and is subject to 30 mph for the majority of its length. A shared use footway is available to the northern edge of this link and the footway is set back a notable distance from the road. Street lighting is present along Glover Road.

3.3.15 Spire Road links to the A1231 Sunderland Highway in the south to Glover Road in the north. It is a single carriageway road subject to 30mph speed limit. Access to commercial units along Spire Road is via priority junctions. Footways and street lighting are present on both sides of Spire Road. Spire Road forms part of a bus route and bus stops are present on both sides of the road.

3.3.16 Cherry Blossom Way connects Nissan Way to the A1290. Th A1290 is a single carriageway road subject to a 40mph speed limit. Parking is prohibited with double yellow lines present along this section. Footways and street lighting are present on both sides of the road. Cherry Blossom Way forms part of a bus route and bus stops are present on both sides of the road.

3.4 Road Network Operations

3.4.1 Numerous site visits have been undertaken during the production of this Transport Assessment to assist with gaining an understanding of existing network operations and performance. Site visits have been undertaken during the typical road network peak periods and during a Nissan morning shift change. In addition, traffic surveys have been undertaken to establish baseline traffic flows.

3.4.2 At the A19 / A184 Testo's Junction, notable queuing occurs on all arms of the junction in both the AM and PM network peak periods (i.e. 07:00-10:00hrs and 15:00-18:00hrs).

3.4.3 The A19 / A1290 Downhill Lane Junction operates as two signalised junctions on either side of the A19. On the western side of the junction, the A1290 has two lanes southbound for a distance of approximately 100 metres from the junction, after which, traffic is required to merge in turn to a single lane. It can be observed on site (and site video footage) that this merge on the A1290 acts as a bottle-neck, with vehicles slowing and leading to queues. As a consequence, from this merge point on the A1290, slow moving traffic queues occur back through the Downhill Lane junction on all approaches. Queuing on the A1290, which backs through the Downhill Lane junction, significantly influences the saturation flow of vehicles on the junction approaches, most notably, the A19 off-slips.

3.4.4 Queuing at the A19 Downhill Lane junction is most pronounced during the Nissan shift change-over and occurs within a short period of time (circa 15-20 minutes). Throughout the rest of the day, numbers are significantly smaller. The shifts on Nissan Production Line 1 are:

- Day Shift (Monday – Friday): 07.00 – 15.35hrs;
- Late Shift (Monday – Friday): 15.30 – 23.20hrs; and
- Night Shift (Monday – Friday): 23.15 – 07.05hrs

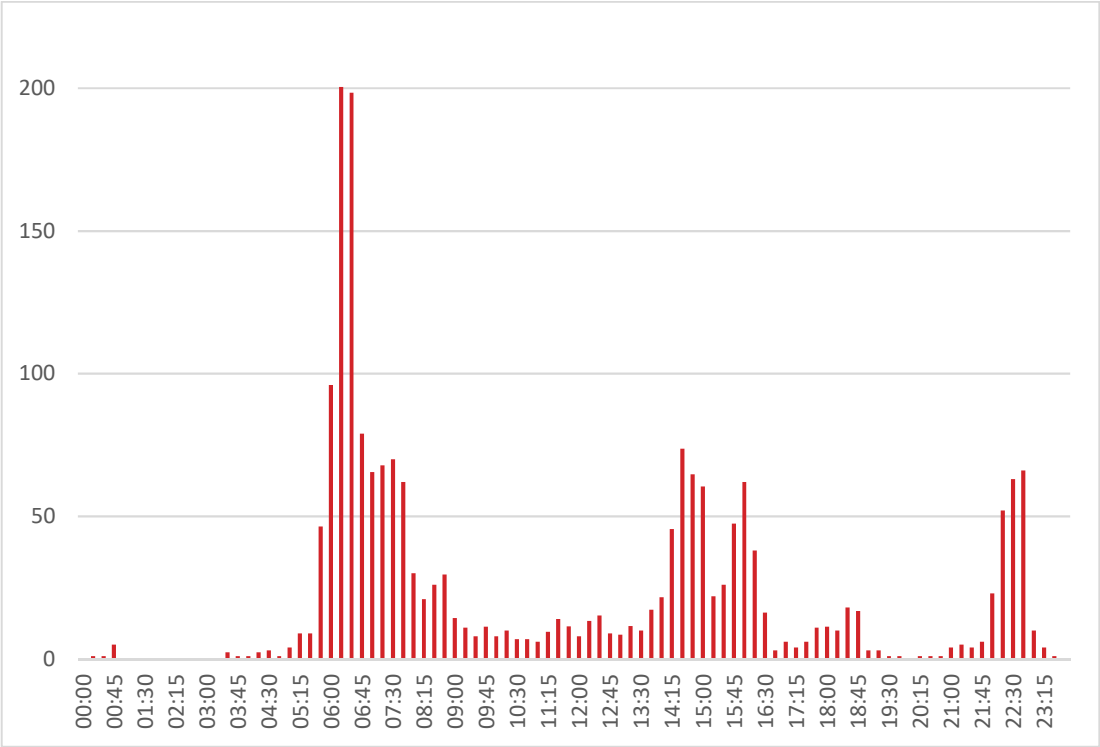
3.4.5 Observations on site, which are confirmed from traffic queue length surveys, reveal that queuing on the A19 slip roads during the Nissan shift change extend along the full length of the available slip and occasionally extend onto the A19 mainline. The Photo below shows the A19 northbound off-slip at Downhill Lane during a Nissan shift arrival period.

Photo 1 – View of South from Downhill Lane, noting queue length on northbound slip road

3.4.6 As an example of network operations during a Nissan shift, Figure 3 presents the traffic flows on the A19 Northbound Off-slip at Downhill Lane, clearly demonstrating the high level of demand during a relatively short period of time, most notably between 06:30 – 06:45hrs.

3.4.7 Outside of the Nissan shift change-over period, the local road network within the study area generally operates in a satisfactory manner, with traffic moving in more free-flow conditions.

Figure 3. Downhill Lane NB Off-slip Traffic Flows



3.5 Surrounding Road Network Improvements

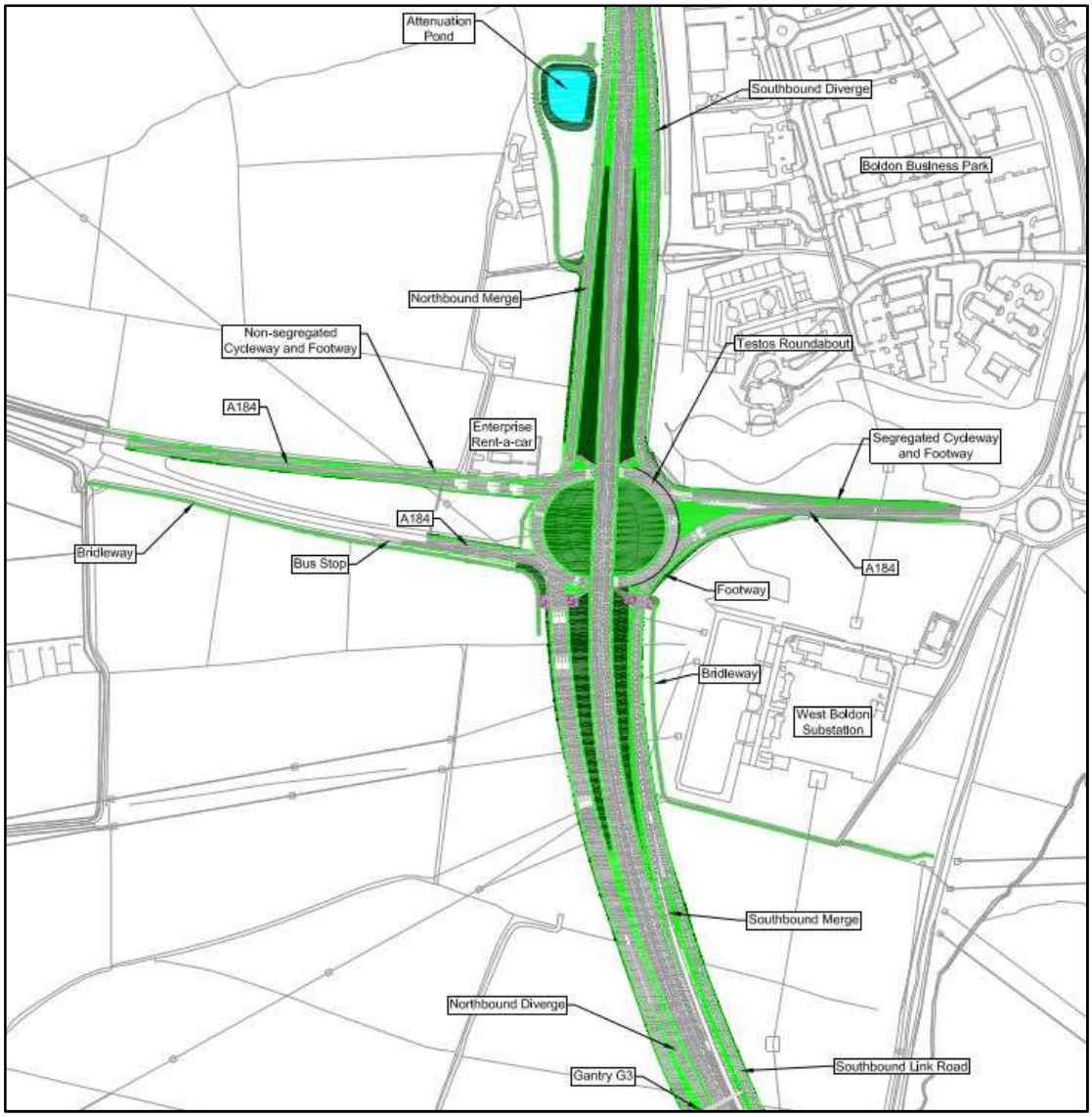
A19 Testo's Junction

3.5.1 This junction forms part of a DCO application being brought forward by Highways England. As part of the planned improvements, the A19 carriageway would be raised to an elevation of 7.5 m above ground level, passing over an enlarged roundabout and linked to it by slip roads. Traffic on the A19 would flow freely above the roundabout, while traffic using the A184 would still travel around the roundabout.

3.5.2 Traffic to and from the north at Downhill Lane would be linked to the A19 at Testo's, via new link roads running parallel to the A19 on either side. Each link road would comprise one lane and a hard-shoulder, running in one direction.

3.5.3 Subject to the relevant planning approvals, construction of the Testo's Junction improvements are expected to commence in early 2019.

Figure 4. Testo's Junction Improvement



A19 Downhill Lane Junction

3.5.4 Highways England is also intending to improve the junction at Downhill Lane and is expected to submit its Development Consent Order to the Planning Inspectorate for examination in April 2018. The preferred option for Downhill Lane Junction expands the existing junction by providing a second bridge to the south of the existing one and establishing a full circulatory system. The existing north-facing slip roads are disconnected from the A19 and instead tie in to the link roads proposed as part of the A19/A184 Testo's Junction Improvement; in this respect there is no change from what is already proposed as part of the Testo's scheme.

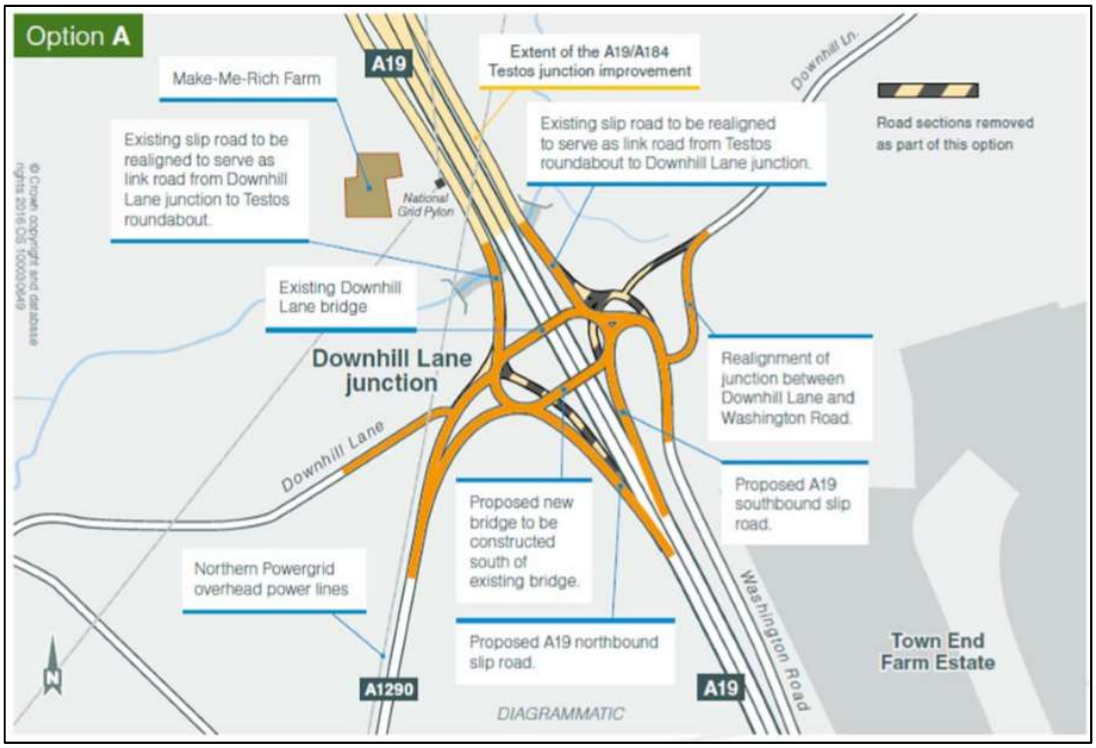
3.5.5 Washington Road to the east of the A19 and the A1290 to the west of the A19 would be realigned slightly to tie-in to the new Downhill Lane junction circulatory system. At a later

stage the western side of the junction would tie-in with the A1290 as a dual carriageway (dualling the A1290 is intended as part of the IAMP scheme).

3.5.6 Downhill Lane to the east of the A19 would be realigned to the south to tie in to Washington Road at a location further away from the circulatory system.

3.5.7 Although it is understood that the design of the Downhill Lane junction has developed further, Figure 4 below provides the indicative layout included in the Public Consultation material, which identified 'Option A' as the 'Preferred Option'.

Figure 5. A19/A1290 Downhill Lane Junction Improvement

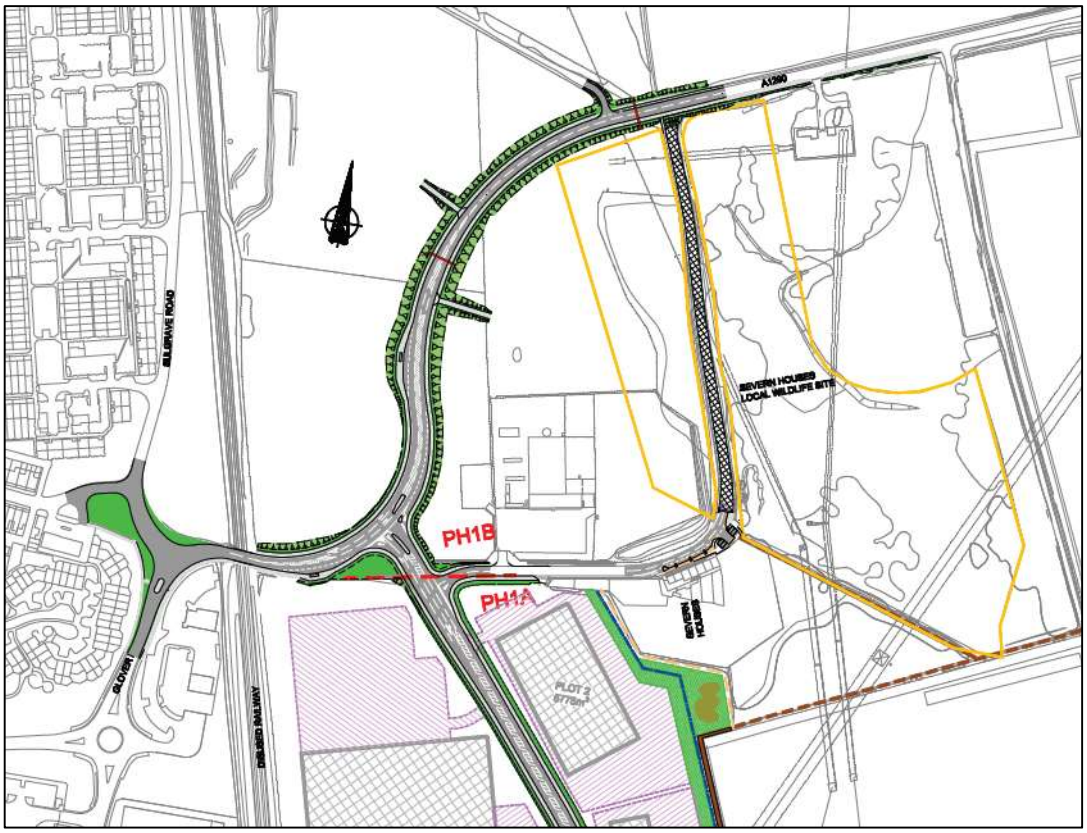


Enterprise Zone Highway Works

3.5.8 These works are being undertaken by Sunderland City Council to enable development to come forward in this area, some of which are now complete and operational, they principally comprise of three elements:-

- Infrastructure works to include a new priority junction to the existing A1290, in order to open the Hillthorn Farm site up for development.
- A new realigned section of the A1290, located between the north-west corner of the Nissan site and the level crossing over the Leamside Line. The road will remove two existing tight bends in the A1290.
- Improve Nissan Way and current access / junction arrangements from Turbine Way. This phase also creates a connection from the improved Nissan Way to Infiniti Drive and through to Washington Road (A1290).

Figure 6. Extract of Enterprise Zone Highway Works



3.6 Journeys on Foot

3.6.1 Walking is the most sustainable form of transport and it offers a range of benefits to everyday living including improvements in: health, safety, access to services and sense of community. Moreover, it is free and predictable, making it an economic and time efficient transport choice.

3.6.2 Although walking distances will vary between individuals and circumstances, the Chartered Institution of Highways & Transportation (CIHT) suggests that up to 2.0km is an acceptable walking distance for commuting and some other journey purposes.

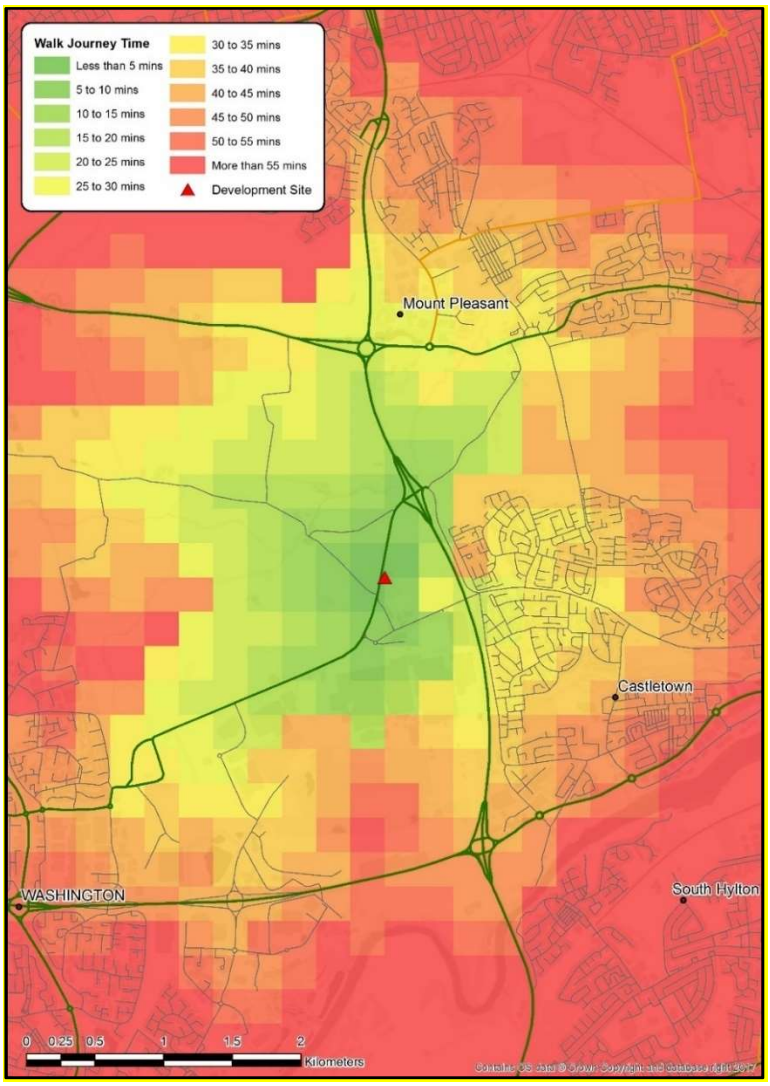
3.6.3 Almost all journeys include an element of walking therefore pedestrian facilities should not be considered in isolation. Walking offers the connection between cycling, public transport and highway transport to destinations.

