highways england

A47 Wansford to Sutton Dualling

Scheme Number: TR010039

Volume 7
7.3 Transport Assessment

APFP Regulation 5(2)(q)

Planning Act 2008

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

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7.3 TRANSPORT ASSESSMENT

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CONTENTS

EXECUTIVE SUMMARY

Highways England has identified in their Road Investment Strategy that there is a requirement to increase traffic capacity along the A47 between Wansford and Sutton to reduce the traffic congestion and delay, which is forecast to increase in the future due to traffic growth.

The Scheme is currently in the Highways England Project Control Framework (PCF) Stage 3 - Preliminary Design. Galliford Try / Sweco have been appointed by Highways England to undertake a transport modelling and network assessment study to progress the preferred option through the Development Phase of the Highways England's PCF to submission of a Development Consent Order (DCO) application.

The Wansford to Sutton section of the A47 is located between the A1 junction at Wansford and Nene Way Roundabout in Sutton to the west of Peterborough. The 2.6 kilometre stretch of road is currently single-carriageway.

The purpose of this Transport Assessment (TA) is to assess the impact of the proposed A47 Wansford to Sutton Scheme (the Scheme) on the strategic and local highway network with respect to traffic congestion and road safety for motorised transport. Thus, the scope of this report covers the transport modelling assessment of the Scheme's operation in the opening and design year forecast scenarios.

The modelling assessment comprises of a strategic model called the Wansford Traffic Model (WTM). The WTM covers all strategic traffic movements across the A47 corridor between Wansford and Peterborough. Within the Scheme's vicinity, the model contains a detailed zoning and network resolution and has been calibrated to a high level of accuracy. The strategic modelling assessment is used as the basis to derive forecasted traffic impacts of the Scheme's performance across the wider area. The strategic model utilised for PCF stage 3 has been developed in line with the Department for Transport (DfT) Transport Appraisal Guidance (TAG). A local micro-simulation model of the A47 single carriageway section and the village of Wansford has also been developed to assess the Scheme's operational performance in the forecast year scenarios.

The modelling analysis indicates that the forecasted local and regional traffic growth will cause the Wansford East roundabout to be over capacity. The Scheme, however, provides the required capacity improvements to allow for the forecasted traffic growth at the A47/A1 as well as along the A47 between Wansford and Sutton.

The results of the modelling assessment show that the Scheme improves the overall operation of the network as well as improving A47 AM peak hour journey times (approximately 17% to 22% depended on direction and time period). Based on the strategic modelling assessment the Scheme will remove the majority of the Wansford East roundabout and A47 single carriageway overcapacity delays. In terms of overall annual average daily

traffic (AADT) the Scheme provides enough additional capacity to allow traffic flows to increase in the order of 14% to 16% on the Scheme section.

The Scheme provides support to walking, cycling and other vulnerable users by incorporating safe, convenient, accessible and attractive routes for pedestrians, cyclists and equestrians. The Scheme will upgrade and realign the A47 with a section of the existing A47 alignment de-trunked to local road status and a section closed to vehicular traffic. This will allow safer passage along the route, away from the upgraded A47 dual carriageway. It also improves safety along the A47 by providing upgraded dual carriageway alignment and an A1 eastbound off-slip. In total, modelling analysis indicates that over the assessed timeframe, the Scheme improvements will save a total of 265 accidents and 42 killed or seriously injured (KSI).

The implementation of the Scheme will improve reliability and network resilience as dual carriageways are more reliable than single carriageways. Road capacity is increased, delays are shortened and accidents (and their impacts) are reduced, all of which contribute to improved reliability.

In summary the Scheme fulfils its objectives by providing additional capacity, relieving congestion, improving journey times and reliability as well as network resilience. Furthermore, it provides additional infrastructure which helps walking, cycling and other vulnerable users as well as reducing the predicted accident rates along the A47 corridor and surrounding network.

Given the overall benefits of the Scheme, its compliance with national, regional and local transport policy and the fact that it achieves its stated objectives, it is considered that there is no reason why the Scheme should not be approved on transport grounds.

1 INTRODUCTION

1.1 Purpose of this Document

1.1.1 Highways England (the Applicant) has submitted an application under Section 37 of the Planning Act 2008 (the 2008 Act) to the Secretary of State via the Planning Inspectorate (the Inspectorate) for an order to grant development consent for the A47 Wansford to Sutton Scheme (the Scheme).

1.1.2 The purpose of this Transport Assessment (TA) is to assess the impact of the proposed A47 Wansford to Sutton Scheme on the strategic and local highway network with respect to traffic congestion and road safety for motorised transport. Thus, the scope of this report covers the transport modelling assessment of the Scheme's operation in the opening and design year forecast scenarios.

1.2 Study Background

The A47 Schemes

1.2.1 In December 2014 the Department for Transport (DfT) published the Road Investment Strategy (RIS) for 2015-2020 (RIS 1). The RIS sets out the list of schemes that are to be delivered by Highways England over the period covered by the RIS.

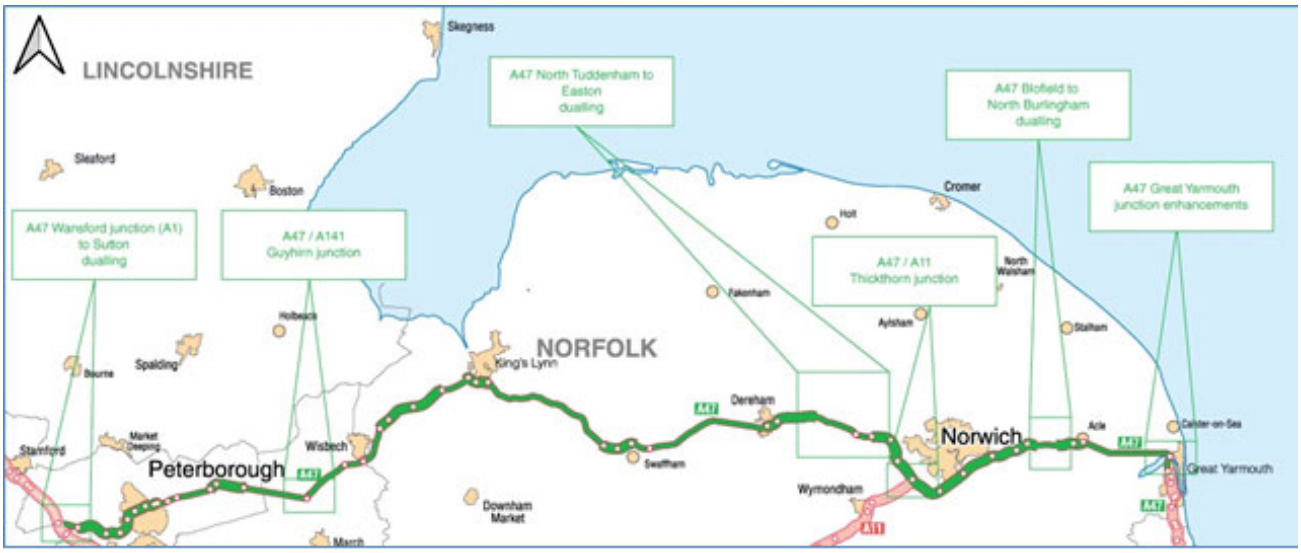
1.2.2 The RIS 1 includes a package of 6 schemes to be developed and constructed by Highways England during Roads Period 1 (2015 - 2020) and the early part of the Roads Period 2 (2020 - 2025). These will improve journeys on the 115-mile section of the A47 between Peterborough and Great Yarmouth. These schemes have been branded as the A47 Improvement Programme.

1.2.3 The 6 schemes are proposed as part of the A47 corridor improvement programme, as shown in

1.2.4 Figure 1-1 including the following:

- A47 Wansford to Sutton
- A47 / A141 Guyhirn junction
- A47 North Tuddenham to Easton
- A47 Blofield to North Burlingham
- A47 / A11 Thickthorn junction improvement
- A47 Great Yarmouth junction improvements

Figure 1-1: A47 Corridor Improvement Programme



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1.2.5 The RIS 1 comprises of:

- A long-term vision for the Strategic Road Network (SRN), outlining how smooth, smart and sustainable roads will be created;
- A multi-year investment plan that will be used to improve the network and create better roads for users
- High-level objectives for Roads Period 1 (2015 – 2020).

1.2.6 As part of this process, the government announced that it would identify and fund solutions, initially through feasibility studies, to look at problems and identify potential solutions to tackle some of the worst road hotspots in the country.

1.2.7 One of the hotspots identified was the A47 trunk road corridor. The A47 trunk road forms part of the SRN and provides a variety of local medium and long-distance trips between the A1 and the east coast. The corridor connects the cities of Norwich and Peterborough, the towns of Wisbech, Kings Lynn, Dereham, Great Yarmouth and Lowestoft and a succession of villages in what is largely a rural area.

1.2.8 The 6 schemes as listed in paragraph 1.2.3, include converting almost 8 miles of single-carriageway to dual-carriageway and making improvements to junctions across the route.

The Scheme status

1.2.9 Highways Agency, now Highways England, introduced the Project Control Framework (PCF) for their Major Projects directorate in 2008. The framework sets

out how major highways schemes should be managed and delivered with consistent products and a well-defined and consistent approach to project governance. The framework is designed to ensure that Highways England delivers road projects which meet their customers' aspirations in a cost efficient and timely manner.

1.2.10 The aim of this TA is to detail the scope, methodology and results of the Project Control Framework (PCF) Stage 3 traffic assessment of the Scheme. A summary of the PCF Stage 1-3 process is provided below.

1.2.11 Stage 1 of the Options Phase (Option Identification) involved the identification of junction improvement options to be taken forward for public consultation.

1.2.12 Stage 2 of the Options Phase (Option Selection) involved a public consultation and refinement of the environmental impact assessment, traffic forecasts and economic benefits.

1.2.13 Stage 3 is the initial stage of the Development Phase (Preliminary Design), which involves refining the traffic modelling and forecasting assessments, as well as undertaking the environmental, economic and operational assessments. The purpose of Stage 3 is to undertake consultation and complete the preliminary design of the preferred route

Option Identification

1.2.14 In total, ten potential options for increasing the capacity of the A47 single carriageway section were identified. After an initial assessment to identify performance against environmental, engineering, transportation and economic criteria three route options were selected (and renamed as Options 1, 2 and 3).

1.2.15 These options were:

- Option 1: dualling the existing road
- Option 2: building a new dual carriageway partly to the north and also to the south of existing A47
- Option 3: building a new dual carriageway to the north of the existing A47.

1.2.16 Further details can be found in the Scheme Assessment Report (2018) (**TR010039/APP/7.9**)

Non Statutory Public Consultation

1.2.17 During PCF Stage 2, a Non-Statutory Consultation period was undertaken between March and April 2017.

1.2.18 The purpose of the Public Consultation was to seek views on the outline proposals from the general public, statutory consultees, including local authorities, and other interested bodies.

1.2.19 After reviewing the feedback from the consultation, and completing a number of

environmental and other surveys and assessments, an amended version of Option 2 was chosen and announced as the preferred option in August 2017.

Design Development and Statutory Consultation

1.2.20 Following the development of the design Statutory consultation on the proposal to upgrade the A47 between Wansford and Sutton was undertaken between September and November 2018. The purpose of the consultation was to seek feedback on the scheme proposals, including the location, purpose and layout of junctions, provision for non-motorised users, and environmental impact and mitigation.

1.2.21 A number of changes were made to the design in response to feedback including moving the alignment to the north of the existing A47 to the east of the Scheduled Monument. Further details can be found in the Scheme Design Report (**TR010039/APP/7.4**). Further targeted statutory consultation and engagement has taken place resulting in the Scheme which is presented in the DCO application.

1.2.22 Further details of the consultations can be found in the Consultation Report (**TR010039/APP/5.1**). This forms part of the DCO application.

1.3 Need for a Transport Assessment

1.3.1 The primary focus of the Transport Assessment (TA) is to detail the impacts of the Scheme and how they correspond to the Scheme objectives. This TA is a key document in supporting the transport case for the Scheme and to document how the transport model assessment was used to forecast future traffic conditions. The results of these model forecast results indicate that the Scheme will improve traffic conditions along the section by reducing journey times, improving reliability and road safety.

1.4 Funding and Delivery

1.4.1 The DfT announced its committed investment for the A47 schemes in the 2014 RIS 1, and this was carried forward into the 2020 RIS 2. Further details can be found in the Funding Statement (**TR010040/APP/4.2**).

1.4.2 As detailed in the Scheme Design Report (**TR010039/APP/7.4**) the construction period will take approximately 22 months. Construction is planned to start in 2023 if the DCO is granted.

1.5 Structure of this Document

1.5.1 This document is comprised of 9 chapters as described below:

- Chapter 1 – Introduces this document
- Chapter 2 – Provides a high-level description of the Scheme
- Chapter 3 – Discusses the national and local policy context

- Chapter 4 – Details the existing site layout and usage
- Chapter 5 – Gives an overview of the baseline data set
- Chapter 6 – Outlines the traffic modelling assessment methodology
- Chapter 7 – Presents the results of the traffic impact assessment
- Chapter 8 – Details the mitigation of the Scheme's impacts
- Chapter 9 – Provides the summary and conclusions to the assessment

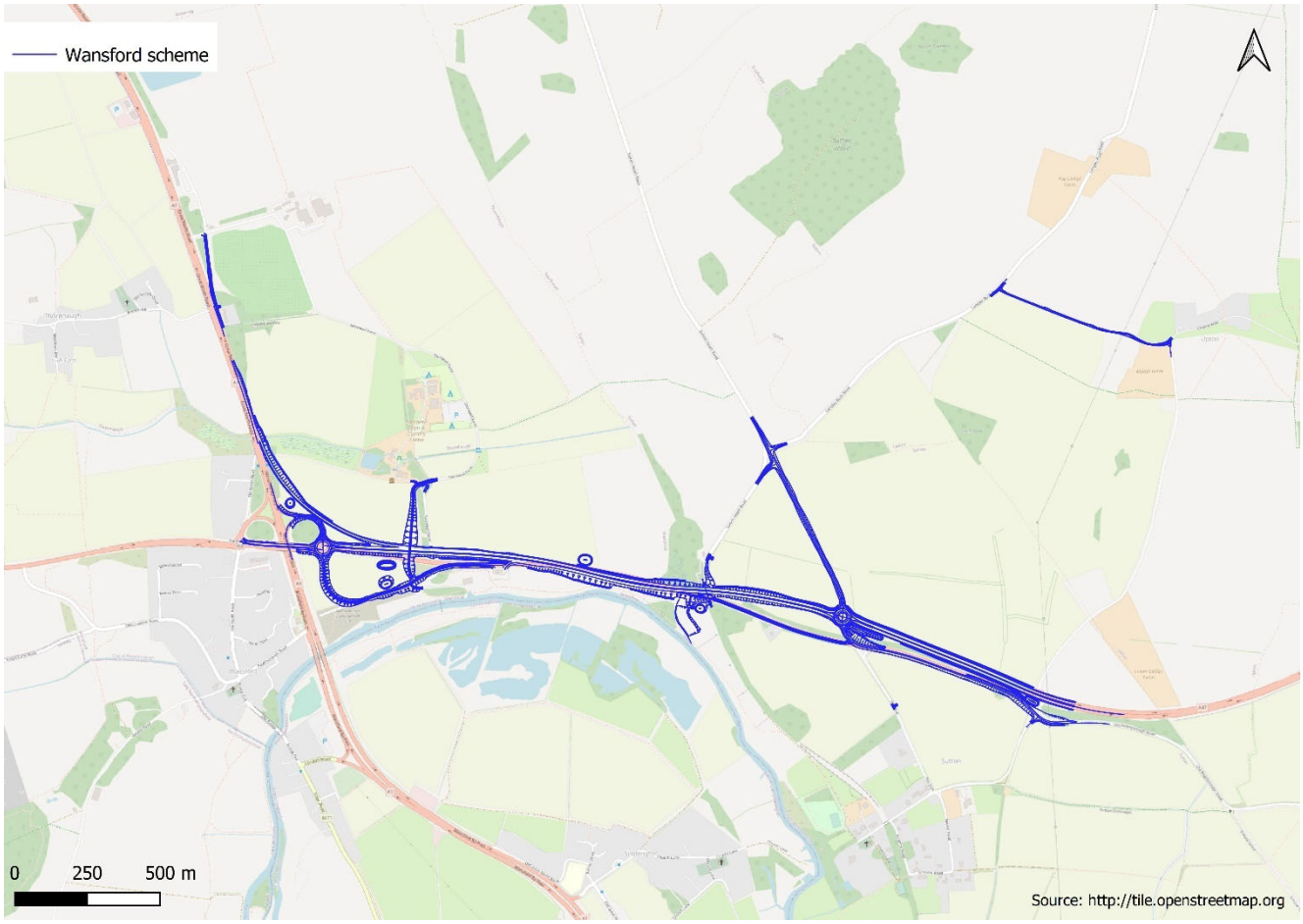
2 THE SCHEME

2.1 Description

2.1.1 The Scheme is located between the A1 junction at Wansford and Nene Way Roundabout in Sutton to the west of Peterborough. The 2.6 kilometre stretch of road is currently single-carriageway. This section of the A47 currently acts as a bottleneck, resulting in congestion and leading to longer journey times and a poor safety record.

2.1.2 The location of the Scheme is shown in Figure 2-1.

Figure 2-1: Location of the Scheme



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2.1.1 The Scheme description along with any supporting information is detailed in ES Chapters 2 and 3 (**TR010039/APP/6.1**), Section 4 of the Scheme Design Report (**TR010039/APP/7.4**) and in Section 2 of the Case for the Scheme

(**TR010039/APP/7.1**).

2.1.2 The main features of the Scheme include:

- approximately 2.6km of new dual carriageway constructed largely offline of the existing A47, including the construction of two new underpasses
- a new free-flow link road connecting the existing A1 southbound carriageway to the new A47 eastbound carriageway
- a new link road from the Wansford East roundabout to provide access to Sacrewell Farm, the petrol filling station and the Anglian Water pumping station
- closure of the existing access to Sacrewell Farm with a new underpass connecting to the farm from the link road provided
- a new slip road from the new A47 westbound carriageway also providing access to the petrol filling station
- a link road from the new A47 Sutton Heath roundabout, linking into Sutton Heath Road and Langley Bush Road
- new junction arrangements for access to Sutton Heath Road and Langley Bush Road
- closure of the existing accesses to the A47 from Sutton Heath Road, Sutton Drift and Upton Road
- new passing places and limited widening along Upton Drift (also referenced as Main Road)
- new walking, cycling and equestrian routes, including a new bridleway underpass at the disused railway
- new safer access to the properties on the A1, north of Windgate Way
- installation of boundary fencing, safety barriers and signage
- new drainage systems including:
    - two new outfalls to the River Nene
    - a new outfall to Wittering Brook
    - extension of the A1 culvert at the Mill Stream
    - realignment and extension of the A47 Wansford Sluice
    - drainage ditch interceptors
    - new attenuation basins, with pollution control devices, to control discharges to local watercourses
- River Nene compensatory flood storage area
- works to alter or divert utilities infrastructure such as electricity lines, water pipelines and telecommunications lines
- temporary compounds, material storage areas and vehicle parking required during construction

- environmental mitigation measures.

2.2 Scheme Objectives

2.2.1 The key objectives of the Scheme are outlined as follows:

Supporting economic growth

- The Proposed Scheme will improve journey times and journey time reliability. This will help contribute to sustainable economic growth by providing benefits such as effectively bringing businesses closer together and encouraging more people to join the labour market as a result of reduced commuting costs.

Making a safer network

- Improving road safety for all road users by designing to modern highway standards appropriate for a major A road.

Providing a more free-flowing network

- Increasing the resilience of the A1 / A47 junction to cope with incidents such as collisions, breakdowns, maintenance and extreme weather. The improved A47 section from Wansford to Sutton will be more reliable, reducing journey times and providing capacity for future traffic growth.

Creating an accessible and integrated network

- Ensuring the proposals take into account the local communities access to the road network, and provide a safer route between the communities for walking, cycling, horse-riding and other road users.

2.3 The Need for the Scheme

2.3.1 The need for the Scheme is comprehensively set out in Section 3 of the Case for the Scheme (**TR010039/APP/7.1**).

2.3.2 The A47 is an important highway link for both local commuter traffic to and from the west of Peterborough and for longer distance trips across the country travelling east and west.

2.3.3 In the wider context, the A47 trunk road forms part of the SRN and provides for a variety of local, medium and long-distance trips linking with the A1 to the north and M1 to London, east to the coastline and west to Leicester.

2.3.4 There has been a rapid growth in the economy along the A47 corridor over the past decade which is expected to continue to grow. The cities of Peterborough and Norwich attract additional traffic along the route, particularly during the morning and evening peak periods.

2.3.5 Traffic is forecast to grow across the country. There are growth hotspots at several locations along the A47 corridor, including Peterborough, Kings Lynn, Norwich and Great Yarmouth and Lowestoft. There are several major proposed housing developments close to the A47, including at Rackheath and Wisbech,

Norwich and on the fringes of Great Yarmouth and Lowestoft.

2.3.6 The 2.6km stretch of single carriageway between Wansford and Sutton lies between two dual carriageway sections of the A47 and acts as a bottleneck, resulting in congestion and leading to longer and unreliable journey times. In addition, this section of the A47 has a poor safety record.

2.3.7 Eastbound traffic levels exceed the theoretical capacity by up to 15% in the AM peak period on a typical weekday, which is likely to result in significant congestion and delay on the link. This effect is independent of junction delay on the A47 and does not take account of local factors such as horizontal and vertical curvature and poor forward visibility that may further reduce capacity.

2.3.8 Westbound traffic levels are higher in the PM peak where they reach 96-99% of the road's theoretical capacity on a typical weekday. This is likely to result in lower vehicle speeds given the A47's speed-flow relationship even if the theoretical capacity is not exceeded. The same issues with curvature, junction delay and visibility also apply as with eastbound traffic.

2.3.9 The A47 is ranked 2nd nationally for fatalities on A roads and the accident severity ratio is above average. During the period October 2011 to September 2016, a total of 2 fatal accidents, 5 serious accidents and 34 slight accidents were recorded along the section of the A47 which is subject to the Scheme. The 41 accidents resulted in 64 casualties: 51 slight, 10 serious and 3 fatal. Further detail is included in section 3.4 of the Scheme Assessment Report, 2018 (**TR010039/APP/7.9**).

2.3.10 Due to the lack of nearby alternative routes, route resilience is also an issue.

2.3.11 The proposed solution to the traffic and safety issues and put forward as a committed scheme in both the RIS 1 and RIS 2 is "dualling of the A47 between the A1 and the dual carriageway section west of Peterborough."

2.3.12 Dualling of this section of the A47 will:

- improve road safety for all road users, ensuring the road design meets modern standards for a major A-road
- shorten journey times, make journey times more reliable, and provide capacity for a rise in future traffic
- contribute to sustainable economic growth
- help the road to better cope with incidents such as collisions, breakdowns, road maintenance and extreme weather
- ensure the proposals consider the local communities
- provide a safer route between communities for walking, cycling and horse riding.

3 POLICY CONTEXT

3.1 Overview of Transport Policy

3.1.1 This section outlines the national, regional and local policies that are relevant to the Scheme. Full details of the Scheme's accordance with relevant national and local policies, local transport plans and associated supplementary plans, particularly the National Policy Statement for National Networks (NPS NN), is provided in Chapter 6 of this document and in the NPS NN Accordance Tables (**TR010040/APP/7.2**).

3.2 National Policy

3.2.1 The National Networks National Policy Statement (NPS NN) sets out the need for, and the Government's policies to deliver, the development of Nationally Significant Infrastructure Projects (NSIPs) on the national road network in England and also sets out the primary basis for making decisions of development consent for NSIPs in England. The Government recognises in the Appraisal of Sustainability accompanying the NPS NN that some developments may have adverse local impacts on noise, emissions, landscape and visual amenity, biodiversity, cultural heritage and water resources. The significance of these effects and the effectiveness of mitigation is uncertain at the strategic and non-locational specific level of the NPS NN. Therefore, while applicants should deliver developments in accordance with government policy and in an environmentally sensitive way, including considering opportunities to deliver environmental benefits, some adverse local effects of development may remain.

3.2.2 Outside the NSIP regime, government policy is to bring forward targeted works to address existing environmental problems on the SRN and improve the performance of the network.

3.2.3 Where appropriate, mitigation of any unavoidable impacts on the environment will be undertaken as set out in the Environmental Statement (**TR010039/APP/6.1**) and where possible enhancements will be made.

The National Planning Policy Framework

3.2.4 While the overall strategic aims of the National Planning Policy Framework (NPPF) and the NPS are consistent, the NPPF is an important and relevant consideration in decisions on nationally significant infrastructure projects, but only to the extent relevant to that project. The NPS NN provides transport policy which will guide individual development brought under it. It also provides guidance on good scheme design, as well as the treatment of environmental impacts. Both documents seek to achieve sustainable development and recognise that different approaches and measures will be necessary to achieve this.

The National Planning Policy Framework (NPPF) states that the purpose of the planning system is to contribute to the achievement of sustainable development. In this regard there are three interdependent overarching objectives, economic, social

and environmental, which need to be pursued in mutually supportive ways with the aim of securing net gains across each. Accordingly, the NPPF states a "presumption in favour of sustainable development" (NPPF Paragraph 10).

Road Investment Strategy 2

3.2.5 In April 2020, the Department of Transport (DfT) published the Road Investment Strategy 2 (RIS 2). The RIS 2 sets out a list of schemes that are to be developed by Highways England in the period 2020-2025.

3.2.6 Highways England, as the strategic highways company and appointed by the Secretary of State must, in exercising its functions and complying with its legal duties and other obligations, act in a manner which it considers best calculated to, among others:

- minimise the environmental impacts of operating, maintaining and improving its network and seek to protect and enhance the quality of the surrounding environment
- conform to the principles of sustainable development.

3.2.7 RIS 2 (page 100) introduces the committed schemes in the East of England committed to in Road Programme 2. RIS 2 (page 101) includes the "*A47 Wansford to Sutton – dualling of the A47 between the A1 and the dual carriageway section west of Peterborough*".

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

3.2.8 This Circular explains how the Highways Agency (now Highways England) will engage with the planning system, communities and the development industry to deliver sustainable development, and thus economic growth, whilst safeguarding the primary function and purpose of the SRN.

3.2.9 The document states that Highways England will work with local authorities to influence Local Plan decisions that may affect the SRN.

3.3 Highways England Policy

The Highways England Licence (2015)

3.3.1 The Highways England Licence (2015) sets out key requirements which must be complied with by the Licence-holder as well as statutory guidance. In exercising its functions and complying with its legal duties and obligations, the Licence-holder must act in such a manner which it considers best calculated to:

- ensure the effective operation of the network
- ensure the maintenance, resilience, renewal, and replacement of the network
- ensure the improvement, enhancement and long-term development of the network

- ensure efficiency and value for money
- protect and improve the safety of the network
- co-operate with other persons or organisations for the purposes of coordinating day-to-day operations and long-term planning
- minimise the environmental impacts of operating, maintaining and improving its network and seek to protect and enhance the quality of the surrounding environment
- conform to the principles of sustainable development
- in complying with section 4.2(g) and its general duty under section 5(2) of the Infrastructure Act 2015 the Licence holder must have regard for the environment
- ensure that protecting and enhancing the environment is embedded into its business decision-making processes and is considered at all levels of operations
- ensure the best practicable environmental outcomes across its activities, while working in the context of sustainable development and delivering value for money
- consider the cumulative environmental impact of its activities across its network and identify holistic approaches to mitigate such impacts and improve environmental performance
- where appropriate, work with others to develop solutions that can provide increased environmental benefits over those that the Licence holder can achieve alone, where this delivers value for money
- calculate and consider the carbon impact of road projects and factor carbon into design decisions and seek to minimise carbon emissions and other greenhouse gases from its operations
- adapt its network to operate in a changing climate, including assessing, managing and mitigating the potential risks posed by climate change to the operation, maintenance and improvement of the network
- develop approaches to the construction, maintenance and operation of the Licence holder's network that are consistent with the government's plans for a low carbon future
- take opportunities to influence road users to reduce the greenhouse gas emissions from their journey choices.

The Highways England Delivery Plan 2020-2025

3.3.1 The Highways England Delivery Plan sets out Highways England's long-term plans for the modernisation and renewal of the road network over the five-year

period from 2020 to 2025. It provides a brief outline of what Highways England have delivered during the previous five years and sets out a clear programme of activity for the first year, as well as a proposed pipeline of future schemes.

3.3.2 In year one, work will be finalised across four schemes to provide dualling and junction upgrades on the A47 between Peterborough and Norwich.

3.3.3 The Wansford to Sutton Scheme is listed within the Regional Investment Programme which is used to deliver enhancement schemes. The schemes along the A47 are focused on tackling regional problems around safety, congestion and capacity.

3.3.4 Annex B of the Plan sets out the six key performance outcomes agreed with the DfT for this second road period including:

- improving safety for all
- providing fast and reliable journeys
- a well-maintained and resilient network
- delivering better environmental outcomes
- meeting the needs of all users
- achieving efficient delivery.

3.3.5 The Funding Statement (**TR010038/APP/4.2**) presents details of the designated funds for delivery of the Scheme under this Plan.

3.4 Sub-Regional Transport Policy

Cambridgeshire and Peterborough Independent Economic Review – September 2018

3.4.1 The Economic Review is a product of the Cambridgeshire and Peterborough Independent Economic Commission which, amongst other things, will inform choices on policy priorities and strategic investment and provide understanding of the future drivers for change in the economy.

3.4.2 In relation to the major transport infrastructure programmes, the Review states "*the growth seen in Cambridgeshire and South Cambridgeshire seems very unlikely to be sustained in the future without further and significant investment in infrastructure. Businesses are already noting this as a major concern*."

3.4.3 Key recommendation #7 states: "*a package of transport and other infrastructure projects to alleviate the growing pains of Greater Cambridge should be considered the single most important infrastructure priority facing the Combined Authority in the short to medium term*". One of the projects listed as being likely to further this aim is the full dualling of the A47.

Cambridgeshire and Peterborough Strategic Spatial Framework (non-statutory) – Towards a Sustainable Growth Strategy to 2050

3.4.4 The Strategic Spatial Framework defines the region's priorities for sustainable growth and includes wider actions to support the sustainable delivery of over 100,000 new homes and over 90,000 additional jobs in Combined Authority plans and Local Plans.

3.4.5 It is noted that a number of key routes within the region suffer severe congestion at peak times. The A47 to Norwich is one of the strategic transport corridors listed as being critical to the area's economic success and growth. Planning for, and investment in, strategic transport infrastructure should therefore be prioritised to ensure growth and regeneration is properly serviced and the effects of congestion on productivity are addressed. Further, Peterborough is a strategic location where urban extensions at Hampton, Great Haddon and Norwood are anticipated to add over 11,000 new homes by 2036. Travel demand is expected to increase by 30% up to 2031 in Peterborough. The A47 dualling is listed as a strategic transport project.

The Cambridgeshire & Peterborough Local Transport Plan February 2020

3.4.6 The Cambridgeshire & Peterborough Local Transport Plan sets out the policies and strategies needed to secure growth and ensure that planned large-scale development can take place in the county in a sustainable way.

