NORTHERN TRANS-PENNINE ROUTES STRATEGIC STUDY

Stage 1 Report

25/02/2016

Quality Management

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Northern Trans-Pennine Routes Strategic Study

Stage 1 Report

25/02/2016

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1 Introduction and Study Objectives

1.1 Introduction

1.1.1 The Northern Trans-Pennine Routes (NTPR) Strategic Study is sponsored by the Department for Transport/Transport for the North and undertaken by Highways England on their behalf. WSP | Parsons Brinckerhoff, Halcrow | TRL and Steer Davies Gleave was commissioned in August 2015 to undertake this package of works.

1.1.2 The requirement for a study of this nature was set out in the first Roads Investment Strategy (RIS), published in December 2014, which announced a programme of new Strategic Studies to explore options to address some of the Strategic Road Network's emerging challenges. The results of these high-level studies will inform the second RIS. The Strategic Studies are:

- Northern Trans-Pennine Study
- Trans-Pennine Tunnel Study
- Manchester North-West Quadrant Study
- A1 East of England Study
- Oxford to Cambridge Expressway Study
- M25 South-West Quadrant Study

1.1.3 Transport for the North has also identified this study, which investigates strategic road improvements, as one of its priorities for 2015/16. It is believed that the recommendations of this report can positively contribute towards the development of the Northern Powerhouse, which sets out a vision for 'improved east-west major road links to ensure more reliable journey times between major cities within the North' and 'effective road connections to the country's major ports in the North of England'.

1.1.4 Concurrent to this study, Cumbria County Council and Tees Valley LEP are also in the process of undertaking studies to examine connectivity beyond the immediate A69 and A66/A685 corridors, to provide an east-west road network which will assist in maximising economic growth potential across the North, Cumbria's Energy Coast and the Tees Valley region.

1.2 Study Objectives

1.2.1 The strategic aim of the NTPR Study is to identify options for a new strategic corridor, upgrading either or both the A66 and A69 routes, with the potential to make alternative improvements along their length. Further aims are to improve east-west connectivity within the North of England, whilst considering the impact that any options may have on wider east-west links between the M62 corridor and the Scottish border, build network resilience and promote economic growth. An assessment will be made of the economic potential of appropriate interventions; including improvements to journey times/safety and the wider economic impact of any proposals.

1.2.2 The study will identify options that can feasibly be constructed, and can be operated/used safely and reach conclusions on the strategic, economic, safety, environmental/operational benefits and impacts for each of the feasible options, making recommendations regarding a preferred option(s).

1.2.3 Key to forming a judgement will be the wider economic costs and benefits of different options, in particular their impacts on the local labour/product markets and the economic geography of the

northern transport area, allowing an understanding to be formed relating to how the options can act as an enabler to raising growth in the north. The study specific objectives are identified in Table 1-1.

Table 1-1: Northern Trans-Pennine Routes Strategic Study Objectives

No.	Study Objectives
1	Review previous study work, other relevant data, and current investment plans to understand current performance and constraints of the existing road infrastructure, and confirm the strategic case for considering further investment.
2	Identify options for a new strategic corridor upgrading one or both of the A66 and A69 and making other improvements along their length, including how they will connect with the existing strategic route network and the local road network and reaching conclusions on the feasibility of their delivery.
3	Understand the operational benefits and challenges of the construction of each of the options, in particular the significant issues with weather related resilience and long diversions following incidents; also assessing the safety impact road users and on local communities of these options and the operational issues associated with periodic and emergency maintenance and renewals.
4	Understand the benefits and impacts resulting from the provision of a new strategic corridor - including the benefits and impacts accruing on the M62 and other existing trans-Pennine routes, including local roads - to further inform the strategic and economic case for investment in new road infrastructure in the corridor. The benefits assessment will need to encompass analysis of the congestion-relief, reliability, safety, and environmental outcomes of constructing a new strategic corridor. The study will need to consider a range of individual potential investment proposals and potentially combinations of investment proposals. As set out in the Transport Investment and Economic Performance Report and the Department for Transport's response on Understanding and Valuing the Impacts of Transport Investments, the study will need to reach an understanding on how options impact on the local and regional environment.
5	Have reference to and reflect wherever possible the key findings of the other northern Strategic Studies (Trans Pennine Tunnel and M60 Manchester north- west quadrant). Specifically, understand the interdependencies between the potential options arising from the Trans Pennine Tunnel Strategic Study and the Manchester north-west quadrant study, to include: ▪ Understanding the implications of the timing and phasing of potential schemes for the three study locations, to minimise impact on the performance of the network during the build phases. ▪ Identification of opportunities for synergy or optimal sequencing of major road and rail works involved in, and options for mitigating strategic risks arising from, three major complex projects being undertaken within the same function geography potentially within the same Roads Period.