3.6.4 In addition to the existing footways and crossing points in the area, key pedestrian facilities within the vicinity of the site include the footbridge of the A19 near Nissan and the 3 metre wide shared use footway/cycleway on the eastern side of the A1290.

3.6.5 To provide a representation of the likely walking isochrones from the site, TRACC has been used. TRACC is multi-modal accessibility tool to assess journey times. Figure 6 presents the output from TRACC for walking, using an average walking speed of 1.4 metres / second.

3.6.6 It can be seen from Figure 7 that the residential areas of Town End Farm and Hylton Castle are within a walking journey time of approximately 30 minutes. It can also be seen that areas slightly further afield can be reached in less than hour.

Figure 7. Walking Accessibility



3.7 Cycling Network

3.7.1 Cycle use is considered a feasible means of transport over short to medium distances. It is influenced by many the same factors as walking but will also be influenced by route conditions, traffic levels and secure parking at destination.

3.7.2 The Cycling England document 'Integrating Cycling into Development Proposals' suggests acceptable cycling distances of commuting and non-work purposes of:

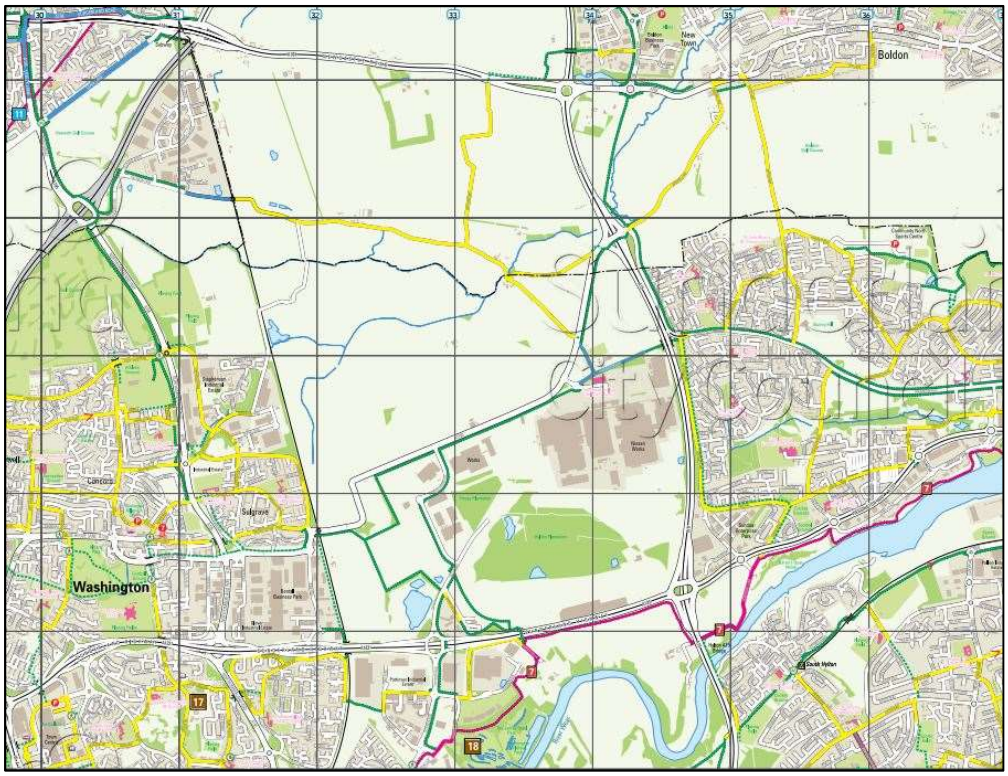
> *"Most cycle journeys for non-work purposes and those to rail stations are between 0.5 miles [0.8km] and 2 miles [3.2km], but many cyclists are willing to cycle much further. For work, a distance of 5 miles [8km] should be assumed."*

3.7.3 The potential for cycling trips is significant as a just five kilometre travel distance from the development site covers north-west Sunderland, Washington, Wardley, Hedworth and Boldon.

3.7.4 The availability of traffic-free cycle routes that are direct and safe can have a positive effect on cycling levels. Currently, the provision of designated on or off road cycle routes near the site and surrounding area is generally good, as shown in Figure 8.

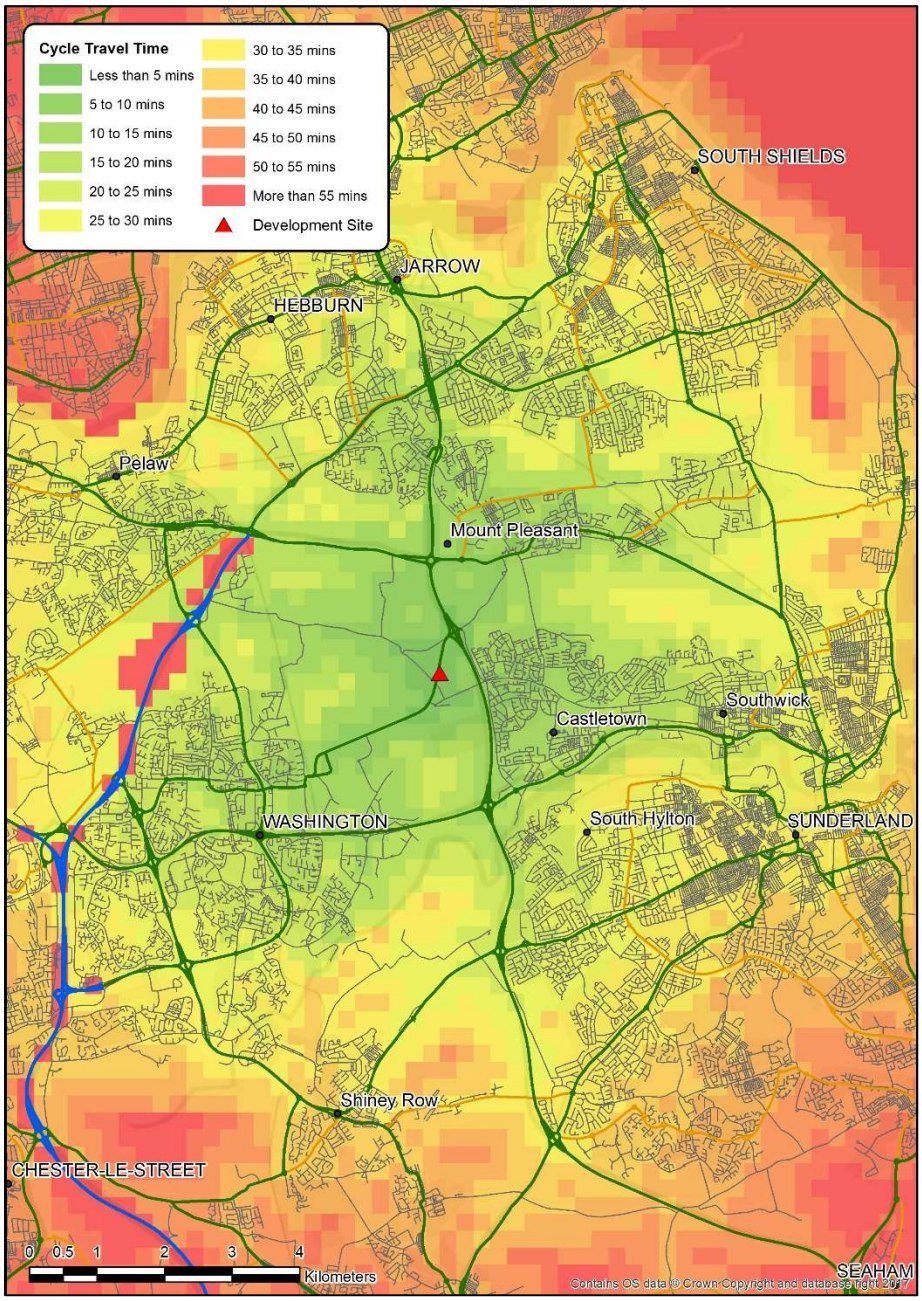
3.7.5 On site observations during the morning peak period noted several people cycling along the shared use facility along the A1290.

Figure 8. Cycle network surrounding the site



3.7.6 To provide a representation of the likely cycling isochrones from the site, TRACC has again been used. It can be seen from Figure 9 that a large number of residential areas, including those in South Shields, Pelaw and Sunderland are within a cycling journey time of approximately 30 minutes. It can also be seen that areas further afield can be reached in less than hour.

Figure 9. Cycle Accessibility



3.8 Bus Services

3.8.1 The bus is generally considered a viable mode of travel over short and medium distances although some routes and services with limited stops and make longer distances viable. Indeed, bus travel plays an important part of the access equation for the IAMP ONE development.

3.8.2 Within close proximity to the site there are bus stops on either side of the A1290 next to the proposed new junction on the A1290; bus stops on either side of the A1290 at the Usworth Cottages junction; and bus stops on either side of the A1290 in the vicinity of the Nissan access. All of which are within walking distance from the site.

3.8.3 The north bound bus stop in the vicinity of the Nissan access has a shelter with lighting, seating and timetable information. The southbound bus stop has flag/pole and timetable information. The services that currently serve the site are outlined in Table 1.

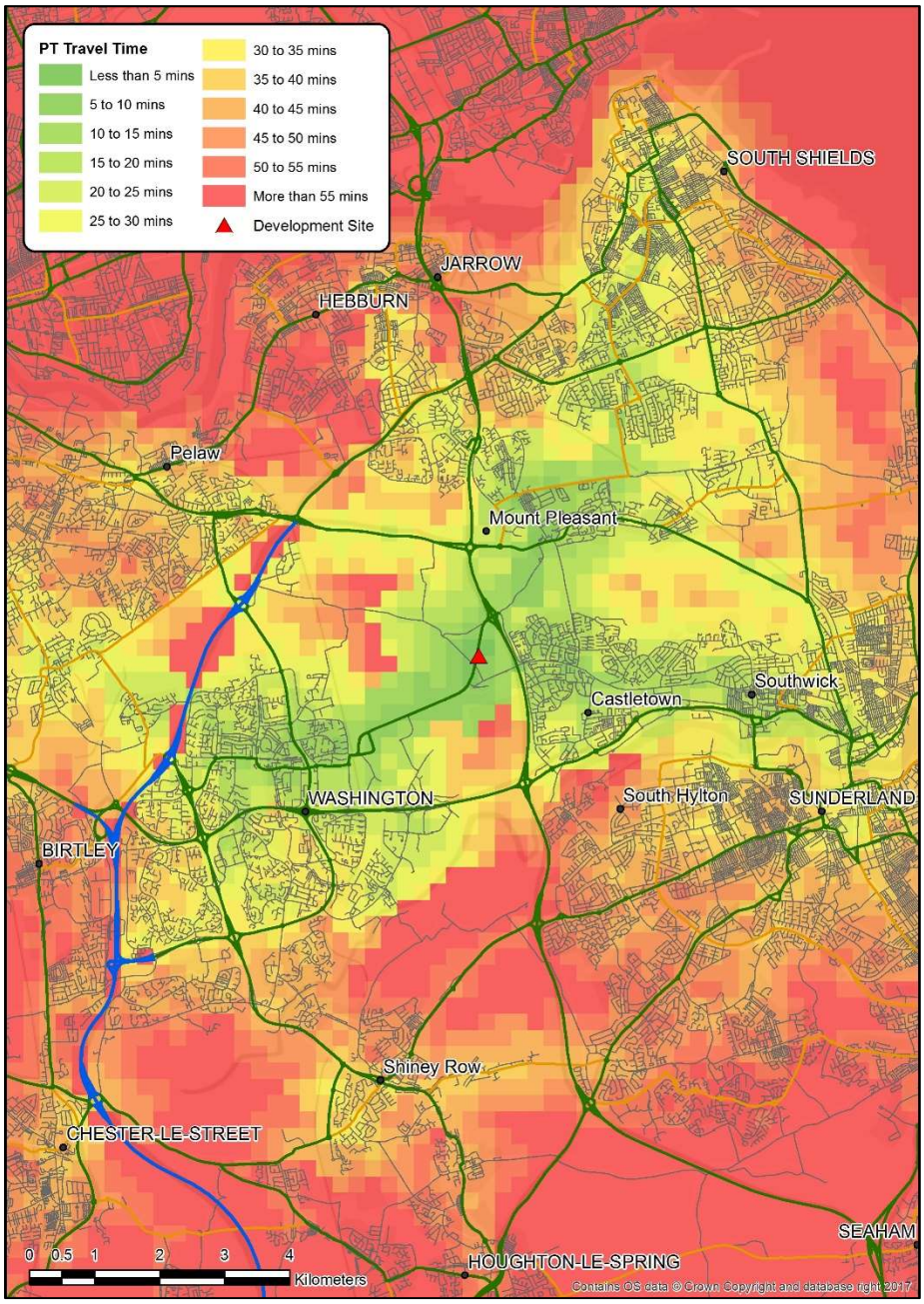
Table 1. Bus Services on the A1290

NUMBER	ROUTE	MON - FRI	SAT	SUN
Wey Aye 50	South Shields - West Harton - Boldon - Concord - Washington Galleries - Chester-le-Street - Waldridge Park - Arnison Centre - Framwellgate Moor - Durham	0705 – 1826 Every 30 mins	0849 – 1811 Every 30 mins	1105 – 1705 Every 60 mins
Fab 56	Sunderland- Southwick - Hylton Castle - Nissan UK - Sulgrave - Concord - Donwell - Springwell Village - Wrekenton - Gateshead - Newcastle	0614 – 0032 Every 12 mins	0634- 0032 Every 12 mins	0827 – 0004 Every 20 - 30 mins

3.8.4 The perception of local bus services in the UK is generally poor, with public perceptions of bus travel being often based on little or no experience of the local service. However, it has been highlighted that the IAMP ONE site and proximity of bus stops which are served by frequent services to local centres assist in encouraging travel to/from the site by public transport. The site accords with guidance provided by the Institution of Highways and Transportation (IHT) in their document 'Planning for Public Transport in Developments' (1999) which advises that bus stops should be located within 400m of a development for ease of accessibility.

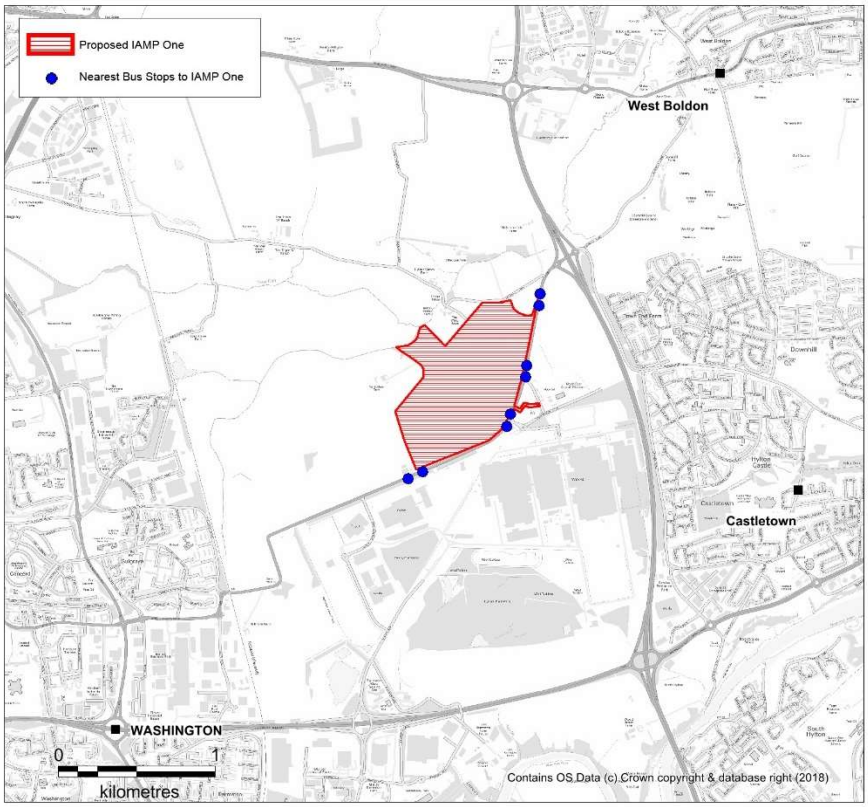
3.8.5 The potential for public transport trips is significant as a 30-minutes travel journey from the development site covers north Sunderland, Washington, parts of Pelaw, parts of Hebburn, South Shields, Southwick and Castletown, as can be seen in the TRACC output in Figure 10.

Figure 10. Bus Travel Accessibility



3.8.6 The location of the nearest bus stops to IAMP ONE along the A1290 is shown in Figure 11.

Figure 11. Nearest Bus Stop Locations



3.9 Train Travel

3.9.1 There are no rail stations within the immediate vicinity of IAMP ONE. The nearest mainline railway station is located in Sunderland City Centre, approximately 6.5km from the site. Also, Newcastle Railway station is located approximately 10km away from the site.

3.9.2 The train stations offer the following regional and nationwide services:

- East Coast main line operates northwards to Scotland and southwards to Yorkshire and London;
- Tyne Valley line operates westwards to Hexham and Carlisle;
- TransPennine rail operates to Leeds and Manchester; and
- Cross-Country line runs to the Midlands and south-west England.

3.10 Air Travel

3.10.1 The nearest airport to IAMP ONE is Newcastle International Airport, which is located 19km to the north west of the site. There is a rail link from the airport to Newcastle City Centre and Sunderland from where a number of additional sustainable measures are available, including taxis, coaches and buses.

4. ROAD SAFETY

4.1 Introduction

4.1.1 This chapter has been produced to provide an overview of collisions within the study area for the most recent 5-year period. The study area for the road safety analysis focuses on the similar extents to that considered for the traffic modelling.