3.4.7 The interrelationship between the Plan's transport objectives and the delivery of wider goals relating to the economy, society and environment is emphasised in terms of inter alia:

- supporting new housing to accommodate a growing population and workforce
- sustainably connecting communities to facilitate rapid access to employment
- sustainable connections for business and tourism to main transport hubs
- building a resilient and adaptive transport network and improving journey time reliability
- achieving zero transport related fatalities or serious injuries
- improving air quality through new transport initiatives
- ensuring transport proposals protect and enhance the natural, historic and built environments
- reducing emissions to minimise the impact of transport and travel on climate change.

3.4.8 The Plan acknowledges that there will be significant growth in the number of commuting trips to the west of Peterborough leading to a rise in congestion by 2041. In this regard, paragraph 3.9 states "*there is a need to provide additional*

targeted highway capacity to support Peterborough's growth". The Scheme is specifically mentioned in paragraph 3.24 as key to improving access to Peterborough as a business destination by reducing journey times. The Scheme would also "*reduce congestion along a key strategic route from Peterborough to the A1 corridor, and the wider north of England, as well as improving road safety along a route with a history of fatal and serious collisions*."

3.5 Local Policy

Peterborough Local Plan July 2019

3.5.1 Peterborough Local Plan contains planning policies for the growth and regeneration of Peterborough and the surrounding villages up to 2036. The Plan notes that important characteristics of Peterborough are the concentration of companies engaged in environment-related activities and also the significant pressure for development to serve the logistics industry, taking advantage of the area's prime location beside the (north-south) A1 and (east-west) A47. With unemployment slightly higher than average there is a need to identify land to meet future employment needs.

3.5.2 Further, the total housing requirement for Peterborough is over 17,000 dwellings from 2018 to 2036, 60% of which will be contained in urban extensions to Peterborough.

3.5.3 Land is safeguarded for future key infrastructure adjacent to the roundabouts at the A47/A1 junction under Policy LP15 of the Plan.

3.6 Policy Summary

3.6.1 The aims of the Scheme are directly in line with the Government's policies and illustrate the need for the Scheme on a national level. The Government has highlighted the express need for further growth and improvements to the national networks within the NPS NN. The Road Investment Strategies (both RIS 1 and RIS 2), which explore these needs in further detail, support the Scheme as a required improvement to the SRN.

3.6.2 The Scheme complies with national planning policy within the NPS NN and NPPF. It will reduce congestion-related delay, improve journey time reliability, increase the overall capacity of the A47 and improve road safety and traffic flow. These improvements mean that the Scheme will contribute towards making the eastern region more attractive for business and will help in promoting a competitive regional economy.

3.6.3 The Scheme supports the economic growth objectives of the various sub-regional policy documents and the Peterborough Local Plan. It will assist in delivering the required and supported improvements to the A47 which are key to safe, fluid connectivity and facilitating new housing and business developments.

3.6.4 The Scheme also accords with the policies of the Peterborough Local Plan in contributing to key regional infrastructure needed to support economic and housing growth.

4 EXISTING SITE INFORMATION

4.1 Overview

4.1.1 This chapter provides an overview of the existing location of the Scheme the current layout of the road network as well as the existing and proposed land uses in the vicinity of the Scheme.

4.2 Location of the Scheme

4.2.1 The Scheme is located between the A1 junction at Wansford and Nene Way Roundabout in Sutton, approximately 9km to the west of Peterborough.

4.2.2 The Scheme lies adjacent to the River Nene and Nene Valley. Arable farmland is the predominate land cover in the area, divided into relatively small agricultural enclosures interconnected by narrow rural lanes, and defined by hedgerows and ditches throughout the landscape. The fields are interspersed with fragmented patches of woodland and clusters of farms and residential settlements.

4.3 Permitted and Existing use of the site

The Transport Network

4.3.1 The single carriageway section of the A47, which runs from the A1 in the west (near Wansford) to the dual carriageway section near the village of Sutton in the east, is shown in Figure 4-1 below. Peterborough lies approximately 9km east of the link. Beyond Peterborough the A47 continues to Norwich and the east coast at Great Yarmouth. The corridor intersects with key strategic routes including the A1, A10 and A11. These strategic roads provide links to other urban centres including Cambridge, Ely and London.

Figure 4-1: Scheme location – landmarks

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4.3.2 The scheme section begins where the A47 meets the A1 at Wansford west of Peterborough and continues 2.5 km east to the Sutton Heath Roundabout.

4.3.3 To the west, the A1 and A47 are connected via a half cloverleaf signalised dumbbell arrangement, with the A47 crossing over the A1 dual carriageway. This dumbbell junction arrangement includes two roundabouts, referred to as the Wansford West and Wansford East roundabouts. The western roundabout provides access to the village of Wansford via the A6118.

4.3.4 Continuing eastwards from the A47/A1 junction the A47 is a single carriageway road. For the first kilometre, the A47 runs adjacent to the navigable River Nene, being some 50m from it at its closest point. Thereafter the river deviates southwards away from the road.

4.3.5 This section of the A47 is subject to a national speed limit of 60mph.

4.3.6 There are a number of side roads joining the A47 along the scheme length, via at grade priority, simple and right turn lane T junctions. From west to east the following side roads and junction types are noted:

- Access to Sacrewell Farm and Country Centre – T junction
- Access to Truck stop/Picnic area and Wansford pumping station – ghost island junction
- Petrol filling station – ghost island junction
- Sutton Heath Road – ghost island junction
- The Drift – double T-junction

4.3.7 To the east, the A47 connects to Nene Way via the Nene Way Roundabout. The roundabout provides connections to the villages of Sutton and Ailsworth to the south and Upton to the north. To the east of the roundabout the A47 is dual two-lane carriageway.

Walking, Cycling and Horse-riding

4.3.8 The Scheme will provide routes for pedestrians, cyclists and equestrians along and across the A47. A number of Public Rights of Way (PRoW) and permitted routes are also present in the vicinity which the Scheme will link to. Further details on the existing walking, cycling and horse-riding facilities are set out below in Section 5. A Walking, Cycling and Horse-riding (WCH) assessment was undertaken and the outcome is provided in ES Chapter 12 Population and Human Health (**TR010039/APP/6.1**).

4.4 Land use in the Vicinity of the Scheme

4.4.1 Between Wansford and Sutton the land use is predominately in agricultural use.

4.4.2 The villages local to the route vary in size, with Wansford being the largest. Wansford has a population of approximately 500 with around 250 properties that have a mixture of residential and business use. The village of Sutton has approximately 50 residential properties and one farming business located on the edge of the village. The village of Upton is 1.3 km north of the Nene Way roundabout and has less than 30 residential properties with two farming businesses located on the edge of the village.

4.4.3 Sacrewell Farm and Country Centre, a tourist destination accessed directly from the A47 is located north of the A47 between the A1 / A47 Junction and Sutton Heath Road. The business has visitor numbers of approximately 90,000 per annum. Arable farmland surrounds the Country Centre and is accessed using the Country Centre service road.

5 BASELINE TRANSPORT DATA

Introduction

5.1.1 This chapter of the TA provides a summary of the baseline data collection used for the assessment of the Scheme as well as the development of the highway assignment and microsimulation models. This includes the collection of volumetric traffic count data, network data and vehicle journey time data. This data is used in the model development process to calibrate and validate the baseline in order to provide a stable basis to undertake the future year assessment of the Scheme.

5.1.2 In addition to the traffic data collection, reported accident data information has been sourced to inform the road safety assessment. Public transport, walking and cycle information has also been sourced to inform the assessment of the WCH impacts.

Road Networks and Traffic Movement Data

5.1.3 Highways England have developed a series of regional traffic models under a consistent framework to support the delivery of the schemes identified in the RIS. The entire SRN and major associated links in England are represented in five strategic models representing the north, the Trans-Pennine south or “Northern Powerhouse” area, the midlands, the south-west and the south-east. The South East Regional Transport Model (SERTM) was used in the development of this Scheme.

5.1.4 Provisional trip matrices were constructed using mobile phone data. The SERTM models network and mobile phone prior matrix traffic movement data were therefore adopted in the study to inform the development of the 2015 base year model.

5.1.5 In addition to SERTM data, the existing Peterborough Transport Model (PTM), Google Maps and TrafficMaster data have been used as data sources for traffic highway network development. Traffic signal data has been sourced from the PTM model.

Traffic Flows

5.1.6 A range of traffic surveys have been undertaken along the Scheme section and across the surrounding network in 2014, 2015, 2016 and 2019. The traffic surveys undertaken in 2014, 2015 and 2016 provide the input traffic flow data for the development of the base year strategic highway model. Whereas the 2019 surveys provide the input traffic data for the operational model.

5.1.7 In June 2015 12-hour Manual Classified Turning Counts (MCTC) surveys were undertaken to observe the traffic flows along the A47 corridor, as shown in

5.1.8 Figure 5-1. In addition to providing the number of vehicles, vehicle classifications were also recorded.

Figure 5-1: 2015 traffic survey sites

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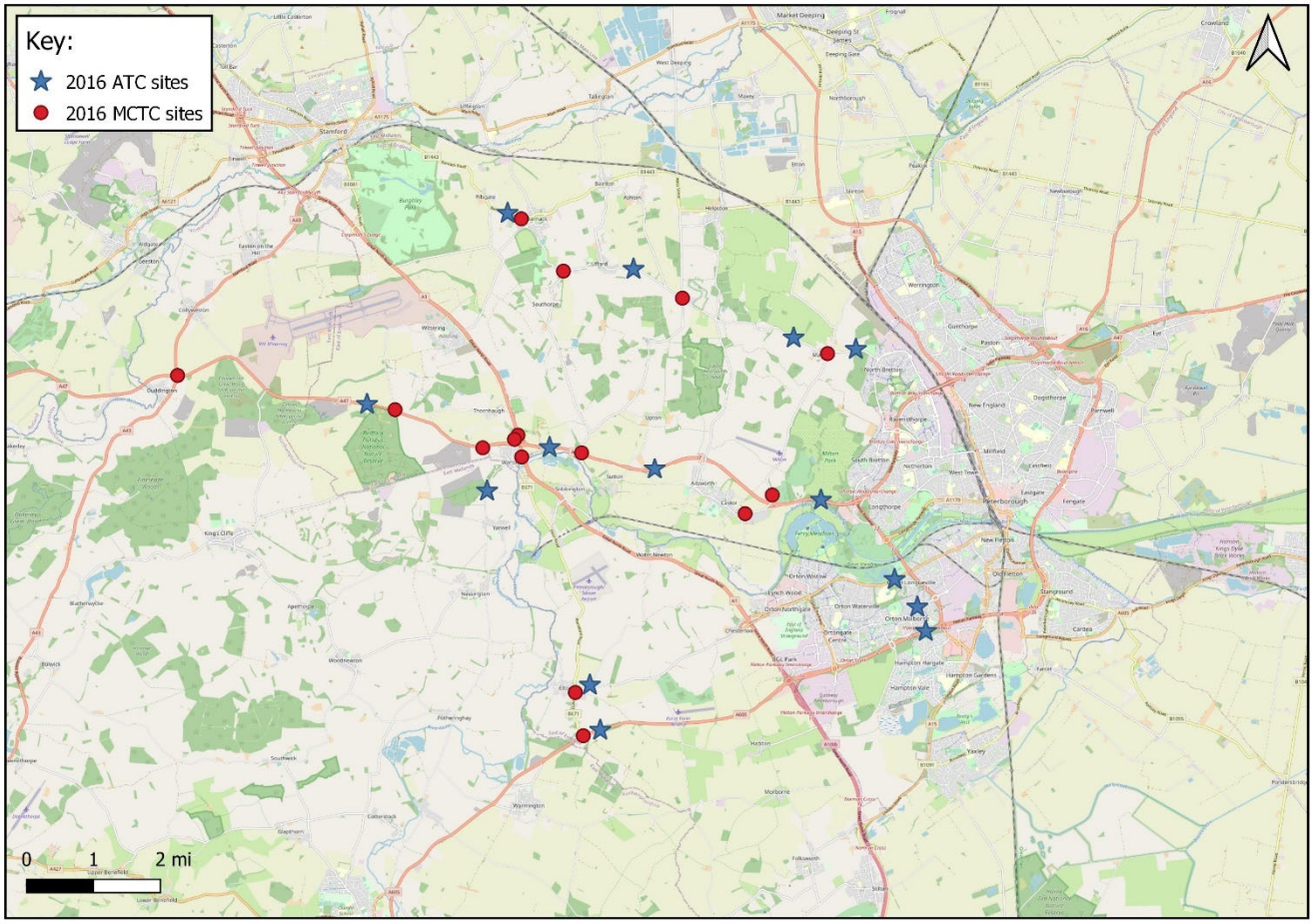
5.1.9 Additional MCTC and Automated Traffic Counts (ATCs) were undertaken during the months of May, June and July 2016.

5.1.10 Figure 5-2 below shows the extent of the 2016 traffic flow data collection. The ATC surveys were conducted over 24-hours a day with flows reported at 15 minute intervals. In summary, the 2015 data collection study focused primarily on the A47, whereas the 2016 data collection covered the wider surrounding area.

Figure 5-2: 2016 survey sites



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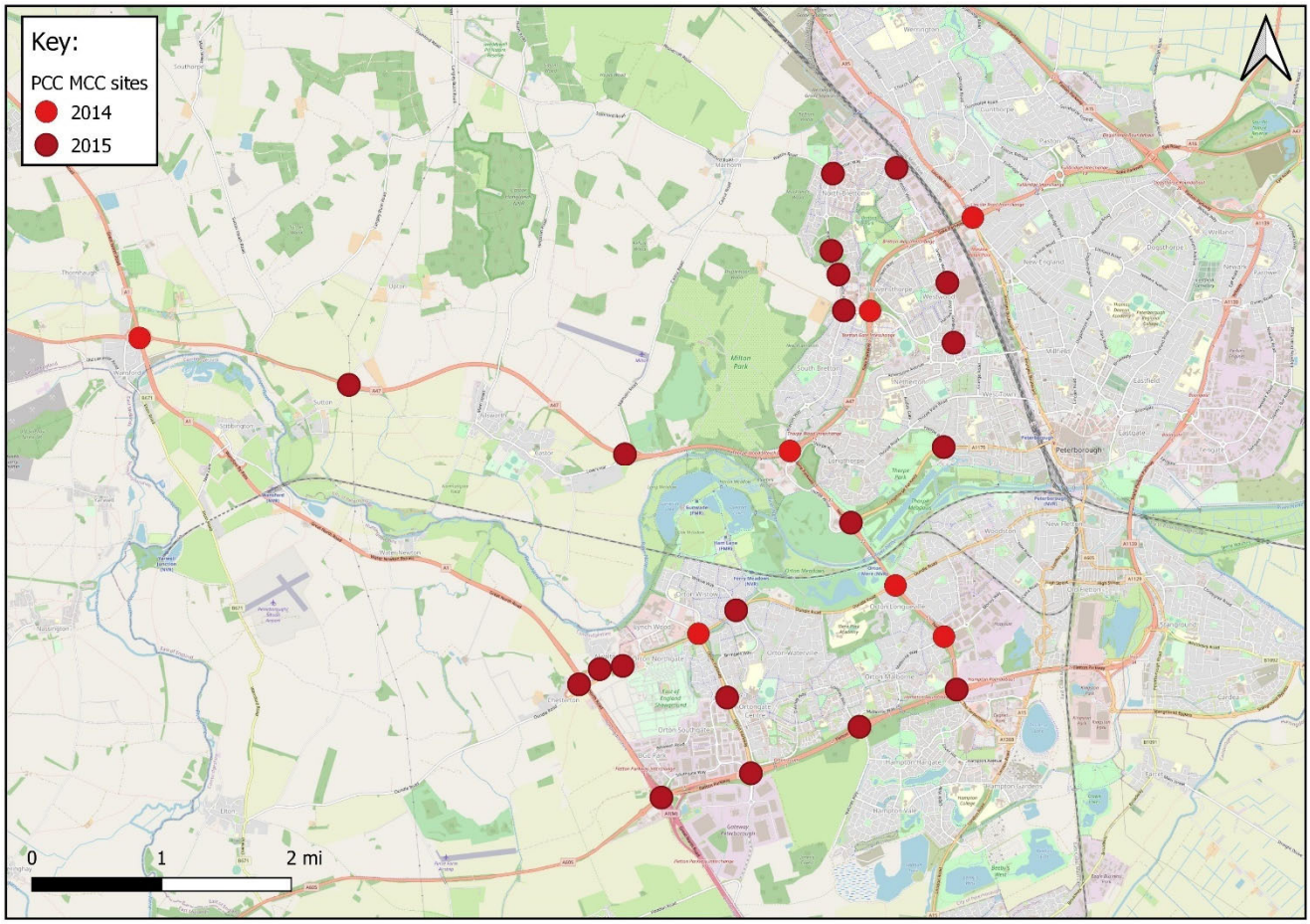
5.1.11 Supplementary 2014 and 2015 MCTC data from Peterborough City Council (PCC) was also used for the model development.

5.1.12 Figure 5-3 shows the locations of the 2014 and 2015 PCC traffic surveys. The 2015 data was collected in November 2015 over a 12-hour period. Whereas the 2014 data was collected in October, from 7:00 to 19:00 with the 10:00 to 13:00 period omitted. Vehicle classifications were recorded as part of both the 2014 and 2015 traffic surveys.

Figure 5-3: PCC MCC data



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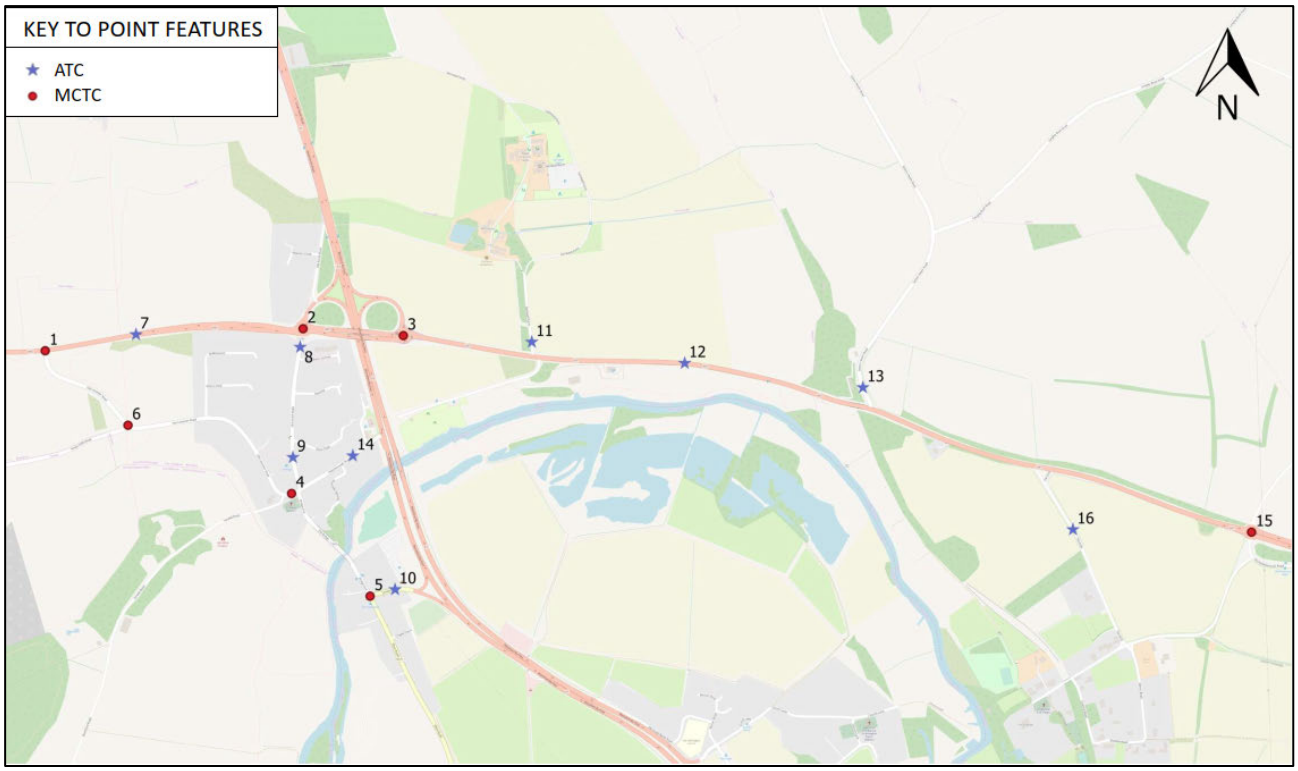
5.1.13 In October 2019, further traffic surveys were undertaken to inform the local traffic movements in and around Wansford village as well as on local access roads including Upton Road at the A47 junction. Figure 5-4 shows the location of the 2019 survey sites, this data exercise involved collecting traffic data on the local roads as well as recollecting data on a number of sites included in 2015 and 2016. Therefore, the 2019 survey information was used to update the microsimulation model.

Figure 5-4: Location of 2019 survey sites



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Journey Times

5.1.14 Figure 7-1 below shows the Wansford journey time routes. For the Wansford Strategic model TomTom Satellite Navigation data from the PTM and additional journey time routes from TrafficMaster data have been utilised.

Accidents

5.1.15 Department for Transport Stats19[1] accident data records have been analysed, over the 2014-2018 period, to identify all reported accidents which have occurred across the Scheme impact area. The data set includes details of all recorded slight, serious and fatal accidents across the five-year time period. This information has been adopted to provide the total observed accidents as an input to the COBA-LT (Cost-Benefit of Accidents - Light Touch) modelling assessment.

Public Transport Facilities

5.1.16 A number of bus services operate in the vicinity of the Scheme serving the local villages of Wansford, Sutton and Ailsworth whilst also providing links to Stamford and Peterborough.

[1] The STATS19 database is a collection of all road traffic accidents provided by DfT : https://data.gov.uk/dataset/cb7ae6f0-4be6-4935-9277-47e5ce24a11f/road-safety-data

5.1.17 Table 5-1 summarises the available bus stops and services located within approximately 400m of the Scheme.

Table 5-1: Bus stop locations and services

Bus Stop Location	Location	Bus Service	Frequency	Route
A6118 Old North Road	Wansford	4P – operated by Call Connect	Hourly (Call to book)	Stamford & Peterborough Callconnect
		4S - operated by Call Connect	Hourly (Call to book)	Stamford & North East Northants Callconnect
		47 – operated by Centrebus	2 per day	Peterborough - Uppingham
		48 – operated by Centrebus	2 per day	Peterborough – Wittering
Old Leicester Road / Robins Field	Wansford	4P – operated by Call Connect	Hourly (Call to book)	Stamford & Peterborough Callconnect
		4S - operated by Call Connect	Hourly (Call to book)	Stamford & North East Northants Callconnect
		47 – operated by Centrebus	2 per day	Peterborough - Uppingham
		48 – operated by Centrebus	2 per day	Peterborough – Wittering
Old Peterborough Road	Sutton	4P – operated by Call Connect	Hourly (Call to book)	Stamford & Peterborough Callconnect
		4S - operated by Call Connect	Hourly (Call to book)	Stamford & North East Northants Callconnect
		47 – operated by Centrebus	2 per day	Peterborough - Uppingham
		48 – operated by Centrebus	2 per day	Peterborough – Wittering
Peterborough Road	Ailsworth	4P – operated by Call Connect	Hourly (Call to book)	Stamford & Peterborough Callconnect
		4S - operated by Call Connect	Hourly (Call to book)	Stamford & North East Northants Callconnect
		47 – operated by Centrebus	2 per day	Peterborough - Uppingham
		48 – operated by Centrebus	2 per day	Peterborough – Wittering

5.1.18 There are no other transport interchanges, bus stations or railway stations within the vicinity of the Scheme.

Pedestrian, Cycling and Horse-riding facilities

5.1.19 A number of walking, cycling and horse-riding facilities are located in the vicinity of the Scheme. These include Public Rights of Way (PRoW), permissive routes and

infrastructure provided as part of the local highway network.

5.1.20 The PRoW and permissive routes described below have been identified using Peterborough City Council's interactive PRoW mapping tool, which can be found at https://www.peterborough.gov.uk/residents/transport-and-streets/public-rights-of-way/.

5.1.21 The locations of these facilities are shown in Figure 5-5 and a description of each facility is provided in Table 5.2.

Figure 5-5: Locations of PRoW, permissive routes and other facilities

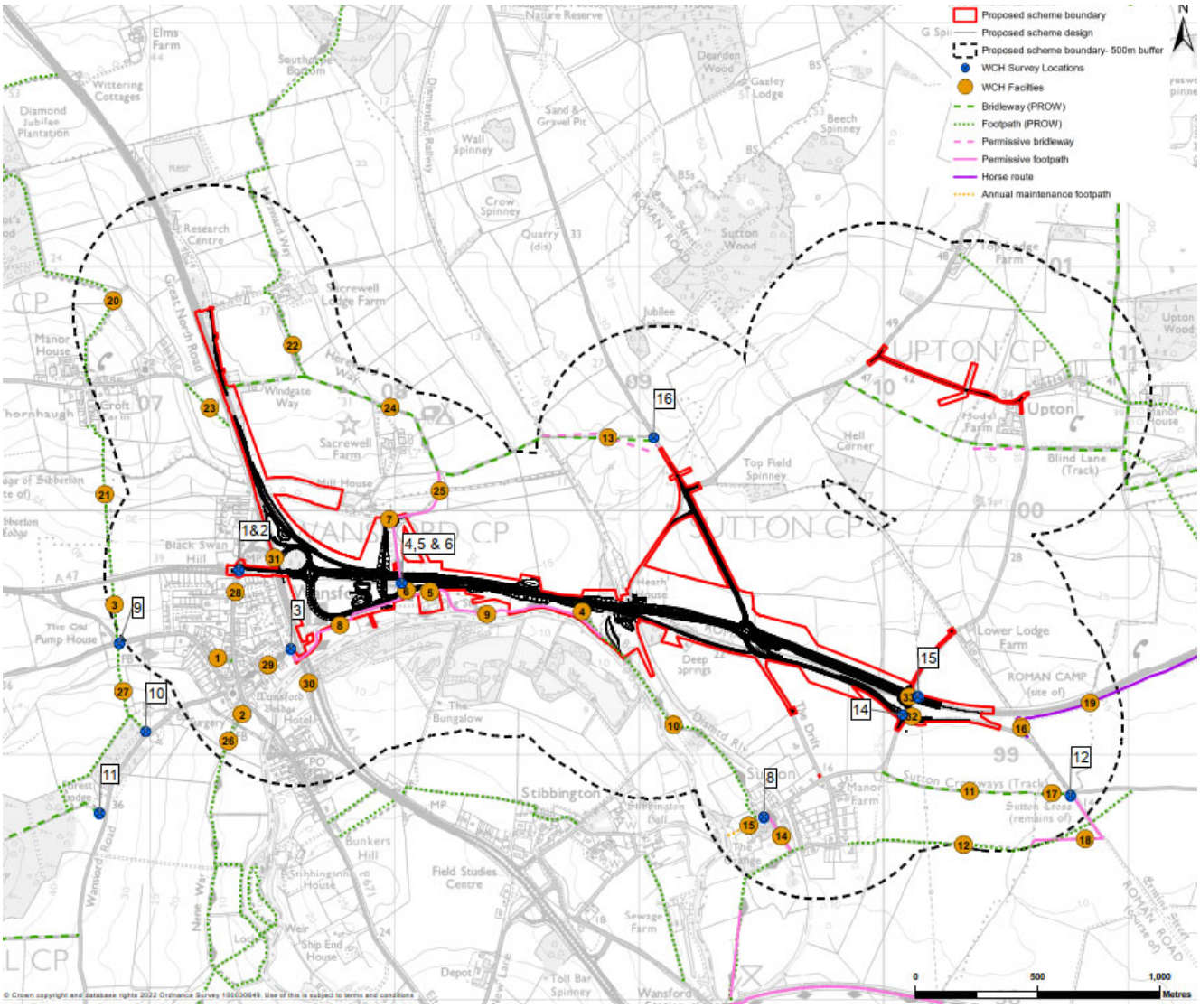

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Table 5-2: PRoW in the vicinity of Scheme

Location Ref (Figure 5-6)	PRoW / Permissive route	Description
1	Wansford 1 (ID: 455)	The footpath runs from Old Leicester Road to Old North Road in an easterly direction for approximately 100m. It passes through a residential area.
2	Wansford 2 (ID: 456)	The footpath runs from Bridge End road in a southerly direction for approximately 93m connecting to the PRoW Footpath PG1 within Northamptonshire. The route is adjacent to Wansford Bridge.
3	Wansford 3 (ID: 458, 783 and 457)	The footpaths start to the south of Old Leicester Road at the boundary with Northamptonshire as a continuation to PRoW PG19. The route heads north through a field until it intersects with Old Leicester Road. It continues to the north of Old Leicester Road through another field before intersecting with the A47. To the north of the A47, it continues along a field boundary connecting with PRoW Thornhaugh 5 (ID: 425).
4	Wansford 4 (ID: 459)	The footpath runs from the A47 in a south easterly direction for approximately 180m until reaching the River Nene where it connects to footpath Wansford Nene Way Permissive 4 and footpath Sutton 1. The footpath runs through open fields and a small wooded area.
5	Wansford Annual Maintenance 113 (ID: 460 & 785)	This permissive footpath runs from the A47 junction with the unnamed access road leading to Wansford Picnic Area in an easterly direction for approximately 200m before merging with permissive footpath Wansford Nene Way Permissive 4 (ID: 784) to the east to the south of the petrol filling station.
6	Wansford Hereward Way Permissive 2 (ID: 786)	Hereward Way Permissive 2 footpath runs between the southern side of the A47 and permissive footpaths Wansford Annual Maintenance 113 (ID: 460) and Wansford Nene Way Permissive 1 (ID:574). The route runs along the first 25m of the unnamed access road leading to the Wansford Picnic Area.
7	Wansford Hereward Way Permissive 3 (ID: 787)	Hereward Way Permissive 3 footpath runs northwards from the A47 along the private road leading serving Sacrewell Farm and connects to footpath Thornhaugh Permissive 1 prior to reaching the farm.
8	Wansford Nene Way Permissive 1 (ID: 574)	This permissive footpath runs from Peterborough Road in Wansford in an easterly direction for approximately 620m. It passes beneath the A1 and runs along northern edge of the Wansford Picnic Area until it reaches Wansford Hereward Way Permissive 2 (ID: 786) and Wansford Annual Maintenance 113 (ID: 460), 25m south of the A47
9	Wansford Nene Way Permissive 4 (ID: 784)	This permissive footpath runs along the northern bank of River Nene, to the south of the A47, between permissive footpath Wansford Annual Maintenance 113 (ID: 785) in west; and the junction of PRoW Wansford 4 (ID: 459) and PRoW Sutton 1 (ID: 392) in the east.
10	Sutton 1 (ID: 392 & 393	This footpath starts at the end of PRoW Wansford 4 (ID: 459) south of the A47 and runs in a southerly direction to the east of the River Nene for approximately 1km until it reaches Sutton
11	Sutton 3 (ID: 395)	This bridleway starts at Nene Way in Sutton and runs in an easterly direction for approximately 640m and connects to bridleway PRoW Ailsworth 3 (ID: 4) and an onward connection to Peterborough Road.
12	Sutton 4 (ID: 396 & 397)	The footpath starts at eastern end of Graeme Road in Sutton and runs in an easterly direction for approximately 750m and connects to PRoW Ailsworth 6 (ID: 9).
13	Sutton 5 (PRoW ID: 903, 399 & 398/Permissive bridleway ID: 904, 522 & 523)	The bridleway starts at Sutton Heath Road, to the north of its junction with Langley Bush Road, and runs in a north westerly direction for approximately 490m connecting to bridleway PRoW Thornhaugh 8 (ID: 430). There are two routes, one a PRoW and one a permissive