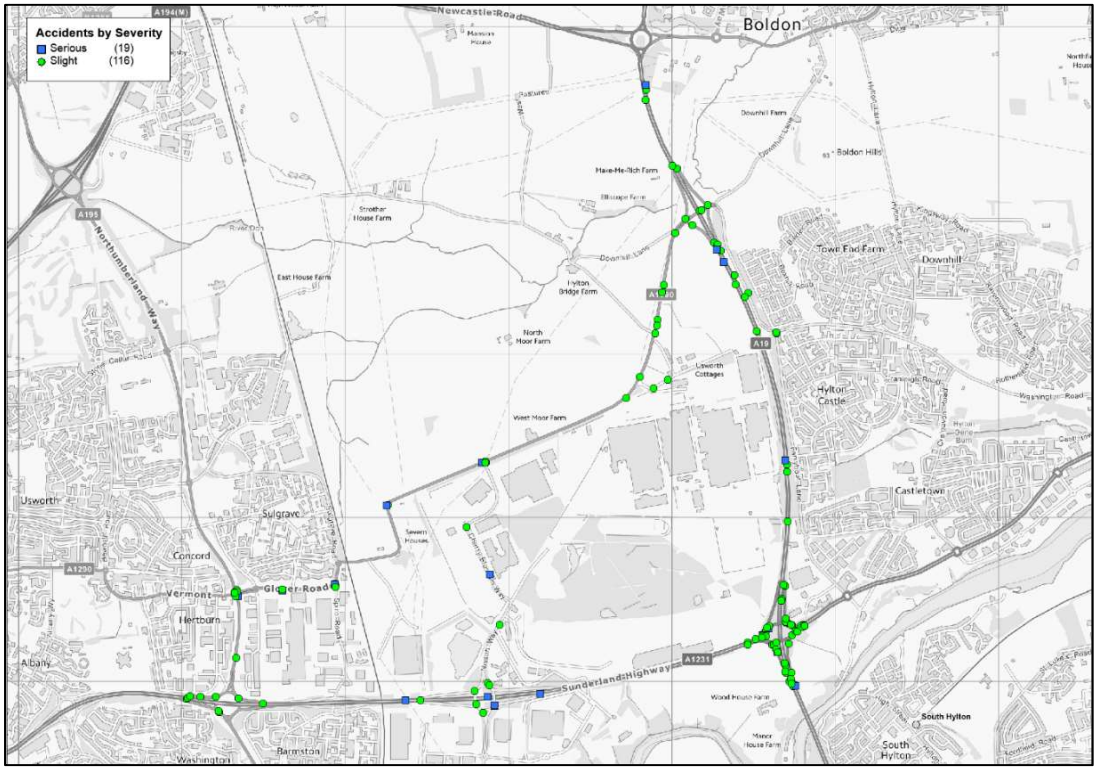
4.1.2 Collision data has been sourced from the Tyne & Wear Traffic and Accident Data Unit (TADU), which compiles road accident data on behalf of the Tyne and Wear Local Authorities. The data supplied by TADU covers PIA for the period from August 2012 to August 2017.

4.1.3 A review of the collision records has been undertaken to identify patterns of collision types that may be attributed to issues from existing road design, layout or construction. The pattern of collisions and collision details are discussed in greater detail within this chapter.

4.2 Study Area and Approach

4.2.1 Figure 12 shows the collision locations and severity across the proposed study area and within the vicinity of the development.

Figure 12. Map showing Collision Locations



4.2.2 The A19 Testo's junction has been excluded from the study area due to the advanced progression of the Highways England improvement scheme for this junction. The junction improvement scheme for Testo's is predicted to improve safety[1] and reduce the number of collisions at this junction.

4.3 Overview

4.3.1 A total of 135 collisions have occurred across the study area between August 2012 and August 2017. The vast majority of collisions (116) were slight in severity, with 19 classified as serious and no collisions resulted in fatality. The number of collisions by year and severity can be found in the table below.

Table 2. Collison Summary by year

Year	Severity			5 Year Total
	Slight	Serious	Fatal	
2012	12	0	0	12
2013	30	5	0	35
2014	20	5	0	25
2015	22	4	0	26
2016	24	4	0	28
2017	8	1	0	9
Total	**116**	**19**	**0**	**135**

4.3.2 Having reviewed the collision data provided for the five year study period the above analysis notes that the majority of the collisions occurred were as a result of driver error and lack of awareness of other road users, rather than highway design.

4.3.3 Looking in more detail at the highway around the proposed development, the following table identifies the total number of collisions by month.

Table 3. Collison Summary by month

Month	Severity			5 Year Total
	Slight	Serious	Fatal	
January	10	0	0	10
February	14	1	0	15
March	6	1	0	7

[1] A19/A184 Test's Junction Improvement, Second Statement of Common Ground, Highways England

April	11	1	0	12
May	6	1	0	7
June	11	4	0	15
July	8	3	0	11
August	11	0	0	11
September	10	1	0	11
October	11	1	0	12
November	10	5	0	15
December	8	1	0	9

4.3.4 As shown in Table 3 the number of collisions by month are fairly consistent. Across the 5-year study period the highest number of collisions occurred in February, June and November totalling 15 for each month.

4.3.5 The months in which the least number of collisions occurred was May and March, both totalling 7 collisions within their respective periods. In both May and March, six of the collisions were classified as slight and one collision classified as serious.

4.3.6 Looking in more detail at the total number of collisions by day and severity over the five year study period, Table 4 presents the summary findings.

Table 4. Collison Summary by day

Day	Severity			5 Year Total
	Slight	Serious	Fatal	
Monday	22	2	0	24
Tuesday	22	4	0	26
Wednesday	13	4	0	17
Thursday	20	2	0	22
Friday	17	2	0	19
Saturday	14	2	0	16
Sunday	8	3	0	11

4.3.7 Assessments of the collision reports identify that the majority of collisions during the study period occurred on a Tuesday. Collisions reports show that 22 of the collisions were classified as slight in severity and four were classified as serious. The collision reports identify that the fewest number of collisions occurred on a Sunday.

4.3.8 Looking in further detail at the number of collisions by time of day and severity, Table 5 provides a summary.

Table 5. Collisions Summary by time

Hour Starting	Severity			5 Year Total
	Slight	Serious	Fatal	
00:00	6	1	0	7
01:00	2	2	0	4
05:00	1	1	0	2
06:00	5	2	0	7
07:00	7	0	0	7
08:00	6	0	0	6
09:00	11	0	0	11
10:00	2	2	0	4
11:00	4	1	0	5
12:00	3	0	0	3
13:00	5	1	0	6
14:00	2	6	0	8
15:00	14	1	0	15
16:00	15	3	0	18
17:00	9	2	0	11
18:00	4	1	0	5
19:00	4	2	0	6
20:00	2	0	0	2
21:00	2	0	0	2
22:00	3	0	0	3
23:00	5	0	0	5

4.3.9 Table 5 highlights that most accidents tend to occur in the PM peak periods between 15:00hrs and 17:59hrs .

4.3.10 A review of the classification of vehicles involved in collisions has been undertaken and Table 6 provides a summary for collisions within the study area. It can be seen from Table 6 that 76% of accidents involved a car, with collisions involving HGVs representing 7.7% of collisions.

Table 6. Collison Summary by vehicle type

Vehicle Type	Number of Collisions	Percentage (%)
Car	218	76.2%
HGV	22	7.7%
Motorcycle	23	8.0%
Pedal Cycle	17	5.9%
Bus / Coach	2	0.7%
Other	4	1.4%

4.4 Collision Clusters

4.4.1 The following sections consider collision clusters in more detail. These are areas within the study area which have been identified as presenting an obvious location where a number of collisions have occurred in close proximity.

A19 Downhill Lane Junction

4.4.2 An assessment of the collision reports identify that a total of 12 collisions have occurred at this junction, of which 11 were classified as slight and one classified as serious.

Table 7. Collison Summary A19 / Downhill Lane

Year	Severity			5 Year Total
	Slight	Serious	Fatal	
2012	3	0	0	3
2013	2	0	0	2
2014	1	0	0	1
2015	3	0	0	3
2016	2	1	0	3
2017	0	0	0	0
Junction Total	**11**	**1**	**0**	**12**

4.4.3 A total of six out of the 11 collisions occurred on the approach to Downhill Lane, with four on the single carriageway and two occurring on the dual carriageway.

4.4.4 From a review of the collision descriptions and details, it is considered that the all of collisions that occurred were as a result of driver error and lack of awareness. It is considered that there are no road safety issues that would be exacerbated by the addition of development traffic.

A19 / A1231 / Wessington Way

4.4.5 An assessment of the collision reports identify that a total of 52 collisions occurred at this junction, 48 of which were classified as slight and four of which were classified as serious.

Table 8. Collison Summary – A19 / Ferryboat Lane

Year	Severity			5 Year Total
	Slight	Serious	Fatal	
2012	4	0	0	4
2013	14	1	0	15
2014	5	0	0	5
2015	11	2	0	13
2016	10	1	0	11
2017	5	0	0	5
Junction Total	**49**	**4**	**0**	**53**

4.4.6 A total of 34 out of the 52 reported collisions happened on the dual carriageway, 12 on the circulatory carriageway and six on the approaches to the roundabout.

4.4.7 It is considered that the majority of collisions that occurred were as a result of driver error and lack of awareness. It is considered that there are no road safety issues that would be exacerbated by the addition of development traffic.

A1231 / Nissan Way

4.4.8 An assessment of the collision reports identify that a total of 11 collisions occurred at this junction, six of which were classified as slight and five of which were classified as serious.

Table 9. Collison Summary – A1231 / Nissan Way

Year	Severity			5 Year Total
	Slight	Serious	Fatal	
2012	1	0	0	1
2013	1	1	0	2
2014	2	2	0	4
2015	1	0	0	1
2016	1	2	0	3
2017	0	0	0	0
Junction Total	**6**	**5**	**0**	**11**

4.4.9 A total of four out of the 11 collisions happened on dual carriageway, three on the circulatory carriageway and four on the approaches to the roundabout.

4.4.10 It is considered that the majority of collisions that occurred were as a result of driver error and lack of awareness. It is considered that there are no road safety issues that would be exacerbated by the addition of development traffic.

A1231 / A195 Junction

4.4.11 An assessment of the collision reports identify that a total of nine collisions occurred at this junction, all of which were classified as slight.

Table 10. Collison Summary – A1231 / A195

Year	Severity			5 year total
	Slight	Serious	Fatal	
2012	1	0	0	1
2013	0	0	0	0
2014	3	0	0	3
2015	1	0	0	1
2016	2	0	0	2
2017	2	0	0	2
Junction Total	**9**	**0**	**0**	**9**

4.4.12 Five of the nine collisions happened along the dual carriageway, three on the circulatory carriageway and one on the approach to the roundabout.

4.4.13 It is considered that the majority of collisions that occurred were as a result of driver error and lack of awareness. It is considered that there are no road safety issues that would be exacerbated by the addition of development traffic.

4.5 Summary

4.5.1 Having reviewed the full extent of the detailed collision data provided for the study period, the above analysis notes that the majority of the accidents occurred as a result of driver error and lack of awareness of other road users, rather than highway design issues.

4.5.2 Whilst it is acknowledged that the IAMP ONE development proposals will lead to the addition of additional traffic on the road network, the collision records do not indicate any particular road safety concerns. It should however be noted that road safety in the vicinity of the A19 Downhill Lane junction has been an on-going concern of the local highway authorities and Highways England. Whilst the collision data does not necessarily imply that there is an existing road safety issue, concern arises when a high demand is experienced on the off-slips and vehicle queues extend back to the mainline flow of the A19.

5. IAMP ONE DEVELOPMENT PROPOSALS

5.1 Introduction

5.1.1 This chapter presents an overview of the IAMP ONE development proposals and sets out in detail how the proposed development will be accessed by the main modes of transport. Particular consideration is given to ensure that the proposed development is fully accessible by sustainable travel modes.

5.2 Proposed Development

5.2.1 A hybrid planning application is submitted for IAMP ONE, which comprises approximately 156,750sqm of industrial units (Class B2(c), B2 and B8), with ancillary office and Research & Development floorspace (Class B1(a) and B1(b)), with associated access and infrastructure on land to the west of the A19 and north of Nissan in Sunderland.

5.2.2 The illustrative masterplan for the site is provided in the appendices, which shows the outline planning application proposals. Included also within the appendices is the masterplan for Unit 3, which form part of the Detailed Planning submission.

5.3 Vehicular Access

Access Junctions

5.3.1 It is proposed that vehicular access to the site will be provided via two new simple priority controlled T-junctions on the A1290. A new spine road will connect the two new junctions allowing through-traffic through the development (see SYSTRA Drg No.: IAMP_ONE-SYS-HGN-ZA1-DR-D-01-001-S0-P02).

5.3.2 The proposed junction layouts are designed to the Design Manual for Roads and Bridges (DMRB) standards, whilst respecting the local context. The general arrangement is shown on the highway layout drawing within the appendices and includes the following:

- A new T-junction to be provided on the A1290 located approximately 400m south of the A19 / A1290 Downhill Lane junction and approximately 650m north of the Nissan access junction. The minor arm will be dual carriageway to future-proof the masterplan for the wider IAMP site. Two lanes are provided for access onto the A1290 and a right turn facility is provided on the A1290 for access into the site for southbound movements. The junction will accord with the geometric standards in DMRB and adequate visibility will be provided in both directions.

- A new T-junction to be provided on the A1290 located approximately 300m west of the Nissan access junction and approximately 760m east of Cherry Blossom Way. Two lanes are provided for access onto the A1290 and a right turn facility on the A1290 for access into the site for westbound movements. The junction will accord with the geometric standards in DMRB and adequate visibility will be provided in both directions.

- A 3.0m wide shared use footway is provided along both sides of the junctions which tie into existing provision on the A1290 and the internal road layout.

- Dropped kerbs, tactile paving and pedestrian refuge are provided to access from the A1290. These are located immediately south of the northern priority junction and immediately west of the southern priority junction.

5.3.3 Capacity assessments have been undertaken for both proposed site access junctions to confirm their suitability. The results of this is presented in section 8 of this report.

5.3.4 It is proposed that the applicant will enter an agreement with the relevant Local Authorities, under Section 278 of the Highway Act 1980 to deliver the works to the existing highway.

Junction Sight Visibility Splays

5.3.5 Junction visibility splays conform to the requirements of DMRB TD 42/95. The minimum visibility splay for a design speed of 70 kph is 120m, which is provided at the proposed junctions.

Internal Road Layout

5.3.6 The submitted details of access show a 10.8m wide link road which connects to the A1290 and provides access to the individual plots via simple priority controlled T-junctions, each with right-turn facilities. A shared use pedestrian and cycleway will be provided along both sides of the link road with additional links through the site increasing permeability.

5.3.7 The proposed link road layout is designed to the DMRB standards, whilst respecting the local context. The general arrangement is included in the appendices and includes the following:

- A 10.8m wide carriageway is provided for the link road through the site. This allows a central 3.5m hatched area to be provided for its length which accommodates the right turning facilities for the individual plot accesses. The link road will accord with the geometric standards in DMRB for a design speed of 50 kph. Adequate visibility will be provided in both directions.

- From the northern most new priority junction into the site there is a 160m section of the link road which is dual carriageway, with a 90-degree corner onto link road. This layout accords with the wider masterplan aspirations. The road will eventually continue northward with a junction being formed with the link road.

5.3.8 With the exception of Plot 3, which is a detailed application, the final position of the individual plot accesses have not been confirmed. However, a standard design for the junction layout is set-out and consists of a 7.3m wide carriageway for each minor arm; a right-turn facility; shared use path in to the development plot; 10m corner radii; and a dropped kerb crossing the junction with tactile paving. Junctions will not be positioned closer that 50m centre-to-centre on the same side of the link road, or closer than a 25m stagger on opposite sides of the carriageway.

5.4 Pedestrian, Cycle & Equestrian Access

Access Routes

5.4.1 The masterplan for the site has been designed to maximise pedestrian, cycle and equestrian connectivity both within the site and connect to the wider area. It is proposed that pedestrians and cycles will be able to access the site as follows:

- A 3.0m wide shared use path is provided along both sides of the link road which ties into the existing provision on the A1290. The shared use path will also provide pedestrian and cycle access into the development plots.
- A pedestrian and cycle link will be provided from the dual carriageway section northwards to Downhill Lane.
- The section of Follingsby Lane within the red line boundary will have a traffic regulation order applied which will prohibit motor vehicles. This provides a pedestrian, cycle and equestrian link through the site. In addition, pedestrians, cyclists and equestrian users will be able to route via the section of Downhill Lane which runs east-west between Hylton Grove Bridge and the A1290; a new link from IAMP ONE to this section of Downhill Lane will also be provided.
- Dropped kerbs, tactile paving and pedestrian refuge provided at intervals along the link road.

5.4.2 Whilst the internal layout of the development plots is to be agreed at the reserved matters stage, it is intended that a safe and attractive environment for walking and cycling will be provided which encourages local journeys to be made by foot or by cycle. The site is reasonably level so ideal for active travel amongst users of the site.

5.5 Public Transport Access

5.5.1 The proposed IAMP ONE development has been designed to maximise the existing public transport services in the local vicinity, ensuring that pedestrian connections to bus stops are safe, convenient, direct and take into consideration the needs of the mobility impaired.

5.5.2 In addition to the proposed measures to improve pedestrian and cycle connectivity outlined previously, it is proposed to improve the existing bus stop provisions. There are currently two north-eastbound bus stops and two south-westbound bus stops adjacent to the site on the A1290. These bus stops do not currently have shelters and as such, new bus shelters will be provided at these stops as part of the development to encourage people working at the site to use public transport. In addition, a new footway will be introduced which will connect the site's pedestrian infrastructure at the southern junction to the bus stop located opposite the Nissan access.

5.5.3 The existing public transport services within the vicinity of the site will be supported by the promotion of sustainable travel options through the implementation of travel planning measures, as set out in the accompanying Framework Travel Plan.

5.6 Framework Travel Plan

5.6.1 In accordance with national and local policy requirements a Framework Travel Plan has been prepared to accompany the hybrid planning application and this is submitted under separate cover.

5.6.2 The Framework Travel Plan is to be read in conjunction with this Transport Assessment and was based on the best practice guidance set out in the Planning Practice Guidance. The Travel Plan combines the delivery of 'hard' structural measures (such as improvements to infrastructure and services), with 'soft' measures (such as marketing and information) to encourage trips to the proposed IAMP ONE development to be made by sustainable (non-car) modes of transport, where possible, and to mitigate the impact of increased traffic.

5.7 Construction Traffic Management Plan

5.7.1 An Outline Construction Traffic Management Plan will be submitted and agreed in writing with the Local Highways Authority at the reserved matters stage. It will ensure that construction works do not have a detrimental impact on the surrounding community, both for the construction on-site and the transport arrangements for servicing the site.

5.7.2 The Construction Traffic Management Plan will address how any impact associated with the proposed works will be mitigated and also manage the cumulative impacts of construction in the vicinity of the site.

5.8 Site Wide Car Parking (Outline)

5.8.1 The indicative masterplan for IAMP ONE (AJA Architects Drg No.: 624-133) demonstrates that parking provision for the development can accommodate the car parking requirements set out in Sunderland City Council's Supplementary Planning Guidance 'Development Control Guidelines'. These guidelines outline that car parking for Class B2 General Industrial uses should be provided at a level of one space for every 50 sqm of gross floor area.

5.8.2 The indicative masterplan shows the approximate gross internal floor areas for the development plots and the number of car parking spaces shown for each unit. It is shown that across the units, which comprise of 156,750 sqm of predominately industrial uses, a total provision of 2,629 car parking spaces can be provided. The precise number of car parking to be provided for each plot will however be considered at the reserved matters stage for each respective plot.

5.8.3 Dedicated car parking will be provided for each unit using car parking space dimensions of 2.4m by 4.8m. Visitor, disabled, car share and cycle parking will be provided in accordance with Sunderland City Council's standards.

5.9 Car Parking for Unit 3 (Detailed)

5.9.1 Unit 3 forms part of the detailed planning application for IAMP ONE and as such, further consideration has been given to car parking requirement.

5.9.2 A high-level review of the car parking provisions of other known existing Nissan suppliers confirms that a car parking ratio of 1 space per 50 sqm may not be appropriate for all potential users. For example:

- The Unipres site located on Cherry Blossom Way provides car parking at a ratio of approximately 1 space per 100 sqm.
- The SNOP site located on Rainhill Road in Washington provides car parking at a ratio of approximately 1 space per 88 sqm.

Plan of SNOP site and car parking

Plan of Unipres site and car parking

5.9.3 The occupier of Unit 3 has extensive knowledge of its operational needs, including the level of car parking required to accommodate staff and visitors. The occupier of Unit 3 has advised that a car parking provision of 276 spaces is required to meet operational needs; this provision is shown on the site masterplan and approximately equates to a ratio of 1 space per 80 sqm.

5.9.4 The occupier of Unit 3 has provided the following supporting background information to qualify the car parking provision:

- The site will operate on a 3-shift pattern, with approximately 90 staff working within each shift.
- Approximately 42 office based staff are expected to work on site, working typical 'office hours'
- Approximately 20 visitors are expected on site at any one time.
- The shift change between the late shift and night shift, whilst having the largest number of 'shift' workers, occurs when office based staff are not on site. Therefore this is not the maximum to be considered for car parking numbers.
- The maximum demand arises during the day when office based staff are on site. During these shift change period, demand is greater.

5.10 Servicing and Deliveries for Unit 3 (Detailed)

5.10.1 The occupier of Unit 3 has extensive knowledge of its operational needs, including the internal layout requirements to accommodate its servicing and delivery arrangements.

5.10.2 A single access from the new spine road is proposed for all vehicles, with a security barrier control measure located approximately 50 metres from the access junction. From here, vehicles will continue into the site, with cars (staff/visitors) turning off into the car park and HGVs (deliveries/servicing) continuing straight ahead toward the servicing area.

5.10.3 Swept path analysis is included in the supporting appendices to confirm the suitability of the layout to accommodate HGV movements, including their manoeuvrability within the service areas. All vehicles will be able to enter and exit the site in a forward gear.

6. TRIP GENERATION AND ASSIGNMENT

6.1 Introduction

6.1.1 This chapter provides details on the methodology used to calculate the number of trips the IAMP ONE development will potentially generate and how these trips will be distributed on the highway network for assessment purposes.

6.1.2 During scoping discussions for IAMP ONE, Highways England raised the current Downhill Lane junction's ability to safety accommodate the additional demands associated with the proposed development, in advance of the Highways England Major Scheme for Downhill Lane coming forward. It was identified that it would be necessary to assess the performance of the existing Downhill Lane junction's operation prior to the commencement of the major scheme works.

6.2 IAMP ONE Operations

6.2.1 The existing operational issues at the Downhill Lane junction are most apparent during the periods that the trips associated with Nissan shift-change times occur. As a mechanism to manage the proposed IAMP ONE development's impact during these periods, for a temporary period, until the improvement works to the A19 at Testo's and Downhill Lane are completed, the end users of IAMP ONE will be required to operate a shift pattern that is off-set by one hour from those used at Nissan in the morning and afternoon periods. To ensure this is controlled, the Local Highway Authority and Highways England will require the end uses to be in accordance with an agreed Operational Management Plan which will provide more detail on this, but for the purposes of this assessment, the following IAMP ONE shift patterns have been assumed within the assessments:

- Day Shift: 06.00 – 14.35hrs;
- Late Shift: 14.30 – 22.20hrs; and
- Night Shift: 22.15 – 06.05hrs

6.3 Development Trip Generation

6.3.1 During scoping discussions it became apparent it was necessary that the approach to trip generation for IAMP ONE was consistent with the methodology adopted by others, and agreed with Highways England, for planning application Ref: 16/01341/HE4 submitted by Town End Farm Partnership for land to the north of Nissan.

6.3.2 Given the range of potential end user requirements and operations, the approach to trip generation assessment within the supporting AAP documents considers a TRICS approach, which is appropriate for informing policy requirements. However, for another similar planning application (Planning Ref: 16/01341/HE4), Highways England had previously accepted that the TRICS database was not particularly representative of the operations identified for proposed end users, such as those of IAMP ONE (i.e., Nissan suppliers).

6.3.3 To ensure consistency with the previously agreed methodology, information submitted in support of planning application Ref: 16/01341/HE4 was requested by SYSTRA and subsequently provided.

6.3.4 To inform the trip generation potential, surveys were commissioned at the Unipres access to identify the trip making characteristics (Unipres was identified as an operation associated with, and a supplier to, Nissan); these surveys were undertaken over a 24-hour period on 18 January 2017.

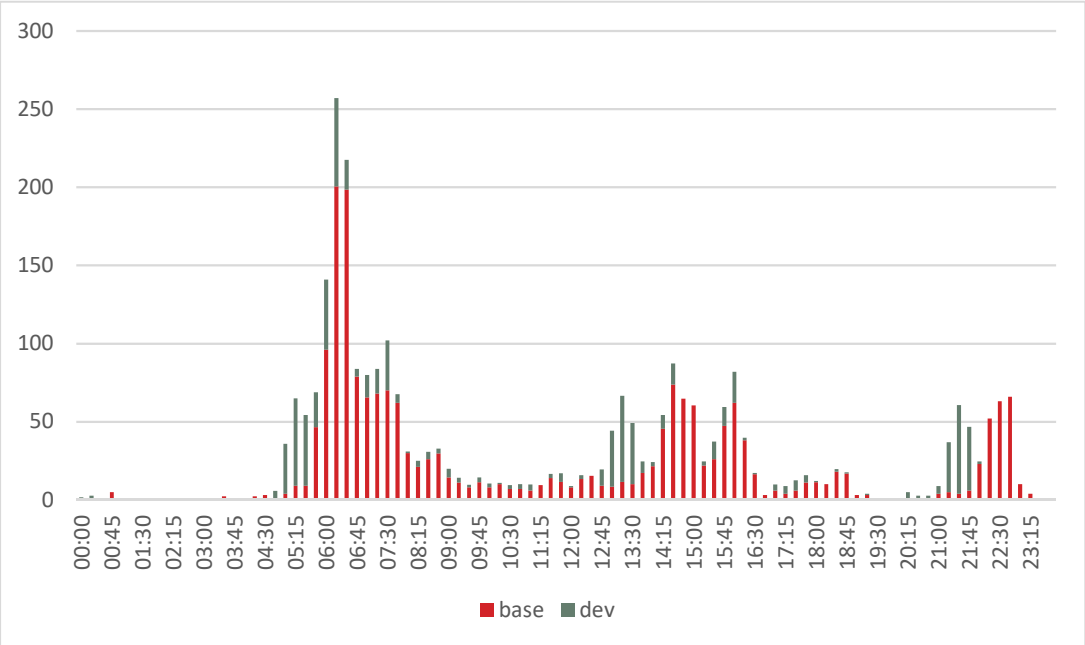
6.3.5 The surveys included, but could do not distinguish between, trips associated with shift working, traditional administrative (9am – 5pm) working as well as other trips throughout the day. To adjust the observed movements to account for the earlier shift change times promoted for the proposed development, whilst avoiding influencing the administrative and other trips it was assumed that:

- the light vehicles observed during the evening peak should be taken as associated purely with the shift change and are devoid of other influences;
- these trips should be removed from the observations at the earlier shift-change periods and added back in an hour earlier;
- the trip rates identified for the re-profiled movements should then be applied to the proposed development.

6.3.6 Trip generation calculations are included in the appendices.

6.3.7 Following the assessment of the IAMP ONE trip generation potential, it became apparent that despite the proposed off-set of shift patterns to occur one hour earlier than those of Nissan, the proposed IAMP ONE development would still result in an increase in trips at the A19 Downhill Lane junction. As such, it is necessary to assess the impact of development traffic at this critical period to ensure that road safety issues arise from increased queuing (onto the A19 mainline flow). For example, Figure 13 shows that approximately an additional 55 PCUs arrive on the A19 north bound off-slip in the 15-minute period from 06:15am.

Figure 13. A19 Downhill Lane NB Off-slip Flows



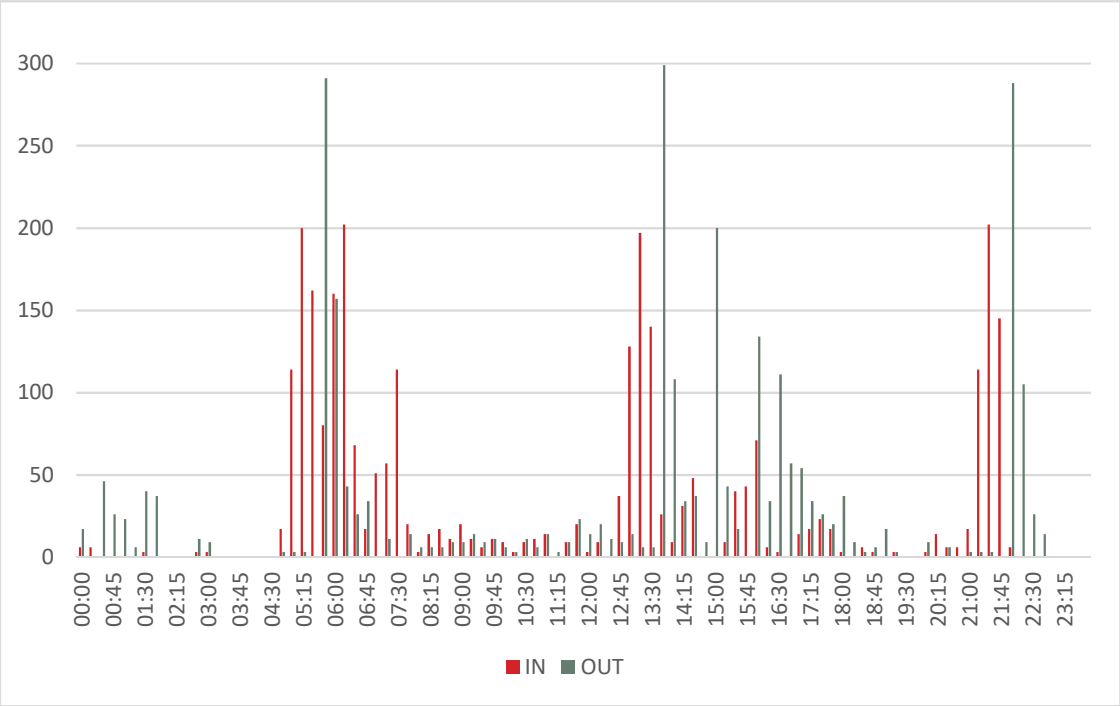
6.3.8 To provide a robust assessment of the IAMP ONE development impact of traffic operations on the surrounding road network, the following trip generation assumptions have been considered.

Table 11. Trip Rates and IAMP ONE Trip Generation

	0530 - 0630		1330 - 1430		2130 – 2230	
	ARR.	DEP.	ARR.	DEP.	ARR.	DEP.
Trip rate derived from Unipress Survey per 100 sqm	0.507	0.315	0.078	0.120	0.225	0.253
Trips for 156,750 sqm IAMP ONE	794	494	123	188	353	396

6.3.9 An overview of the 24-hour daily arrival and departure profile of IAMP ONE development trips is presented below in Figure 14. Over a 24-hour period, it is anticipated that IAMP ONE will generate approximately 2,800 arrivals and 2,800 departures.

Figure 14. IAMP ONE Arrival & Departure Profile



6.4 Traffic Distribution

6.4.1 Technical Note TN-TD01 'IAMP – Vehicle Distribution' forms part of the evidence base submitted in support of the IAMP AAP. The Technical Note sets out the overall methodology adopted to derive the IAMP traffic distribution onto the surrounding highway network.

6.4.2 JMP Consultants (now SYSTRA) previously produced a Technical Note 'IAMP Workforce Distribution Analysis' assessing four different approaches to trip distribution for the IAMP development. The findings of this Note concluded that the distribution determined from 'SD12 – Impact Study IAMP – Topic Update 2016: Skills' which was submitted as part of the supporting evidence for the IAMP AAP, was the most appropriate rationale to follow.

6.4.3 It is noted that Technical Note 'IAMP Workforce Distribution Analysis' provides a comparison of the distribution determined from SD12 with a distribution based on the postcode data of the Nissan workforce, demonstrating similarities.

6.4.4 Drawing on the summaries of TN-TD01 from the AAP evidence base, the following traffic distribution has been considered for the assessment of IAMP ONE trips.

Table 12. IAMP ONE Trip Distribution Assumptions

Route	Proportion %
A19 North	35%
A19 South	28%
Washington Road	4%
A1290 West	31%
Cherry Blossom Way	2%

6.4.5 As shown in Table 12, the largest proportion of the development traffic will travel to and from the North on the A19 via the Downhill Lane junction. The traffic travelling to/from the west has been shared between Spire Road and the A195.

6.4.6 As the development is proposing two access points, it is necessary to distribute the development traffic between the two accesses. Examining how traffic will access the site assumptions have been on the shortest journey time to the closest site access junction on the A1290. Combining the distribution assumptions in Table 12, the following proportions were derived:

- 67% of the development would utilise the northern access; and
- 33% would utilise the south west access.

6.4.7 Traffic distributions are shown within the supporting appendices.

7. ASSUMPTIONS AND TRAFFIC FLOWS

7.1 Assessment Years and Scenarios

Traffic Surveys

7.1.1 Classified junction turning counts and vehicle queue length surveys were undertaken on 18 March 2015 at the following junctions within the study area:

- Junction 1 – A19 / 184 (Testo's Roundabout);
- Junction 2 – A19 / Downhill Lane;
- Junction 3 – A19 / A1231 / Wessington Way
- Junction 4 – A1290 / Cherry Blossom Way three-arm signalised Junction.
- Junction 5 – A1290 / Sulgrave Road / Glover Road three-arm priority roundabout.
- Junction 6 – Glover Road / Spire Road four-arm priority roundabout.
- Junction 7 – Glover Road / Silverstone Road four-arm priority roundabout.
- Junction 8 – Glover Road / A195 four-arm priority roundabout.
- Junction 9 – A1290 / Nissan Access

7.1.2 In addition to the above, at the request of Highways England, a classified junction turning movement count was again performed at the A19 Downhill Lane junction over a 24-hour period, noting queue lengths on the junction approaches. Surveys were also undertaken on 19 October and 22 November 2017.

Assessment Periods

7.1.3 The traffic impact assessment considers the weekday morning and evening peak periods of the local highway network and also that of the IAMP ONE development. Whilst these periods will undoubtedly provide the greatest level of traffic impact on the road network, to provide a robust assessment and gain an understanding of the impact outside of these periods, an inter-peak has also been considered.

7.1.4 The peak periods for operational capacity assessments are therefore as follows:

- AM Peak (1): 05:30 - 06:30hrs
- AM Peak (2): 07:30 – 08:30hrs
- Inter Peak: 13:30 – 14:30hrs
- PM Peak: 17:00 – 18:00hrs

Assessment Years

7.1.5 This Transport Assessment considers the impact of the proposed IAMP ONE development for the year of planning application (2018) and a future year 'Design Year' of 2028, i.e. 10 years post submission of the planning application.

Assessment scenarios

7.1.6 An overview of the scenarios considered with in this report are summarised in Table 13.

Table 13. Operational assessment scenarios

	Base + Committed			
2018	0530 - 0630	0730 - 0830	1330 - 1430	1700 - 1800
2028	0530 - 0630	0730 - 0830	1330 - 1430	1700 - 1800
	Base + Committed + Development			
2018	0530 - 0630	0730 - 0830	1330 - 1430	1700 - 1800
2028	0530 - 0630	0730 - 0830	1330 - 1430	1700 - 1800

7.2 Background Traffic Growth

7.2.1 The traffic survey flows established in 2015 have been factored to the assessment years using local traffic growth factors from the National Transport Model (NTM) datasets, modified in the Trip End Model Presentation Program (TEMPro v7).

7.2.2 The geographical area of Sunderland City Council's administrative boundary has been selected to forecast growth as the area. Table 14 presents the Growth Factor applied for assessment purposes.

Table 14. TEMPRO / NTM local traffic growth factors – Sunderland

Growth Period	Traffic Growth		
	AM Peak	Inter Peak	PM Peak
2015 - 2018	1.0465	1.0437	1.0454
2015 - 2028	1.1411	1.1373	1.1346

7.2.3 No account has been made to remove committed developments considered within this assessment from the TEMPRO calculation. There will therefore be an element of double counting which will ensure a robust assessment.

7.3 Committed Developments

7.3.1 Committed developments are considered to be "land with current planning permission, or allocated in the adopted development plans for development (particularly residential development)". The following committed developments have been included:

- **Hillthorn Farm** – Commercial industrial development to the west of the proposed site. Part of the Hillthorn Farm site is already occupied and in operation. However when the traffic surveys were undertaken the site was not yet occupied. Therefore, all of the predicted traffic from the supporting Transport Assessment will be added as committed development.

- **Turbine Business Park** - Commercial industrial development to the south west of the proposed site. The original application for this site was submitted in 2007 and since then, a large proportion of the development has been built out and so will be included in the traffic surveys. In order to account for the remaining undeveloped area, SYSTRA have applied a pro-rata volume of traffic, based on the amount of developed and undeveloped land within the site red line boundary.

- **Renewable Energy Centre (REC) Site** – A planning application has been submitted to Sunderland Council for a REC on land at Hillthorn Farm. At the time of writing this Transport Assessment the planning application had not been determined. However, during public consultation events for IAMP ONE, concern was raised regarding the potential cumulative traffic impact should permission be granted. To provide a robust assessment, traffic flows for this development have been directly taken from the supporting transport documents and are included as a committed development within the IAMP ONE assessments.

7.3.2 Other developments have been considered for direct inclusion as committed developments, however it was agree with Sunderland and South Tyneside Local Authorities that other developments will be appropriately considered within the application of background traffic growth.

8. TRAFFIC IMPACT ASSESSMENT

8.1 Introduction

8.1.1 This section considers the impact of the development proposals on the key junctions on the local and strategic road network within the study area. It provides a summary of the findings from the operational junction capacity assessments that have been undertaken. The scope of the assessments has been discussed at length with the local highway authority and Highways England during the scoping stage.

8.1.2 Operational capacity assessments have been undertaken to determine the development traffic impact at the junctions:

Strategic Road Network (SRN)

- Junction 1 – A19 / 184 (Testo's Roundabout);
- Junction 2 – A19 / Downhill Lane;
- Junction 3 – A19 / A1231 / Wessington Way

Local Road Network (LRN)

- Junction 4 – A1290 / Cherry Blossom Way three-arm signalised Junction.
- Junction 5 – A1290 / Sulgrave Road / Glover Road three-arm priority roundabout.
- Junction 6 – Glover Road / Spire Road four-arm priority roundabout.
- Junction 7 – Glover Road / Silverstone Road four-arm priority roundabout.
- Junction 8 – Glover Road / A195 four-arm priority roundabout.
- Junction 9 – A1290 / Nissan access signalised junction

8.1.3 In addition to the above junctions, both of the proposed site access junctions have been assessed to ensure they will operate in a satisfactory manner. The northern site access junction has also been modelled in conjunction with the assessment of the A19 Downhill Lane Junction to demonstrate the interaction between the two junctions.

8.1.4 The remainder of this section summarises the results of standalone junction capacity assessments for the study area junctions. The assessments have been undertaken using TRL industry-standard modelling software Junctions 9, with the ARCADY module for roundabout junctions and the PICADY module for the assessment of priority controlled junctions.

8.2 Modelling Software

8.2.1 The ARCADY and PICADY models return results in RFC (Ratio of Flow to Capacity) and mean maximum queues (MMQ) in each 15-minute time segment, measured in the number of passenger car units (PCUs). Theoretically, RFC values between 0.00 and 0.85 indicate good operating conditions; values of between 0.85 and 1.00 represent variable operation (i.e. queues building at the junction resulting in increased vehicle delay moving through the junction); values in excess of 1.00 represent overloaded conditions.

8.2.2 The assessment of signalised junctions has been undertaken using the industry standard software package LinSig version 3. LinSig reports a Degree of Saturation (DoS) for each link (i.e. demand / available capacity) and MMQ recorded in Passenger Car Units (PCUs).