Location Ref (Figure 5-6)	PRoW / Permissive route	Description
		route. Both routes pass through fields.
14	Sutton Nene Way Permissive 1 (ID: 520)	The permissive footpath starts at Nene Way in Sutton and runs along Lovers Lane in a southerly direction for approximately 175m.
15	Sutton Annual Maintenance 96 (ID: 400)	This footpath starts at the end of Nene Way in Sutton and runs in a westerly direction for approximately 130m until it reaches the River Nene.
16	Sutton Annual Maintenance 111 (ID: 454)	This permissive bridleway starts at Peterborough Road west of Ailsworth runs in a northerly direction for approximately 90m and connects to permissive bridleway Upton Annual Maintenance 110 (ID: 453) which runs eastwards to the south of the existing A47 alignment
17	Ailsworth 3 (ID: 4)	The PRoW bridleway starts at the end of PRoW Sutton 3 (ID: 395) runs in an easterly direction for approximately 145m and ends at Peterborough Road
18	Ailsworth 6 (ID: 650, 651, 652, 659, 546 & 397)	A series of footpaths, some sections of which are PRoW and some permissive that link between PRoW Sutton 4 and Peterborough Road. The footpaths run along a mixture of field boundaries and tracks.
19	Upton Annual Maintenance 110 (ID: 453)	This permissive bridleway forms a continuation of permissive bridleway Sutton Annual Maintenance 111 (ID: 454) and runs in an easterly direction to the south of the A47 alignment for approximately 300m and connects to permissive bridleway Ailsworth Annual Maintenance 1 (ID: 516). This permissive bridleway then continues eastwards as far as Helpston Road in Ailsworth.
20	Thronhaugh 1 (ID: 415, 416 & 417)	The footpath starts at Russell Hill and continues north along a track before heading westerly along a field edge and then north along the edge of a wooded area to join PRoW Wittering 4 (ID: 467).
21	Thornhaugh 5 (ID: 425)	This footpath is a continuation of PRoW Wansford 3 (ID: 457, 783 & 458)). The route continues north along the field boundary and connects with Meadow Lane in Thornhaugh.
22	Thornhaugh 6 (ID: 427)	This footpath runs northwards from the eastern end of Wingate Way [where it connects to bridleway Thronhaugh 8 (ID: 669)] to PRoW Wittering 8 (ID: 473). The route follows a mixture of tracks and field boundaries
23	Thronhaugh 7 (ID: 428)	This footpath runs from Russell Hill in a south eastern direction for approximately 243m until it reaches a wooded area adjacent to the A1. The route passes through a field.
24	Thornhaugh 8 (ID: 429, 430 & 669)	This bridleway starts on Windgate Way at the junction with the A1 and runs in an easterly and south-easterly direction around Sacrewell Farm before running easterly again and joining PRoW Sutton 5. The route mainly follows access tracks with the easternmost section following a field boundary.
25	Thornhaugh Permissive 1 (ID: 537)	This footpath runs in a southerly direction to the east of Sacrewell Farm for approximately 75m providing a connection between PRoW Thornhaugh 8 (ID: 429, 430 & 669) and permissive footpath Wansford Hereward Way Permissive 3 (ID: 787). It follows an access track.
26	Northamptonshire PG1	This footpath is a continuation of footpath Wansford 2 (ID: 456) and runs in a south / south westerly direction. to Main Street in Yarwell, approximately 80m to the east of the church. The route predominantly follows field footpaths.
27	Northamptonshire PG19	This footpath is a continuation of footpath Wansford 3 (ID: 457, 783 & 458)) and runs in a south / south westerly direction to join PRoW PG6 at Wansford Quarter in Old Sulehay Forest
28	Wansford	A footway is provided on the western frontage of Old North Road (A6118) in a southerly direction between the A47 and a point opposite its junction with Black Swan Spinney. From here, the footway

Location Ref (Figure 5-6)	PRoW / Permissive route	Description
		switches to the eastern frontage as far as its junction with Peterborough Road. A section of footway is also provided on the western frontage of Old North Road between its junction with Peterborough Road and a point opposite its junction with Nene Close. These footways lead to an underpass under the A47 connecting to the footway leading to the cul-de-sac section of Old North Road to the north of the A47 and adjacent to the A1
29	Wansford	Footways are provided on both frontages of Peterborough Road that lead to a footway on the A1 on the western frontage of the northbound carriageway. The also provide a connection to Wansford Nene Way Permissive 1 which passes under the A1.
30	Wansford	Footways are provided on the A1 on the western frontage of the northbound carriageway. The footway on the A1 travels as far as the overbridge of the A47 to the north and link to a footway on the A6118 slip road to the south.
31	Wansford	Short sections of cycleway are provided at both of the A47/ A1 roundabouts to allow cyclists to leave the carriageway, negotiate the respective roundabout and then re-join the carriageway.
32	Sutton	There are two short sections of footway on Old Peterborough Road. One section on the western frontage between the A47 Nene Way Roundabout and the junction with Nene Way. The second section is on the northern frontage to the east of Nene Way which provides access to the eastbound bus stop.
33	A47 / Upton Road / Peterborough Road roundabout	The roundabout provides a crossing point on the A47 for promoted advisory cycle routes in the area

5.1.22 The definitions of each type of PRoW and permissive route are summarised in Table 5-3.

Table 5-3: PRoW definitions

Type	Definition
Footpath	If a path is used for walking only, it is a footpath. Footpaths are legally protected routes that the public can travel along by foot. These are different from footways (the pavement alongside a road), as they comprise the whole width of the highway. Footpaths are usually unsurfaced tracks (rarely surfaced or lit), open to walkers, runners and users of mobility vehicles or powered wheelchairs.
Bridleway	Bridleways are legally protected routes that the public can use on foot or on horseback. Cyclists are permitted to use the bridleways although, through the Countryside Act 1968, there is no obligation to facilitate cycling on the routes, and cyclists must give way to other users. Horse drawn vehicles are not permitted.
Permissive footpath/bridleway	It is possible for landowners to allow access over their land without dedicating a right of way. These accesses are called permissive paths. To the user they are often indistinguishable from normal highways. Landowners have granted permission for the route to be used by the public, but they also have the right to withdraw that permission if they choose. They can also specify which user groups are permitted to use these routes, which can include cyclists, equestrians and pedestrians.

5.1.23 In addition to the facilities outlined above, there is also a prescribed long distance walking route known as The Hereward Way which runs between Stamford and Peterborough and is listed as Walk No.912 on the Britishwalks website: [redacted] This walking route follows a series of PRoW and permissive routes between the urban areas although it is understood that the walk was diverted from its original alignment some time ago to avoid passing alongside the A47. The original alignment was noted to have taken walkers between Sutton Heath Road and PRoW Wansford 4 (ID: 459) via the A47.

5.1.24 The alignment of the Hereward Way now utilises the permissive right of way Wansford Nene Way Permissive 4 (ID: 784), Wansford Annual Maintenance 113 (ID: 460 & 785) and Wansford Hereward Way Permissive 2 (ID: 786) before crossing the A47 at the Sacrewell Farm access. The crossing of the A47 is at grade with no specific crossing facilities provided. The route then continues along permissive route Wansford Hereward Way Permissive 3 (ID: 787) further west of its original alignment. A comment on the British Walks website referring to the re-aligned Hereward Way states:

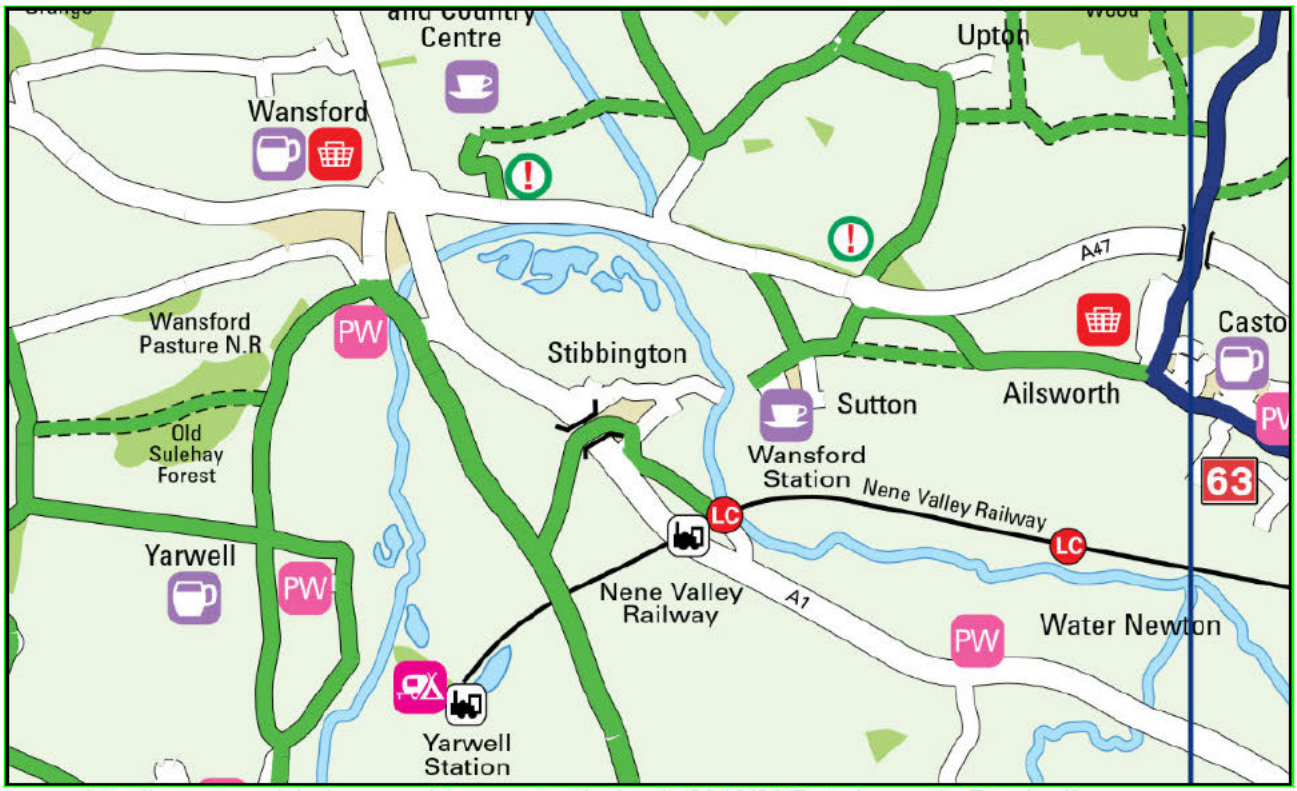
"The new path proved to be well waymarked and easy to follow, with a series of posts with yellow blazes marking the way. It crossed a series of fields before joining tracks; the first headed past Sacrewell Lodge Farm, which had a couple of double-decker busses in a barn, and then onto Sacrewell Farm where there is a campsite. Eventually another track dumped me out onto the A47(T) immediately to the east of Wansford. This diversion of the trail was longer than the old one and although it was not classic, it was far preferable to the old route along the road".

Other Cycling facilities

5.1.25 In addition to the facilities outlined in Table 5-3, Peterborough City Council, through [redacted] identify a number of advisory on-road and off-road cycle routes within the surrounding network. See

5.1.26 Figure 5-6 below extract from the Peterborough Rural Cycle Network Map.

Figure 5-6: Peterborough Rural Cycle Network Map



Source: http://www.travelchoice.org.uk/wp-content/uploads/2013/06/Peterborough_Rural.pdf

5.1.27

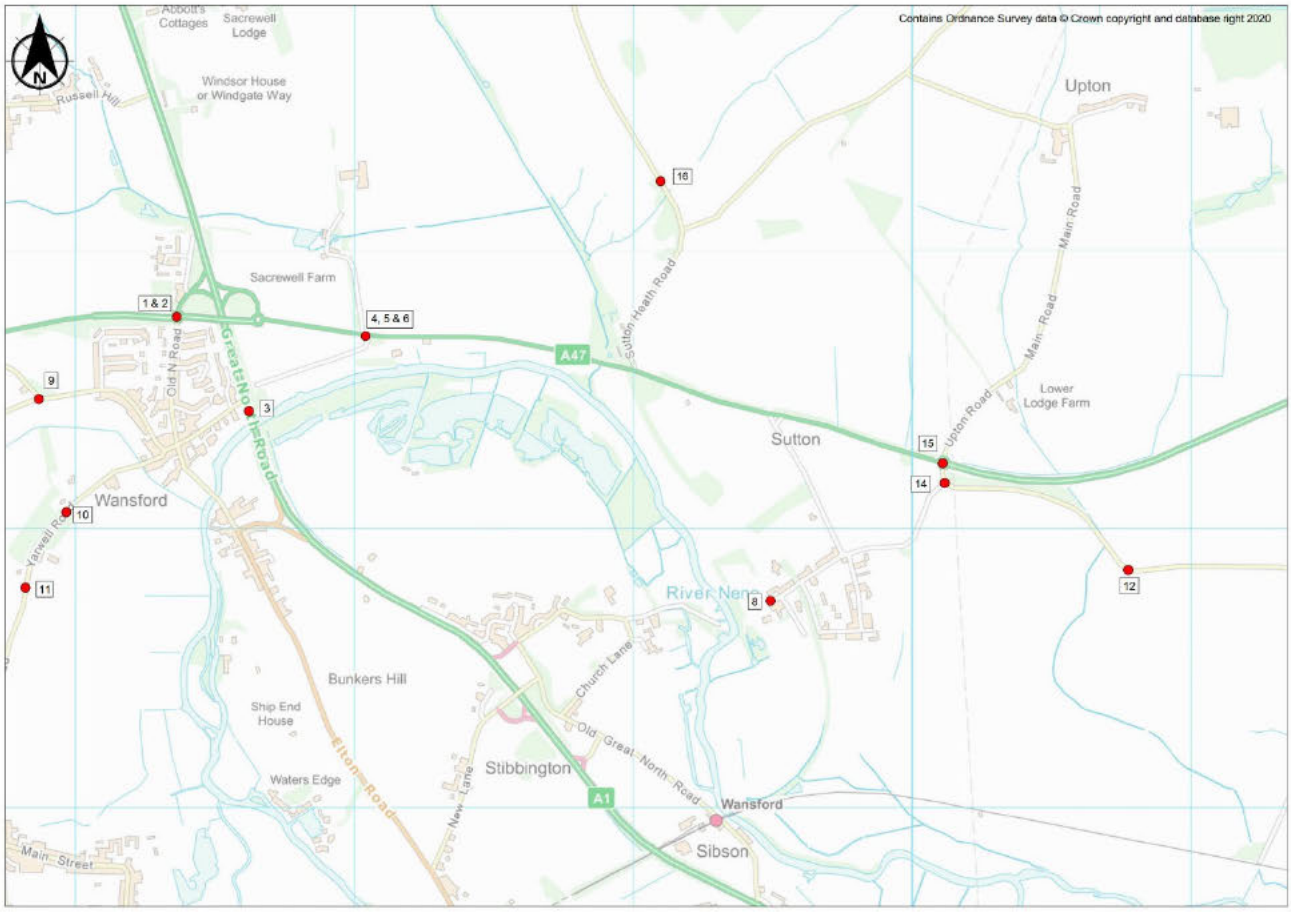
5.1.28 Figure 5-6 shows that there are a number of established advisory on-road (green lines with sold boundary) and off-road cycle routes (green lines with dashed boundary) within the study area, including at the Nene Way Roundabout, at The Drift and the southern section of Wansford High Street. It shows that the A47 / Upton Road / Peterborough Road roundabout is used as a crossing point for cyclists for these promoted routes.

5.1.29 The figure also highlights where PRoW bridleways are used between Sutton and Ailsworth and a section of PROW bridleway Thornhaugh 8 between Sutton Heath Road and Sacrewell Farm and that there is no current east-west connection adjacent to the A47 and a lack of connectivity between Sutton and Wansford.

Pedestrian, Cycling and Horse-riding movements

5.1.30 To provide an indication of current usage of the PRoW and permissive routes and for key locations where WCH activity could occur on the local highways, WCH surveys were undertaken at 12 locations in the vicinity of the Scheme, as shown in Figure 5-7 and listed below.

Figure 5-7: Survey locations



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- Site 1 – Subway at A47 Wansford West Roundabout.
- Site 2 – A47 Wansford West Roundabout – Cycle movements only.
- Site 3 – Peterborough Road at end of permissive route Wansford Nene Way (ID 574).
- Sites 4, 5 and 6 – A47 Sacrewell Farm access and access along Nene Way permissive footpath opposite.
- Site 8 – Southern end of footpath exiting onto Nene Way – All Movements.
- Site 9 – Old Leicester Road and King's Cliffe Road – north and south along PRoW – All movements.
- Site 10 – Southern end of PRoW exiting onto Yarwell Road – All movements.
- Site 11 – Split of PRoW on west side of Yarwell Road, in Old Sulehay Forest – All movements..

- Site 12 – Sutton Crossways at Nene Way – All movements east and west into and out of Sutton Crossways PRoW.
- Site 14 – Old Peterborough Road at junction with Nene Way – All movements in all directions at junction.
- Site 15 – Old Peterborough Road at junction with A47 – All movements in all directions.
- Site 16 – Sutton Heath Road – bridleway (Provisional Item) record all movements on Sutton Heath Road (north and south) and on / off bridleway (east and west).

5.1.31 Sites 4,5,6 were surveyed as one combined site and not as three separate locations.

5.1.32 The surveys were carried out between 7am and 7pm for seven consecutive days between Saturday 26 May and Friday 1 June 2018 using CCTV video cameras. In the main, the weather during the surveys was dry and bright. As such, we would expect that the usage information collected is representative of typical weekday and weekend day WCH activity in the vicinity of the Scheme.

5.1.33 There was a wide variance in the number of pedestrians, cyclists and horse riders at each of the survey sites. Over 3,000 user movements were observed over the 7-day survey period.

5.1.34 No movements were observed at any time throughout the survey from for users classed as 'Pedestrian & Buggy' or 'Wheelchair'.

5.1.35 Table 5-4 summaries the survey results; and classifies and groups the sites by number of movements / users per week.

Table 5-4: Survey results summary

No. of Sites	Survey Sites	Max Daily Movements	WCH Weekly Total	WCH Use
6	1,2,3,9,10,12	0-25	0-99	Low
3	8,14,15	26-125	100-499	Medium
3	4,11,16	126+	500+	High

5.1.36 The 3 busiest sites (4 [5,6], 11, 16) all vary in the type of pedestrian, cycle and horse-riding movement. Movements at Site 4 (amalgamated with Site 5 and 6) are split between pedestrian and cycle movements. The cycle movements account for 25% of the total use and pedestrian movements account for 75% of the users at this site.

5.1.37 There has been an identified anomaly between movements at Site 4 and Site 2 A47 Wansford West Roundabout. There were approximately 100 cyclists recorded in the east-west direction at Site 4 on Sunday 27 May, yet only 3 cyclists recorded east-west at Site 2. This may be attributable to cyclists using the A6118 into Wansford, however this is unsubstantiated.

5.1.38 Movements at Site 11 are predominantly pedestrian movements from Wansford Road into Sulehay Forest. The PRoW is heavily used. Pedestrian movements on the PRoW account for 94% of all movements at this site.

5.1.39 Movements at Site 16 are predominantly cycle movements on the existing road network. The PRoW is rarely used. Cycling movements on the road network account for 95% of all WCH movements at this site.

5.1.40 In total, fewer than 30 horse rider movements were observed at all sites during the survey period, However the surveys results indicate that Site 12 is a common destination for horse ridings (25 movements recorded in the 7-day period) despite being classed as a “Low” use site in Table 5-4.

6 ASSESSMENT METHODOLOGY

6.1 Introduction

6.1.1 This section of the Transport Assessment Report provides information on the A47 Wansford modelling assessment. The framework of the A47 Wansford modelling assessment has been developed to enable the comparative analysis of the existing single carriageway section and the proposed dual carriage way improvements against the Scheme objectives.

6.1.2 The modelling assessment comprises of a strategic model which covers Wansford, the A1/A47 junction and the surrounding area. The strategic modelling assessment is used as the basis to derive forecasted traffic impacts of the Scheme's performance across the wider area. The model utilised for the assessment of the Scheme is called the Wansford Traffic Model (WTM). The model, utilised for PCF stage 3, has been developed in line with the DfT Transport Appraisal Guidance (TAG).

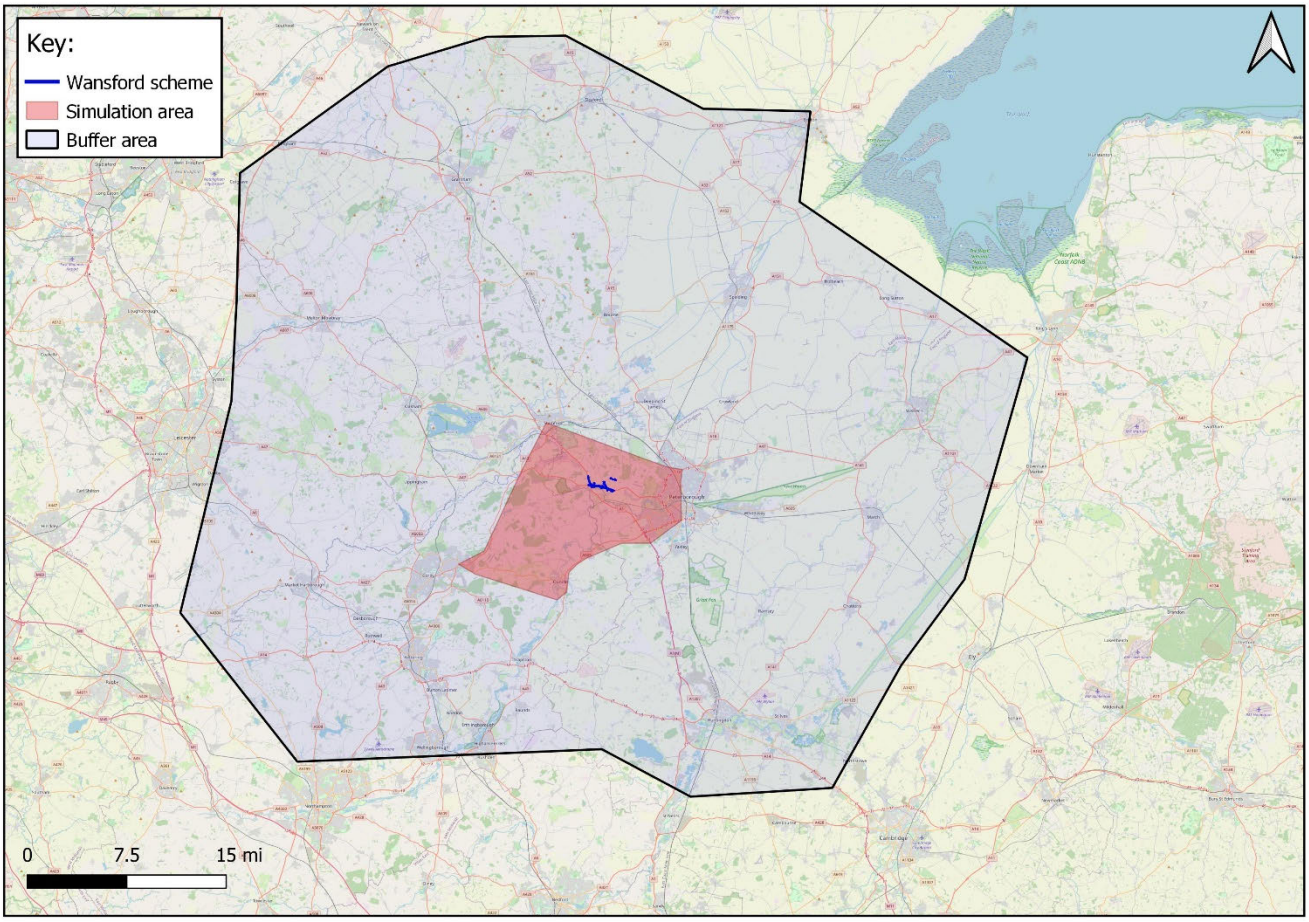
6.1.3 A local VISSIM model[2], including the village of Wansford, has been utilised to assess the Scheme's impact in the forecast year scenarios on the local road network. Together these models are used to evaluate current and future conditions along the A47 single carriageway section and the immediate surrounding road network. The strategic model has been used to provide the initial assessment of any strategic implications of the Scheme, as well as the basis for forecasting future year traffic demand matrices. The purpose of the local VISSIM model is to examine the impact of the Scheme at the Wansford West roundabout as well as the local roads in Wansford village.

6.2 Overview of the A47 Strategic Modelling

6.2.1 Figure 6-1 shows the extent of the WTM study area used for the assessment of the Scheme. The WTM covers the strategic traffic movements across the A47 corridor between Wansford and Peterborough. Within the Scheme's vicinity, the model contains a detailed zoning and network resolution and has been calibrated to a high level of accuracy.

[2] VISSIM is a micro-simulation modelling software developed by the PTV Group, Germany

Figure 6-1: Extent of the 2015 WTM study area



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6.3 The Base Year Model

6.3.1 The WTM's strategic highway component adopts the SATURN[3] software package which calculates converged assignment impacts of the Scheme. This is supplemented by a Variable Demand Model (VDM) in DIADEM[4] software package. For the VDM, a skeleton network covering the whole of the UK was included to allow the use of the DIADEM parameters already developed for the SERTM regional model.

6.3.2 The WTM has been calibrated to represent a 2015 base year. As discussed in Section 5, the model utilises the data collected as part of the Scheme assessment as well as network data from the PTM and mobile phone demand data from SERTM. Key features of the WTM include:

[3] Simulation and Assignment of Traffic in Urban Road Network (SATURN): [redacted]
[4] Dynamic Integrated Assignment and Demand Modelling is a (DIADEM): https://www.gov.uk/government/publications/diadem-software

- the model contains AM and PM peak hours (07:30 to 08:30 and 16:30 to 17:30) and an IP hour (13:00 to 14:00) time segments.
- the highway trip purposes represented in the model comprise of 5 user groups: car employer business, car commute, car other, light goods vehicles (LGVs) and heavy goods vehicles (HGVs).

6.3.3 Mobile phone data, from SERTM, is the primary source used for deriving the distribution of trips in the base year prior demand. Traffic count data is used to calibrate the model based on a Matrix Estimation (ME) procedure. The SATURN ME process adjusts the prior trip matrix based on the strategic traffic assignment and the observed count data. This process utilises traffic data collected across the WTMs study area, referred to in Section 5 of this assessment. A variety of checks were undertaken to ascertain that ME has not altered the integrity and profile of the trip matrix. Subsequent to the ME process, the model has been validated against independent data sets based on the following criteria:

- Flows across screenlines
- Individual link flows
- Journey time comparison
- Model convergence

6.3.4 The base model was developed in accordance with the DfT's TAG Unit M3.1: Highway Assignment Modelling (2020). The strategic base year model development process is outlined in Figure 6-2.

6.4 Forecast year scenarios

6.4.1 The base year and forecast years are listed as follows:

- 2015 Base Year
- 2025 Opening Year
- 2040 Design Year (15 years after opening)

6.4.2 In both the future year scenarios, 2025 and 2040, both a Do-Minimum (DM) and a Do-Something (DS) network scenario has been modelled. Hence the comparison of the Do-Minimum and a Do-Something provides the assessment of the Scheme's impacts in a given forecast year.

Figure 6-2: Strategic base year model development process - overview

6.5 Overview of the Operational Modelling

6.5.1 A local area VISSIM[5] micro-simulation model, shown in Figure 6-3, has been constructed to aid the assessment of the Wansford West roundabout as well the local roads in Wansford village. Micro-simulation models include a representation of the time-continuous movement of individual vehicles travelling across a highway network. This individual representation of driver behavior provides a suitable tool to assess the detailed impact of the Scheme.

Figure 6-3: VISSIM base model study area

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6.5.2 The VISSIM model's simulation periods are defined as follows:

- AM model 07:00 – 09:00 (peak hour 07:30 to 08:30)
- PM model 16:00 – 18:00 (peak hour 16:30 to 17:30)

[5] VISSIM is a micro-simulation modelling software developed by the PTV Group, Germany :

6.5.3 The simulation period is two hours which comprises of a 30-minute 'warm-up' period to populate the network, followed by a modelled peak hour where evaluation results are extracted, followed by a 30-minute 'cool-down' period where traffic can complete their journeys. The definitions of the VISSIM operational model time periods differ from the strategic model (See Section 6.3), as the micro-simulation model considers individual vehicle movements. Thus 'warm-up' and 'cool-down' periods are included to allow for queues to build up at the beginning of the peak hour and for all vehicles to finish their journey at the end of the peak hour.

6.5.4 The traffic demand used in the VISSIM model has been derived from the wider area WTM via an interface which considers the local observed 2019 traffic count data. To assess the model's robustness and to ensure it provides a suitable platform for evaluating the Scheme's forecast year impacts, the model was validated to represent the 2019 traffic conditions. As the VISSIM models base year represents 2019 it includes the impact of the 20mph speed limit introduced in 2018 across all roads leading into the center of Wansford village.

6.5.5 The VISSIM base year model achieved the DfT required validation criteria and is therefore considered fit for undertaking operational modelling.

6.6 Use of traffic modelling to support the transport assessment

The Strategic Model

6.6.1 In order to complete a fully TAG compliant assessment of the Scheme, the WTM was developed and calibrated based on up to date survey data. The results of the calibration indicated that the TAG criteria where achieved for link flow calibration and validation. In addition, TAG criteria were also achieved for the journey time validation assessment.

6.6.2 Overall, it is considered that the Wansford base year model demonstrates a good representation of traffic behavior in the Scheme study area as well as the surrounding wider area. Therefore, the model forms a robust basis for the future year forecast assessment of the Scheme.

6.6.3 The forecasting approach involves creating initial reference case travel demand forecasts which reflect changes in car ownership, population, employment and other demographic and economic factors. However, traffic growth resulting from other sources, such as changes in generalised costs due to traffic conditions, are not included in the reference case forecasts. These impacts are evaluated through the VDM.

6.6.4 The VDM calculates the increment in demand applied to the reference case forecasts generated by changes in road network congestion. To calculate this increment, the VDM alternates between demand matrix calculations and highway assignment model runs to achieve an appropriate equilibrium between demand

and supply[6].