8.2.3 A DoS between 0.00 and 0.90 is generally considered as representing stable operating conditions, values between 0.90 and 1.00 represents a constrained scenario (i.e. possible queues building up at the junction and increases in vehicle delay). DoS beyond 1.00 represents overloaded conditions and a junction working beyond theoretical capacity.

8.2.4 The full junction modelling reports for all demand sets are provided within the appendices.

8.3 Junction 1 – A19 / A184 (Testo's Roundabout)

8.3.1 As outlined previously, Highways England is progressing a significant improvement scheme for the Testo's junction, with work expected to commence on site in January 2019. As such, notable improvements to the operation and capacity of this junction will be delivered.

8.3.2 Notwithstanding the proposed improvement measures being brought forward, the operation of this junction in its existing form has been assessed and Table 15 summarises the results of the modelling. It should however be noted that the junction operates under MOVA control, which is able to adjust signal timings to reflect on-site demand and as such, the results presented below may over report any capacity constraint.

Table 15. Junction 1 – Modelling Results Summary

	0530 - 0630		0730-830		1330 - 1430		1700 - 1800	
	DoS (%)	Queue (PCU)	DoS (%)	Queue (PCU)	DoS (%)	Queue (PCU)	DoS (%)	Queue (PCU)
	2018 Base							
A19 NB Ahead	30.1%	3.1	74.3%	12.0	50.0%	6.0	82.6%	15.7
A19 NB Ahead	33.7%	3.0	80.6%	12.8	57.7%	5.4	92.3%	22.0
A19 NB Bypass Left	33.0%	1.9	75.4%	11.4	34.9%	2.9	67.7%	8.1
A184 EB Ahead2	24.3%	1.7	81.9%	11.7	69.5%	8.4	119.7%	99.3
A184 EB Ahead	52.1%	3.6	116.5%	93.4	61.7%	5.6	97.3%	22.6
S circ Ahead	41.2%	0.8	75.4%	7.3	46.7%	1.6	81.7%	7.0
S circ Right Ahead	23.1%	1.0	63.4%	5.6	23.4%	1.7	81.2%	7.0
S circ Right	11.9%	0.2	24.1%	2.1	14.5%	0.9	43.6%	3.1
W Circ Ahead	31.0%	0.8	101.4%	34.6	53.8%	1.7	121.6%	126.7
W Circ Ahead	34.0%	1.7	95.6%	22.2	58.2%	3.6	120.9%	126.3
W Circ Right	6.8%	0.1	38.8%	3.8	23.1%	0.7	45.6%	4.0
A19 NB Ped Ahead	24.1%	0.2	59.0%	0.8	34.9%	0.4	63.6%	1.5
A19 NB Ped Ahead	26.1%	0.2	59.0%	12.8	36.0%	0.3	64.0%	13.7
A19 SB Ahead Left	52.8%	3.6	114.9%	133.7	69.8%	6.9	104.6%	57.9
A19 SB Ahead	34.9%	3.6	84.5%	16.1	47.1%	5.6	96.0%	25.3
N Circ Ahead	38.5%	2.9	103.1%	26.4	66.9%	4.9	99.5%	22.3
N Circ Right Ahead	36.9%	1.0	88.2%	7.9	56.2%	5.1	98.4%	19.3
N Circ Right	26.8%	0.5	106.0%	33.0	30.5%	1.0	98.3%	20.4
N Circ Right	24.1%	0.4	32.7%	2.3	24.0%	0.8	3.8%	0.2
E Circ Ahead	52.0%	4.6	91.7%	17.8	58.3%	4.9	91.8%	18.8
E Circ Ahead	52.2%	4.3	99.5%	31.2	63.5%	5.6	91.0%	19.8

E Circ Right Ahead	53.7%	4.3	118.2%	117.1	67.4%	5.2	103.8%	47.4
A184 WB Ahead Left	52.1%	4.1	118.5%	102.3	68.3%	7.0	117.8%	99.2
A184 WB Ahead	8.8%	0.7	16.0%	1.4	13.9%	1.2	23.9%	2.0
	2028 Base							
A19 NB Ahead	36.2%	3.9	79.3%	14.1	58.9%	7.5	106.0%	63.5
A19 NB Ahead	39.3%	3.8	85.6%	15.9	66.0%	7.4	114.6%	127.7
A19 NB Bypass Left	37.0%	2.5	81.9%	14.9	39.6%	4.0	76.5%	12.0
A184 EB Ahead2	20.8%	1.7	89.4%	14.8	72.5%	9.3	130.0%	141.7
A184 EB Ahead	47.9%	3.6	121.3%	119.1	67.9%	7.5	102.4%	37.4
S circ Ahead	35.0%	0.5	82.0%	8.0	42.5%	0.4	54.6%	5.7
S circ Right Ahead	21.7%	0.9	75.3%	6.8	27.2%	1.9	51.2%	5.1
S circ Right	12.3%	0.2	28.3%	2.3	14.6%	0.1	30.7%	3.2
W Circ Ahead	37.5%	0.9	111.0%	73.9	61.4%	1.9	125.7%	145.4
W Circ Ahead	41.9%	2.6	103.9%	44.2	65.1%	4.3	115.8%	99.2
W Circ Right	8.3%	0.2	42.3%	4.3	26.2%	0.7	43.1%	3.6
A19 NB Ped Ahead	25.9%	0.2	61.2%	1.1	38.2%	0.4	62.8%	1.4
A19 NB Ped Ahead	28.8%	0.2	59.9%	13.6	39.0%	0.9	64.8%	13.8
A19 SB Ahead Left	57.2%	4.1	121.6%	177.2	75.2%	9.0	114.9%	117.0
A19 SB Ahead	38.3%	4.0	102.4%	46.0	51.1%	6.2	108.6%	72.2
N Circ Ahead	41.2%	3.1	113.5%	55.6	74.1%	8.7	96.7%	19.1
N Circ Right Ahead	39.9%	1.3	96.4%	15.0	60.1%	6.7	96.6%	18.7
N Circ Right	30.0%	0.7	122.2%	81.7	41.2%	1.3	95.9%	18.3
N Circ Right	26.3%	0.6	0.3%	0.0	27.7%	0.8	0.3%	0.0
E Circ Ahead	54.5%	4.9	104.7%	47.0	62.2%	5.0	100.6%	33.3
E Circ Ahead	55.1%	4.7	109.5%	68.5	68.8%	7.8	100.4%	33.0
E Circ Right Ahead	57.1%	4.7	124.2%	139.3	75.1%	6.6	109.7%	72.0
A184 WB Ahead Left	57.5%	4.5	122.5%	128.0	74.4%	8.3	126.4%	142.9
A184 WB Ahead	11.6%	0.9	16.0%	1.4	15.2%	1.3	23.7%	2.1
	2028 Base + Com Dev							
A19 NB Ahead	32.4%	3.4	74.6%	12.1	50.5%	6.1	82.9%	15.8
A19 NB Ahead	35.7%	3.3	81.0%	12.9	58.0%	5.5	92.6%	22.7
A19 NB Bypass Left	33.5%	1.9	75.4%	11.4	34.8%	2.9	67.8%	8.1
A184 EB Ahead2	19.2%	1.6	81.9%	11.7	69.5%	8.4	119.7%	99.3
A184 EB Ahead	43.7%	3.2	116.7%	94.3	63.5%	6.2	97.3%	22.7
S circ Ahead	34.8%	0.6	75.2%	7.3	44.2%	1.5	81.7%	7.0
S circ Right Ahead	21.4%	0.9	63.2%	5.5	25.8%	1.9	81.2%	7.0
S circ Right	11.0%	0.2	24.1%	2.1	14.5%	0.9	43.6%	3.1
W Circ Ahead	35.1%	1.0	101.9%	36.1	54.3%	1.8	122.0%	128.9
W Circ Ahead	38.4%	2.2	96.0%	23.0	58.5%	3.6	121.3%	128.5
W Circ Right	7.8%	0.2	38.9%	3.7	23.2%	0.7	45.7%	4.0
A19 NB Ped Ahead	24.3%	0.2	59.0%	0.8	35.2%	0.4	63.6%	1.5
A19 NB Ped Ahead	26.4%	0.2	59.2%	12.9	36.2%	0.3	64.0%	13.7
A19 SB Ahead Left	53.3%	3.7	115.5%	138.0	69.3%	6.9	105.1%	60.7
A19 SB Ahead	35.3%	3.7	85.0%	16.3	46.1%	5.5	96.3%	25.7
N Circ Ahead	38.7%	2.9	103.1%	26.4	69.8%	7.9	99.5%	22.4
N Circ Right Ahead	37.1%	1.1	88.5%	8.0	56.6%	5.9	98.7%	20.9
N Circ Right	26.8%	0.6	106.7%	34.5	34.4%	1.0	98.6%	20.9
N Circ Right	24.3%	0.5	32.0%	2.2	26.1%	0.8	3.4%	0.2
E Circ Ahead	50.9%	4.5	91.8%	17.9	57.9%	4.8	92.1%	19.0
E Circ Ahead	50.9%	4.2	99.5%	31.1	64.4%	6.1	91.1%	19.9

E Circ Right Ahead	52.6%	4.2	118.4%	118.3	68.5%	5.7	103.9%	47.8
A184 WB Ahead Left	53.7%	4.1	118.8%	103.8	68.4%	7.0	117.8%	99.2
A184 WB Ahead	9.7%	0.8	16.0%	1.4	13.9%	1.2	23.9%	2.0
	2018 Base + Com Dev							
A19 NB Ahead	35.6%	3.8	80.4%	14.7	63.7%	8.1	106.1%	64.0
A19 NB Ahead	38.5%	3.6	: 85.1%	15.3	70.8%	8.1	115.3%	132.3
A19 NB Bypass Left	36.9%	2.8	82.1%	14.9	40.3%	4.0	76.6%	12.0
A184 EB Ahead2	21.9%	1.7	89.4%	14.8	72.5%	9.3	130.0%	141.7
A184 EB Ahead	50.2%	3.7	121.5%	120.2	67.9%	7.4	102.9%	39.4
S circ Ahead	37.8%	0.6	82.7%	8.2	39.9%	0.4	54.5%	5.7
S circ Right Ahead	22.5%	0.9	74.1%	6.6	24.2%	1.5	51.3%	5.1
S circ Right	12.9%	0.2	28.3%	2.3	13.4%	0.1	30.7%	3.2
W Circ Ahead	36.9%	1.0	112.6%	81.4	61.8%	1.5	125.7%	145.4
W Circ Ahead	40.8%	2.2	103.2%	41.3	65.5%	3.9	115.9%	99.7
W Circ Right	8.1%	0.2	42.4%	4.3	26.3%	0.5	43.0%	3.5
A19 NB Ped Ahead	26.3%	0.2	60.8%	1.1	38.6%	0.4	62.8%	1.4
A19 NB Ped Ahead	28.9%	0.2	60.3%	13.6	39.2%	0.4	64.8%	13.8
A19 SB Ahead Left	56.7%	4.0	122.4%	182.5	75.7%	9.4	115.5%	120.9
A19 SB Ahead	37.6%	3.9	102.8%	47.5	51.7%	6.3	108.9%	73.7
N Circ Ahead	45.2%	3.2	113.7%	56.1	74.1%	8.4	96.8%	19.2
N Circ Right Ahead	43.2%	1.6	96.3%	14.9	60.9%	6.7	95.4%	17.4
N Circ Right	32.3%	0.7	122.2%	81.9	41.4%	1.4	96.0%	18.4
N Circ Right	29.0%	0.6	0.3%	0.0	27.2%	0.9	0.6%	0.0
E Circ Ahead	55.1%	5.1	104.8%	47.2	62.9%	5.1	100.3%	32.3
E Circ Ahead	55.5%	4.9	109.5%	68.3	69.3%	7.3	100.1%	32.1
E Circ Right Ahead	57.6%	4.9	124.2%	139.3	75.5%	6.7	109.9%	73.3
A184 WB Ahead Left	57.7%	4.5	122.9%	129.8	74.4%	8.3	126.4%	142.9
A184 WB Ahead	11.4%	0.9	16.0%	1.4	15.2%	1.3	23.7%	2.1
	2018 Base + Com Dev + Dev							
A19 NB Ahead	34.9%	3.7	74.6%	12.1	54.3%	6.8	83.1%	16.2
A19 NB Ahead	39.3%	3.5	81.5%	13.1	62.5%	6.3	93.9%	24.8
A19 NB Bypass Left	37.0%	2.5	75.2%	11.4	39.1%	3.8	70.4%	8.5
A184 EB Ahead2	20.3%	1.6	81.9%	11.7	69.5%	8.4	125.0%	115.8
A184 EB Ahead	56.7%	4.4	119.1%	104.5	67.3%	7.0	106.3%	50.9
S circ Ahead	36.2%	0.5	73.4%	7.0	45.1%	0.6	86.6%	7.3
S circ Right Ahead	22.4%	1.0	63.8%	5.7	25.0%	1.6	85.9%	7.2
S circ Right	12.8%	0.1	24.1%	2.1	14.5%	0.2	48.0%	2.9
W Circ Ahead	37.2%	1.0	101.8%	35.7	58.3%	1.9	121.0%	125.5
W Circ Ahead	40.7%	2.7	96.6%	23.7	61.5%	3.8	120.0%	123.2
W Circ Right	10.5%	0.3	39.1%	3.7	26.4%	0.8	47.0%	3.5
A19 NB Ped Ahead	26.4%	0.2	59.1%	0.8	37.9%	0.4	65.3%	1.5
A19 NB Ped Ahead	28.8%	0.2	59.5%	12.9	37.6%	0.3	65.8%	14.4
A19 SB Ahead Left	55.7%	3.8	116.3%	143.2	71.2%	7.8	109.7%	84.8
A19 SB Ahead	36.9%	3.8	86.0%	16.9	47.3%	5.6	103.2%	45.8
N Circ Ahead	47.1%	3.4	103.1%	26.4	71.6%	8.3	94.5%	16.0
N Circ Right Ahead	48.6%	1.8	89.0%	8.2	59.1%	6.5	93.7%	16.0
N Circ Right	36.7%	0.9	107.1%	35.6	37.2%	1.0	93.5%	13.7
N Circ Right	33.0%	0.8	31.6%	2.2	27.5%	0.7	2.5%	0.1
E Circ Ahead	54.1%	5.2	91.8%	17.9	59.7%	4.8	91.0%	17.9
E Circ Ahead	54.6%	5.0	99.7%	31.6	66.2%	7.2	88.6%	18.3

E Circ Right Ahead	56.5%	5.0	119.4%	123.3	70.9%	6.0	104.1%	48.8
A184 WB Ahead Left	56.7%	4.2	119.8%	108.6	69.1%	7.0	122.4%	119.0
A184 WB Ahead	11.2%	0.9	16.0%	1.4	13.9%	1.2	23.9%	2.0
	2028 Base + Com Dev + Dev							
A19 NB Ahead	35.9%	3.8	80.2%	14.3	61.3%	8.0	106.0%	65.1
A19 NB Ahead	40.2%	3.5	85.8%	15.9	69.1%	8.0	115.9%	140.6
A19 NB Bypass Left	39.8%	2.7	82.3%	14.9	42.9%	4.4	78.9%	13.0
A184 EB Ahead2	17.2%	1.5	89.4%	14.8	72.5%	9.3	130.0%	141.7
A184 EB Ahead	49.4%	4.0	124.1%	132.2	72.2%	8.6	108.1%	61.5
S circ Ahead	42.9%	0.8	82.4%	8.1	44.4%	1.0	56.5%	5.6
S circ Right Ahead	30.1%	1.1	72.1%	6.4	28.4%	2.1	53.0%	5.0
S circ Right	15.9%	0.3	28.3%	2.3	15.2%	0.9	32.6%	3.2
W Circ Ahead	47.3%	2.5	112.3%	79.9	66.1%	2.3	129.3%	163.9
W Circ Ahead	51.5%	3.7	103.9%	44.2	68.5%	5.0	117.6%	109.0
W Circ Right	13.0%	0.6	42.6%	4.0	29.6%	0.8	45.3%	3.9
A19 NB Ped Ahead	28.6%	0.2	61.1%	1.1	40.5%	0.4	62.6%	1.4
A19 NB Ped Ahead	31.1%	0.2	60.0%	13.6	41.4%	1.5	65.0%	13.8
A19 SB Ahead Left	61.2%	4.5	122.4%	182.6	77.6%	10.6	117.9%	135.7
A19 SB Ahead	41.7%	4.5	105.0%	58.5	55.0%	6.9	111.4%	86.6
N Circ Ahead	47.9%	3.9	113.5%	55.2	74.7%	8.8	97.5%	20.1
N Circ Right Ahead	48.6%	3.6	95.8%	16.2	63.0%	7.2	97.2%	19.6
N Circ Right	36.0%	2.3	122.9%	81.8	47.5%	1.6	96.6%	19.0
N Circ Right	31.6%	2.0	0.1%	0.0	27.1%	0.8	0.4%	0.0
E Circ Ahead	58.4%	5.8	104.6%	46.3	63.6%	5.0	100.4%	32.6
E Circ Ahead	58.7%	5.4	108.7%	65.0	66.6%	7.8	100.1%	32.1
E Circ Right Ahead	61.4%	5.3	124.2%	138.6	76.4%	6.7	109.8%	72.4
A184 WB Ahead Left	62.0%	4.7	124.6%	137.2	78.0%	8.8	129.9%	158.8
A184 WB Ahead	12.2%	0.9	16.0%	1.4	15.9%	1.3	23.7%	2.1

8.3.3 It can be seen that the junction currently operates with notable queuing on its approach arms, which is forecast to become worse when background traffic growth and committed development traffic is added. As would be expected, when IAMP ONE development traffic is also added to traffic passing through this junction, queue lengths are exacerbated. However, importantly, notwithstanding the proposed improvement measures to be implemented at this junction, as the junction is at-grade, the addition to queue lengths resulting from IAMP ONE traffic does not give rise to safety concerns and the impact is therefore not severe.

8.4 Junction 2 – A19 Downhill Lane

Overview

8.4.1 This junction provides the closest access to the A19 and the Strategic Road Network and as such, the assessment of this junction has been the subject of focused scrutiny by Highways England prior to the formal submission of this report.

8.4.2 Observations on site during a morning Nissan shift change noted that this junction experiences an intense period of demand. It was observed that traffic travelling southbound on the A1290 queues back from the merge into a single lane, resulting in the slow-moving

queue blocking back through the junction and limiting the ability of the junctions at the top of the slip roads to achieve their saturation flow potential. This congestion scenario typically only occurs over a 10-15 minute period prior to 07:00hrs, after which, traffic quickly dissipates and returns to satisfactory operating conditions.

8.4.3 A LinSig model was developed for this junction, founded on controller specification data for the junction nodes. The junction currently operates on MOVA control and therefore, the junction operation is maximised.

8.4.4 As outlined previously, although the proposed shift patterns at IAMP ONE are proposed to be off-set by one hour prior to the Nissan shift change, IAMP ONE development trips are still expected to occur during the Nissan shift arrival period. Increases in queue length to the slip roads gives rise to concern from Highways England, as safety issues arise if queue lengths extend back onto the A19 mainline. As such, some mitigation is required to alleviate the development traffic impact.

Proposed Mitigation

8.4.5 A layout of the highway mitigation proposals are included in the appendices. To address the potential issue of increased queuing, widening works on the western side of the A1290 are proposed. The proposed widening works occur from the location of the proposed northern access junction northward in the direction of the Downhill Lane junction.

8.4.6 Providing the widening works on the western side of the A1290 will allow the extension of the two lane provision for southbound movements, by approximately 300m. To facilitate this arrangement, the existing lane widths on the A1290 would be reduced from 3.65m to 3.25m. Given that the implementation of this mitigation is focussed on addressing a short-lived intense period of traffic flow associated with Nissan staff arriving for the start of their shift, the proposed reduction in lane widths is considered acceptable; larger vehicles such as HGVs will are not expected on this section of the network during this period.

8.4.7 The extension of the two-lane southbound arrangement enables approximately an extra 50 PCU queuing capacity (300 metres).

8.4.8 The approach to modelling the effectiveness of this proposed mitigation and the operational capacity results is described in the following sections.

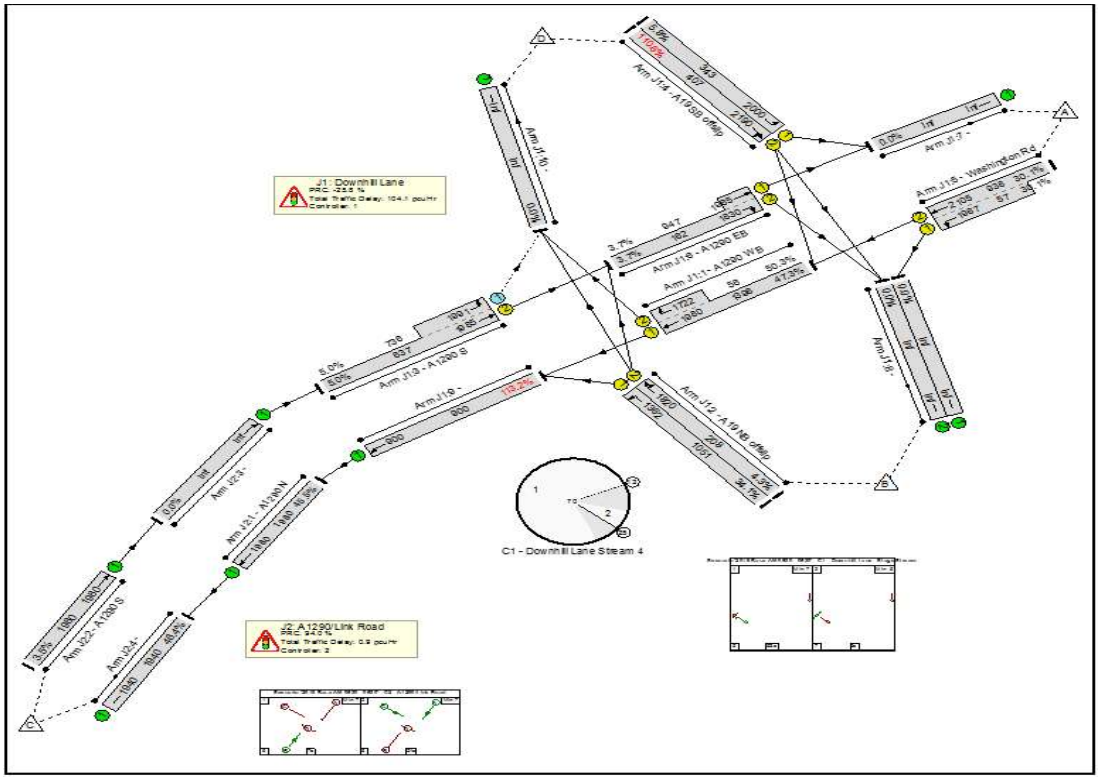
Approach to Modelling

8.4.9 The classified traffic count observations for this junction have been converted into Passenger Car Units [PCUs]. The junction's total inflows were then identified per 15-minute period; the trips associated with the committed development were added and the **rolling** hourly inflows calculated with the highest trafficked hours being identified. The trips associated with the proposed development were then added and the rolling hourly inflows re-calculated.

8.4.10 The operation and assessment of this junction has been discussed at length with Highways England and its consultants CH2M. It was generally acknowledged that the software modelling package LINSIG models 'vertical queue lengths', so further consideration was given to the appropriate method of modelling the possible blocking back of traffic.

8.4.11 When the junction was modelled with either the observed lane saturation flow (sat flow) or the geometrically calculated sat flow, the model reported the junction operating with shorter queues than observed on site. As such, validation of the model for further assessment purposes was difficult to achieve. Consequently, the following specific LINSIG model was developed to better reflect the existing operation of the junction and allow the impact of the proposed mitigation to be quantified and results compared.

Figure 15. Existing Layout LINSIG Link / Node Structure



8.4.12 In order to replicate the effect of the blocking back from A1290 merge point, Arm J1:9 (shown in Figure 15) was used as a 'control link' with the sat flow on this link manually reduced to 900 PCUs/Hr to report a queue of 116 PCUs – to match those recorded on site for the combination of queue lengths on all arms. For the purposes of assessment, the reported queue length (116PCU) is considered to occur across all arms of the junction.

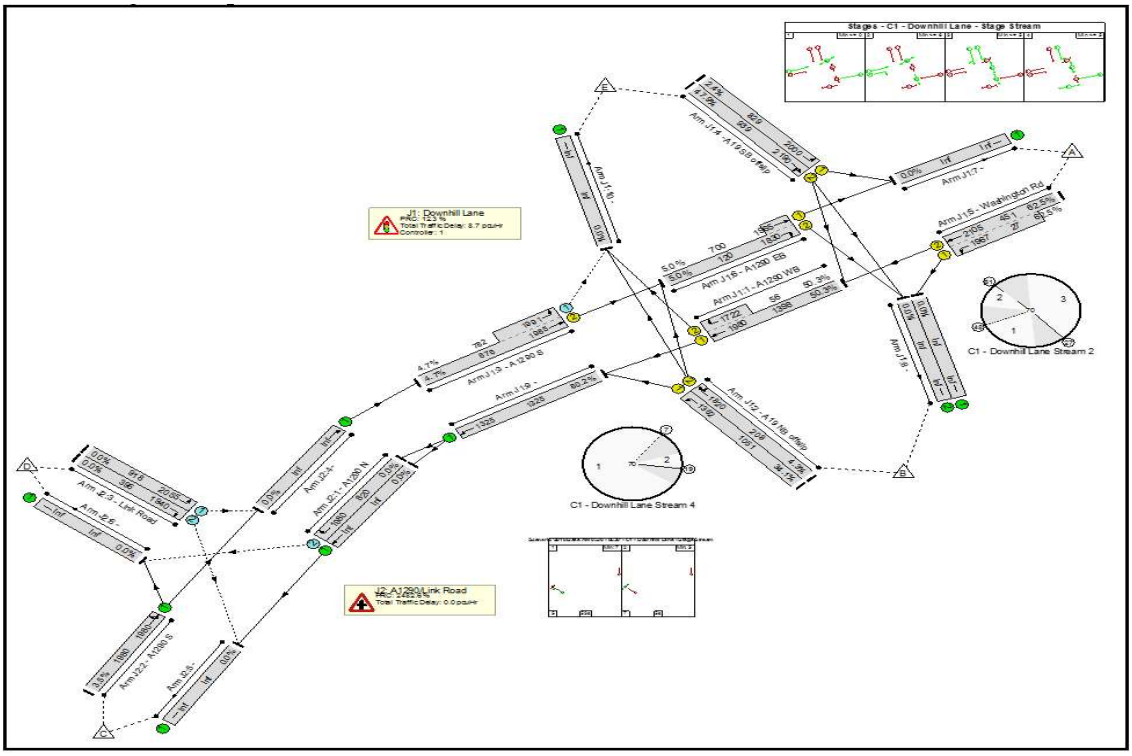
8.4.13 During discussions with CH2M and Highways England, the issue of residual traffic demand was highlighted, as Linsig makes no account for traffic left queuing after the model period ends.

8.4.14 During periods of congestion and / or where queueing is apparent, the flows that pass through the network do not represent the full demand but rather the capacity. The full demands are represented by the flows observed as passing through the network plus the vehicles queuing at the end of the survey / assessment period. If a model is tested using the observed flows it will not predict the queues that exist, as the excess demands that induced the queues are absent. Similarly, if the model is throttled down in an endeavour to produce the queues, as the full demand are not being tested the capacity will be overly restrained, and any benefits

arising from interventions will be underestimated, as the modelling throttles will remain in place.

8.4.15 IAMP ONE proposes a new 3-arm priority controlled junction on the A1290, approximately 350m south-west of the Downhill Lane junction. The revised LINSIG network is shown in Figure 16, which also reflects the proposed mitigation widening work on the A1290.

Figure 16. Proposed Layout LINSIG Link / Node Structure



8.4.16 Again, Arm J1:9 was used as the 'control link' but in this new layout, the Sat flow was increased to 1325 PCUs/Hr to reflect the improvement to capacity likely to be experienced from creating two lanes in this location, rather than the single lane within the existing model layout.

8.4.17 Within traffic modelling, it is common to expect the saturation flow (capacity) of a link to be doubled with the introduction of another lane. However, in this instance, a two-fold increase in the Sat flow on this link is considered unrepresentative of the benefit likely to be achieved on site. However, the Sat flow of 1325 PCU/hr represents an increase of 47% and returns queue length results to similar levels to those reported in the 'Base + Committed Development' scenario. In reality, it is expected that the Sat Flow on this arm would achieve a greater benefit and as such, the junction will likely operate with less queuing than reported.

8.4.18 It is observed on site that the queueing at the northbound off-slip is currently apparent for only a short period; in which case over an hour's observations all vehicles may well enter the junction with no queuing at the end of the hour to consider. However, for the shorter critical

period of assessment there will be and therefore, an additional 30-minute assessment has been undertaken to account for the residual demands of the queuing.

8.4.19 The models have been re-run for a 30min critical period between 0615 -0645hrs, with the residual demand accounted for by adding the observed queue lengths onto the base traffic (as left turns for the A19NB slip and as right turns for A19SB slip). To be robust, within the models, the residual queuing is considered to be:

- 50 PCUs (circa 290m) on the A19 NB off slip
- 50 PCUs (circa 290m) on the A19 SB off Slip (right turn)
- 18 PCUs (circa 105m) on Washington Road (eastern arm of junction)

8.4.20 The following tables provide a summary of the results for all of the scenarios previously discussed.

Table 16. Junction 2 – Base Modelling Results Summary

	0530 - 0630		0730-830		1330 - 1430		1700 - 1800	
	DoS (%)	Queue (PCU)	DoS (%)	Queue (PCU)	DoS (%)	Queue (PCU)	DoS (%)	Queue (PCU)
	2018 Base							
A1290 WB Ahead Right	50.3%	10.8	73.2%	12.7	33.5%	6.5	20.7%	0.2
A19 NB offslip Left	34.1%	2.3	17.7%	1.0	9.0%	0.5	8.2%	0.5
A19 NB offslip Right Ahead	4.3%	0.2	43.8%	2.0	34.1%	1.5	8.2%	0.3
A1290 S Ahead Left	5.0%	0.3	31.0%	2.6	24.1%	2.0	: 8.6%	0.6
A19 SB offslip Left	5.8%	0.4	50.5%	4.0	24.1%	1.9	8.7%	0.9
A19 SB offslip Right Ahead	110.6%	35.6	111.4%	42.3	36.7%	3.4	15.0%	1.7
Washington Rd Ahead Left	30.1%	3.6	59.6%	7.3	38.8%	4.3	36.4%	3.0
A1290 EB Ahead Right	3.7%	0.3	55.8%	4.1	5.6%	3.1	8.5%	1.0
A1290 WB Ahead	113.2%	116.9	108.5%	95.4	55.6%	1.1	37.0%	0.3
	2028 Base							
A1290 WB Ahead Right	48.3%	9.2	68.5%	12.5	39.0%	7.2	22.5%	0.4
A19 NB offslip Left	37.2%	2.7	19.3%	1.1	9.9%	0.5	8.9%	0.5
A19 NB offslip Right Ahead	4.8%	0.2	48.1%	2.3	37.0%	1.7	9.1%	0.4
A1290 S Ahead Left	5.2%	0.3	34.6%	2.9	25.6%	2.1	9.3%	0.7
A19 SB offslip Left	2.3%	0.2	27.5%	3.1	26.0%	2.1	9.8%	1.0
A19 SB offslip Right Ahead	46.2%	6.7	62.8%	9.5	39.9%	3.7	16.9%	2.0
Washington Rd Ahead Left	113.8%	30.0	120.4%	78.2	42.3%	4.8	37.0%	3.2
A1290 EB Ahead Right	6.5%	0.7	55.8%	5.9	27.5%	3.4	9.0%	1.1
A1290 WB Ahead	125.0%	179.9	118.2%	139.1	60.6%	3.0	40.2%	0.3
	2018 Base + Com Dev							
A1290 WB Ahead Right	51.6%	10.8	73.2%	12.7	35.8%	6.6	21.4%	0.4
A19 NB offslip Left	36.7%	2.6	20.4%	1.2	11.0%	0.6	10.2%	0.6
A19 NB offslip Right Ahead	4.3%	0.2	43.8%	2.0	34.1%	1.5	8.2%	0.3
A1290 S Ahead Left	7.1%	0.5	33.4%	2.8	24.7%	2.0	9.4%	0.7
A19 SB offslip Left	5.8%	0.4	50.5%	4.0	24.1%	1.9	8.4%	0.9
A19 SB offslip Right Ahead	114.8%	43.9	115.1%	50.7	38.5%	3.6	15.6%	1.8
Washington Rd Ahead Left	30.2%	3.6	59.7%	7.3	38.8%	4.3	39.0%	3.1
A1290 EB Ahead Right	14.6%	0.6	66.6%	4.5	29.1%	3.1	11.3%	1.0
A1290 WB Ahead	116.4%	131.8	111.7%	110.1	59.0%	2.8	40.4%	0.3
	2028 Base + Com Dev							

A1290 WB Ahead Right	51.8%	9.2	79.8%	13.5	39.0%	7.6	23.1%	0.4
A19 NB offslip Left	39.9%	3.0	22.0%	1.4	11.9%	0.7	10.9%	0.6
A19 NB offslip Right Ahead	4.8%	0.2	48.1%	2.3	37.0%	1.7	9.1%	0.4
A1290 S Ahead Left	7.6%	0.5	36.3%	3.1	26.7%	2.2	10.3%	0.7
A19 SB offslip Left	2.2	0.2	51.3%	4.3	24.5%	2.0	9.4%	1.0
A19 SB offslip Right Ahead	45.1	6.6	117.3%	59.5	39.4%	3.8	17.4%	2.1
Washington Rd Ahead Left	128.4	45.8	66.8%	8.6	43.6%	4.9	39.5%	3.3
A1290 EB Ahead Right	14.4	0.7	71.9%	5.5	31.0%	3.5	11.9%	1.1
A1290 WB Ahead	127	182.3	120.3%	150.8	64.0%	3.7	43.7%	0.4

Table 17. Junction 2 – Mitigation Modelling Results Summary

	0530 - 0630		0730-830		1330 - 1430		1700 - 1800	
	DoS (%)	Queue (PCU)	DoS (%)	Queue (PCU)	DoS (%)	Queue (PCU)	DoS (%)	Queue (PCU)
	2018 Base + Com Dev + Dev							
Downhill Lane								
A1290 WB Ahead Right	53.2%	9.7	73.2%	13.2	39.7%	7.7	22.3%	0.4
A19 NB offslip Left	52.8%	4.7	24.4%	1.5	16.6%	1.0	19.6%	1.2
A19 NB offslip Right Ahead	4.3%	0.2	43.8%	2.0	34.1%	1.5	8.2%	0.3
A1290 S Ahead Left	: 22.3%	2.2	34.3%	2.9	38.6%	3.8	13.5%	1.0
A19 SB offslip Left	2.4%	0.2	32.1%	3.2	31.8%	2.1	9.3%	0.9
A19 SB offslip Right Ahead	49.8%	7.0	75.0%	10.8	50.4%	4.0	17.2%	2.0
Washington Rd Ahead Left	72.9%	6.9	76.5%	9.6	52.4%	5.5	34.8%	3.1
A1290 EB Ahead Right	76.2%	4.5	70.4%	5.4	53.8%	3.5	17.6%	1.3
A1290 WB Ahead	98.2%	25.2	84.8%	21.2	45.1%	0.4	36.0%	0.3
Site Access								
A1290 N Ahead	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0
A1290 S Ahead	22.3%	0.1	23.8%	0.2	31.4%	0.2	15.1%	0.1
Site Access Left	0.0%	0.0	0.0%	0.0	1.1%	0.0	0.9%	0.0
Site Access Right	68.2%	1.1	18.6%	0.1	19.5%	0.1	26.5%	0.2
	2028 Base + Com Dev + Dev							
Downhill Lane								
A1290 WB Ahead Right	57.9%	13.1	74.9%	15.0	43.4%	8.8	24.0%	0.4
A19 NB offslip Left	56.0%	5.2	26.0%	1.7	17.4%	1.0	20.4%	1.2
A19 NB offslip Right Ahead	4.8%	0.2	48.1%	2.3	37.0%	1.7	9.1%	0.4
A1290 S Ahead Left	22.8%	2.2	38.0%	3.3	40.6%	4.0	14.2%	1.1
A19 SB offslip Left	5.1%	0.4	35.0%	3.5	34.4%	2.3	10.1%	1.0
A19 SB offslip Right Ahead	101.5%	23.3	81.6%	12.6	54.6%	4.5	18.6%	2.2
Washington Rd Ahead Left	44.9%	5.3	83.3%	11.4	57.0%	6.1	37.6%	3.4
A1290 EB Ahead Right	60.3%	4.0	75.7%	6.6	55.7%	3.7	18.3%	1.4
A1290 WB Ahead	104.9%	113.1	91.8%	26.3	48.5%	0.5	38.2%	0.3
Site Access								
A1290 N Ahead	0.0%	0.0	0.0%	0.0	0.0%	0.0	0.0%	0.0
A1290 S Ahead	22.6%	0.1	25.7%	0.2	32.8%	0.2	15.6%	0.1
Site Access Left	0.0%	0.0	0.0%	0.0	1.1%	0.0	0.9%	0.0
Site Access Right	69.5%	1.1	20.4%	0.1	20.2%	0.1	26.9%	0.2

Table 18. Base model - 30 minute Sensitivity Test

	0615 - 0645	
	DoS (%)	Queue (PCU)
	2017 Base	
A1290 WB Ahead Right	78.3%	19.1
A19 NB offslip Left	85.5%	14.2
A19 NB offslip Right Ahead	1.0%	0.0
A1290 S Ahead Left	12.0%	0.9
A19 SB offslip Left	2.3%	0.2
A19 SB offslip Right Ahead	82.9%	15.9
Washington Rd Ahead Left	78.9%	7.8
A1290 EB Ahead Right	20.4%	0.9
A1290 WB Ahead	101.1%	116.7
	AM 2028 Base + Com Dev + Dev	
A1290 WB Ahead Right	94.1%	25.1
A19 NB offslip Left	111.7%	60.2
A19 NB offslip Right Ahead	1.0%	0.0
A1290 S Ahead Left	22.1%	1.7
A19 SB offslip Left2	2.7%	0.3
A19 SB offslip Right Ahead	116.3%	65.9
Washington Rd Ahead Left	108.6%	20.7
A1290 EB Ahead Right	41.6%	2.2
A1290 WB Ahead	117.0%	222.6

Table 19. Mitigation model - 30 minute Sensitivity Test

	0615 - 0645	
	DoS (%)	Queue (PCU)
	AM 2028 Base + Com Dev + Dev	
Downhill Lane		
A1290 WB Ahead Right	96.0%	26.3
A19 NB offslip Left	111.7%	60.2
A19 NB offslip Right Ahead	1.0%	0.0
A1290 S Ahead Left	21.9%	1.6
A19 SB offslip Left	2.4%	0.2
A19 SB offslip Right Ahead	105.8%	43.7
Washington Rd Ahead Left	108.6%	20.7
A1290 EB Ahead Right	51.5%	1.7
A1290 WB Ahead	93.6%	24.5
Site Access		
A1290 N Ahead	51.9%	0.5
A1290 S Ahead	11.0%	0.1
Site Access Left	12.6%	0.1
Site Access Right	0.0%	0

8.5 Junction 3 – A19 / A1231 / Wessington Way

8.5.1 This signalised grade separated roundabout on the A19 has been modelled using Linsig, the results of which are presented in Table 20.