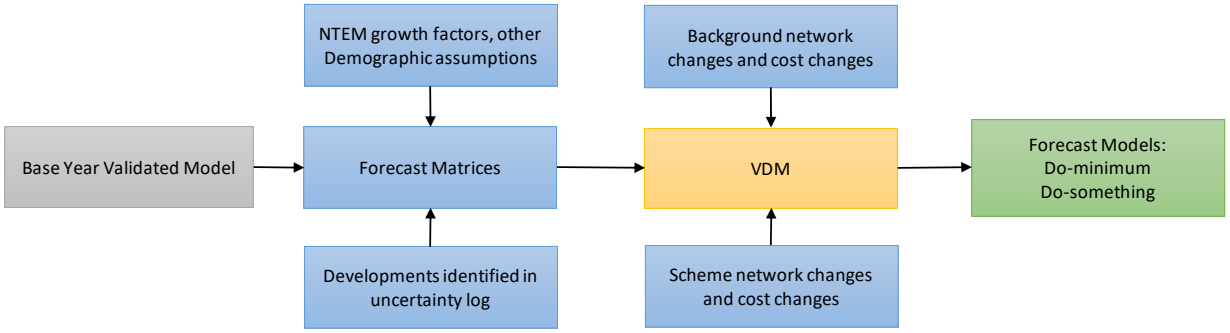
6.6.5 In this iterative process, the VDM calculates the growth in traffic demand across the UK, between origin and destination pairs. Based on the origin-destination demand and the available highway network supply capacity, the SATURN assignment model's algorithm calculates the equilibrium traffic flows on individual road links. The underlying principle of this equilibrium, or steady state, is outlined in DfTs WebTAG[7] Unit M3.1 guidance:

6.6.6 Traffic arranges itself on networks such that the cost of travel on all routes used between each OD (Origin-Destination) pair is equal to the minimum cost of travel and all unused routes have equal or greater cost.

6.6.7 Based on this approach VDM is applied to derive the demand impacts of both the without-Scheme scenario (Do-Minimum) as well as the with-Scheme scenario (Do-Something).

6.6.8 The overall forecasting approach is summarised in the flowchart in Figure 6-4.

Figure 6-4: Forecasting approach



Traffic Forecast Development

6.6.9 The traffic forecasts are dependent on household and employment growth, which were derived from both local and national growth forecasts. The local growth forecasts consider the local authority growth projections and the national growth forecasts take wider anticipated growth into account.

6.6.10 The wider area national growth in car trips is derived from the DfT National Trip End Model (NTEM 7.2). This provides demographic projections in employment and population throughout the UK. The change in freight traffic (light and heavy

[6] DfT WebTAG Unit M1 Section 4.2 : https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/427118/webtag-tag-unit-m1-1-principles-of-modelling-and-forecasting.pdf

[7] DfT WebTAG Unit M3.1 Section 2.7.3 : https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/888363/tag-unit-m3.1-highway-assignment-modelling.pdf

goods vehicles) was derived from the DfT 2018 road traffic forecasts.

6.6.11 The local authority forecasts on development growth are derived from the uncertainty log. The uncertainty log details the local authority development schemes in regions which are both nearby and significant to the model. This includes assumptions on local uncertainty, which is dependent on whether developments or other planned transport schemes close to the Scheme area are proposed. In addition to identifying each source of uncertainty in the local area, the uncertainty log lists the following information for each source:

- The core assumptions – describing the assumptions that have been made for the core scenario
- The likelihood that the scheme or development will go ahead.
- The range of assumptions around each input or parameter and, if possible, information about the distribution

6.6.12 The core scenario represents the most unbiased and realistic set of assumptions. It is intended to provide a sound basis for decision-making given current evidence. It must be robust and evidence-based taking on board various factors and noting uncertainties affecting travel demand in the future. In accordance with TAG guidance, the uncertainty log includes the management of the uncertainties required for formulating the core scenario.

6.6.13 The definition of each classification of likelihood is summarised in Table 6-1. Where a scheme or land use change is considered "near certain" or "more than likely", it will be included in the core scenario.

Table 6-1: Uncertainty log – classification of future inputs

Probability of the Input	Local Authority / Development Scheme	Core Scenario Assumption
Near Certain: The outcome will happen or there is a high probability that it will happen	• Intent announced by the proponent to regulatory agencies • Approved development proposals • Projects under construction	This should form part of the core scenario
More than likely: The outcome is likely to happen but there is some uncertainty	• Submission of planning or consent application imminent • Development application within the consent process • Projects under construction	This could form part of the core scenario
Reasonably Foreseeable: The outcome may happen, but there is significant uncertainty	• Identified within a development plan; • Not directly associated with the transport strategy/scheme, but may occur if the strategy/scheme is implemented • Development conditional upon the transport strategy/scheme proceeding	These should be excluded from the core scenario but may form part of the

Probability of the Input	Local Authority / Development Scheme	Core Scenario Assumption
	• Or, a committed policy goal, subject to tests (e.g. of deliverability) whose outcomes are subject to significant uncertainty	alternative scenarios
Hypothetical: There is considerable uncertainty whether the outcome will ever happen	• Conjecture based upon currently available information • Discussed on a conceptual basis • One of a number of possible inputs in an initial consultation process • Or a policy aspiration	These should be excluded from the core scenario but may form part of the alternative scenarios

6.6.14 The categorisation and schedule for the potential developments included in the uncertainty log for the WTM modelling forecasting were derived from the PTM uncertainty log as agreed from correspondence with Peterborough County Council.

6.6.15 The 'core' scenario traffic growth forecast matrices representing car growth are calculated by spatially allocating development trips from the uncertainty log using trip rates derived from the NTEM 7.2 data. PT growth was fully based on NTEM 7.2 growth factors and LGV and HGV growth was derived using DfT RTF 2018 growth factors. A constraining process is then carried out to control the development growth in accordance with the overall growth forecast from the DfT.

Local Development

6.6.16 Following the TAG guidance, developments with the likelihood of at least 'near certain' or 'more than likely' were included in the forecast estimates. The level of residential, retail and employment developments included within the uncertainty log can be seen in

6.6.17 Figure 6-5 to Figure 6-7

Figure 6-5: DM Residential development locations (households)

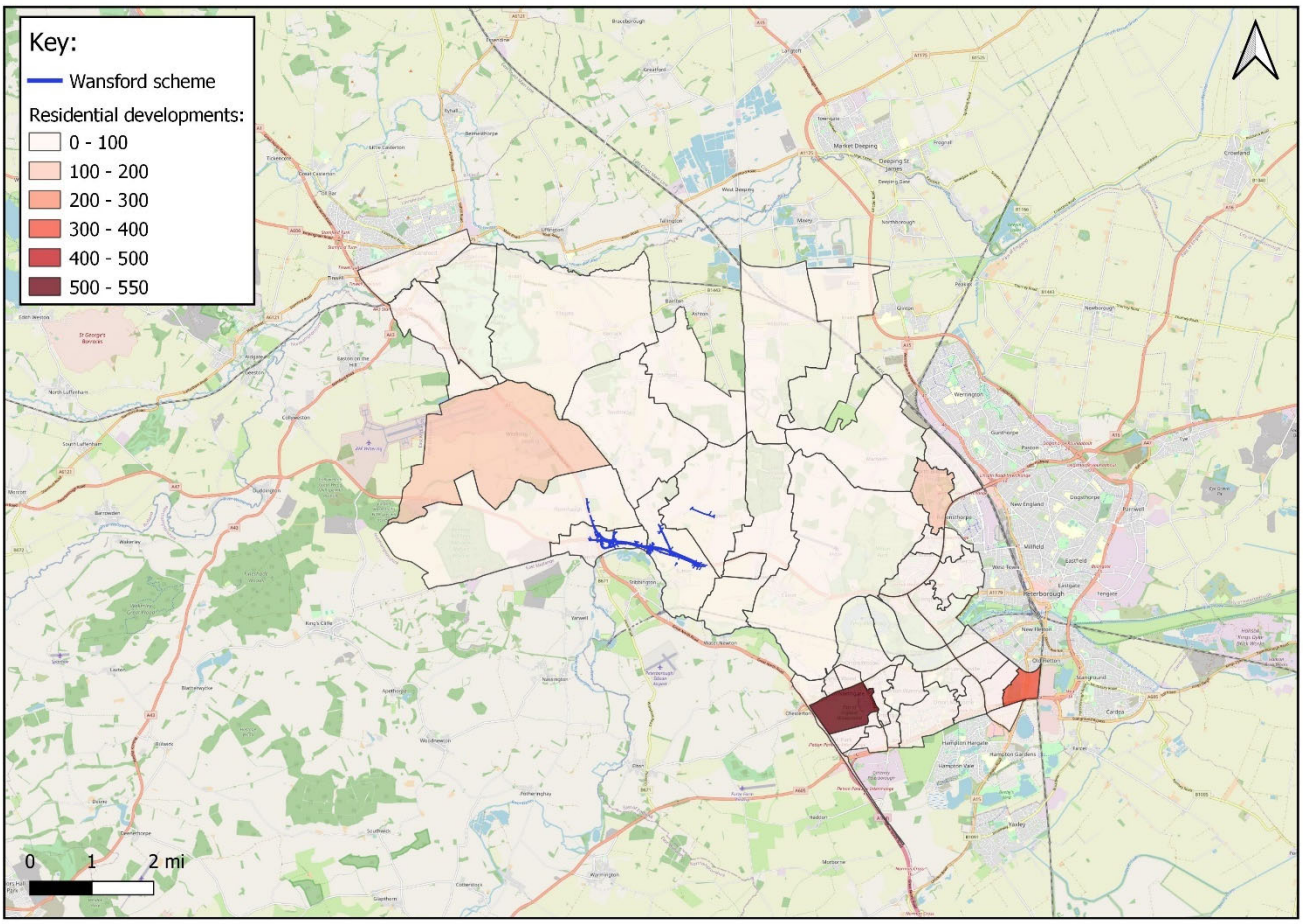


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Figure 6-6: DM Retail development locations (GFA)

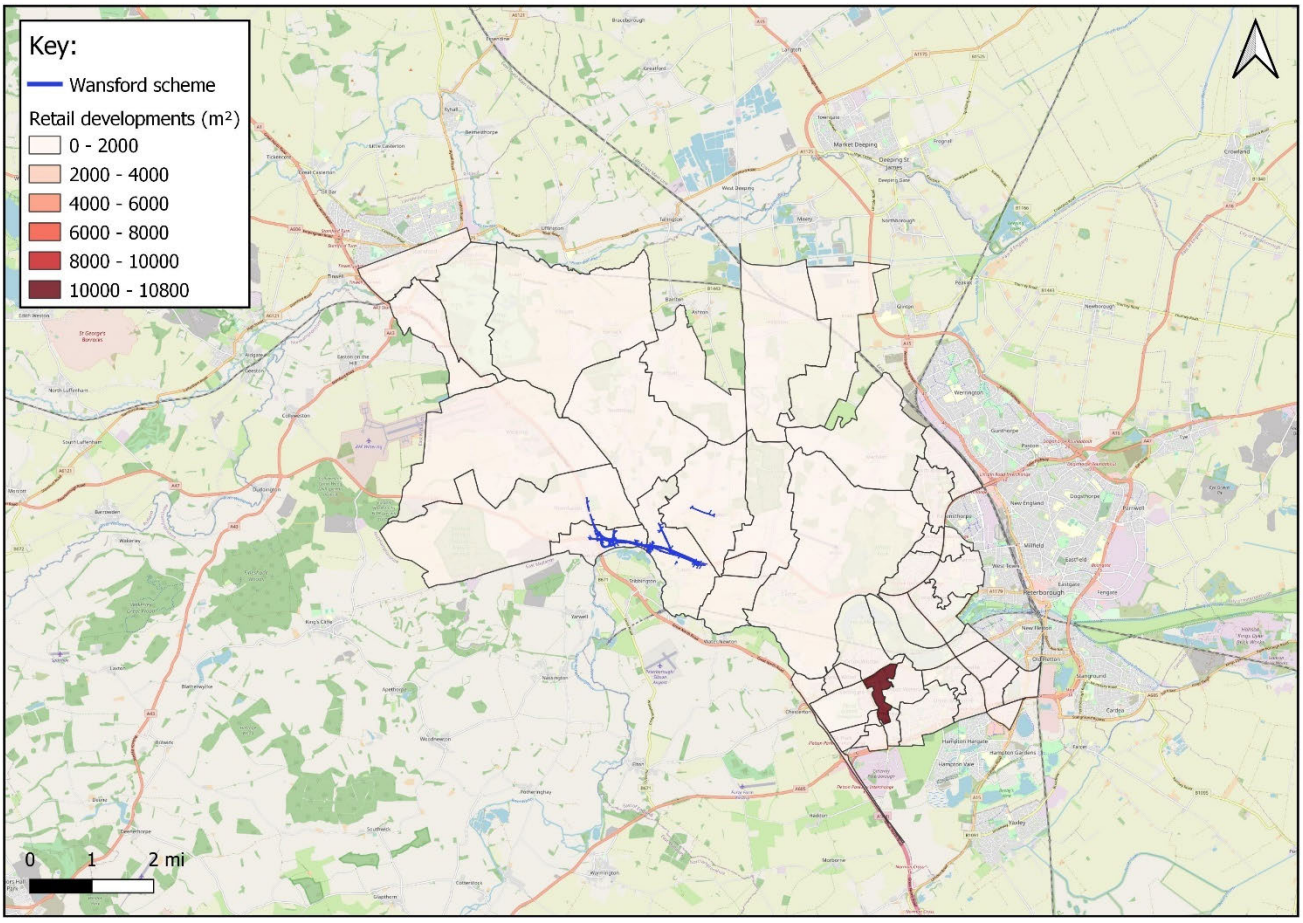

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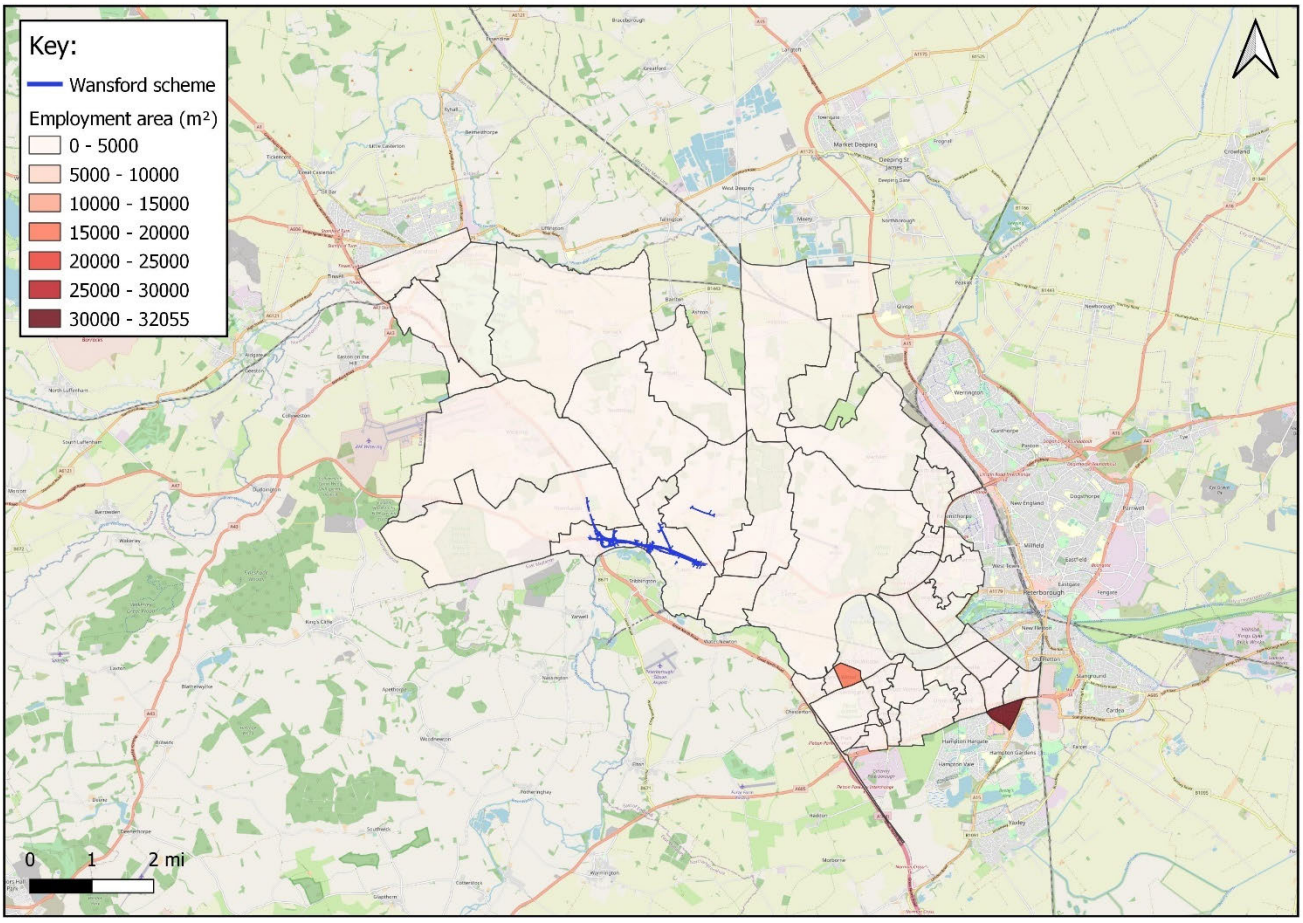
Figure 6-7: DM Employment development locations (GFA)



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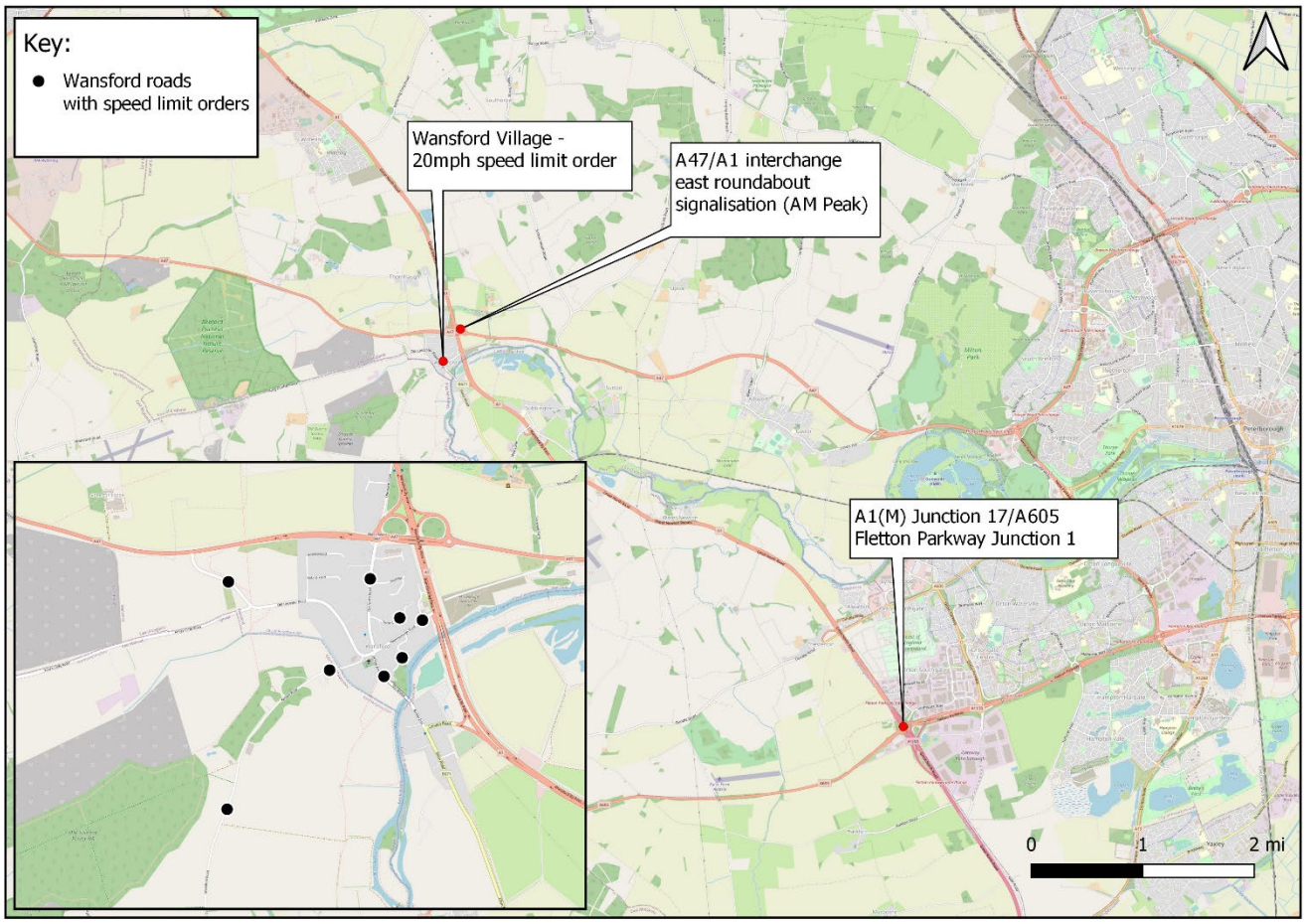
Highway schemes

6.6.18 The uncertainty log contains the significant local authority and Highways England network schemes. Based on TAG guidance, the schemes included in the Do-Minimum scenario have a likelihood of at least 'near certain' or 'more than likely'.

6.6.19 The major highway schemes listed in the uncertainty log as near certain' or 'more than likely' are shown below on Figure 6-8.

Figure 6-8: Do-Minimum network alterations (wider area)



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Forecast Year Networks

6.6.20 The Do-Minimum scenario is defined as the core highway network scenario without the A47 dualling scheme intervention, against which the Scheme is compared. The Scheme included in the Do-Something scenario is described in Section 2 of this report.

7 TRANSPORT IMPACTS

7.1 Introduction

7.1.1 This chapter provides an overview of the current and forecasted future year operation of the road network as well as the impacts of the Scheme. The source of information for the strategic assessment is the Wansford SATURN highway network assignment model. A local VISSIM model provides a platform for the assessment of the Scheme impacts at the Wansford West roundabout and on local roads in Wansford Village.

7.1.2 In the current situation, assessed as part of the base year model, the single carriageway section of the A47 between Wansford and Sutton acts as a bottleneck, resulting in congestion and leading to longer and unreliable journey times.

7.1.3 Traffic forecasts for 2025 and 2040 have been prepared using the modelling approach outlined in Section 6 above. Using these models and assumptions Do-Minimum and Do-Something scenarios have been prepared. The comparison of these two scenarios enables the impacts of the Scheme to be evaluated.

7.1.4 The Do-Minimum scenario represents a without Scheme scenario, it includes all the changes unrelated to the Scheme which are considered more than likely to be in place prior to the respective future year.

7.1.5 The Do-Something scenario includes the Scheme. The local development and transport infrastructure assumptions for both scenarios are detailed in Section 6.5 above.

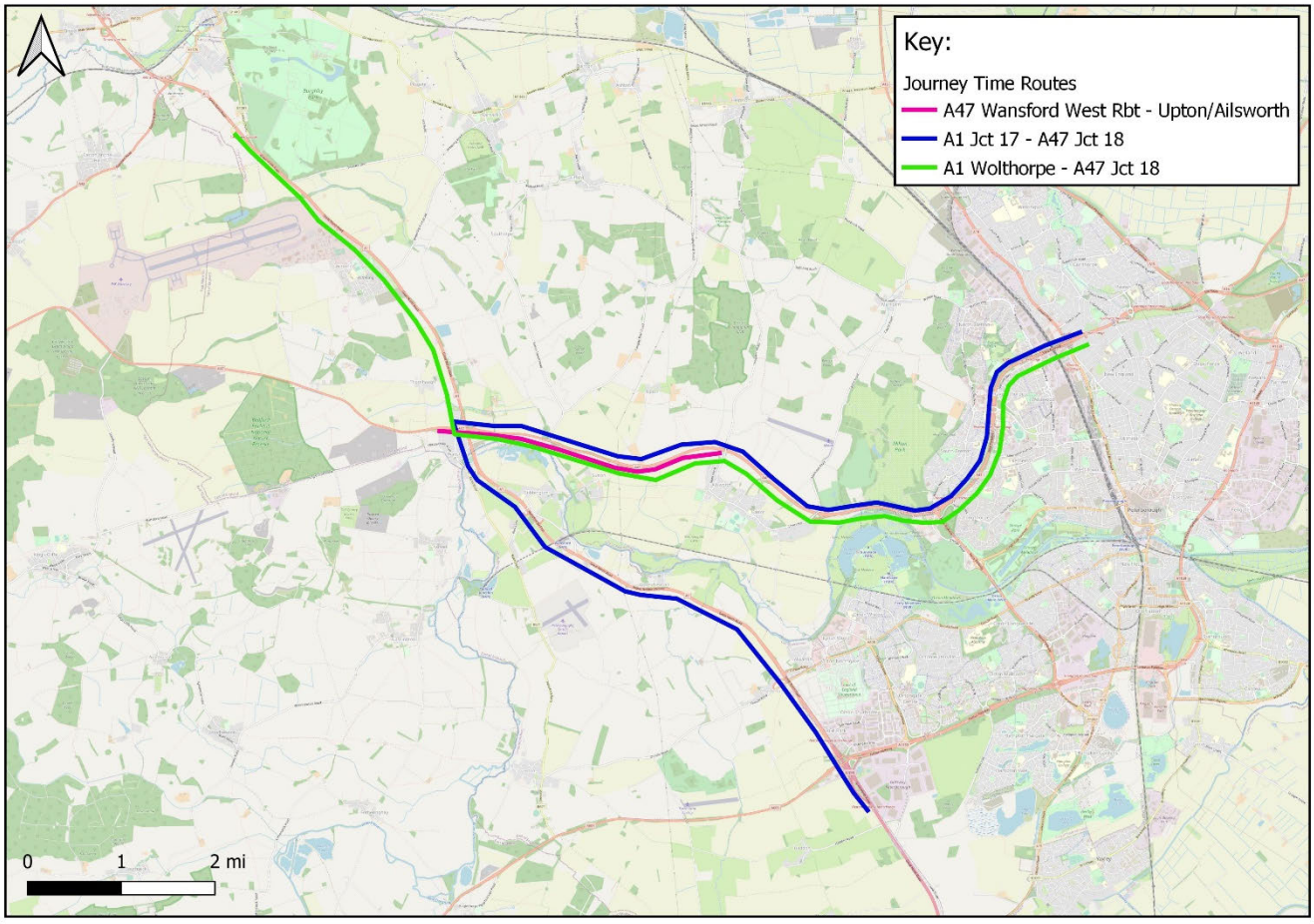
7.1.6 This chapter also provides an overview of the Scheme's impact on road safety, WCHs, public transport and network resilience. The combination of these separate assessments are then summarised with respect to the overall Scheme benefits.

7.2 Key Locations for the Assessment

7.2.1 The key link for the Scheme assessment is the A47 single carriageway section between Wansford and Sutton. Analysis of journey time routes across this section capture the change in congestion related delays across the A47 corridor. Thus, the comparison of Do-Minimum and Do-Something journey times across these sections highlight the positive benefits of the Scheme in terms of relieving congestion. The following journey time routes, shown in Figure 7-1, have been selected for this assessment:

- Wansford West roundabout and Ailsworth
- A47 Junction 18 and A1 Junction 17
- A47 Junction 18 and A1 Wothorpe Junction

Figure 7-1: Journey time routes



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7.2.2 Traffic impacts of the Scheme have also been analysed using the forecast model traffic flows, link delays and capacities for the locations shown in Figure 7-2 and described in Table 7-1. The analysis of these metrics highlights the direct impact of the Scheme with respect to relieving congestion. The following locations are included in this assessment:

- The A47 mainline between A1 and Sacrewell Farm
- The A47 mainline between The Drift and Nene Way Roundabout
- Sutton Heath Road and The Drift
- Wansford East roundabout approach arms
- Nene Way Roundabout (new Sutton Heath Roundabout) approach arms

7.2.3 The impact of the Scheme on the Wansford West roundabout and the local network in Wansford village, also shown in Table 7-1 and Figure 7-2, has been assessed utilising the VISSIM model. VISSIM has been adopted to undertake a detailed assessment of the performance of the A47/A1 western roundabout. As

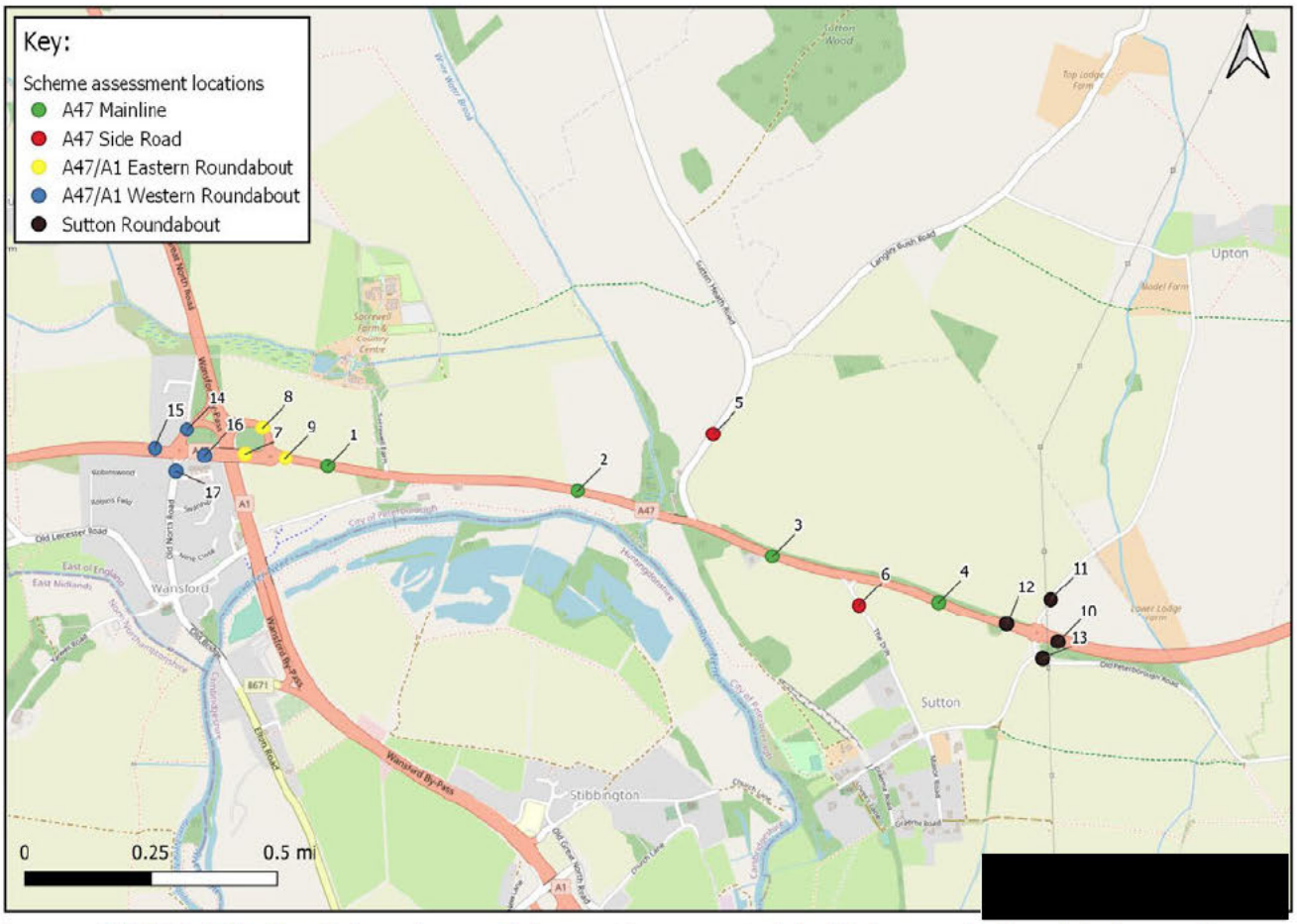
discussed in Section 2.1, there are no scheme improvements on the approach arms of the A47/A1 western roundabout. However, the allocation of two eastbound exit lanes improves the utilisation of the A47 eastbound approach lanes. Therefore, the VISSIM micro-simulation model has been adopted to assess the benefits of the operational improvements at the junction. ARCADY has also been used to support the operational modelling assessment.