Table 20. Junction 3 – Modelling Results

	0530 - 0630		0730-830		1330 - 1430		1700 - 1800	
	DoS (%)	Queue (PCU)	DoS (%)	Queue (PCU)	DoS (%)	Queue (PCU)	DoS (%)	Queue (PCU)
	2018 Base							
A19 NB Ahead Left	12.3	1.2	57.1	5.8	42.0	4.1	50.2	5.1
S Circ Ahead	35.3	4.0	82.3	11.4	56.9	10.1	72.9	11.1
S Circ Right Ahead	40.5	5.0	72.5	10.0	52.8	9.7	71.4	11.8
S Circ Right	10.8	1.2	21.2	2.5	17.4	2.5	24.8	3.0
A19 NB Bypass Ahead	92.5	20.9	157.5	304.9	106.8	75.1	150.4	247.1
W Circ Ahead	0	0.0	0.4	0.0	0.2	0.0	0.2	0.0
W Circ Right Ahead	6.8	1.2	40.6	3.2	36.1	3.5	42.7	4.3
W Circ Right	9.6	0.2	36.2	2.5	28.8	0.8	33	1.9
A1231 EB Ahead Left	90.2	8.4	157	200.3	77.1	10.9	122.1	84.4
A1231 EB Ahead	57.2	4.7	115.6	48.3	54.3	6.8	72.2	8.8
Circ N Ahead	21.8	5.5	57	7.6	49.6	6.5	52.8	7.5
Circ N Right Ahead	25	5.4	64.2	15.1	52.3	7.3	62.8	12.8
Circ N Right	16.3	4.6	33.8	8.7	29.9	4.9	30.9	3.9
A19 SB Ahead Left	33.7	1.7	78.2	6.9	48.4	2.8	66.9	3.7
A19 SB Ahead	5.9	0.3	55.4	4.1	46.1	2.7	100.1	11.7
W Circ Ahead	19.2	4.8	13.9	2.1	69.3	7.6	102.5	21.2
W Circ Right Ahead	21.9	4.8	63.8	9.5	84.8	11.1	105.3	27.1
W Circ Right	1	0.0	26.5	0.5	25.9	0.4	54.7	2.7
A1231 WB Ahead Left	91.6	12.0	155	340.7	106.8	81.4	150.6	404.3
A1231 WB Ahead	13.5	1.0	13.1	1.4	12.9	1.3	14.5	1.4
	2028 Base							
A19 NB Ahead Left	11.6	0.9	65.9	7.4	43.6	4.3	57.4	5.9
S Circ Ahead	40.4	4.4	75.7	10.3	61.9	10.2	61.3	9.0
S Circ Right Ahead	46.8	5.5	66.8	9.3	55.8	9.4	60.7	10.3
S Circ Right	12.3	1.3	21.3	2.2	20.2	2.7	23.5	3.0
A19 NB Bypass Ahead	103.1	79.6	173.5	385.5	117.3	116.6	166.1	306.3
W Circ Ahead	0	0	0.5	0	0.2	0	0.2	0.0
W Circ Right Ahead	9.4	1.4	49.9	3.7	37.2	3.8	54	4.9
W Circ Right	7.9	0.2	37.5	2.6	29.6	1.3	37.4	2.6
A1231 EB Ahead Left	102.5	15.7	130.2	160.2	91.3	14.1	95	20.6
A1231 EB Ahead	70.4	5.9	126.6	82.3	63.6	8.0	77	11.4
Circ N Ahead	28.5	6.0	64.9	10.1	55.3	9.4	58.1	5.0
Circ N Right Ahead	29.1	6.2	68.1	10.4	58.2	11.2	68.4	12.7
Circ N Right	21.5	5.3	38.3	4.7	33	5.1	39.6	4.3
A19 SB Ahead Left	21	1.5	80.1	7.2	45	2.8	67.4	3.8
A19 SB Ahead	3.4	0.2	70.9	5.7	50.8	3.2	115.1	25.3
W Circ Ahead	20.4	5.0	7.2	0.3	76.2	8.8	83.8	9.5
W Circ Right Ahead	25.5	5.4	64.8	10.4	88.7	12.5	122.4	67.2
W Circ Right	1.1	0.0	32.7	0.7	31.5	0.5	51.1	2.7

A1231 WB Ahead Left	99.7	21.9	173.5	431.2	117.7	155	167.2	516.4
A1231 WB Ahead	13.8	1.0	14.8	1.5	14.1	1.4	16.2	1.6
	2018 Base + Com Dev							
A19 NB Ahead Left	12.3	1.2	83.9	10.8	37.8	3.6	59.5	6.6
S Circ Ahead	35.3	4	45.3	9.1	67.6	9.7	63.5	9.6
S Circ Right Ahead	40.5	5	40.6	8.5	61.7	9.4	59.9	10.2
S Circ Right	11	1.2	12.2	2.1	20.6	2.4	21.6	2.7
A19 NB Bypass Ahead	92.5	20.9	158.4	307.2	106.8	75.0	153.6	255
W Circ Ahead	0	0	0.6	0	0.2	0	0.2	0
W Circ Right Ahead	6.9	1.2	68.6	4.0	31.1	3.4	56.2	4.7
W Circ Right	9.6	0.2	50.3	4.5	25.4	0.5	27.6	0.7
A1231 EB Ahead Left	90.2	8.4	65.6	9.6	95.3	14.3	91.1	16.8
A1231 EB Ahead	57.2	4.7	63.9	9.5	68.2	8.1	64.5	8.4
Circ N Ahead	25.7	5.7	68.2	4.9	47.3	4.9	62.5	6.7
Circ N Right Ahead	29.5	5.7	72.9	8.0	50.2	4.6	62.7	11.0
Circ N Right	19.3	4.6	45.6	6.2	29.2	2.9	34.1	3.5
A19 SB Ahead Left	17.8	1.3	68.7	5.8	56	2.9	49.5	2.9
A19 SB Ahead	3.2	0.2	59	4.7	66	3.7	85.2	7.0
W Circ Ahead	19.2	4.8	7.8	0.7	64.3	7.2	83.6	9.9
W Circ Right Ahead	21.9	4.7	72	12.5	77.6	9.7	95	15.4
W Circ Right	1.1	0	28.3	0.5	28.4	0.9	51.0	1.9
A1231 WB Ahead Left	91.6	12	160.1	354.5	107.6	85.5	154.4	421.5
A1231 WB Ahead	13.7	1	14.1	1.4	13.2	1.3	15.2	1.5
	2028 + Com Dev							
A19 NB Ahead Left	11.6	0.9	70.7	8.1	42.7	4.4	51.4	5.3
S Circ Ahead	43.9	4.8	55.5	8.8	66.1	9.2	95.9	18.5
S Circ Right Ahead	43.6	5.1	61.2	10.2	64.8	10.2	82.5	12.4
S Circ Right	12.5	1.3	17.6	2.6	22.5	2.6	33.1	3.5
A19 NB Bypass Ahead	103.1	79.4	173.3	385	117	115.9	163.1	299.5
W Circ Ahead	0	0	0.5	0	0.2	0	0.2	0.0
W Circ Right Ahead	9.5	1.4	54.3	3.8	41.5	3.9	47	4.8
W Circ Right	7.9	0.2	44.9	4.4	19.6	0.4	25.5	0.5
A1231 EB Ahead Left	100.1	10.5	100.8	32.0	93.3	16.7	157.5	277.5
A1231 EB Ahead	73.6	6.4	97.6	21.2	80.2	10.6	103.8	25.9
Circ N Ahead	28.3	5.9	71.5	15.2	54.6	7.0	52.2	8.1
Circ N Right Ahead	28.9	6.1	82.0	21.1	51.6	7.1	50.5	10.0
Circ N Right	22.5	5.5	49.4	10.4	35	4.1	32.6	6.0
A19 SB Ahead Left	21.7	1.5	72.3	6.3	51	2.8	71	4.1
A19 SB Ahead	4.6	0.3	70.2	6.0	71.1	4.4	107.8	18.0
W Circ Ahead	19.5	4.8	9.4	1.2	59.8	6.9	70.1	6.6
W Circ Right Ahead	26	5.6	78.3	14.1	83.4	11.9	111.7	39.6
W Circ Right	1.5	0.0	34.9	0.7	32.2	1.0	54.7	2.7
A1231 WB Ahead Left	99.9	22.2	173.3	434.9	117.3	151.6	163.1	501.3
A1231 WB Ahead	14.0	1.1	15	1.6	14.8	1.5	15.8	1.5
	2018 + Com Dev + Dev							
A19 NB Ahead Left	21.3	2.1	57.6	6.7	42.7	4.8	56.4	7.3
S Circ Ahead	17.1	5.1	74.5	11.7	59.3	13.6	74.5	14.7
S Circ Right Ahead	17.8	5.7	89.4	17.0	52.3	12.1	59.3	11.8
S Circ Right	9.1	2.7	24.4	3.4	18.8	3.5	26.8	4.1
A19 NB Bypass Ahead	89.7	22.5	149.8	305.5	101.9	74.8	143	246.6

W Circ Ahead	0	0.0	0.4	0.0	0.2	0.0	0.2	0.0
W Circ Right Ahead	23.5	2.9	39.9	4.2	38.1	4.8	53.6	6.6
W Circ Right	15.4	0.2	35	3.1	27.8	1.9	25.8	1.3
A1231 EB Ahead Left	33.1	5.2	149.3	194.9	71.2	12.8	95	23.6
A1231 EB Ahead	20	2.9	108.3	37.0	49.7	8.0	65.9	10.7
Circ N Ahead	24.2	1.8	65.6	16.6	47.2	5.0	55.8	4.4
Circ N Right Ahead	23.8	1.7	74.7	22.5	49.5	5.3	56.4	9.1
Circ N Right	16	1.4	39.9	11.4	27.9	3.4	30	5.7
A19 SB Ahead Left	31.9	2.3	55.8	5.7	56.6	4.0	89.0	7.1
A19 SB Ahead	8.1	0.6	43.5	5.4	54	3.8	137.5	41.1
W Circ Ahead	19.6	1.6	15.4	2.9	77	10.2	103	23.2
W Circ Right Ahead	20.4	1.5	60	12.5	89	14.1	113	43.1
W Circ Right	1.9	0.0	34.1	0.5	31.1	0.5	45.1	2.5
A1231 WB Ahead Left	89.4	13.6	149.5	333.0	102.2	64.0	143	381.4
A1231 WB Ahead	22.1	2.3	13.5	1.8	13.2	1.6	15.7	1.9
	2028 + Com Dev + Dev							
A19 NB Ahead Left	11.7	1.1	67.7	8.7	42.2	5.0	63.4	8.4
S Circ Ahead	44.2	6.3	71.9	11.9	71.2	13.0	62	13.5
S Circ Right Ahead	41.3	6.3	68.3	12.6	63.5	12.4	60.1	12.2
S Circ Right	21.2	3	22.3	3	24.4	3.6	26.7	5.2
A19 NB Bypass Ahead	99.5	41.2	165.5	377.7	112.2	115.1	158.8	309.9
W Circ Ahead	0	0	0.5	0	0.2	0	0.2	0
W Circ Right Ahead	12.8	3.0	47.6	4.7	34.3	5.1	60.2	11.4
W Circ Right	7.7	0.2	41.6	4.9	27.7	1.9	31.5	2.5
A1231 EB Ahead Left	97.4	12.3	143.3	205.2	98.7	20.2	95.1	25.1
A1231 EB Ahead	54.4	5.8	72.5	10.5	66.6	10.3	63.5	10.7
Circ N Ahead	27.7	8.7	66.1	11.3	50.6	7.6	59.9	8.5
Circ N Right Ahead	25.6	8.0	74.5	13.6	53.6	7.7	62.7	17.2
Circ N Right	16.6	5.9	30.9	5.1	29.6	5.6	31.7	6.0
A19 SB Ahead Left	34.2	2.5	77.3	8.1	61.3	4.2	100.1	14.1
A19 SB Ahead	8.7	0.6	71.3	7.5	74.8	5.6	139.2	42.7
W Circ Ahead	22.7	7.3	30.7	3.6	84.9	12.1	108.9	34.7
W Circ Right Ahead	21.9	6.0	53.2	10.7	90.8	15.0	116.7	53.5
W Circ Right	2.1	0.0	36.1	0.7	39.4	1	42.6	2.5
A1231 WB Ahead Left	96.9	20.9	165.5	418.9	112.4	133.1	160.0	507.8
A1231 WB Ahead	22.1	2.3	15	2	14.3	1.8	17.2	2.1

8.5.2 At this junction, it is important to note that IAMP ONE traffic through this junction is generally expected to be the north-to-east movement (i.e., A19N to Wessington Way) and vice-versa.

8.5.3 Existing queueing occurs at this junction most notably on the northbound off-slip. When development traffic is added to the junction, slight increases in queue lengths on the local road network approach is noted. Due to a re-balancing of traffic demand through the junction, performance on some links are slightly improved.

8.5.4 It is considered that the operation of this junction with development traffic included, does not result in safety concerns and the impact is not severe.

8.6 Junction 4 - A1290 / Cherry Blossom Way

8.6.1 This signal controlled 3-arm junction has been modelled in Linsig for all considered scenarios, the results of which are presented in Table 21.

Table 21. Junction 4 – Modelling Results Summary

	0530 - 0630		0730-0830		1330 - 1430		1700 - 1800	
	DoS (%)	Queue (PCU)	DoS (%)	Queue (PCU)	DoS (%)	Queue (PCU)	DoS (%)	Queue (PCU)
	2018 Base							
A1290 E	28.8	4	46.6	7.3	31.0	4.2	47.8	7.5
A1290 W	50.7	8.6	59.3	10.4	28.4	4	39.1	5.9
Cherry Blossom Way	26.6	1.1	55.8	4.1	30.8	2.4	47.7	3.5
	2028 Base							
A1290 E	31.5	4.4	50.7	8.1	33.8	4.7	51.9	8.3
A1290 W	55.7	9.7	64.7	11.8	31.1	4.3	42.6	6.6
Cherry Blossom Way	29.2	1.3	60.5	4.5	33.5	2.6	51.9	3.9
	2018 Base + Com Dev							
A1290 E	33.6	4.9	50.9	8.2	35.4	5	51.7	8.3
A1290 W	54.8	9.5	61.7	11.1	33.6	4.8	43.9	6.9
Cherry Blossom Way	29.2	1.3	61.4	4.4	33.7	2.6	51.1	3.8
	2028 Base + Com Dev							
A1290 E	36.8	5.4	54.9	9.2	38.3	5.4	55.7	9.3
A1290 W	60	10.8	67	12.6	36.2	5.2	47.4	7.6
Cherry Blossom Way	31.7	1.4	66.5	4.9	36.4	2.9	55.3	4.2
	2018 Base + Com Dev + Dev							
A1290 E	49.7	8.3	52	8.5	47.7	7.6	63.8	11.6
A1290 W	75.2	15.8	66.9	12.5	36.7	5.5	53.8	9.2
Cherry Blossom Way	36.8	1.6	62.5	4.5	46.2	3	60.8	4.3
	2028 Base + Com Dev + Dev							
A1290 E	52.4	8.9	55.9	9.4	50.1	8.1	67.6	12.8
A1290 W	81.3	18.1	72.2	14.3	39	6	57.2	10
Cherry Blossom Way	39.3	1.8	67.6	5.1	49.8	3.3	65.5	4.8

8.6.2 As shown from the results table, the junction continues to operate within the theoretical capacity on all arms in all scenarios tested. The highest DoS reported was 75.2% on the A1290 West Arm, in the AM Peak of 05:30 – 06:30hrs period, in 2018 with all committed developments and the proposed development in place. This results in a Mean Maximum Queue of 16 which clears each cycle. The impact of development traffic at this junction is considered to be not severe.

8.7 Junction 5 - A1290 / Sulgrave Road

8.7.1 This 3-arm roundabout has been modelled in ARCADY module of Junctions 9 for all considered scenarios, the results of which are presented in Table 22.

Table 22. Junction 5 – Modelling Results Summary

	0530 - 0630			0730 - 0830			1330 - 1430			1700 - 1800		
	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2018 Base											
A1290	0.0	2.18	0.02	0.2	2.60	0.17	0.1	2.30	0.11	0.3	2.64	0.21
Glover Road	0.5	3.21	0.31	0.5	3.29	0.31	0.2	2.50	0.14	0.3	2.85	0.24
Sulgrave Road	0.1	2.28	0.05	0.1	2.40	0.11	0.1	1.95	0.08	0.1	2.11	0.10
	2028 Base											
A1290	0.0	2.18	0.02	0.2	2.65	0.18	0.1	2.33	0.12	0.3	2.85	0.23
Glover Road	0.5	3.35	0.34	0.5	3.44	0.34	0.2	2.54	0.16	0.4	3.08	0.26
Sulgrave Road	0.1	2.34	0.06	0.1	2.47	0.12	0.1	1.98	0.08	0.1	2.25	0.11
	2018 Base + Com Dev											
A1290	0.1	2.20	0.06	0.3	2.72	0.21	0.2	2.45	0.16	0.4	2.84	0.27
Glover Road	0.6	3.48	0.37	0.6	3.56	0.37	0.2	2.65	0.19	0.4	3.04	0.28
Sulgrave Road	0.1	2.39	0.05	0.1	2.52	0.11	0.1	2.02	0.08	0.1	2.18	0.10
	2028 Base + Com Dev											
A1290	0.1	2.21	0.06	0.3	2.78	0.23	0.2	2.48	0.17	0.4	3.04	0.29
Glover Road	0.7	3.64	0.39	0.7	3.74	0.40	0.3	2.69	0.20	0.5	3.27	0.30
Sulgrave Road	0.1	2.45	0.06	0.2	2.60	0.13	0.1	2.05	0.09	0.1	2.34	0.11
	2018 Base + Com Dev + Dev											
A1290	0.2	2.43	0.16	0.3	2.74	0.22	0.3	2.73	0.25	0.5	3.18	0.35
Glover Road	0.9	4.21	0.48	0.7	3.72	0.40	0.3	2.80	0.23	0.5	3.37	0.35
Sulgrave Road	0.1	2.63	0.07	0.1	2.58	0.12	0.1	2.08	0.08	0.1	2.31	0.11
	2028 Base + Com Dev + Dev											
A1290	0.2	2.44	0.16	0.3	2.80	0.23	0.3	2.78	0.26	0.6	3.39	0.36
Glover Road	1.1	4.46	0.51	0.8	3.92	0.42	0.3	2.85	0.24	0.6	3.62	0.37
Sulgrave Road	0.1	2.71	0.08	0.2	2.67	0.13	0.1	2.11	0.09	0.1	2.47	0.12

8.7.2 As shown from the result table, the junction continues to operate within the theoretical capacity of 0.85 RFC on all arms in all scenarios tested. The highest RFC reported was 0.51 on the Glover Road arm in the AM Peak period of 05:30 – 06:30hrs in 2028, with all committed developments and the proposed development in place. This results in a Mean Maximum Queue of 1 PCU. The impact of development traffic at this junction is considered to be not severe.

8.8 Junction 6 - Glover Road / Spire Road

8.8.1 This 4-arm roundabout has been modelled in the ARCADY module of Junctions 9 for all considered scenarios, the results of which are presented in Table 23.