.

Table 7-1: Scheme assessment locations

Group	Link	Direction	Location	Description
A47 Mainline	A47 between A1 and Sacrewell farm	EB	1	A47 eastbound between A1 and Sacrewell farm
		WB		A47 westbound between Sacrewell farm and A1
	A47 between Sacrewell farm and Sutton Heath Road	EB	2	A47 eastbound between Sacrewell farm and Sutton Heath Road
		WB		A47 westbound between Sutton Heath Road and Sacrewell farm
	A47 between Sutton Heath Road and The Drift	EB	3	A47 eastbound between Sutton Heath Road and The Drift
		WB		A47 westbound between Sutton Heath Road and The Drift
	A47 between The Drift and Sutton Roundabout	EB	4	A47 eastbound between The Drift and Sutton Roundabout
		WB		A47 westbound between The Drift and Sutton Roundabout
A47 Side Roads	Sutton Heath Road	SB	5	Sutton Heath Road southbound
	The Drift	NB	6	The Drift northbound
A47/A11 Eastern Roundabout	A47 western approach	EB	7	A47/A11 Eastern Roundabout A47 eastbound
	A1 off slip approach	SB	8	A47/A11 Eastern Roundabout A1 off slip southbound
	A47 eastern approach	WB	9	A47/A11 Eastern Roundabout A47 westbound
Nene Way Roundabout	A47 western approach	EB	10	Nene Way Roundabout A47 eastbound
	Northern approach arm	SB	11	Nene Way Roundabout southbound
	A47 eastern approach	WB	12	Nene Way Roundabout A47 westbound
	Old Peterborough Road approach arm	NB	13	Nene Way Roundabout Old Peterborough Road northbound
A47/A11 Western Roundabout	A1 off slip approach	SB	14	A47/A11 Western Roundabout A1 southbound
	A47 western approach	EB	15	A47/A11 Western Roundabout A47 eastbound
	A47 eastern approach	WB	16	A47/A11 Western Roundabout A47 westbound
	Old North Road approach arm	NB	17	A47/A11 Western Roundabout Old North Road northbound

Figure 7-2: Scheme assessment locations



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7.3 AADT flows

7.3.1 The core scenario forecast traffic flows for the Scheme area are shown in Figure 7-3 at annual average daily traffic (AADT) level to the nearest 100 vehicles for each forecast scenario.

7.3.2 The two-way AADT flows on the Scheme section (Site 13) are forecasted to increase from 23,600 in the base scenario (2015) to 26,900 in the opening year (2025) and 30,600 in the design year (2040) in the Do-Minimum scenario. This represents an approximate increase of 14% from 2015 to 2025 Do-Minimum and a 30% increase from 2015 to 2040 Do-Minimum.

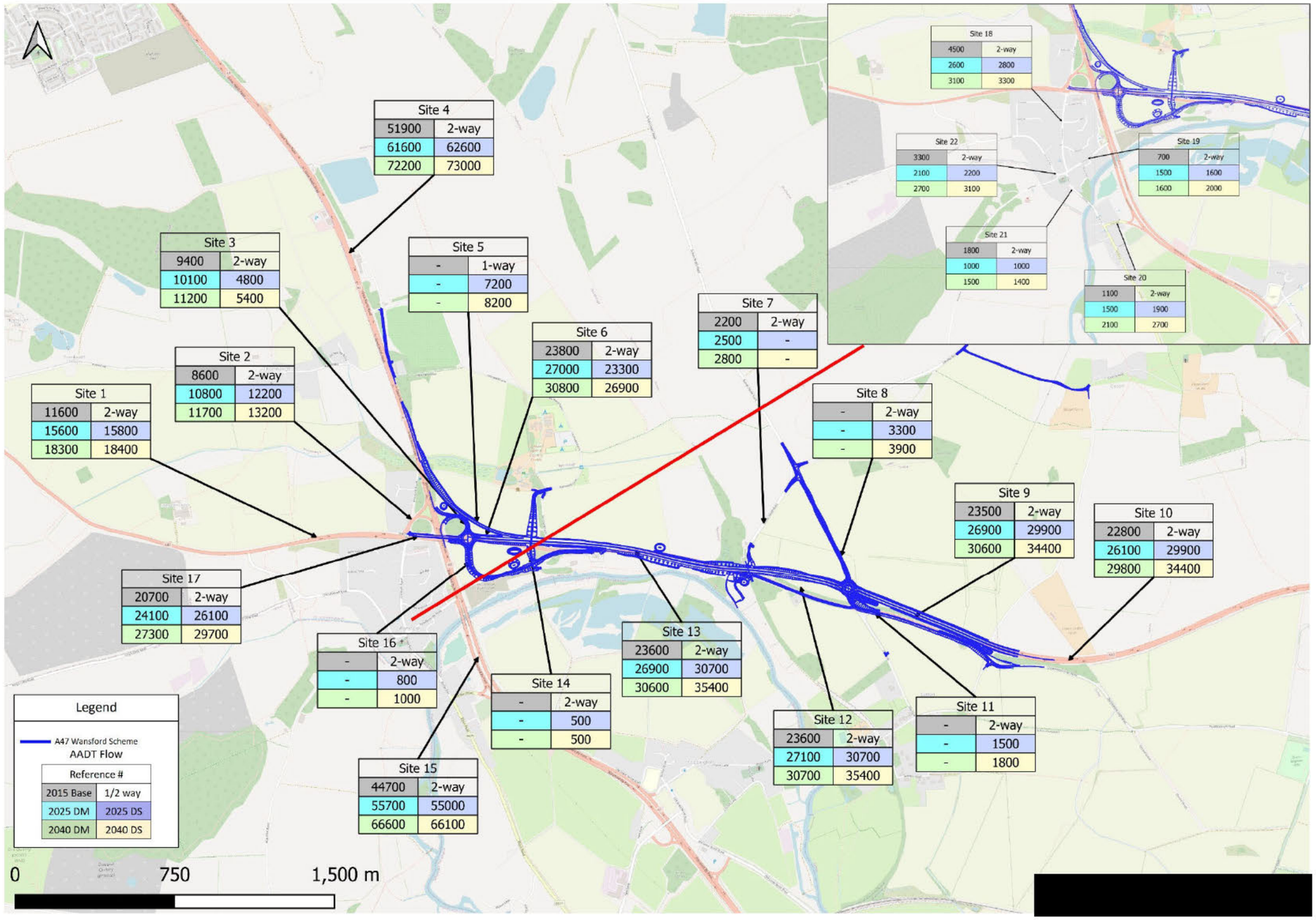
7.3.3 In the Do-Something scenario, with the new dual carriageway in place, the WTM forecasts 30,700 in 2025 and 35,400 in 2040. This represents an approximate increase of 14% in 2025 and 16% in 2040 in the Do-Something scenario compared to the respective Do-Minimum scenario.

7.3.4 On the A1 northern approach arm to the Wansford East roundabout (Site 3) there is a decrease in traffic, of around 5000-6000 AADT, this is due to traffic diverting

on to the Scheme A1 eastbound off-slip (Site 5). Similarly, on the A47 eastern approach arm (Site 6) there is a decrease in traffic, of around 3000-4000 AADT, again this is due to the implementation of the Scheme A1 eastbound off-slip.

7.3.5 Traffic flows on the downgraded existing A47 alignment in the Do-something (Site 11: 2025 DS 1500, 2040 DS 1800) are significantly reduced from their equivalent mainline Do-Minimum flows (Site 9: 2025 DM: 26900, 2040 DM 30600).

Figure 7-3: AADT's in Scheme area - base and core scenario

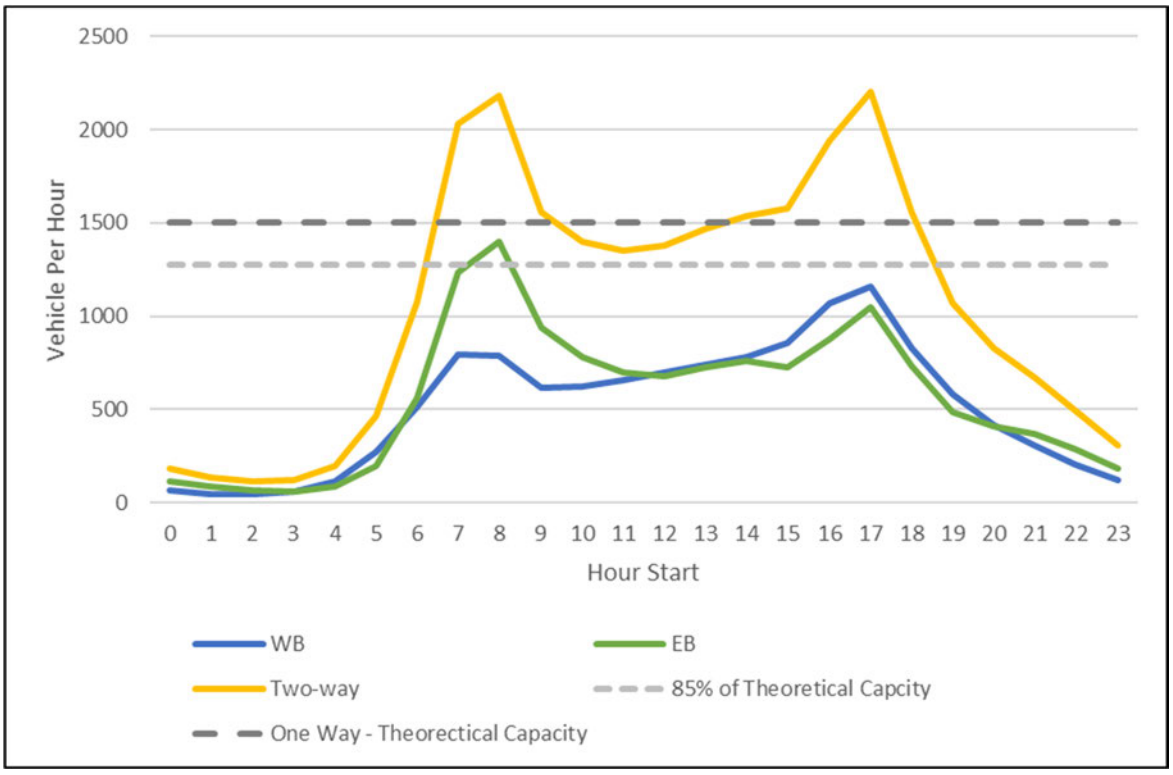


7.4 Overview of 2015 AM and PM peak base year traffic flows and delays

7.4.1 Figure 7-4 shows the base year observed traffic flow profile along the A47 Scheme section based on average weekday 2015 June data from the WebTRIS counter located west of Sutton Heath Road. The traffic flows shown are hourly total vehicles, whereas the theoretical capacity is an approximate value based on the models calibrated capacity assumption.

7.4.2 Analysis of the observed data indicates that the traffic peak movement in the AM period is in the eastbound direction. In the PM period the peak traffic movement is in the westbound direction. However, in the PM peak the variation between eastbound and westbound traffic flow is relatively small when compared to the AM peak variation. Furthermore, the AM peak eastbound traffic flows are greater than the PM peak westbound flows. Based on the theoretical capacity indicative analysis, in the AM peak the A47 observed traffic flow is approximately greater than the 85% threshold.

Figure 7-4: Observed flow profile - WebTRIS 2015 data



7.4.3 The base year observed traffic speeds in the peak directions, based on average weekday 2015 June data from TrafficMaster, are shown in Table 7 2 and Table 7 3. The data shows that in both directions observed speeds are below the 60mph speed limit. On the single carriageway section, between the A47/A1 east roundabout and Upton Road in the AM and PM peaks, speeds drop to around 33-

35 mph, which represents a 42-44% decrease from the speed limit.

Table 7-2: 2015 observed traffic speeds – Scheme section eastbound AM

Section	A47 between Wansford West and East Roundabouts	A47 between Wansford East Roundabout and Upton Road
Road Type	Single/Dual	Single
Road Speed – EB (mph)	11	33

Table 7-3: 2015 observed traffic speeds – Scheme section westbound PM

Section	A47 between Wansford West and East Roundabouts	A47 between Wansford East Roundabout and Upton Road
Road Type	Single	Single
Road Speed – WB (mph)	18	35

7.4.4 The base year modelled traffic flows along the A47 Scheme section as well as the side roads are shown in Table 7-4. The traffic flows shown are peak hour flows, in passenger car units (PCUs) for the AM and PM peaks. The PCU assumes that heavy goods vehicles are equivalent to approximately two car\light vehicles.

7.4.5 The A47 mainline traffic flows, between Sutton Heath Road and The Drift, peak at around 1,650 PCUs. The highest flows in the AM peak are in the eastbound direction and in the PM peak the primary traffic movement is in the westbound direction. However, along the A47 mainline the highest AM peak traffic flows are greater than the PM peak by around approximately 500-700PCUs. Approximately 100PCUs travel along the A47 side road Sutton Heath Road in both the AM and PM peak periods.

7.4.6 At the Wansford East roundabout, peak hour traffic flows of around 1,150-1,200 on the A47 western approach and eastern approach arms are recorded in the AM and PM peaks respectively. At Nene Way Roundabout the largest traffic flows are on the A47 western approach arm in the AM peak (1650 PCUs).

Table 7-4: 2015 Base year traffic flows

Link	Peak Hour Flow (PCUs)	
	AM Peak	PM Peak
A47 eastbound between A1 and Sacrewell farm	1,631	1,014
A47 westbound between Sacrewell farm and A1	917	1,203
A47 eastbound between Sacrewell farm and Sutton Heath Road	1,620	1,011
A47 westbound between Sutton Heath Road and Sacrewell farm	925	1,191
A47 eastbound between Sutton Heath Road and The Drift	1,664	943
A47 westbound between Sutton Heath Road and The Drift	1,004	1,240
A47 eastbound between The Drift and Sutton Roundabout	1,650	933
A47 westbound between The Drift and Sutton Roundabout	999	1,236
Sutton Heath Road southbound	102	91
The Drift northbound	4	5
A47/A11 Eastern Roundabout A47 eastbound	1,166	835
A47/A11 Eastern Roundabout A1 off slip southbound	805	528
A47/A11 Eastern Roundabout A47 westbound	917	1,203
Nene Way Roundabout A47 eastbound	1,650	933
Nene Way Roundabout southbound	75	14
Nene Way Roundabout A47 westbound	907	1,216
Nene Way Roundabout Old Peterborough Road northbound	100	43

7.4.7 The base year modelled traffic delays along the A47 Scheme section and access roads are shown in Table 7-5. Volume over capacity ratios (V/C %) are also shown in this table. The percentage ratio of (volume of traffic) flow to capacity, is an indicator of the likely performance of a road link. To give context to the results, V/C ratios equal to or greater than the 85% threshold have been highlighted. In general terms, traffic delays can be classified as either 'over capacity' queuing delays or transient 'under capacity' delays. Thus, traffic movements which are close to (>85%), or above (100%), their capacity will generate additional queuing delay. Transient delays are also generated when the network is less congested. These transient delays can result from the geometry of the network, the type of junction or even random fluctuations in vehicle arrivals. SATURN therefore calculates the delay for each movement in the network dependent on the traffic flow, the type of road and the type of intersecting junction, hence delays are not calculated as a direct linear relationship with V/C ratios.

7.4.8 The A47 Scheme section is operating just below its full capacity, but over the 85% threshold, during the AM peak in the eastbound direction (96% - 99%). On average vehicles experience around 0.7 mins of delay due to the traffic congestion along the A47 single carriageway mainline link between Sutton Heath Road and The Drift. Sutton Heath Road is over capacity in the AM peak base year model with a V/C greater than 100%. Vehicles also experience delays on the A1

off slip approach to the Wansford East roundabout of around 0.3 mins (91% V/C) in the AM peak.

7.4.9 In general, in the PM the A47 is operating under the threshold of 85% V/C ratio with reduced levels of delay compared to the AM peak.

Table 7-5: 2015 Base year traffic delay and V/C results

Link	Volume Over Capcity Ratio		Delay (Min)	
	AM Peak	PM Peak	AM Peak	PM Peak
A47 eastbound between A1 and Sacrewell farm	97%	60%	0.4	0.0
A47 westbound between Sacrewell farm and A1	55%	72%	0.1	0.1
A47 eastbound between Sacrewell farm and Sutton Heath Road	96%	60%	0.6	0.1
A47 westbound between Sutton Heath Road and Sacrewell farm	55%	71%	0.1	0.1
A47 eastbound between Sutton Heath Road and The Drift	99%	56%	0.7	0.1
A47 westbound between Sutton Heath Road and The Drift	71%	74%	0.3	0.1
A47 eastbound between The Drift and Sutton Roundabout	98%	56%	0.1	0.1
A47 westbound between The Drift and Sutton Roundabout	59%	74%	0.1	0.1
Sutton Heath Road southbound	103%	18%	3.7	0.4
The Drift northbound	1%	2%	0.1	0.1
A47/A11 Eastern Roundabout A47 eastbound	58%	42%	0.1	0.1
A47/A11 Eastern Roundabout A1 off slip southbound	91%	48%	0.3	0.1
A47/A11 Eastern Roundabout A47 westbound	55%	72%	0.1	0.1
Nene Way Roundabout A47 eastbound	98%	56%	0.1	0.1
Nene Way Roundabout southbound	25%	5%	0.1	0.1
Nene Way Roundabout A47 westbound	39%	52%	0.1	0.1
Nene Way Roundabout Old Peterborough Road northbound	9%	5%	0.1	0.1

7.5 Existing traffic conditions – Do Minimum model 2025 & 2040

Do Minimum – Traffic Flows

7.5.1 Table 7-6 shows the forecasted change in traffic flows along the A47 corridor between the base year and 2025, 2040 DM for the AM and PM peak periods.

7.5.2 Overall, there is expected to be an increase in traffic throughout the network across the wider area. This traffic growth is derived from the modelling approach detailed in Section 6.5. In summary, the growth in traffic at an individual link level is calculated by the Wansford SATURN highway assignment model based on the available road capacity and the total network wide traffic demand.

Table 7-6: Forecasted change in flow between base year, 2025 and 2040 DM scenario

Link	Base Year Peak Hour Flow (PCUs)		DM Peak Hour Flow (PCUs)		% Change vs Base	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
2015 Vs 2025						
A47 eastbound between A1 and Sacrewell farm	1,631	1,014	1,483	1,151	-9%	13%
A47 westbound between Sacrewell farm and A1	917	1,203	1,045	1,421	14%	18%
A47 eastbound between Sacrewell farm and Sutton Heath Road	1,620	1,011	1,472	1,151	-9%	14%
A47 westbound between Sutton Heath Road and Sacrewell farm	925	1,191	1,055	1,413	14%	19%
A47 eastbound between Sutton Heath Road and The Drift	1,664	943	1,565	1,075	-6%	14%
A47 westbound between Sutton Heath Road and The Drift	1,004	1,240	1,142	1,482	14%	19%
A47 eastbound between The Drift and Sutton Roundabout	1,650	933	1,560	1,064	-5%	14%
A47 westbound between The Drift and Sutton Roundabout	999	1,236	1,137	1,477	14%	20%
Sutton Heath Road southbound	102	91	148	82	44%	-9%
The Drift northbound	4	5	5	5	11%	7%
A47/A11 Eastern Roundabout A47 eastbound	1,166	835	1,292	1,024	11%	23%
A47/A11 Eastern Roundabout A1 off slip southbound	805	528	597	517	-26%	-2%
A47/A11 Eastern Roundabout A47 westbound	917	1,203	1,045	1,421	14%	18%
Nene Way Roundabout A47 eastbound	1,650	933	1,560	1,064	-5%	14%
Nene Way Roundabout southbound	75	14	82	15	10%	9%
Nene Way Roundabout A47 westbound	907	1,216	1,043	1,455	15%	20%
Nene Way Roundabout Old Peterborough Road northbound	100	43	102	47	2%	10%
2015 Vs 2040						
A47 eastbound between A1 and Sacrewell farm	1,631	1,014	1,506	1,370	-8%	35%
A47 westbound between Sacrewell farm and A1	917	1,203	1,228	1,442	34%	20%
A47 eastbound between Sacrewell farm and Sutton Heath Road	1,620	1,011	1,494	1,375	-8%	36%
A47 westbound between Sutton Heath Road and Sacrewell farm	925	1,191	1,239	1,435	34%	20%
A47 eastbound between Sutton Heath Road and The Drift	1,664	943	1,595	1,272	-4%	35%
A47 westbound between Sutton Heath Road and The Drift	1,004	1,240	1,324	1,519	32%	22%
A47 eastbound between The Drift and Sutton Roundabout	1,650	933	1,592	1,261	-3%	35%
A47 westbound between The Drift and Sutton Roundabout	999	1,236	1,318	1,513	32%	22%
Sutton Heath Road southbound	102	91	148	89	44%	-2%
The Drift northbound	4	5	6	5	29%	21%
A47/A11 Eastern Roundabout A47 eastbound	1,166	835	1,335	1,221	14%	46%
A47/A11 Eastern Roundabout A1 off slip southbound	805	528	591	538	-27%	2%
A47/A11 Eastern Roundabout A47 westbound	917	1,203	1,228	1,442	34%	20%
Nene Way Roundabout A47 eastbound	1,650	933	1,592	1,261	-3%	35%
Nene Way Roundabout southbound	75	14	89	17	19%	18%
Nene Way Roundabout A47 westbound	907	1,216	1,220	1,491	35%	23%
Nene Way Roundabout Old Peterborough Road northbound	100	43	113	54	13%	25%

7.5.3 Along the A47 mainline scheme section traffic flows increase by around 13% to 19% in 2025 and 20% to 36% in 2040. However, in the AM peak in the eastbound direction traffic flows decrease by around -5% to -9% in 2025 and -3% to -8% in 2040. This decrease is the result of traffic growth being constrained by the A47 eastbound approach to the Wansford East roundabout in the AM peak. On the A47 western approach to the A47/A1 eastern roundabout traffic increases by 11% to 23% in 2025 and 14% to 46% in 2040.

Do Minimum – Traffic Delays

7.5.4 Table 7-7 shows the forecasted change in traffic delays and V/C ratios along the A47 corridor between the base year and 2025, 2040 DM for the AM and PM peak periods.

7.5.5 The increase in traffic flows along the A47 western approach to the Wansford East roundabout in the AM peak, in the eastbound direction, corresponds with the increase in delays and V/C ratios shown in Table 4.10. Delays on the A47 western approach, in the AM peak, are forecasted to increase to 1.2 minutes in 2025 (V/C 100%) and 2.9 minutes in 2040 (V/C 106%).

7.5.6 Analysis of the DM V/C results across the A47 mainline indicates that the section is operating over the threshold 85% capacity in 2025 in the AM peak in the eastbound direction and the PM peak in the westbound direction. In the 2040 scenario V/C ratios increase further (with results increasing up to 95% in the AM peak and 90% in the PM peak). However, although the AM peak results show the A47 eastbound is over capacity in the 2025 and 2040 Do-Minimum scenarios the V/C ratios have decreased slightly, compared to the base year, due to traffic growth being constrained by the Wansford East roundabout. Similarly, Sutton Heath Road congestion reduces from the base year scenario, due to the decrease in opposing A47 traffic flow, but is still over capacity in both the 2025 and 2040 AM peak scenarios.

Table 7-7: Forecasted change in V/C and traffic delay between base year, 2025 and 2040 DM scenario

Link	Base Year Peak				DM			
	Volume Over Capacity Ratio		Delay (Min)		Volume Over Capacity Ratio		Delay (Min)	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
2015 Vs 2025								
A47 eastbound between A1 and Sacrewell farm	97%	60%	0.4	0.0	88%	68%	0.1	0.1
A47 westbound between Sacrewell farm and A1	55%	72%	0.1	0.1	70%	85%	0.3	0.1
A47 eastbound between Sacrewell farm and Sutton Heath Road	96%	60%	0.6	0.1	88%	69%	0.3	0.1
A47 westbound between Sutton Heath Road and Sacrewell farm	55%	71%	0.1	0.1	63%	84%	0.1	0.2
A47 eastbound between Sutton Heath Road and The Drift	99%	56%	0.7	0.1	93%	64%	0.3	0.1
A47 westbound between Sutton Heath Road and The Drift	71%	74%	0.3	0.1	68%	88%	0.2	0.2
A47 eastbound between The Drift and Sutton Roundabout	98%	56%	0.1	0.1	93%	63%	0.1	0.1
A47 westbound between The Drift and Sutton Roundabout	59%	74%	0.1	0.1	68%	88%	0.1	0.2
Sutton Heath Road southbound	103%	18%	3.7	0.4	86%	21%	1.6	0.5
The Drift northbound	1%	2%	0.1	0.1	2%	2%	0.1	0.1
A47/A11 Eastern Roundabout A47 eastbound	58%	42%	0.1	0.1	100%	51%	1.2	0.1
A47/A11 Eastern Roundabout A1 off slip southbound	91%	48%	0.3	0.1	93%	51%	0.8	0.1
A47/A11 Eastern Roundabout A47 westbound	55%	72%	0.1	0.1	70%	85%	0.3	0.1
Nene Way Roundabout A47 eastbound	98%	56%	0.1	0.1	93%	63%	0.1	0.1
Nene Way Roundabout southbound	25%	5%	0.1	0.1	27%	5%	0.1	0.1
Nene Way Roundabout A47 westbound	39%	52%	0.1	0.1	45%	62%	0.1	0.1
Nene Way Roundabout Old Peterborough Road northbound	9%	5%	0.1	0.1	10%	6%	0.1	0.1
2015 Vs 2040								
A47 eastbound between A1 and Sacrewell farm	97%	60%	0.4	0.0	84%	82%	0.1	0.1
A47 westbound between Sacrewell farm and A1	55%	72%	0.1	0.1	82%	86%	0.3	0.1
A47 eastbound between Sacrewell farm and Sutton Heath Road	96%	60%	0.6	0.1	89%	82%	0.3	0.2
A47 westbound between Sutton Heath Road and Sacrewell farm	55%	71%	0.1	0.1	74%	85%	0.1	0.2
A47 eastbound between Sutton Heath Road and The Drift	99%	56%	0.7	0.1	95%	76%	0.4	0.1
A47 westbound between Sutton Heath Road and The Drift	71%	74%	0.3	0.1	78%	90%	0.7	0.2
A47 eastbound between The Drift and Sutton Roundabout	98%	56%	0.1	0.1	95%	75%	0.1	0.1
A47 westbound between The Drift and Sutton Roundabout	59%	74%	0.1	0.1	78%	90%	0.1	0.3
Sutton Heath Road southbound	103%	18%	3.7	0.4	101%	31%	2.6	0.6
The Drift northbound	1%	2%	0.1	0.1	1%	2%	0.1	0.1
A47/A11 Eastern Roundabout A47 eastbound	58%	42%	0.1	0.1	106%	61%	2.9	0.1
A47/A11 Eastern Roundabout A1 off slip southbound	91%	48%	0.3	0.1	92%	62%	0.8	0.1
A47/A11 Eastern Roundabout A47 westbound	55%	72%	0.1	0.1	82%	86%	0.3	0.1
Nene Way Roundabout A47 eastbound	98%	56%	0.1	0.1	95%	75%	0.1	0.1
Nene Way Roundabout southbound	25%	5%	0.1	0.1	30%	6%	0.1	0.1

Link	Base Year Peak				DM			
	Volume Over Capacity Ratio		Delay (Min)		Volume Over Capacity Ratio		Delay (Min)	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
Nene Way Roundabout A47 westbound	39%	52%	0.1	0.1	52%	64%	0.1	0.1
Nene Way Roundabout Old Peterborough Road northbound	9%	5%	0.1	0.1	12%	7%	0.1	0.1

7.6 Impact of the Scheme on link flows and delays

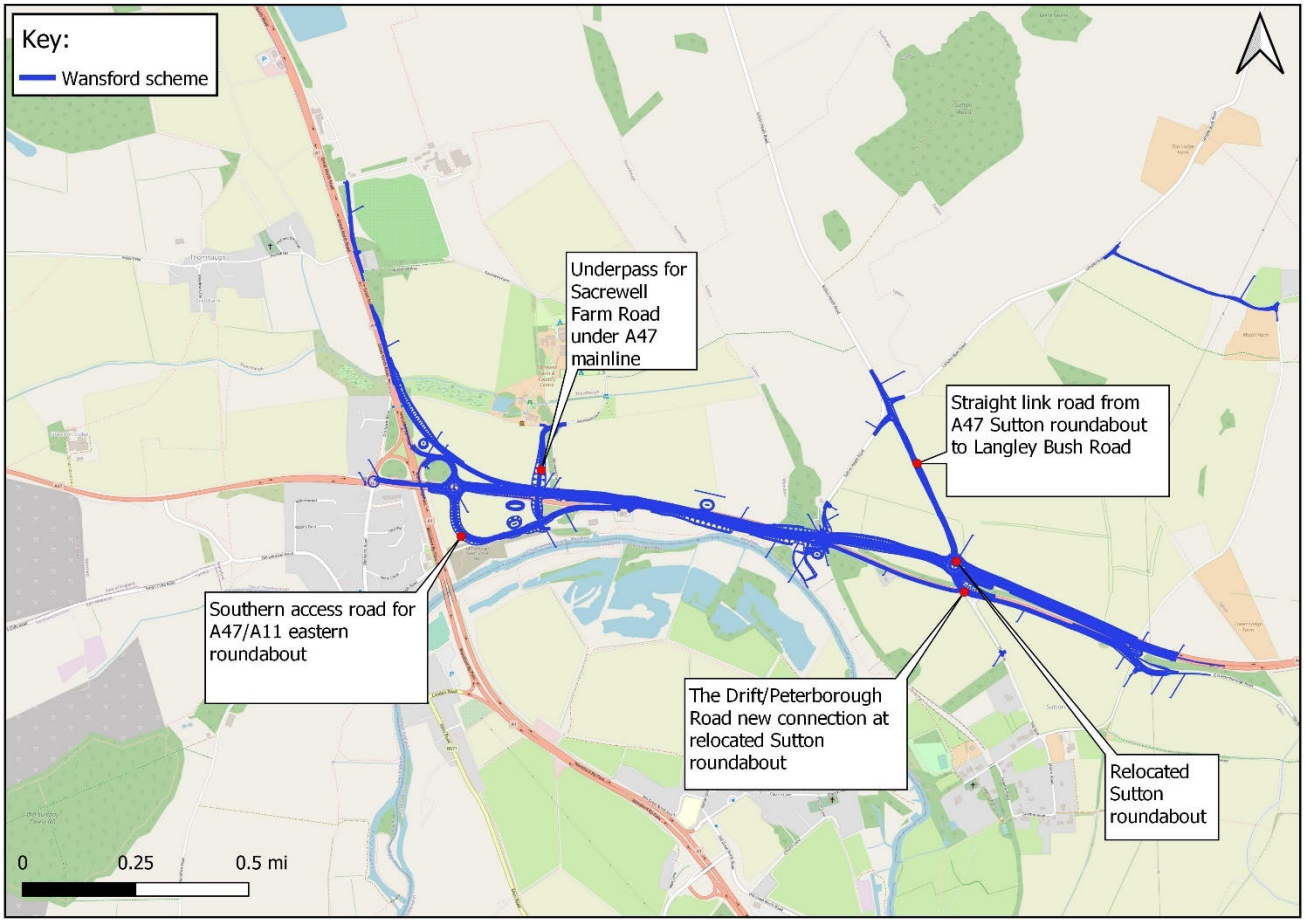
Do Something Scenario – Traffic Flows

7.6.1 Table 7-8 shows the projected change in traffic flows between the DM and DS scenarios for the AM and PM peak periods in 2025 and 2040. The comparison of these two forecast scenarios show the impact of the Scheme on traffic flows. Figure 7-6 and Figure 7-7 show the two-way peak hour traffic flows (PCU) to the nearest 10 for each forecast scenario and the 2015 base year.

7.6.2 In the DS scenario there are several alterations to the operation of the A47 side roads, the prominent alterations are highlighted in Figure 7-5 and listed below:

- The Nene Way Roundabout is relocated to the west of its existing location (becoming the Sutton Heath Roundabout)
- A straight link road will be formed from the Sutton Heath Roundabout, linking to Sutton Heath Road and Langley Bush Road
- The Drift and Old Peterborough Road connect to the A47 via the Sutton Heath Roundabout
- A southern access road is added to the Wansford East roundabout
- Sacrewell Farm Road passes under the A47 mainline and connects on to the A47 via the southern access road to the Wansford East roundabout

Figure 7-5: DS scenario side road alterations



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7.6.3 The comparison of the DM and DS scenarios for the A47 includes the alterations to the road network shown in Figure 7-5.

7.6.4 The Scheme is forecasted to increase the overall traffic flows across the A47, between the scheme A1 eastbound off-slip and the Sutton Heath Roundabout, by up to 41% in 2025 and 46% in 2040 compared to the DM. In particular, large percentage increases in growth can be seen along the A47 eastbound direction in the AM peak, due to the increase in capacity provided by the A47 dual carriageway and the A1 eastbound off-slip. Along the A47 between the Wansford East roundabout and the Scheme A1 eastbound off-slip traffic is forecasted to decrease in the eastbound direction (2025: -25% AM, -33% PM. 2040: -18% AM, -31% PM). This is due to traffic diverting on to the A1 eastbound off-slip in the DS scenario.

7.6.5 Traffic growth is also present on Sutton Heath Road. In the Scheme scenario the network upgrades provide additional capacity on the A47 side roads as they are connected to the new Sutton Heath Roundabout.

Figure 7-6: Traffic flow in Scheme area - base and core scenario - AM peak (PCU)

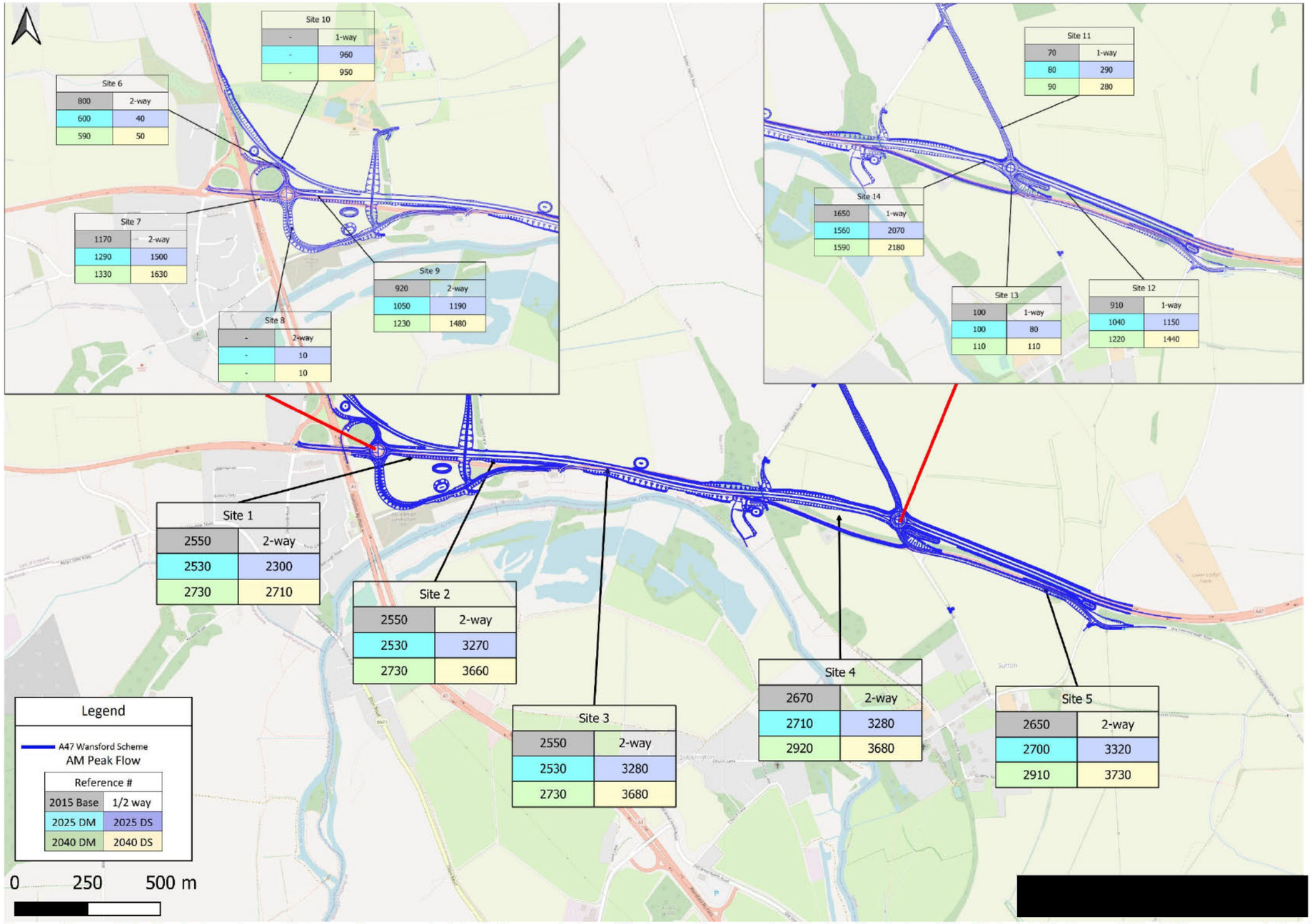

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Figure 7-7: Traffic flow in Scheme area – base and core scenario – PM peak (PCU)

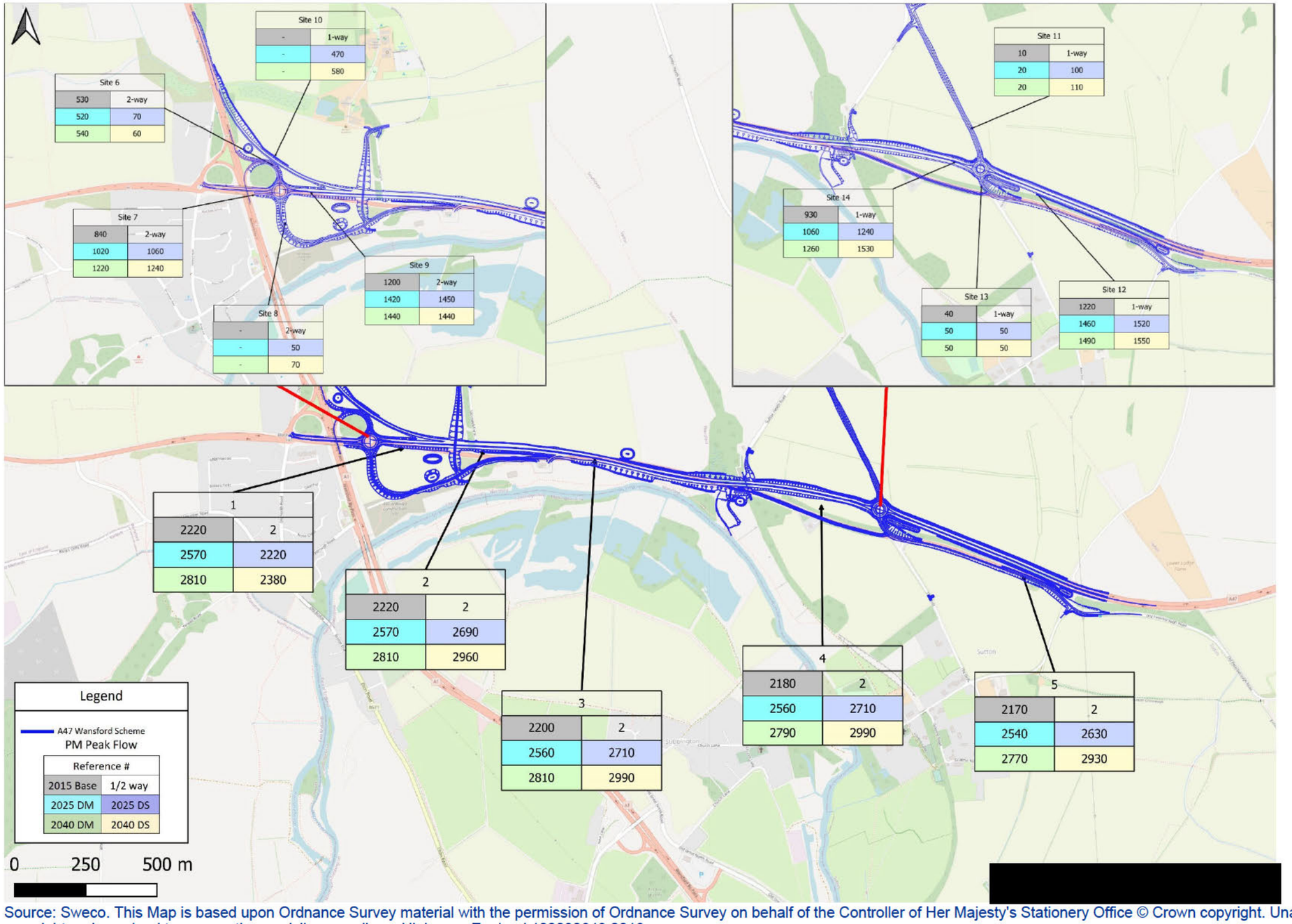

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Table 7-8: Future Year DS and DM traffic flows

Link	DM Peak Hour Flow (PCUs)		DS Peak Hour Flow (PCUs)		% Change vs Base	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
2025 DM Vs DS						
A47 eastbound between A1 and Sacrewell farm	1,483	1,151	1,112	770	-25%	-33%
A47 westbound between Sacrewell farm and A1	1,045	1,421	1,193	1,452	14%	2%
A47 eastbound between Sacrewell farm and Sutton Heath Road	1,483	1,151	2,074	1,238	40%	8%
A47 westbound between Sutton Heath Road and Sacrewell farm	1,045	1,421	1,193	1,452	14%	2%
A47 eastbound between Sutton Heath Road and The Drift	1,472	1,151	2,074	1,238	41%	8%
A47 westbound between Sutton Heath Road and The Drift	1,055	1,413	1,206	1,471	14%	4%
A47 eastbound between The Drift and Sutton Roundabout	1,560	1,064	2,172	1,103	39%	4%
A47 westbound between The Drift and Sutton Roundabout	1,137	1,477	1,152	1,524	1%	3%
A47/A11 Eastern Roundabout A47 eastbound	1,292	1,024	1,501	1,059	16%	3%
A47/A11 Eastern Roundabout A1 off slip southbound	597	517	44	74	-93%	-86%
A47/A11 Eastern Roundabout A47 westbound	1,045	1,421	1,193	1,452	14%	2%
A47/A11 Eastern Roundabout Northbound	0	0	14	54		
Nene Way Roundabout A47 eastbound	1,560	1,064	2,074	1,238	33%	16%
Nene Way Roundabout southbound	82	15	290	101	255%	563%
Nene Way Roundabout A47 westbound	1,043	1,455	1,152	1,524	10%	5%
Nene Way Roundabout northbound	102	47	76	49	-26%	4%
A1 eastbound off-slip (DS only)			962	468		
2040 DM Vs DS						
A47 eastbound between A1 and Sacrewell farm	1,506	1,370	1,229	946	-18%	-31%
A47 westbound between Sacrewell farm and A1	1,228	1,442	1,480	1,436	20%	0%
A47 eastbound between Sacrewell farm and Sutton Heath Road	1,506	1,370	2,183	1,528	45%	12%
A47 westbound between Sutton Heath Road and Sacrewell farm	1,228	1,442	1,480	1,436	20%	0%
A47 eastbound between Sutton Heath Road and The Drift	1,494	1,375	2,183	1,528	46%	11%
A47 westbound between Sutton Heath Road and The Drift	1,239	1,435	1,495	1,467	21%	2%
A47 eastbound between The Drift and Sutton Roundabout	1,592	1,261	2,291	1,382	44%	10%
A47 westbound between The Drift and Sutton Roundabout	1,318	1,513	1,435	1,552	9%	3%
A47/A11 Eastern Roundabout A47 eastbound	1,335	1,221	1,633	1,242	22%	2%
A47/A11 Eastern Roundabout A1 off slip southbound	591	538	49	59	-92%	-89%
A47/A11 Eastern Roundabout A47 westbound	1,228	1,442	1,480	1,436	20%	0%
A47/A11 Eastern Roundabout Northbound	0	0	15	70		
Nene Way Roundabout A47 eastbound	1,592	1,261	2,183	1,528	37%	21%
Nene Way Roundabout southbound	89	17	285	112	220%	573%
Nene Way Roundabout A47 westbound	1,220	1,491	1,435	1,552	18%	4%
Nene Way Roundabout northbound	113	54	110	53	-2%	-1%
A1 eastbound off-slip (DS only)			954	582		

Do Something Scenario - A47 Main Line and Side Road Traffic Delays

7.6.6 Table 7-9 shows the link delay and volume over capacity ratios in the DS and DM 2025 and 2040 scenarios. In the DS scenario delays across the A47 mainline scheme section reduce to around 0.1 minutes. Furthermore, due to the increased capacity of the dual carriageway scheme, V/C ratios decrease to less than the 85% threshold. This is with the exception of the A47 eastbound in the AM peak between Sacrewell farm and the Sutton Heath Roundabout, where in 2040 the DM and DS scenarios are slightly over the 85% threshold (DM: 89% VC, Delay 0.3. DS: 89% VC, Delay 0.1). Overall, the introduction of the Scheme has removed the majority of the overcapacity delays across the A47 corridor.

Table 7-9: Future Year DS and DM delays and V/C ratios – A47 Mainline and Side Roads

Link	DM				DS			
	Volume Over Capacity Ratio		Delay (Min)		Volume Over Capacity Ratio		Delay (Min)	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
2025 DM Vs DS								
A47 eastbound between A1 and Sacrewell farm	84%	82%	0.1	0.1	42%	25%	0.0	0.0
A47 westbound between Sacrewell farm and A1	70%	85%	0.3	0.1	51%	64%	0.1	0.1
A47 eastbound between Sacrewell farm and Sutton Heath Road	88%	68%	0.1	0.1	58%	34%	0.0	0.0
A47 westbound between Sutton Heath Road and Sacrewell farm	70%	85%	0.3	0.1	33%	40%	0.0	0.0
A47 eastbound between Sutton Heath Road and The Drift	88%	69%	0.3	0.1	84%	49%	0.1	0.1
A47 westbound between Sutton Heath Road and The Drift	63%	84%	0.1	0.2	34%	41%	0.0	0.0
A47 eastbound between The Drift and Sutton Roundabout	93%	63%	0.1	0.1	60%	31%	0.0	0.0
A47 westbound between The Drift and Sutton Roundabout	68%	88%	0.1	0.2	49%	62%	0.1	0.1
Sutton Heath Road southbound	86%	21%	1.6	0.5	83%	11%	0.6	0.1
The Drift northbound	2%	2%	0.1	0.1	9%	8%	0.1	0.1
2040 DM Vs DS								
A47 eastbound between A1 and Sacrewell farm	84%	82%	0.1	0.1	46%	31%	0.0	0.0
A47 westbound between Sacrewell farm and A1	82%	86%	0.3	0.1	64%	62%	0.1	0.1
A47 eastbound between Sacrewell farm and Sutton Heath Road	84%	82%	0.1	0.1	61%	42%	0.0	0.0
A47 westbound between Sutton Heath Road and Sacrewell farm	82%	86%	0.3	0.1	41%	40%	0.0	0.0
A47 eastbound between Sutton Heath Road and The Drift	89%	82%	0.3	0.2	89%	62%	0.1	0.1
A47 westbound between Sutton Heath Road and The Drift	74%	85%	0.1	0.2	42%	41%	0.0	0.0
A47 eastbound between The Drift and Sutton Roundabout	95%	75%	0.1	0.1	64%	38%	0.0	0.0
A47 westbound between The Drift and Sutton Roundabout	78%	90%	0.1	0.3	61%	64%	0.1	0.1

Link	DM				DS			
	Volume Over Capacity Ratio		Delay (Min)		Volume Over Capacity Ratio		Delay (Min)	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
Sutton Heath Road southbound	101%	31%	2.6	0.6	100%	15%	1.4	0.1
The Drift northbound	1%	2%	0.1	0.1	17%	8%	0.1	0.1

Do Something Scenario - Sutton Heath Roundabout Traffic Delays

7.6.7 Table 7-10 shows the link delay and volume over capacity ratios in the 2015 base year as well as the DM and DS 2025 and 2040 scenarios on the approach arms to the existing Nene Way roundabout (DM) and the scheme Sutton Heath roundabout (DS).

Table 7-10: Future Year DS and DM delays and V/C ratios – Sutton Heath Roundabout

Link	BY				DM				DS [1]			
	Volume Over Capacity Ratio		Delay (Min)		Volume Over Capacity Ratio		Delay (Min)		Volume Over Capacity Ratio		Delay (Min)	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
BY 2015, 2025 DM Vs DS												
A47 eastbound	98%	56%	0.1	0.1	93%	63%	0.1	0.1	84%	49%	0.1	0.1
Southbound approach [2]									83%	11%	0.6	0.1
A47 westbound	39%	52%	0.1	0.1	45%	62%	0.1	0.1	49%	62%	0.1	0.1
Northbound approach	9%	5%	0.1	0.1	10%	6%	0.1	0.1	9%	8%	0.1	0.1
BY 2015, 2040 DM Vs DS												
A47 eastbound	98%	56%	0.1	0.1	95%	75%	0.1	0.1	89%	62%	0.1	0.1
Southbound approach [2]									100%*	15%	1.4	0.1
A47 westbound	39%	52%	0.1	0.1	52%	64%	0.1	0.1	61%	64%	0.1	0.1
Northbound approach	9%	5%	0.1	0.1	12%	7%	0.1	0.1	17%	8%	0.1	0.1

1) *Please note that in the DS scenario Nene Way Roundabout is relocated to the west of its existing location (becoming the Sutton Heath Roundabout)*

2) *The Southbound approach in the DS scenario represents the straight link road will be formed from the Sutton Heath Roundabout, linking to Sutton Heath Road and Langley Bush Road. This road is not present in the DM.*

7.6.8 Volume over capacity ratios on the A47 eastbound approach arm decrease below the 85% threshold in the 2025 DS scenario. This represents a relative improvement from the base year and DM scenarios which are above 90%. In the 2040 DS scenario the V/C ratio for the A47 eastbound is above 85% in the AM

peak. However, this still represents a relative improvement compared to the DM and BY scenarios. Furthermore, it should be noted that due to relatively low opposing flows at the roundabout there is minimal delay on the A47 eastbound approach in 2040.

7.6.9 On the Southbound approach arm V\C ratios are below the 85% threshold in the DS 2025 scenario. Due to the relocation of the roundabout, in the DM scenario the Southbound approach arm represents Upton Road. Whereas, in the DS scenario the Southbound approach arm represents Sutton Heath Road.

7.6.10 In the 2040 DS scenario the V/C ratio for the Sutton Heath Road southbound approach arm is above 85% in the AM peak. However, when comparing results for Sutton Heath Road in the AM peak in the DM and DS scenarios (DM: prior to the re location of the roundabout, DS : joining the A47, via the Sutton Heath Roundabout) delays have been reduced by the Scheme (See Table 7-9. 2025: DM 1.6, DS 0.6. 2040: 2.6, DS 1.4).

7.6.11 In summary although two approach arms to the scheme Sutton Heath Roundabout are above the 85% threshold in the 2040 DS AM peak scenario, the results indicate that the DS scenario provides a relative improvement compared to the DM. No further mitigations are proposed for this roundabout.

Do Something – A47\A11 Eastern Roundabout Traffic Delays

7.6.12 Table 7-13 shows the link delay and volume over capacity ratios in the DS and DM 2025 and 2040 scenarios on the approach arms to the A1/A47 eastern roundabout. Analysis of the SATURN model results indicate that the A1/A47 eastern roundabout link delays have reduced on all approach arms due to the Schemes capacity enhancements. (2040 DS delays: 0.1 minutes, 2040 DM delays 1.4 to 2.7 minutes).

7.6.13 It should be noted that the SATURN journey time savings in the westbound direction during the PM peak hour is comparatively lower than the AM peak (detailed in Section 7.7). However, due to the constraints at the at the bridge over the A1 and the A1/A47 western roundabout, potential queues could be formed in the PM peak at this point in the westbound direction (see Section 7.9 VISSIM modelling for further analysis). No further mitigations are proposed for the A1/A47 eastern roundabout.

Table 7-11: Future Year DS and DM delays and V/C ratios – A47\A11 East Roundabout

Link	BY				DM				DS			
	Volume Over Capacity Ratio		Delay (Min)		Volume Over Capacity Ratio		Delay (Min)		Volume Over Capacity Ratio		Delay (Min)	
	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak	AM Peak	PM Peak
BY 2015, 2025 DM Vs DS												
A47 eastbound	58%	42%	0.1	0.1	100%	51%	1.2	0.1	67%	46%	0.1	0.1
A1 off slip southbound	91%	48%	0.3	0.1	93%	51%	0.8	0.1	6%	8%	0.1	0.1
A47 westbound	55%	72%	0.1	0.1	70%	85%	0.3	0.1	51%	64%	0.1	0.1
Northbound									3%	20%	0.1	0.3
BY 2015, 2040 DM Vs DS												
A47 eastbound	58%	42%	0.1	0.1	106%	61%	2.9	0.1	74%	55%	0.1	0.1
A1 off slip southbound	91%	48%	0.3	0.1	92%	62%	0.8	0.1	8%	7%	0.1	0.1
A47 westbound	55%	72%	0.1	0.1	82%	86%	0.3	0.1	64%	62%	0.1	0.1
Northbound									6%	37%	0.2	0.4

7.7 Impact of the Scheme on Journey Times and Congestion

Journey Time Results

7.7.1 To assess the journey time savings generated from the Scheme, results for the Do-Minimum and Do-Something scenarios are reported in Table 7-12.

Table 7-12: 2025 & 2040 Do-Something and Do-Minimum journey time comparison (minutes)

Direction	Scenario	2025			2040		
		AM	IP	PM	AM	IP	PM
A47 EB	DM	07:42	04:12	04:34	10:17	04:27	05:48
	DS	06:06	03:26	03:52	08:32	03:36	04:57
	DS - DM	**-01:36**	**-00:46**	**-00:42**	**-01:45**	**-00:51**	**-00:51**
	DS - DM % difference	**-21%**	**-18%**	**-15%**	**-17%**	**-19%**	**-15%**
A47 WB	DM	04:31	04:10	05:18	04:53	04:20	06:43
	DS	03:42	03:41	04:51	03:48	03:45	06:32
	DS - DM	**-00:49**	**-00:29**	**-00:27**	**-01:05**	**-00:35**	**-00:11**
	DS - DM % difference	**-18%**	**-12%**	**-8%**	**-22%**	**-13%**	**-3%**
A1 (south) to A47 EB	DM	18:04	15:13	17:08	20:27	15:57	19:07
	DS	14:53	14:22	16:16	15:47	15:02	18:00
	DS - DM	**-03:11**	**-00:51**	**-00:52**	**-04:40**	**-00:55**	**-01:07**
	DS - DM % difference	**-18%**	**-6%**	**-5%**	**-23%**	**-6%**	**-6%**
A1 (south) to A47 WB	DM	18:14	15:08	16:11	19:24	15:41	17:38
	DS	15:50	14:44	15:17	16:35	15:09	17:30
	DS - DM	**-02:24**	**-00:24**	**-00:54**	**-02:49**	**-00:32**	**-00:08**
	DS - DM % difference	**-13%**	**-3%**	**-6%**	**-15%**	**-3%**	**-1%**
A1 (north) to A47 EB	DM	15:27	12:41	13:04	16:25	13:17	13:55
	DS	13:55	11:58	12:15	15:04	12:27	12:56
	DS - DM	**-01:32**	**-00:43**	**-00:49**	**-01:21**	**-00:50**	**-00:59**
	DS - DM % difference	**-10%**	**-6%**	**-6%**	**-8%**	**-6%**	**-7%**
A1 (north) to A47 WB	DM	14:07	13:45	16:15	15:02	14:33	18:03
	DS	13:14	13:14	15:45	13:54	13:57	17:49
	DS - DM	**-00:53**	**-00:31**	**-00:30**	**-01:08**	**-00:36**	**-00:14**
	DS - DM % difference	**-6%**	**-4%**	**-3%**	**-8%**	**-4%**	**-1%**

7.7.2 The journey time results along the A47 between the Wansford West roundabout and Ailsworth show a travel time saving of approximately 1 minute 30 seconds in 2025 and 1 minute 45 seconds in 2040 for the eastbound direction during the AM peak, when compared to the Do-Minimum. This represents approximately 17-20% reduction in the total journey time across the route. In the westbound direction along the A47 there is a saving of approximately 1 minute in the 2040 AM peak (-22%) but in the 2040 PM peak there is a minimal saving of around 10 seconds (-3%). This minimal time saving in the PM peak is mainly due to delays at the exit from the Wansford East roundabout in the DS scenario which is caused by traffic blocking back across the bridge from the Wansford West roundabout.

7.7.3 The rest of the time periods also show an average saving of approximately 20-60 seconds in both directions, apart from 2040 in the PM peak in the westbound direction which shows a saving of 10 seconds.

7.7.4 Along the A1 south and A47 route (between A47 Junction 18 and A1 Junction 17) journey times decrease by up to 18% and 23% in 2025 and 2040 respectively. The largest journey time savings are generated in 2040 in the AM peak with reductions of around 4 minutes 40 seconds in the eastbound direction and 2 minutes 50 seconds in the westbound direction.

7.7.5 Between the A47 Junction 18 and A1 Wothorpe Junction (the A1 (north) - A47 route), journey times decrease by around 1 minute 30 seconds in the eastbound direction in the AM peak. The rest of the time periods also experience an average saving of approximately 30-60 seconds in both directions, apart from 2040 in the PM peak in the westbound direction which shows a saving of around 14 seconds.

7.7.6 Overall, across all assessed routes the Do-Something journey times are reduced to levels below the Do Minimum scenario. These journey time savings are due to upgrading the A47 to dual carriageway and the junction improvements in the Do Something scenario.

Wider Network Statistics

7.7.7 Network wide average speeds have been extracted from the model for the wider area. The SATURN 2025 and 2040 average network speeds represent an average of all trips travelling across every link on the entire model simulation network for the specified time periods.

7.7.8 The overall average speeds are displayed in Table 7-13. In both 2025 and 2040, there is a relative improvement in Do-Something speeds, within the simulation area, of up to 4% (2040 DS – DM AM: 3.5% IP: 3.3% PM: 3.9%).

7.7.9 Overall, this indicates that the Scheme will have a positive impact in terms of improving the operation of the wider network. The wider network statistics are calculated over the entire Wansford simulation area (Figure 6-1). Therefore, deriving a network wide increase in average speeds of around 1-4%, from the implementation of the Scheme, is considered to represent a sizeable

improvement in the overall operation of the network.

Table 7-13: SATURN simulation network overall average speed (km/hr)

Scenario	AM	IP	PM
2025 DM	62.7	72.7	62.7
2025 DS	64.5	73.2	63.1
2025 DS- DM	1.7	0.5	0.4
2025 DS- DM % difference	2.8%	0.7%	0.6%
2040 DM	56.2	68.0	54.1
2040 DS	58.2	70.3	56.2
2040 DS- DM	2.0	2.2	2.1
2040 DS- DM % difference	3.5%	3.3%	3.9%

7.8 Impact of the Scheme on the Local Road Network

7.8.1 Figure 7-8 and Figure 7-9 show the local road network two-way peak hour traffic flows (PCU) to the nearest 10 for each forecast scenario.

7.8.2 The results of the model indicate that the Scheme causes a relatively minor impact on traffic flows across the local road network. Sutton Heath Road (7 & 8) experiences the largest traffic flow increase, across the local road network, of around 50-180 PCUs. Along Peterborough Road in Wansford (5) the Scheme creates an increase in traffic of approximately 170 PCUs in the 2040 AM peak and a minimal increase in flow in the PM peak. The increase in AM peak traffic on Peterborough road is partly due to the reduction in traffic along Old North Road from the 2015 base. Traffic flows along The Drift (9), south of the Sutton Heath Roundabout, are forecasted to increase by around 110-150 PCUs depending on direction and time period, this is due to traffic being diverted to access the Sutton Heath Roundabout.