Table 23. Junction 6 – Modelling Results Summary

	0530 - 0630			0730 - 0830			1330 - 1430			1700 - 1800		
	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2018 Base											
Fire station	0.0	0.00	0.00	0.0	0.00	0.00	0.0	2.91	0.00	0.0	3.23	0.01
Spire Road	0.4	3.01	0.28	0.4	3.26	0.30	0.2	2.74	0.18	0.4	3.11	0.27
Glover Road W	0.1	2.52	0.12	0.3	2.72	0.22	0.1	2.30	0.12	0.3	2.60	0.20
Glover Road N	0.0	2.97	0.03	0.3	3.87	0.24	0.2	3.55	0.17	0.4	4.33	0.31
	2028 Base											
Fire station	0.0	0.00	0.00	0.0	0.00	0.00	0.0	2.96	0.00	0.0	3.37	0.01
Spire Road	0.5	3.27	0.30	0.5	3.59	0.33	0.3	2.81	0.20	0.4	3.40	0.29
Glover Road W	0.2	2.73	0.13	0.3	2.97	0.24	0.2	2.34	0.14	0.3	2.81	0.22
Glover Road N	0.0	3.13	0.04	0.4	4.21	0.26	0.2	3.63	0.18	0.6	4.99	0.36
	2018 Base + Com Dev											
Fire station	0.0	0.00	0.00	0.0	0.00	0.00	0.0	3.05	0.00	0.0	3.40	0.01
Spire Road	0.4	3.19	0.30	0.5	3.47	0.33	0.3	2.88	0.21	0.4	3.29	0.29
Glover Road W	0.2	2.68	0.16	0.4	2.90	0.26	0.2	2.40	0.15	0.3	2.73	0.24
Glover Road N	0.1	3.17	0.09	0.4	4.22	0.30	0.3	3.92	0.25	0.6	4.90	0.39
	2028 Base + Com Dev											
Fire station	0.0	0.00	0.00	0.0	0.00	0.00	0.0	3.10	0.00	0.0	3.55	0.01
Spire Road	0.5	3.46	0.33	0.6	3.83	0.36	0.3	2.95	0.22	0.5	3.59	0.32
Glover Road W	0.2	2.88	0.17	0.4	3.16	0.28	0.2	2.45	0.16	0.4	2.95	0.25
Glover Road N	0.1	3.24	0.10	0.5	4.57	0.32	0.4	4.02	0.26	0.8	5.66	0.44
	2018 Base + Com Dev + Dev											
Fire station	0.0	0.00	0.00	0.0	0.00	0.00	0.0	3.27	0.00	0.0	3.64	0.01
Spire Road	0.5	3.57	0.35	0.5	3.53	0.34	0.3	3.08	0.23	0.5	3.57	0.32
Glover Road W	0.3	3.07	0.25	0.4	3.01	0.28	0.2	2.50	0.18	0.4	2.95	0.28
Glover Road N	0.3	3.66	0.22	0.4	4.26	0.31	0.6	4.61	0.36	0.9	5.88	0.49
	2028 Base + Com Dev + Dev											
Fire station	0.0	0.00	0.00	0.0	0.00	0.00	0.0	3.32	0.01	0.0	3.82	0.01
Spire Road	0.6	3.88	0.38	0.6	3.89	0.37	0.3	3.16	0.24	0.6	3.90	0.35
Glover Road W	0.4	3.27	0.26	0.5	3.27	0.31	0.2	2.55	0.19	0.5	3.17	0.30
Glover Road N	0.3	3.71	0.22	0.5	4.61	0.33	0.6	4.75	0.38	1.2	6.89	0.55

8.8.2 As shown in the results table, the junction continues to operate within the theoretical capacity of 0.85 RFC on all arms in all scenarios tested. The highest RFC reported was 0.38 on Spire Road in the AM Peak period 05:30 – 06:30hrs in 2028, with all committed developments and the proposed development in place. This results in a Mean Maximum Queue of approximately 1 PCU. The impact of development traffic at this junction is considered to be not severe.

8.9 Junction 7 – Glover Road / Silverstone Road

8.9.1 This 4-arm roundabout has been modelled in the ARCADY module of Junctions 9 for all considered scenarios, the results of which are presented in Table 24.

Table 24. Junction 7 – Modelling Results Summary

	0530 - 0630			0730 - 0830			1330 - 1430			1700 - 1800		
	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2018 Base											
Glover Road	0.0	1.75	0.03	0.2	2.11	0.16	0.1	1.89	0.11	0.2	2.14	0.16
Tower Road	0.0	1.69	0.01	0.0	1.91	0.01	0.0	1.82	0.02	0.1	2.10	0.06
Glover Road W	0.1	1.50	0.09	0.2	1.68	0.18	0.1	1.53	0.10	0.2	1.77	0.17
Silverstone Road	0.0	1.72	0.01	0.1	1.96	0.07	0.0	1.75	0.03	0.0	1.96	0.04
	2028 Base											
Glover Road	0.0	1.76	0.04	0.2	2.27	0.18	0.1	1.91	0.12	0.2	2.08	0.18
Tower Road	0.0	1.70	0.01	0.0	2.04	0.01	0.0	1.84	0.02	0.1	2.04	0.06
Glover Road W	0.1	1.46	0.07	0.3	1.80	0.20	0.1	1.55	0.11	0.2	1.72	0.19
Silverstone Road	0.0	1.69	0.02	0.1	2.11	0.08	0.0	1.77	0.04	0.1	1.89	0.05
	2018 Base + Com Dev											
Glover Road	0.0	1.77	0.05	0.2	2.15	0.18	0.1	1.93	0.12	0.2	2.17	0.18
Tower Road	0.0	1.71	0.01	0.0	1.94	0.01	0.0	1.85	0.02	0.1	2.13	0.06
Glover Road W	0.1	1.54	0.12	0.3	1.73	0.21	0.1	1.57	0.12	0.2	1.81	0.19
Silverstone Road	0.0	1.76	0.01	0.1	2.01	0.07	0.0	1.78	0.03	0.0	2.00	0.04
	2028 Base + Com Dev											
Glover Road	0.1	1.78	0.05	0.3	2.30	0.19	0.2	1.95	0.13	0.2	2.12	0.20
Tower Road	0.0	1.72	0.01	0.0	2.06	0.01	0.0	1.87	0.02	0.1	2.07	0.06
Glover Road W	0.1	1.50	0.09	0.3	1.84	0.22	0.2	1.59	0.13	0.3	1.77	0.21
Silverstone Road	0.0	1.73	0.02	0.1	2.16	0.08	0.0	1.80	0.04	0.1	1.93	0.05
	2018 Base + Com Dev + Dev											
Glover Road	0.1	1.87	0.10	0.3	2.27	0.22	0.2	2.05	0.17	0.3	2.27	0.22
Tower Road	0.0	1.78	0.01	0.0	2.01	0.01	0.0	1.92	0.02	0.1	2.21	0.06
Glover Road W	0.2	1.62	0.16	0.3	1.75	0.22	0.2	1.61	0.14	0.3	1.87	0.22
Silverstone Road	0.0	1.86	0.03	0.1	2.04	0.08	0.0	1.82	0.04	0.1	2.05	0.05
	2028 Base + Com Dev + Dev											
Glover Road	0.1	1.88	0.10	0.3	2.42	0.24	0.2	2.07	0.18	0.3	2.24	0.24
Tower Road	0.0	1.79	0.01	0.0	2.14	0.01	0.0	1.94	0.02	0.1	2.15	0.07
Glover Road W	0.2	1.59	0.14	0.3	1.87	0.23	0.2	1.63	0.15	0.3	1.84	0.23
Silverstone Road	0.0	1.82	0.03	0.1	2.19	0.08	0.0	1.84	0.04	0.1	2.00	0.06

8.9.2 As shown in the results table, the junction continues to operate well within the theoretical capacity of 0.85 RFC on all arms in all scenarios tested. The highest RFC reported was 0.24 on Glover Road in the PM Peak 17:00 – 18:00hrs in 2028, with all committed developments and the proposed development in place. This results in a Mean Maximum Queue of approximately 1 PCU. The impact of development traffic at this junction is considered to be not severe.

8.10 Junction 8 – Glover Road / A195

8.10.1 This 4-arm roundabout has been modelled in the ARCADY module of Junctions 9 for all considered scenarios, the results of which are presented in Table 25.

Table 25. Junction 8 – Modelling Results Summary

	0530 - 0630			0730 - 0830			1330 - 1430			1700 - 1800		
	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2018 Base											
A1290 Glover Rd	0.0	1.75	0.03	0.2	2.11	0.16	0.1	1.89	0.11	0.2	2.14	0.16
A195 S	0.0	1.69	0.01	0.0	1.91	0.01	0.0	1.82	0.02	0.1	2.10	0.06
A1290 W	0.1	1.50	0.09	0.2	1.68	0.18	0.1	1.53	0.10	0.2	1.77	0.17
A195 N	0.0	1.72	0.01	0.1	1.96	0.07	0.0	1.75	0.03	0.0	1.96	0.04
	2028 Base											
A1290 Glover Rd	0.0	1.76	0.04	0.2	2.27	0.18	0.1	1.91	0.12	0.2	2.08	0.18
A195 S	0.0	1.70	0.01	0.0	2.04	0.01	0.0	1.84	0.02	0.1	2.04	0.06
A1290 W	0.1	1.46	0.07	0.3	1.80	0.20	0.1	1.55	0.11	0.2	1.72	0.19
A195 N	0.0	1.69	0.02	0.1	2.11	0.08	0.0	1.77	0.04	0.1	1.89	0.05
	2018 Base + Com Dev											
A1290 Glover Rd	0.0	1.77	0.05	0.2	2.15	0.18	0.1	1.93	0.12	0.2	2.17	0.18
A195 S	0.0	1.71	0.01	0.0	1.94	0.01	0.0	1.85	0.02	0.1	2.13	0.06
A1290 W	0.1	1.54	0.12	0.3	1.73	0.21	0.1	1.57	0.12	0.2	1.81	0.19
A195 N	0.0	1.76	0.01	0.1	2.01	0.07	0.0	1.78	0.03	0.0	2.00	0.04
	2028 Base + Com Dev											
A1290 Glover Rd	0.1	1.78	0.05	0.3	2.30	0.19	0.2	1.95	0.13	0.2	2.12	0.20
A195 S	0.0	1.72	0.01	0.0	2.06	0.01	0.0	1.87	0.02	0.1	2.07	0.06
A1290 W	0.1	1.50	0.09	0.3	1.84	0.22	0.2	1.59	0.13	0.3	1.77	0.21
A195 N	0.0	1.73	0.02	0.1	2.16	0.08	0.0	1.80	0.04	0.1	1.93	0.05
	2018 Base + Com Dev + Dev											
A1290 Glover Rd	0.1	1.87	0.10	0.3	2.27	0.22	0.2	2.05	0.17	0.3	2.27	0.22
A195 S	0.0	1.78	0.01	0.0	2.01	0.01	0.0	1.92	0.02	0.1	2.21	0.06
A1290 W	0.2	1.62	0.16	0.3	1.75	0.22	0.2	1.61	0.14	0.3	1.87	0.22
A195 N	0.0	1.86	0.03	0.1	2.04	0.08	0.0	1.82	0.04	0.1	2.05	0.05
	2028 Base + Com Dev + Dev											
A1290 Glover Rd	0.1	1.88	0.10	0.3	2.42	0.24	0.2	2.07	0.18	0.3	2.24	0.24
A195 S	0.0	1.79	0.01	0.0	2.14	0.01	0.0	1.94	0.02	0.1	2.15	0.07
A1290 W	0.2	1.59	0.14	0.3	1.87	0.23	0.2	1.63	0.15	0.3	1.84	0.23
A195 N	0.0	1.82	0.03	0.1	2.19	0.08	0.0	1.84	0.04	0.1	2.00	0.06

8.10.1 As shown in the results table, the junction continues to operate well within the theoretical capacity of 0.85 RFC on all arms in all scenarios tested. The highest RFC reported was 0.24 on the A1290 Glover Road in the PM Peak period 17:00 – 18:00hrs in 2028 with all committed developments and the proposed development in place. This results in a Mean Maximum Queue of approximately 1 PCU. The impact of development traffic at this junction is considered to be not severe.

8.11 Junction 9 - A1290 / Nissan Access

8.11.1 It is envisaged distribution of development traffic is unlikely to pass through this junction, instead choosing to route via either of the two new site access junction, which will likely offer

a quicker journey during peak periods. However, during scoping discussions with SCC it was requested that a sensitivity test of this junction be undertaken to account for instances when traffic instead passes through this junction (either intentionally, or unintentionally).

8.11.2 To provide a robust assessment, the sensitivity test this junction has been carried out with 25% of the arrivals from each direction routing through the junction, resulting in:

- 101 additional trips from the east
- 50 additional trips from the west

8.11.3 Table 26 presents the results of the sensitivity test at this junction.

Table 26. Junction 9 – Modelling Results Summary

	0530 - 0630	
	DoS (%)	Queue (PCU)
	2028 Base + Com Dev	
A1290 E Left	64.2%	2.9
A1290 E Ahead	32.2%	3.3
NISSAN Access Right Left	25.2%	1.1
NISSAN Access Right	0.4%	0.0
A1290 W Ahead Right	59.7%	5.6
	2028 Base + Com Dev + Dev	
A1290 E Left	64.2%	1.1
A1290 E Ahead	42.6%	4.8
NISSAN Access Right Left	25.2%	1.1
NISSAN Access Right	0.4%	0.0
A1290 W Ahead Right	66.8%	6.6

8.11.4 As shown in the results table, the junction operates within capacity in the scenarios tested, with the highest DoS reported at 64.2% in both the '2028 AM Base + Committed development' and the '2028 AM Base + Committed development + Development' scenarios.

8.11.5 It should be noted that on site observations confirm that the queuing occurring at this junction on the A1290 is typically a 'rolling queue' and difficult to replicate within Linsig. The results do however present a suitable comparison between assessment scenarios to demonstrate the impact of the proposed development. The impact of development traffic at this junction is considered to be not severe.

8.12 A1290 / West Site Access

8.12.1 This proposed new 3-arm priority controlled junction has been modelled in the PICADY module of Junctions 9 for all considered scenarios, the results of which are presented in Table 27.

Table 27. West Site Access – Modelling Results Summary

	0530 - 0630			0730 - 0830			1330 - 1430			1700 - 1800		
	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2018 Base + Com Dev + Dev											
Site Access right turn to A1290	0.8	16.89	0.46	0.0	11.65	0.03	0.6	13.52	0.38	0.7	17.23	0.41
	2028 Base + Com Dev + Dev											
Site Access right turn to A1290	0.9	18.96	0.47	0.0	13.20	0.03	0.7	14.84	0.39	0.8	19.69	0.43

8.12.2 As shown in the results table, the junction operates within the theoretical capacity of 0.85 RFC on all arms in all scenarios tested. The highest RFC reported was 0.47 in the AM Peak Period 05:30 – 06:30hrs in 2028 with all committed developments and the proposed development in place. This results in a Mean Maximum Queue of approximately 1 PCU.

8.13 A1290 / North Site Access

8.13.1 This proposed new 3-arm priority controlled junction has been modelled in the PICADY module of Junctions 9 for all considered scenarios, the results of which are presented in Table 28.

8.13.2 The output from this PICADY model has then been used to inform the parameters within the Linsig assessment of Junction 2, as outlined previously.

8.13.3 The results demonstrate that the junction will operate within capacity for all scenarios considered.

Table 28. West Site Access – Modelling Results Summary

	0530 - 0630			0730 - 0830			1330 - 1430			1700 - 1800		
	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC	Queue (PCU)	Delay (s)	RFC
	2018 Base + Com Dev + Dev											
Site Access Left turn to A1290	0.9	9.20	0.48	0.0	5.88	0.03	0.9	10.49	0.48	0.9	10.86	0.46
A1290 Right turn to site	1.9	16.04	0.66	0.2	8.01	0.20	0.3	8.17	0.25	0.9	12.37	0.47
	2028 Base + Com Dev + Dev											
Site Access Left turn to A1290	0.9	9.25	0.48	0.0	6.01	0.03	1.0	10.77	0.49	0.9	11.30	0.47
A1290 Right turn to site	2.0	16.18	0.66	0.3	8.22	0.20	0.3	8.31	0.26	0.9	12.87	0.48

8.14 Summary

8.14.1 This section has summarised the junction modelling exercise which has been undertaken to assess the impact of the proposed development. This has demonstrated that the surrounding highway network, subject to the proposed mitigation on the A1290, can accommodate the additional traffic generated by the development without significant queuing or delay. The impact of development traffic on the road network is considered to be not severe.

9. SUMMARY AND CONCLUSIONS

9.1 Summary

9.1.1 This Transport Assessment has been prepared to accompany a hybrid planning application for the proposed IAMP ONE, on land to the west of the A19 and to the north of the Nissan in Sunderland.

9.1.2 The development proposals comprise of up to 156,750 sqm of industrial uses, which are highly anticipated to be Nissan suppliers. The report provides a full and robust assessment of the transportation impacts of the development proposals.

9.1.3 In accordance with national and local planning guidance, this report has examined the baseline conditions on the transport network, considered relevant national and local transport planning policy, outlined the proposed development and described in detail the proposed access arrangement. The resulting impacts on the transport networks have been determined and presented.

9.1.4 This assessment confirms that the proposals can be safely accessed by vehicles, public transport users, cyclists, pedestrians and horse riders.

9.1.5 The assessment identifies that the proposals within the planning application provide safe and robust mitigation measures to offset the impact of the development, in particular:

- Safe vehicular access can be provided from the A1290, the designs of which have been undertaken in accordance with the DMRB design standards. The associated junction capacity assessment of theses junctions has been undertaken and demonstrates that they will operate satisfactorily with the level of development proposed. They have also been designed whilst being mindful of the future aspirations for the wider IAMP.
- Proposed mitigation on the A1290 in the form of localised widening will create an extension of the two-lane southbound movement and displace vehicle queuing which would otherwise occur on the A19 slip roads.
- A number of measures are proposed to ensure that all users, including pedestrian, cyclists, horse riders and public transport users can access the site safely.
- Good quality pedestrian and cycle links are proposed between IAMP ONE and the surrounding area, with new links integrated with the existing networks. Proposed measures include:
    - A 3.0m wide shared use path is provided along both sides of the link road which ties into the existing provision on the A1290. The shared use path will also provide pedestrian and cycle access into the development plots.
    - A pedestrian and cycle link will be provided from the dual carriageway section northwards to Downhill Lane.
    - The section of Follingsby Lane within the red line boundary will have a traffic regulation order applied which will prohibit motor vehicles. This provides a non-motorised user link through the site.
    - Dropped kerbs, tactile paving and pedestrian refuge provided at intervals along the link road.

- The site is served by existing public transport services and a range of measures are proposed to enhance connections, including the provision of new bus shelters to existing bus stops on the A1290.
- Parking will be provided within the site in accordance with the local highway authority guidance, with justification provided for any deviation from this level of provision.
- A detailed review of the road safety history in the surrounding area has been undertaken and it is not envisaged that traffic associated with the proposed development would give rise to a material impact on road safety.
- Junction capacity assessments demonstrate that traffic associated with the proposed development can be adequately accommodated on the road network, without a severe impact on operations or safety.
- A Framework Travel Plan has been prepared for IAMP ONE, with the intention of encouraging trips by sustainable modes of transport, where viable.
- An Outline Construction traffic Management Plan has been prepared to set out how traffic associated with the construction works can be reduced and limit any detrimental impact on the surrounding areas.
- The proposed development is consistent with the policy set out in Circular 02/2013, as the residual impact of the proposed development on the Strategic Road Network are not considered to be severe.
- The proposals accord with both national and local transport policy. The residual cumulative impacts of the proposed development are not considered to be severe within the context of Paragraph 32 of the NPPF.

9.2 Conclusion

9.2.1 With consideration of all of the above, it is concluded that the proposed IAMP ONE development is acceptable from a transport perspective and as such, should be supported.

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