Figure 7-8: AM Peak Side Road Traffic Flows (PCU 2-way) – Base and Do-Minimum and Do-Something

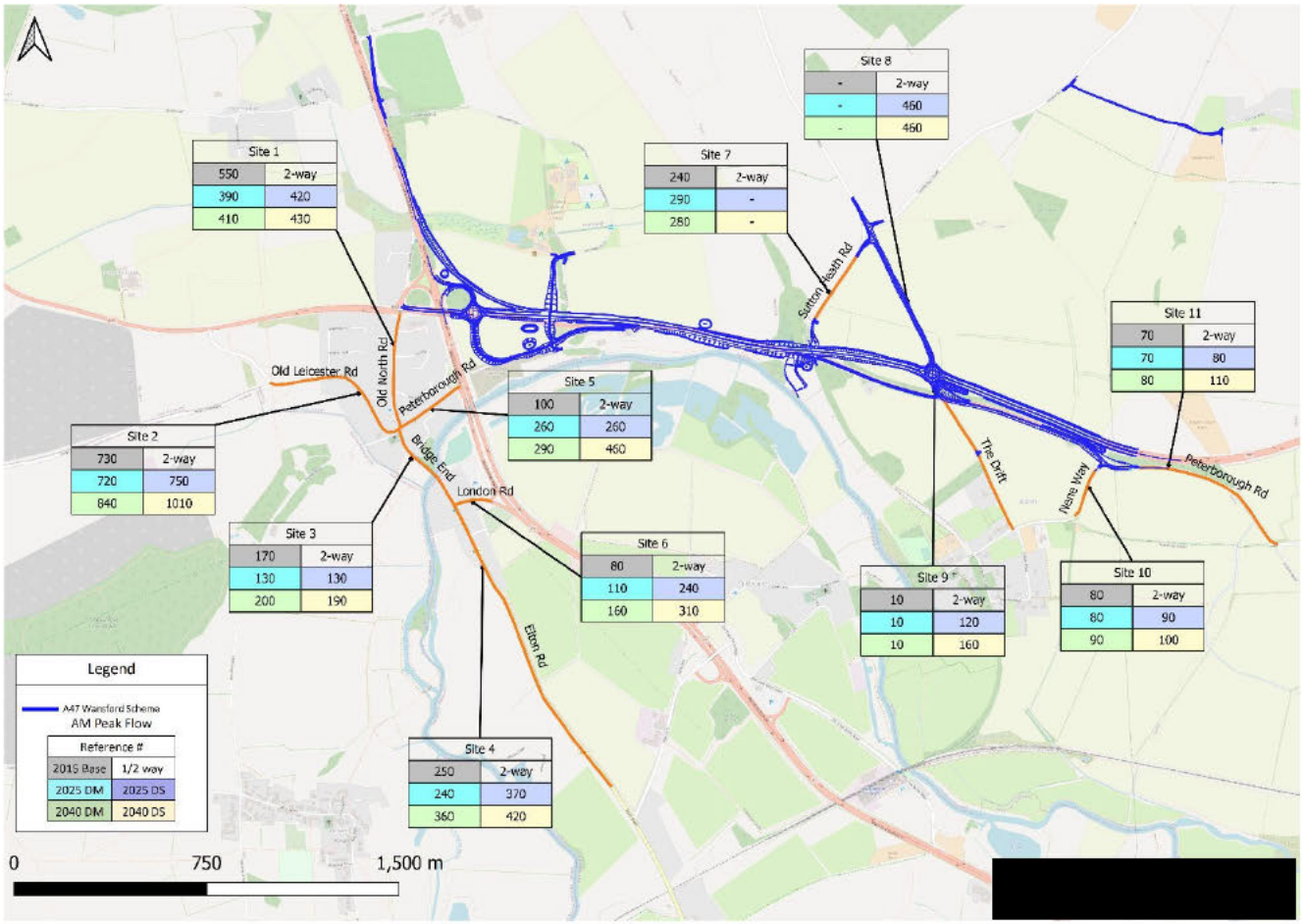

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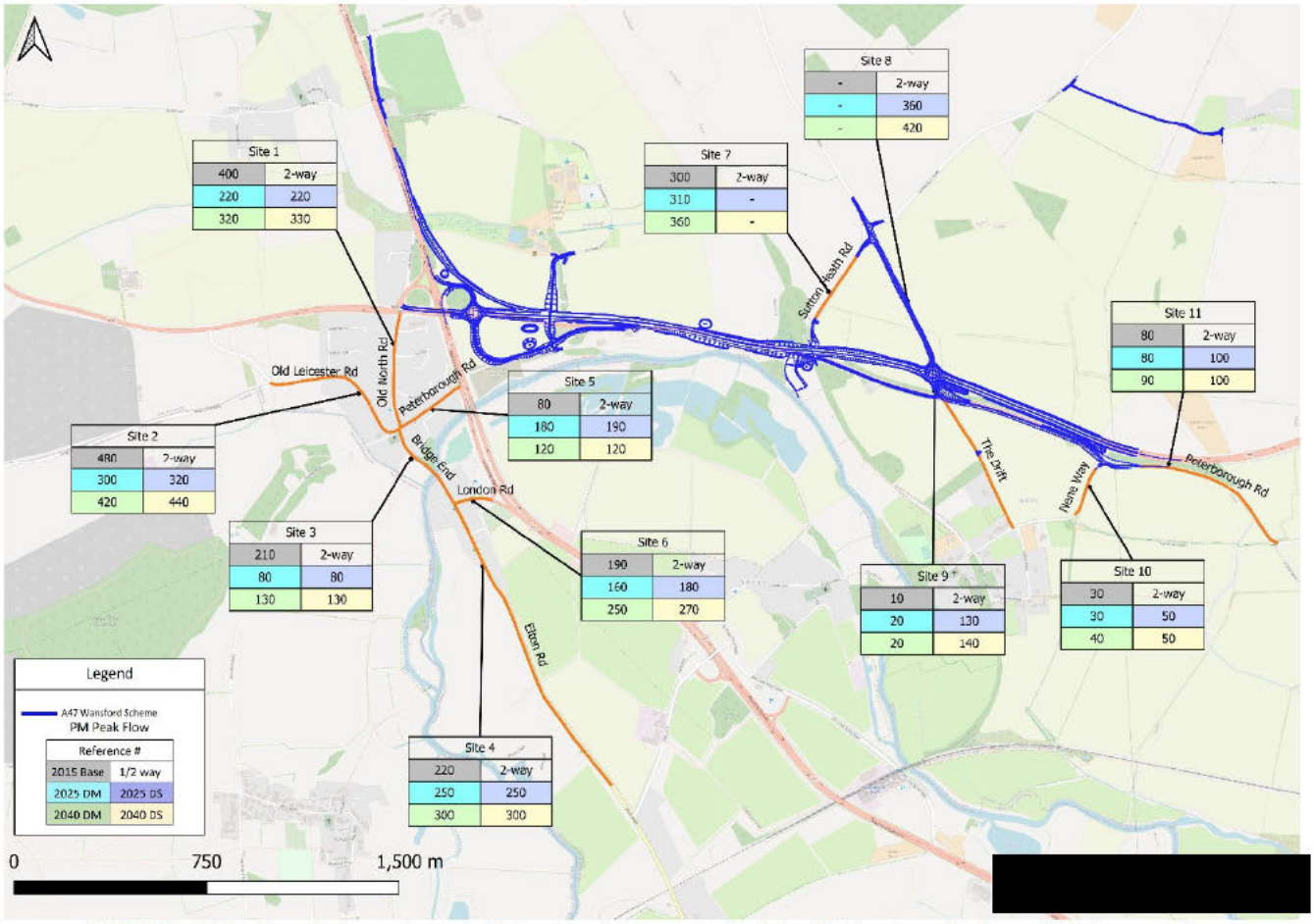
Figure 7-9: PM Peak Side Road Traffic Flows (PCU 2-way) – Base and Do-Minimum and Do-Something



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7.8.3 Table 7-14 shows the total one-way traffic flow in to Wansford village on Old North Road, Old Leicester Road, Peterborough Road and Bridge End. The table shows the change in the number of trips in Wansford Village in the different forecast scenarios. The analysis in Table 7-14 provides the comparison of the 2015 base year scenario to the DM and DS 2025 and 2040 scenarios for the AM and PM peak periods as well as the overall daily flow (AADT rounded to the nearest 100 vehicles).

7.8.4 Overall, there is a slight decrease in traffic accessing Wansford village in the future year scenarios as AADT flows slightly reduce in the DM and DS scenarios by around 1500 vehicles in 2025 and 900 to 200 vehicles in 2040. However, although the overall daily traffic levels decrease, there is a slight increase in AM peak hour traffic (approx. 2025 DS: 20 PCU, 2040 DM 100 PCU, 2040 DS 280 PCU).

Table 7-14: Wansford village total trips

Scenario	2015 BY	DM		% Change DM vs BY		DS		% Change DS vs BY	
		2025	2040	2025	2040	2025	2040	2025	2040
AM (PCU)	778	760	882	-18	104	791	1,054	13	276
PM (PCU)	599	401	508	-198	-91	416	528	-184	-72
AADT (veh)	4,900	3,400	4,000	-1,500	-900	3,500	4,700	-1,400	-200

Impact of the Scheme on Upton Road and Main Road traffic flows

7.8.1 Table 7-15 shows the total two-way traffic flow in to Upton village on Upton Road (by the junction with the A47) and Main Road (by the junction with Langley Bush Road). The table shows the change in the number of trips on these roads in the different forecast scenarios. The analysis in Table 7-15 provides a comparison of the total traffic on these roads between the DM and DS 2025 and 2040 scenarios for the AM and PM peak periods as well as the overall daily flow (AADT rounded to the nearest 10 vehicles).

7.8.2 As it can be seen from Table 7-15 the closure of Upton Road in the DS scenario diverts traffic on to Main Road. However, the overall level of traffic approximately remains the same for all scenarios. The relatively small increase in peak hour traffic (approximately 30 to 100 PCUs) on Main Road has no adverse impacts on the operation of the Main Road/ Langley Bush Road junction.

Table 7-15: Upton Road and Main Road traffic flows – two-way flows

Year:		2015	2025			2040		
Scenario	Road	BY	DM	DS	Change DS vs DM	DM	DS	Change DS vs DM
AM (PCU)	Upton Road	80	92		-92	97		-97
	Main Road	19	16	108	92	21	118	98
	Total	**98**	**108**	**108**	**0**	**118**	**118**	**0**
PM (PCU)	Upton Road	33	36		-36	39		-39
	Main Road	8	9	42	34	10	46	37
	Total	**41**	**44**	**42**	**-2**	**48**	**46**	**-2**
AADT (veh)	Upton Road	430	490		-490	520		-520
	Main Road	90	90	560	470	110	620	510
	Total	**520**	**580**	**560**	**-20**	**630**	**620**	**-10**

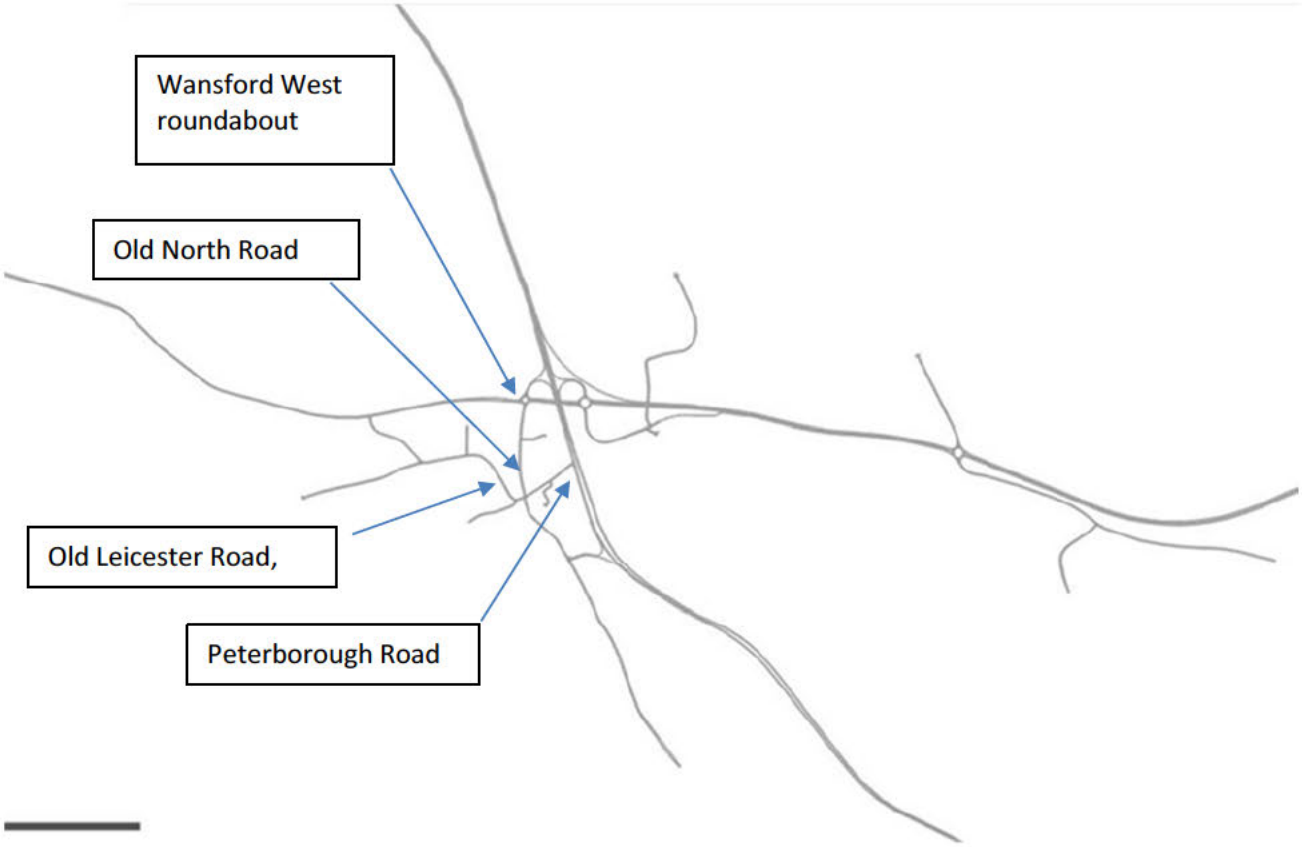
7.9 Operational Modelling Assessment

Introduction

7.9.1 The VISSIM operational model has been adopted to undertake a detailed assessment of the Scheme's performance on the A47/A1 western roundabout and the local roads in Wansford. Micro-simulation model runs are undertaken to ensure the detailed aspects of the road network, such as lane allocations and merge sections, are suitable to accommodate the WTM strategic models DS scenario demand forecasts.

7.9.2 The road network layout of the VISSIM model's representation in the DS scenario is shown below in Figure 7-10.

Figure 7-10: DS VISSM Network



Wansford West Roundabout and Wansford Village

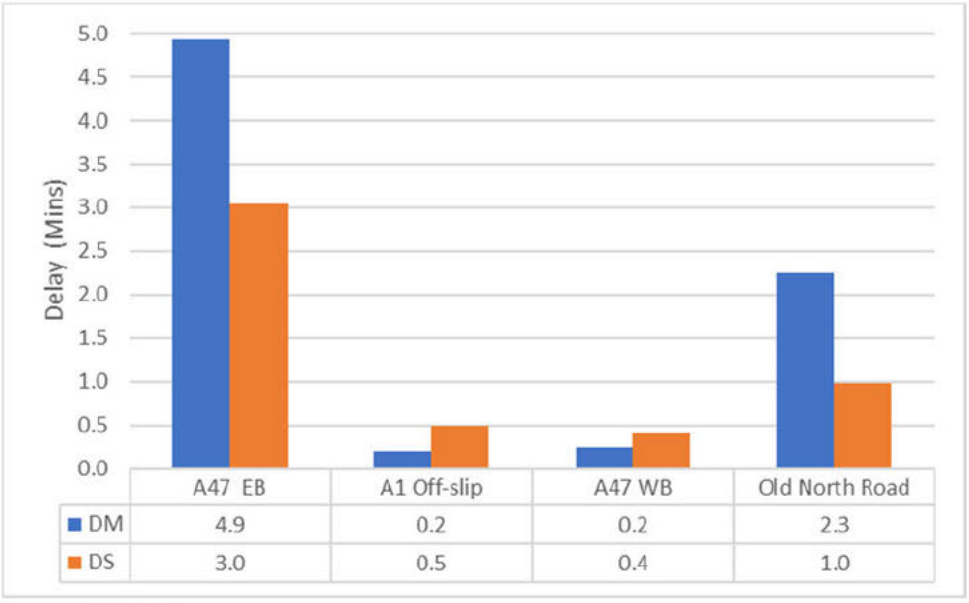
7.9.3 The A1 and A47 are connected via a dumbbell arrangement, with the A47 crossing over the A1 dual carriageway. This dumbbell junction arrangement includes two roundabouts, referred to as the Wansford West and Wansford East roundabouts. The western roundabout provides access to the village of Wansford via the Old North Road (the A6118). The A47 westbound from the Wansford East roundabout is connected to the Wansford West roundabout via a single lane bridge over the A1.

7.9.4 Figure 7-11 and Figure 7-12 show the AM and PM peak delays on each of the Wansford West roundabout approach arms in the DM and DS 2040 scenarios. Table 7-16 shows the VISUM traffic flows for the 2019 base year, DM and DS 2040 scenarios.

Table 7-16: Base Year (2019), 2040 DS and DM traffic flows (vehicles) – VISSIM

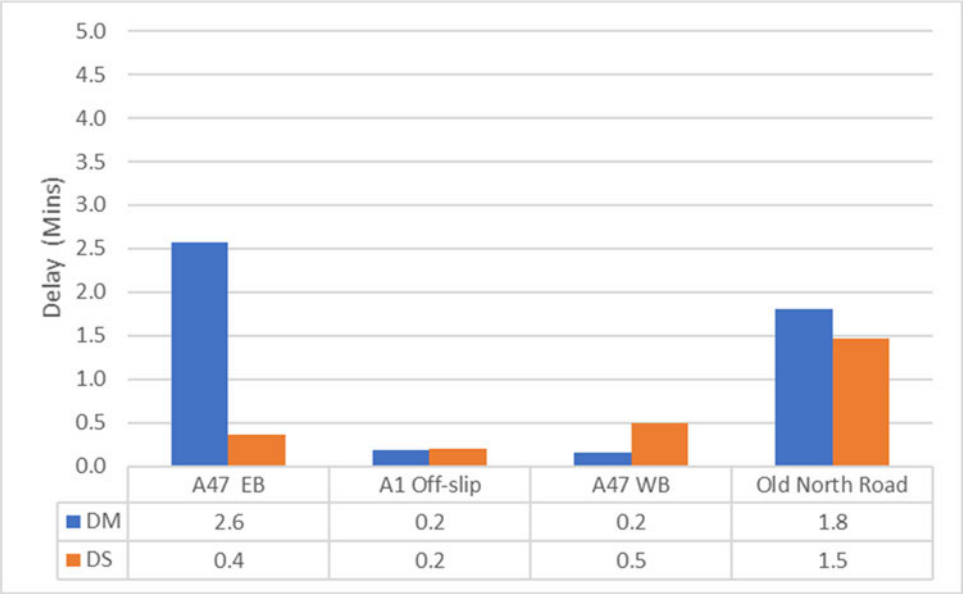
Time Period	Link	2019 Base Flow	2040 DM Flow	2040 DS Flow
AM	A1 southbound	259	330	622
	A47 westbound	790	1,060	1,214
	Old North Road northbound	386	330	260
	A47 eastbound	490	592	758
PM	A1 southbound	362	545	587
	A47 westbound	1,232	1,274	1,318
	Old North Road northbound	180	142	75
	A47 eastbound	590	763	859

Figure 7-11: Wansford West roundabout AM peak – average vehicle delay



Source: SWECO

Figure 7-12: Wansford West roundabout PM peak – average vehicle delay



Source: SWECO

7.9.5 Analysis of the VISSIM model indicates that vehicles experience congestion on the A47 eastbound (AM 4.9 mins, PM 2.6 mins) and Old North Road (AM 2.3 mins, PM 1.8 mins) approach arms to the junction in the 2040 DM scenario.

7.9.6 In the DS scenario, the Scheme provides a 2-lane exit for A47 eastbound traffic. This results in a reduction in congestion along the A47 eastbound approach arms in the AM and PM peaks (AM DM 4.9 mins, DS 3.0 mins. PM DM 2.6 mins, DS 0.4 mins). The DS scenario also presents a decrease in delay on the Old North Road northbound approach arm as the traffic finds more gaps in the circulatory flow (AM DM 2.3 mins, DS 1.0 mins. PM DM 1.8 mins, DS 1.5 mins).

7.9.7 However, despite the reduction in congestion on the A47 eastbound and Old North Road approach arms, delays on the other approach arms stay approximately the same or increase. Furthermore, it should be noted that even in the DS scenario delays, of around 3 mins, still remain on the A47 eastbound approach arm in the AM peak. Therefore, although in the DS scenario delays at the roundabout decrease slightly, it is acknowledged that there is an existing congestion issue at the Wansford West roundabout in the 2040 DM scenario.

7.9.8 Table 7-17 shows the AM and PM peak hour queue lengths in the 2019 base year and 2040 DM and DS scenarios on the approach arms to the A47/A1 Western roundabout. The analysis presents the average queue length and the average maximum queue length over the peak hour for all assessed scenarios.

7.9.9 Queue lengths on the A47 eastbound approach arm decrease by around 350m on average (300m maximum) in the AM peak and by around 400m on average (450m maximum) in the PM peak. On Old North Road queue lengths decrease by around 130m and 20m on average in the AM and PM peaks respectively. On the A47

westbound and A1 southbound relatively minor increases in queue of around 0-50m on average are forecasted.

7.9.10 The queue length results correspond with the delay results shown above in that the DS scenario shows a decrease in queuing on the A47 eastbound and Old North Road northbound approach arms relative to the DM. However, queue lengths of around 900m on average remain in the 2040 DS scenario on the A47 eastbound approach arm in the AM peak.

Table 7-17: Base Year (2019), 2040 DS and DM queue lengths – (meters)

Time Period	Link	Queue Length (m)						Difference DS - DM (m)	
		Base Ave	Base Max	DM Ave	DM Max	DS Ave	DS Max	Ave	Max
AM	A1 southbound	8	38	5	35	55	131	50	96
	A47 westbound	4	59	7	90	30	173	23	83
	Old North Road northbound	39	95	166	218	31	68	-135	-150
	A47 eastbound	369	474	1,229	1,352	888	1,050	-341	-302
PM	A1 southbound	2	26	10	55	12	67	2	12
	A47 westbound	3	54	3	58	19	157	15	100
	Old North Road northbound	80	113	34	59	14	29	-20	-30
	A47 eastbound	48	121	433	558	22	111	-411	-447

7.9.11 To support the VISSIM operational performance assessment of the western roundabout junction, ARCADY analysis was undertaken for the 2040 DM and DS scenarios. Table 7-18 presents the Level of Service (LoS) and Ratio of Flow to Capacity (RFC) results from the ARCADY assessment. The forecast flows used the ARCADY assessment are derived from the VISSIM model as shown in Table 7-16. To give context to the results, RFC ratios equal to or greater than 0.85 have been highlighted. LoS results provide a qualitative assessment of the performance of each approach arm. The LoS measures are sumarised as follows:

- A = Free flow
- B = Reasonably free flow
- C = Stable Flow
- D = Approaching unstable flow
- E = Unstable flow
- F = Forced or breakdown flow

7.9.12 The model results show that the A47 eastbound approach arm is over-capacity in

both the DM and DS scenarios in the AM. However, the DS scenario does represent an improvement in performance due to the 2-lane exit for A47 eastbound traffic. In the PM peak the A47 eastbound approach the DS scenario RFC decreases to below unity (0.94). Similarly, on the A47 westbound approach in the PM peak both the DM and DS scenarios are above the 0.85 threshold.

7.9.13 The A1 southbound arm exceeds the 0.85 threshold in the 2040 AM peak DS scenario. However, the arm remains within capacity and, based on the VISSIM analysis, delays increase by less than 0.5 minutes.

Table 7-18: ARCADY summary of junction performance – 2040 Do Minimum & Do Something

Time Period	Link	RFC		LoS	
		DM	DS	DM	DS
AM	A1 southbound	0.43	0.89	A	E
	A47 westbound	0.80	0.84	B	B
	Old North Road northbound	0.83	0.68	F	D
	A47 eastbound	1.68	1.02	F	F
PM	A1 southbound	0.63	0.80	B	C
	A47 westbound	0.96	0.92	E	D
	Old North Road northbound	0.46	0.23	C	B
	A47 eastbound	1.72	0.94	F	E

7.9.14 In summary, delay and queues are expected at the A47/A1 western roundabout in both the DM and DS scenarios. In particular, delays are forecasted on the A47 eastbound and Old North Road approach arms. However, the results do indicate that the DS scenario provides a relative improvement compared to the DM. Further discussion on mitigations for the A47/A1 western roundabout are discussed in Section 8.2.

A1/A47 Eastern Roundabout

7.9.15 As stated in Section 7.6 the constraints on the A47 westbound at the bridge over the A1 could potentially impact the operation of the Eastern roundabout. Therefore, Table 7-19 shows the AM and PM peak hour queue lengths in the 2019 base year and 2040 DM and DS scenarios on the approach arms to the A47/A1 eastern roundabout based on the VISSIM operational modelling. The analysis presents the average queue length and the average maximum queue length over the peak hour for all assessed scenarios.

7.9.16 In the AM peak queue lengths decrease on all approach arms in the DS scenario. In the PM peak DS scenario there is an increase in A47 westbound average queue lengths of around 350m (400m maximum). This queuing is principally caused by constraints on the A47 at the bridge over the A1 and the western roundabout.

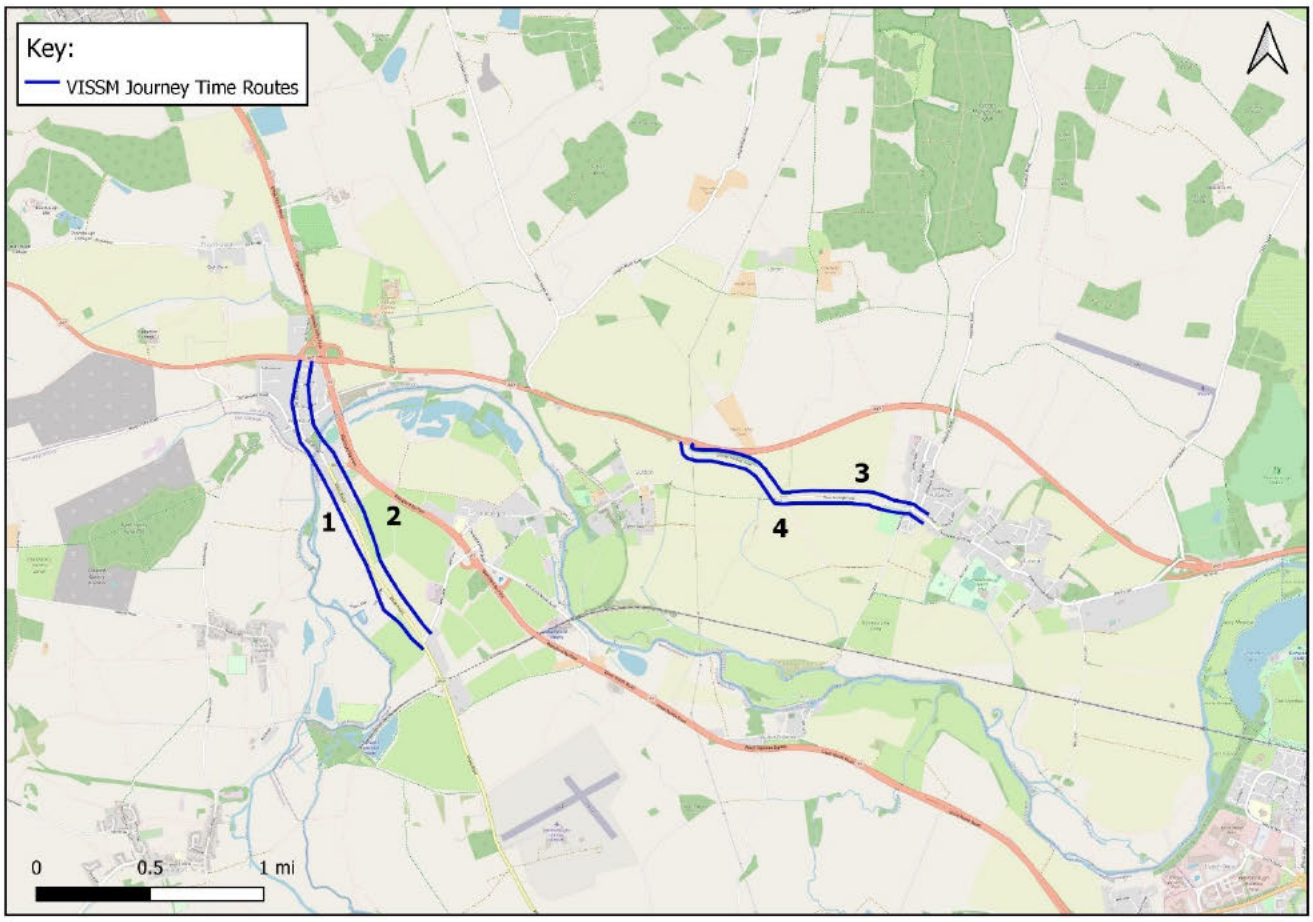
Table 7-19: Base Year (2019), 2040 DS and DM queue lengths – (meters)

Time Period	Link	Queue Length (m)						Difference DS - DM (m)	
		Base Ave	Base Max	DM Ave	DM Max	DS Ave	DS Max	Ave	Max
AM	A1 southbound	490	727	42	140	0	2	-41	-138
	A47 westbound	115	277	437	704	219	311	-219	-393
	A47 eastbound	171	294	135	222	3	32	-132	-190
PM	A1 southbound	9	64	26	91	0	3	-26	-89
	A47 westbound	5	61	1	29	345	424	344	396
	A47 eastbound	0	1	0	3	1	15	1	13

Wansford and Ailsworth Local Road Journey Times

7.9.17 Table 7-20 shows the 2040 AM and PM journey times results on the local roads accessing the A47 from Wansford and Ailsworth as shown in Figure 7-13.

Figure 7-13: VISSM Journey Time Routes



Source: SWECO. This Map is based upon Ordnance Survey material with the permission of Ordnance Survey on behalf of the Controller of Her Majesty's Stationery Office © Crown copyright. Unauthorised reproduction infringes Crown copyright and may lead to prosecution or civil proceedings. Highways England 100030649 2016.

Table 7-20: VISSM Journey Time Results

Route	Direction	AM				PM			
		DM	DS	Diff	%	DM	DS	Diff	%
1	Wansford to Western Rdbt (NB)	4.4	3.6	-0.8	-18%	3.2	3.3	0.0	2%
2	Western Rdbt to Wansford (SB)	4.0	3.5	-0.5	-13%	3.4	3.3	-0.2	-5%
3	Ailsworth to Sutton Heath Rdbt (WB)	2.4	2.2	-0.2	-8%	2.3	2.2	-0.2	-8%
4	Nene Way Rdbt to Ailsworth (EB)	2.3	2.2	-0.1	-4%	2.3	2.2	-0.1	-4%

7.9.18 The northbound journey time results between Wansford Road and the Wansford West roundabout show a decrease of around -18% in the AM and a minimal change in the PM peak, when compared to the Do-Minimum. Analysis of the southbound route shows a slight reduction of up to 0.5 mins. The Sutton Heath Roundabout to Ailsworth journey time results also show the Scheme has a minimal impact on journey times in all directions and time periods.

7.10 Impact of the Scheme on Walking and Cycling

7.10.1 The Scheme will affect a number of existing walking, cycling facilities along the section of the A47 to be improved.

7.10.2 The proposed improvements are shown in Figure 7-14 and summarised in Table 7-21.

Figure 7-14 : Locations of proposed walking, cycling and equestrian facilities

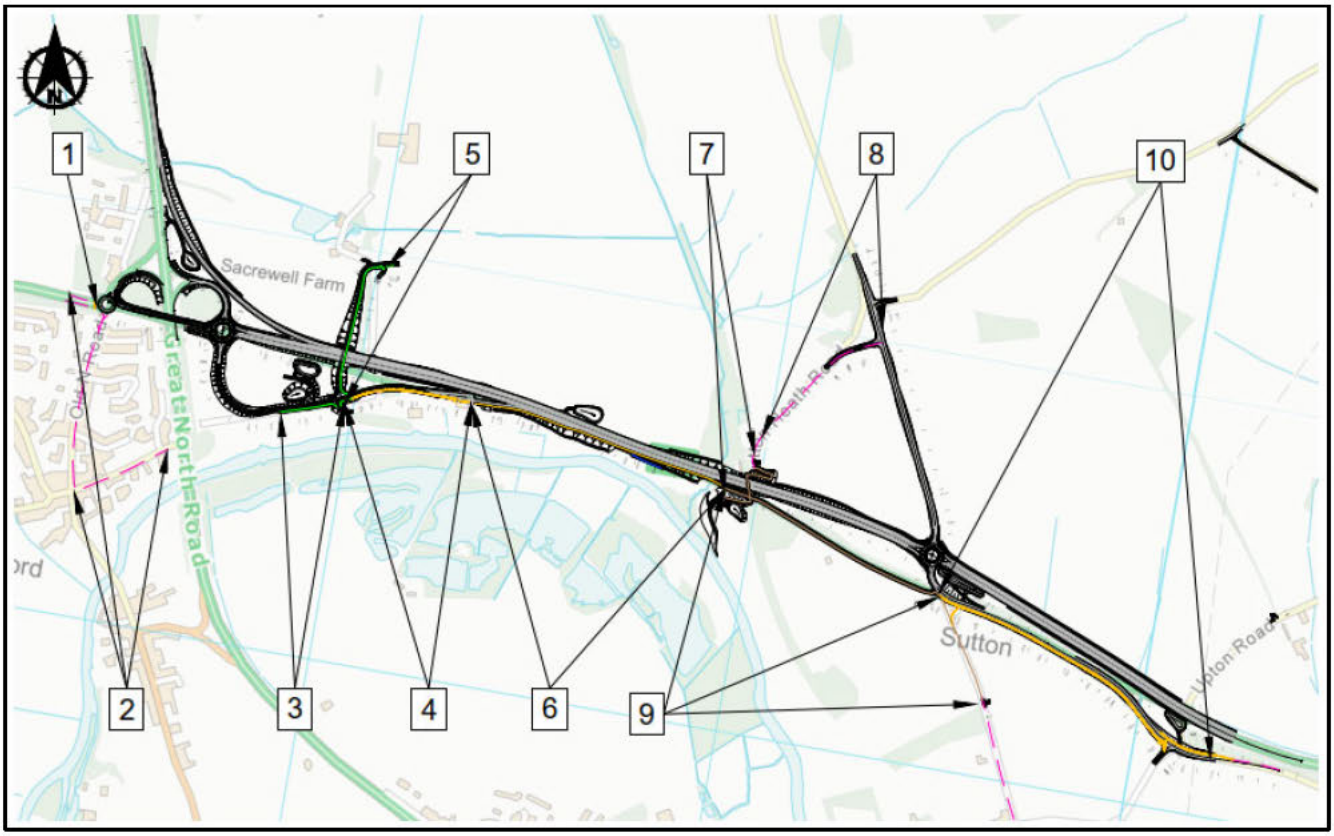


Table 7-21: Proposed walking and cycling facilities

Reference (Figure 7-14)	Improvement
1	At the A47/A1 western roundabout, new crossings for cyclists will be provided on the A47 western arm and on the A6118 southern arm to replace the off-road facilities provided at the two existing A47/A1 roundabouts. The new crossings will allow cyclists to connect between the existing A47 to the west of A1 and the proposed on-road route cycle route along Old North Road and Peterborough Road within Wansford which lead to the recently upgraded all-user permissive route (Wansford Nene Way Permissive 1) which passes beneath the A1 The new crossings will also facilitate access to the existing underpass under the A47 where cyclists are required to dismount.
2	New signage will be provided to direct cyclists from the A47/A1 western roundabout via Old North Road and Peterborough Road through Wansford, to the recently upgraded all users permissive route (Wansford Nene Way Permissive 1).
3	A continuation of the recently upgraded all-user route (Wansford Nene Way Permissive 1) will be provided which follows the alignment of the existing access road that will be retained but upgraded, as far as the proposed new access for Sacrewell Farm.

Reference (Figure 7-14)	Improvement
4	A shared footway/cycleway will be provided from the proposed Sacrewell Farm access to the point where the upgraded access road will connect with the new A47 alignment. This will replace a section of permissive footpath Wansford Annual Maintenance 113 (ID: 460 & 785) that passes in front of the pumping station.
5	A new permissive bridleway, albeit substandard in width, will be provided adjacent to the new access road for Sacrewell Farm. The new access will pass under the A47 via a new underbridge so users will no longer be required to cross the A47 at-grade. This new permissive bridleway will replace a section of permissive footpath Wansford Hereward Way Permissive 3 and permissive footpath Wansford Hereward Way Permissive 2. An appropriate crossing facility will be incorporated on the existing access road to be upgraded to connect between these sections of WCH infrastructure.
6	A shared footway/cycleway will be provided from the petrol filling station, following the southern frontage of the new A47 alignment to a point where the route joins the proposed bridleway along the old alignment of the A47. A new section of footpath (PRoW) will be provided to allow a connection between the new footway/cycleway and footpath Wansford 4 (ID: 459) replacing a section of this PRoW that will be lost to the scheme. The new footway/cycleway will also connect to the proposed bridleway underpass via the disused railway at Sutton Heath Road.
7	A new underpass suitable for use by pedestrians, cyclists and equestrians will be provided allowing a connection between the proposed shared footway/cycleway and bridleway on the southern side of the new A47 alignment and the section of Sutton Heath Road which will become a cul-de-sac as a result of the proposed scheme. The proposed underpass will utilise the disused railway alignment that is in a cutting at this point.
8	Signage will be provided on Sutton Heath Road to direct pedestrians and cyclists to the underpass allowing them to pass beneath the new A47 alignment.
9	. A bridleway will be provided on the old alignment of the A47, that will be closed to traffic, and along the section of The Drift that will be stopped up by the scheme. These new sections of bridleway will provide a link for all users between The Drift and the proposed underpass. The route from The Drift will then continue as an on-road route to allow cyclists and equestrians to connect with bridleway Sutton 3 (ID:395) to the south east.
10	A shared footway/cycleway will be provided along the southern side of the proposed new side road alignment that links between the proposed new roundabout on the A47 and Peterborough Road (at Ailsworth). This new side road utilises the old alignment of the A47. The shared footway cycleway will link to the proposed bridleway at the junction of the old alignment of the A47 and The Drift that is being stopped up by the scheme. At the Peterborough Road/Nene Way junction, a crossing and transitions will be provided to allow cyclists to return to the carriageway on Peterborough Road to the east into Ailsworth.

7.10.3 The resultant network of local highway connections and the facilities to be provided by the Scheme will support walking, cycling and horse-riding by incorporating safe, convenient, accessible and attractive routes for pedestrians, cyclists and equestrians. In particular, the Scheme will provide:

- A new underbridge at the Sacrewell Farm access and a new underpass at the former railway line connecting to Sutton Heath Road, which would facilitate safe north to south movements across the new A47 alignment for all users.

- various sections of new shared footway/cycleway and bridleway to provide safer and more pleasant journeys for cyclists and pedestrians undertaking east to west trips between Wansford and Ailsworth and for pedestrian, cyclist and equestrian journeys between the north and south of the A47 alignment with safer crossing points.

7.10.4 Overall, the Scheme will provide approximately 3.4km of new infrastructure for pedestrians, cyclists and equestrians. This includes:

- 535m of a route suitable for all users including a 160m section which runs between the existing all user route at Wansford and along the new link road as far as the new access road for Sacrewell Farm and 375m adjacent to the new access road for Sacrewell Farm which will be a replacement to permissive footpath Wansford Hereward Permissive 3 (ID 787).
- 930m of shared footway/cycleway between the Sacrewell Farm access road and the point where the route joins the proposed bridleway along the old alignment of the A47;.
- 240m of bridleway that runs under the A47 alignment utilising the former railway line allowing connections to the realigned Sutton Heath Road to the north;
- 857m of bridleway on the old alignment of the A47, that will be closed to traffic, and along the section of The Drift that will be stopped up by the Scheme;
- 917m of shared footway/cycleway along the the proposed new side road alignment that links between the proposed new roundabout on the A47 and Peterborough Road (at Ailsworth) starting at the junction of the old alignment of the A47 and The Drift that is being stopped up by Scheme; and
- ;
- 81m of new PRoW footpath that will replace a 30m section of PRoW footpath that will be lost to the Scheme.

7.10.5 In addition to the above, signing for cyclists will be provided along Old North Road and Peterborough Road in Wansford to redirect cyclists to the recently improved all user route, which passes under the A1 and provides a connection to the picnic site area. Signing for cyclists will also be provided from the junction of Sutton Heath Road to direct cyclists to the proposed underpass at the former railway line. The new signing along these routes will cover approximately 1.1km.

7.10.6 There will be three points at which pedestrians and cyclists can cross the A47 alignment. Two of these crossing points are also suitable for use by equestrians. These crossing points are:

- At the Wansford West roundabout where existing cycling facilities will be replaced with a new dropped crossing for cyclists on the A47 western arm and A6118 Old North Road southern arm of the roundabout. The crossings will

allow cyclists to connect between the existing A47 and the on-road route cycle route to the west and the signed route through Wansford. Access to the existing underpass will also be provided but cyclists are required to dismount;

- An underpass at the Sacrewell Farm access road suitable for all users; and
- An underpass that utilises the former railway line allowing all users access between Sutton Heath Road and the shared footway/cycleway and bridleway running to the south of the new A47 alignment. Equestrians will be required to dismount to use the underpass.

7.10.7 There will also be a number of informal crossings on the local road network to enable safe crossing of the local highway network. For example, at the access and egress of the petrol filling station and on Peterborough Road.

7.11 Impact of the Scheme on Public Transport

7.11.1 There are no proposed alterations to rail public transport services as part of the Scheme, therefore any impacts are judged to be insignificant.

7.11.2 No alterations to bus public transport service frequencies are included in the Scheme modelling. It is considered the Scheme's overall impact on bus transport users will be beneficial due to the congestion relief provided for all highway traffic.

7.12 Impact of the Scheme on Accidents

7.12.1 This section outlines the existing situation based on the recorded accident data in the vicinity of the Scheme, as well as the forecast impact of the Scheme. The DfT's COBA-LT modelling tool has been used to assess the forecast impact of the Scheme on accidents.

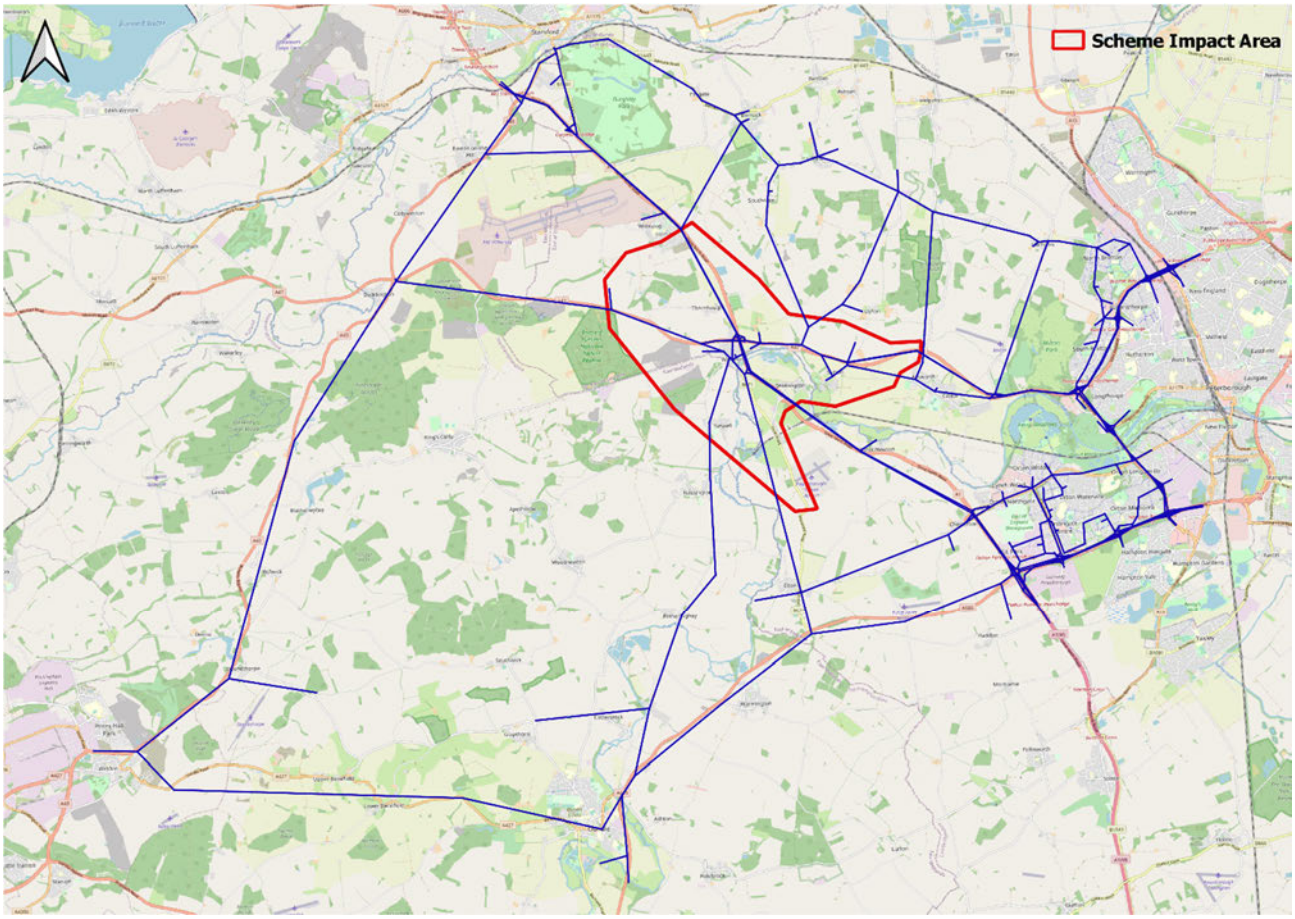
7.12.2 The DfT COBA-LT software is used to calculate the impact of the Scheme, in terms of the number of accidents and the number of casualties, by comparing the DM and DS scenarios. This section details the underlying STATS-19 accident data used in the development of the model as well as the results of the assessment.

Scheme impact area

7.12.3 The COBA-LT model study area is shown in Figure 7-15. The model study area is based on a sub area, or cordon, of the Wansford model. The cordoned network used within the assessment contains all of the principal roads in the wider highway network in the vicinity of the Scheme.

7.12.4 In addition to the study area, a Scheme impact corridor was identified within the cordoned network covering Wansford Village the A1\A47 junction and the Scheme (represented by the red box in Figure 7-16). Within this Scheme impact area observed data was analysed to assess the accidents records on the local road network. The observed data analysis was used to inform the impact area baseline accidents in the COBA-LT model. Outside of the Scheme impact area, default DfT COBA-LT accident rates were adopted.

Figure 7-15: COBA-LT road network



Observed accident data

7.12.5 The five-year 2014-2018 collision data, derived from STATS-19 accident records, was analysed to derive the total number of accidents on the links in the Scheme impact area, shown in Figure 7-16.

7.12.6 The severity of casualties was based on the default COBA-LT values for each link type. The observed accidents by accident type are summarised in Table 7-22. The locations and years of the observed accidents are shown in Figure 7-16.

Figure 7-16: Impact area/scheme links and junction observed accidents between 2014 and 2018

Table 7-22: Locally observed accidents

Year	2014	2015	2016	2017	2018	Total
Fatal	1	1	0	1	0	**3**
Serious	3	3	3	5	2	**17**
Slight	17	19	16	27	13	**92**
Total	**21**	**23**	**19**	**33**	**16**	**112**

Accidents analysis

7.12.7 The Scheme is designed to generate a reduction in accidents by upgrading the A47 to dual carriageway. The Scheme will also generate road safety benefits from the new scheme A1 eastbound off-bound slip, which reduces the interactions between the A47 and the A1 at the eastern roundabout. Furthermore, the Scheme removes the A47 mainline intersections with Sacrewell Farm Road. Therefore, the removal of these intersections improves road safety by reducing the number of conflicting movements across the on the Wansford East roundabout and across the A47 corridor.

7.12.8 The economic appraisal of the Scheme's accident benefits, derived from the

COBA-LT modelling assessment. A summary of the casualty savings and economic benefits is presented in Table 7-23 and Table 7-24.

Table 7-23: Predicted casualty reductions

Scenario	DM	DS	Savings
Fatal	143	138	5
Serious	1,297	1,260	37
Slight	11,648	11,425	223
Total	**13,088**	**12,823**	**265**
KSI	**1,440**	**1,398**	**42**

Table 7-24: Predicted casualty reductions and benefits

Accident Results	Without Scheme	With Scheme	Total Savings
Accident cost, £m	£431.46	£420.79	£10.67

7.12.9 The results of the COBA-LT analysis are presented in tables Table 7-23 and Table 7-24 which indicate that in total around 265 casualties, including 37 serious casualties and 5 fatalities, are saved by the Scheme over the analysis period. Total accident benefits generated by the Scheme over the same period amount to about £10.67m of economic benefits.

Summary

7.12.10 In summary, the COBA-LT analysis demonstrates that the Scheme improves road safety by reducing the numbers of accidents and consequently the number of casualties. The Scheme improves safety along the A47 by providing upgraded dual carriageway alignment and a separate A1 eastbound off-slip. In total, over a 60-year timeframe the Scheme's improvements will save a total of 265 casualties and 42 KSIs (killed or seriously injured) (Table 7-23).

7.13 Impact on Network Resilience and Journey Time Reliability

7.13.1 Resilience is defined as the capacity to recover quickly. Therefore, network resilience is the ability of the road network to be able to deal and recover quickly from events. This is closely linked to reliability. The term reliability refers to variation in journey times that are unable to be predicted (journey time variability, or JTV). Such variation could come from recurring congestion at the same period each day (day-to-day variability, or DTDV) or from non-recurring events, such as incidents. It excludes predictable variation relating to varying levels of demand by time of day, day of week, and seasonal effects which travellers are assumed to be aware of.

7.13.2 The implementation of the Scheme will generate reliability benefits as dual

carriageways are more reliable than single carriageways. Road capacity is increased, delays are shortened and accidents (and their impacts) are reduced, all of which contribute to improved reliability. It can then be concluded that the improved reliability of the A47 as a result of dualling will also then lead to increased network resilience.

7.13.3 Journey time reliability analysis has been undertaken to assess the economic impacts of the Scheme. The economic assessment of the Scheme is outlined in Section 4 of the Case for the Scheme (**TR010039/APP/7.1**). This analysis shows that the Scheme will generate a positive journey time reliability improvement benefit of around £0.75m.

7.14 Overall Benefits of the Scheme

7.14.1 Implementation of the Scheme will improve the capacity of the A47 by providing dual carriageway between the villages of Wansford and Sutton. Observed data indicates that this section of the A47 acts as a bottleneck. Analysis of WebTRIS data indicates that 2015 base year traffic flows are approaching the reasonable capacity limitations of the road (Figure 7-4).

7.14.2 The Wansford traffic model analysis shows that strategic traffic growth will cause an approximate increase in peak hour A47 traffic flows accessing the Wansford East roundabout of approximately 11% to 23% in 2025 and 14% to 46% in 2040. (Table 7-6). This traffic growth will further exacerbate the existing capacity issues at the roundabout resulting in increased delays and longer journey times.

7.14.3 The results of the modelling assessment show that the Scheme improves the overall operation of the network (Table 7-13) as well as improving A47 AM peak hour journey times (approximately 17% to 22% depended on direction and time period, see Table 7-12). Based on both the strategic modelling assessment the Scheme will remove the majority of the Wansford East roundabout and A47 single carriageway overcapacity delays (Table 7-9). In terms of overall AADT the Scheme provides enough additional capacity to allow traffic flows to increase in the order of 14% to 16% on the Scheme section (Figure 7-3)

7.14.4 The Scheme therefore provides additional capacity to the highway network, improves travel times and encourages economic growth across the region. In the schemes uncertainty log, provided by Peterborough City Council, a number of residential, retail and employment developments, are identified in the study area. The improvements to the capacity of the A47 between Wansford and Sutton will support these developments. In addition to this the Scheme will provide additional capacity to support strategic traffic growth across the A47 corridor between the A1 and Peterborough.

7.14.5 Evidence of the strategic benefits to traffic across the A47 corridor is provided in the wider economic benefits. The appraisal of the Scheme's wider economic benefits, which represents an individual component of the Scheme's total

economic appraisal, is outlined in Section 5 of the Case for the Scheme (**TR010039 /APP/7.1**). As part of the wider economic benefits analysis, it is estimated the Scheme will provide a long-term positive impact of £19.93m. This indicates that businesses will benefit from the enhanced connectivity and congestion reductions brought about by the Scheme.

7.14.6 The implementation of the Scheme will improve reliability and network resilience as dual carriageways are more reliable than single carriageways. Road capacity is increased, delays are shortened and accidents (and their impacts) are reduced, all of which contribute to improved reliability. In addition to this the Scheme provides additional route options, which avoid the A47, for traffic travelling to\from Sacrewell Farm.

7.14.7 The Scheme provides support to walking, cycling and other vulnerable users by incorporating safe, convenient, accessible and attractive routes for all users. The Scheme will upgrade and realign the A47 with a section of the existing A47 alignment de-trunked to local road status and a section closed to vehicular traffic. This will allow safer passage along the route, away from the upgraded A47 dual carriageway. The results of the modelling assessment shows that the traffic flows on the downgraded existing A47 road, between Sutton and Ailsworth will be reduced as a result of the Scheme (Figure 7-3)

7.14.8 In addition to the safety improvements the Scheme provides for walking, cycling and other vulnerable users and will reduce the total number of road traffic accidents. The Scheme improves safety along the A47 by providing upgraded dual carriageway alignment and an A1 eastbound off-slip. In total, COBA-LT analysis indicates that, over a 60-year timeframe the Scheme's improvements will save a total of 265 casualties and 42 KSIs (killed or seriously injured) (Table 7-23).

7.14.9 In summary the Scheme fulfils its objectives by providing additional capacity, relieving congestion, improving journey times and reliability as well as network resilience. Furthermore, it provides additional infrastructure which helps walking, cycling and other vulnerable users as well as reducing the predicted accident rates along the A47 corridor and surrounding network.

8 MITIGATION OF TRANSPORT IMPACTS

8.1 Introduction

8.1.1 This section details the application of mitigation measures to reduce the severity of any identified adverse transport impacts resulting from the Scheme. The mitigations required for the Scheme involves adopting an appropriate signage strategy and monitoring the performance of the road network.

8.2 Wansford West Roundabout

8.2.1 The traffic modelling assessment has identified ongoing issues with the operational performance of the Wansford West roundabout. In summary the modelling shows that delays are expected at the Wansford West roundabout in both the DM and DS scenario.

8.2.2 In the westbound direction in the DS scenario, the delays and backing back at the Wansford West roundabout together with the constraint at the A1 bridge will impact the westbound traffic at the exit from the Wansford East roundabout. Although the modelling shows journey time savings in the AM peak in the westbound direction, it shows minimal savings are expected in the PM peak due to the issues at the Wansford West roundabout and the A1 bridge.

8.2.3 In the eastbound direction in the DS scenario, the Scheme provides a 2-lane exit for A47 eastbound traffic from the Wansford West roundabout. This results in a reduction in congestion along the A47 eastbound approach arms in the AM and PM peaks. However, it should be noted that even in the DS scenario, delays still remain on the A47 eastbound approach arm in the AM peak.

8.2.4 The pre-existing issue at the A1/A47 roundabouts will be raised with the Highways England Operations team for consideration as a future improvement project during the identification and prioritisation process for future roads periods.

8.3 Signage Strategy

8.3.1 A signage strategy has been completed for the Scheme. The strategy has been designed to be compliant with national guidance including the DMRB and Traffic Signs Manual.

8.4 Liaison with Local Highway Authority

8.4.1 Highways England has engaged with Peterborough City Council during the initial development of the WF SATURN transport model as well as throughout the development of the Scheme design and the DCO application including the development of the traffic model and its assumptions. HE also provides regular updates to the A47 Alliance which is a wider stakeholder group that represents the business community, local authorities, MPs and stakeholders along the whole of the trunk road route between Peterborough and Lowestoft.

8.4.2 Throughout the development of the Scheme meetings have taken place between the two parties on specific items such as the development of a WCH strategy and development of the project drainage strategy to ensure the Scheme has not developed in isolation from the Local Planning Authority or PCC's wider service and asset development.

9 SUMMARY AND CONCLUSIONS

Policy context

9.1.1 In terms of adherence to national policy requirements, the Scheme demonstrates compliance with the Government's strategic vision for the development of the national road network. The benefits of the Scheme are demonstrated by its inclusion within RIS 1 and within national, regional and local transport and planning policy. Section 3(6) of the Infrastructure Act 2015 places a duty on the SoS to comply with the provisions of RIS 1.

9.1.2 The 2020 Local Transport Plan also emphasises the interrelationship between the region's transport objectives and the delivery of wider goals relating to the economy, society and environment and both it and the Peterborough Long Term Transport Strategy (LTTS) specifically list the Scheme as a network improvement. The Scheme delivers the aims of the Peterborough Local Plan and the Local Transport Plan 2020 which supports the Scheme improvements to the A47.

9.1.3 The Scheme is strongly supported at a wider level, such as within the Norfolk County Council Local Transport Plan and improvements to the SRN are considered to be key priorities for the delivery of economic growth in Norfolk and the East of England as a whole.

9.1.4 The Scheme will help to support economic growth by encouraging inward investment in business and residential development and will tackle a range of identified issues including congestion, safety and journey times along this stretch of the A47. It also provides for the improvement of green infrastructure for sustainable transport modes.

9.1.5 These benefits and improvements will also support the economic growth and distribution objectives contained in the Cambridgeshire and Peterborough Independent Economic Review and the Cambridgeshire and Peterborough Strategic Spatial Framework.

9.1.6 The Case for the Scheme (**TR010039/APP/7.1**) sets out how the Scheme has been designed to meet the objectives of the NPS NN in the above regards as well as protecting the environment, ensuring a more accessible and integrated network which represents value for money.

The Impact of the Scheme on Traffic Conditions

9.1.7 The results of the modelling assessment show that the Scheme improves the overall operation of the network as well as improving A47 peak hour journey times (approximately 17% - 22% depended on direction and scenario in the AM peak). The strategic modelling assessment shows that overall, the Scheme will reduce the single carriageway overcapacity delays to minimal levels. In terms of overall AADT the Scheme provides enough additional capacity to allow traffic flows to increase in the order of 14-16% on the Scheme section.

The impact of the Scheme on Walking and Cycling

9.1.8 The Scheme provides support to walking, cycling and horse riders by incorporating safe, convenient, accessible and attractive routes for pedestrians, cyclists and equestrians along and across the A47. The Scheme will upgrade and realign the A47 with a section of the existing A47 alignment de-trunked to local road status and a section closed to vehicular traffic. New sections of shared footway / cycleway are to be provided along the Scheme that will allow a continuous east - west route for users between Wansford and Peterborough Road (Ailsworth) as well as linking into existing PRoW and permissive footpaths at the River Nene and permissive routes at Sacrewell Farm. The section of route to be provided between Wansford, via the new all user route that has recently been provided, and Sacrewell Farm will also be suitable for equestrians. The Scheme also provides grade separated infrastructure comprising an underbridge at Sacrewell Farm suitable for all users and a underpass at the disused railway line suitable for pedestrians, cyclists and equestrians allowing users to cross the new A47 alignment at two points for north to south movements. New signage will also be provided to redirect cyclists through Wansford to the east of the A1 via the new all user route that has recently been provided linking to the Scheme. The results of the modelling assessment show that the traffic flows on the downgraded existing A47 road will be reduced as a result of the Scheme.

The Impact of the Scheme on Accidents

9.1.9 From de-trunking the existing A47 alignment, between Sutton and Ailsworth, to local road status and the provision of new cycling and walking infrastructure the Scheme provides safety improvements for walking, cycling and other vulnerable users. It also improves safety along the A47 for road users by providing an upgraded dual carriageway alignment and a separate A1 EB off-slip road. In total, COBA-LT analysis indicates that, over a 60-year timeframe the Scheme improvements will save a total of 265 casualties and 42 KSIs.

The Impact of the Scheme on Network Resilience and Journey Time Reliability

9.1.10 The implementation of the Scheme will improve reliability and network resilience as dual carriageways are more reliable than single carriageways. Road capacity is increased, delays are shortened and accidents (and their impacts) are reduced, all of which contribute to improved reliability. In addition to this, the Scheme provides additional route options, which avoid the A47, for traffic travelling between Sutton and Ailsworth as well as a under-pass for Sacrewell Farm north-south traffic. This improves the resilience of the network and provides additional access for short distance local movements.

Conclusions

9.1.11 In conclusion, the Scheme fulfils its objectives by providing capacity, relieving congestion, improving journey times and reliability as well as network resilience.

9.1.12 The modelling analysis indicates that the forecasted local and regional traffic growth will cause the Wansford East roundabout to be over capacity on the A47 western approach arm. The Scheme, however, provides the required capacity improvements to allow for the forecasted traffic growth at the A47/A1 as well as along the A47 between Wansford and Sutton.

9.1.13 In terms of operational traffic impacts the VISSIM modelling assessment shows that, with 2040 forecasted demand, the Scheme will reduce delays at the A47/A1 western roundabout and on local journey time routes between the A47 and Wansford. Further information on the Scheme's environmental and economic impacts can be found in ES Chapters 5-15 (**TR010039/APP/6.1**) and Section 5 of the Case for the Scheme (**TR010039/APP/7.1**) respectively.

9.1.14 In summary it is considered that the Scheme achieves the following objectives:

- Providing additional capacity as well as improving journey times and journey time reliability to encourage economic growth in the local area as well as across the A47 corridor between the A1 and Peterborough
- Improve safety operational issues by upgrading to dual carriageway and providing with a separate A1 EB off-slip road
- Road traffic congestion is reduced by the Scheme, with journey times reducing in the 2040 Do-Something scenario to be better than the Do-Minimum scenario
- The Scheme will improve reliability and network resilience as dual carriageways are more reliable than single carriageways. Road capacity is increased, delays are shortened and accidents (and their impacts) are reduced, all of which contribute to improved reliability
- The Scheme provides improvements to cycling, walking and other vulnerable users by providing new cycling and walking infrastructure as well as downgrading the existing A47 alignment, between Sutton and Ailsworth, to a local road status

9.1.15 The traffic modelling assessment has identified ongoing issues with the operational performance of the Wansford West roundabout. In summary the modelling shows that delays are expected at the A47/A1 western roundabout in both the DM and DS scenario.

9.1.16 The pre-existing issue at the A1/A47 roundabouts will be raised with the Highways England Operations team for consideration as a future improvement project during the identification and prioritization process for future roads periods.

9.1.17 The Scheme's objectives of accommodating future planned growth, tackling congestion and improving road safety ensures its compliance with national, regional and local transport policy.

9.1.18 Need for the Scheme is established at national level and the Scheme will support NPPF economic objectives and strategic policy in making adequate provision for transport infrastructure which will contribute to related economic growth in the area.