1.2.4 Additionally, outputs from the Northern Trans-Pennine Routes Strategic Study will align with the study objectives set out in the draft terms of reference, which seek to:

- Review previous study work, other relevant data and investment plans to understand current performance/constraints of the existing road infrastructure and confirm the strategic case for considering further investment. Furthermore, consider the conclusions of the Northern Trans Pennines Route Strategy Evidence Report (2014).
- Identify options for improving existing road links between the A1(M) and M6 using the route of either/or the A66 and A69. Understand the operational/technical feasibility and user benefits/challenges (including weather related resilience) of the different options.

- Understand the benefits and impacts (including analysis of the congestion relief, reliability, safety and environmental outcomes of dualling one or both links) resulting from:
- Creation of a new strategic corridor in the region - including the potential benefits and impacts upon the M62 or other existing Trans-Pennine routes (including local roads) to inform the strategic/economic case for investment.
- A greater role for the Newcastle to Carlisle railway line in providing a Trans-Pennine link.
- Improved rail connectivity across the Liverpool–Manchester–Leeds corridor and longer term TransNorth/HS3 plans.
- Improvements to the SRN on traffic utilising the local road network, including the identification of areas where improvements could alleviate pressure on the network (including issues likely to be created/exacerbated by expected growth) or create additional problems/congestion.
- Provide an understanding of how options are likely to impact the local and regional environment, including factors such as:
- The effect on local labour markets, wages, employment and skill formation.
- The impact on businesses from the perspective of reduced costs of supply, greater co-operation benefits, economies of scale, etc.
- Any forecast land-use changes and the impact this may have.
- The likelihood of increased investment opportunities for the region.
- An estimation of whether the impacts of an option are completely new and the areas/groups likely to experience improved or worsened conditions as a result implementation (including whether they have a negative impact on other areas).
- Provide an understanding of how different options impact on the Northern Transport area (including Manchester/Leeds/Liverpool) through the A1(M)/M60/M62 corridors. Options and analysis should reference other strategic studies and reflect wherever possible the key findings of the other northern Strategic Studies (such as the Trans-Pennines Tunnel and Manchester North-West Quadrant).

1.2.5 The outputs from the study will be used to inform the second phase of the Roads Investment Strategy (beginning in 2018) with the overall programme for constructing 'RIS 2' upgrades being 2020 and beyond.

1.3 Study Area

1.3.1 The North Pennines region of England is located between Darlington to the east and Carlisle to the west. It is bounded by the Tyne Valley to the north and the Stainmore Gap to the south. The A69 and A66/A685 represent the primary east-west corridors which cross the North Pennines region. Within the context of this NTPR study, the following sections of these corridors will be examined:

- A69 between the A1 at Newcastle upon Tyne and the M6 at Carlisle (with a section length of approximately 52.3 miles).
- A66 between the A1 at Scotch Corner and the M6 at Penrith (with a section length of approximately 49.5 miles).
- A685 between the A66 at Brough and the M6 at Tebay (with a section length of approximately 15.5 miles).

1.3.2 The A69 and A66 are both part of the national Primary Route Network (PRN) which is composed of "roads between places of traffic importance across the UK, with the aim of providing easily identifiable routes to access the whole of the country" (as defined by the Department for Transport). These two corridors are also part of a subset of the PRN, referred to as the Strategic Road Network (SRN). The

SRN is distinguished from the remainder of the PRN by virtue of the Secretary of State for Transport being the highway authority.

1.3.3 As part of the PRN these routes serve two functions; firstly the PRN links a set of DfT defined Primary Destinations. In Cumbria they include Carlisle and Penrith, whilst in the North East they include Newcastle, Sunderland, Durham and Darlington. Collectively the network links the whole of England, with few places more than 10 miles from a PRN route. It is expected that any regional or national trips should be capable of making all but the start and finish of the journey using the PRN. Catering for traffic making such regional or national journeys is, therefore, the first function of the A69 and A66 corridors.

1.3.4 The second function is that the two routes provide a point of entry to the PRN for the local area surrounding the A69 and A66 corridors. Trips generated from these locations typically involve journeys to work or places of education, in addition to general leisure based destinations or locally generated freight movements.

1.3.5 The A69 and A66/A685 interface with the A1 to the east and the M6 to the west, with the connecting intersections considered to be of significant regional importance as a result of these corridors facilitating principal freight access routes connecting with wider economic regions of the United Kingdom.

1.3.6 The rural nature of the North Pennines severely limits the availability of viable alternative north-south and east-west route options in the event that a section of the strategic road network should become unavailable due to operational incidents, maintenance/improvement works or severe weather events. The two corridors under consideration are also affected by increases in seasonal traffic demand with high volumes of visitors to attractions within the study corridor/surrounding region and the Lake District National Park.

1.3.7 Figure 1-1 shows the A69 and A66/A685 corridors in the context of the North Pennines region of England. For the purposes of this NTPR study the respective corridors have been split into ten individual sections (as described at Table 1-2) in order to facilitate detailed analysis of the routes under consideration. A summary of each section is attached as Appendix 1.

Figure 1-1: Study Area Illustrating the A69 and A66/A685 Corridors in the Context of the North Pennines

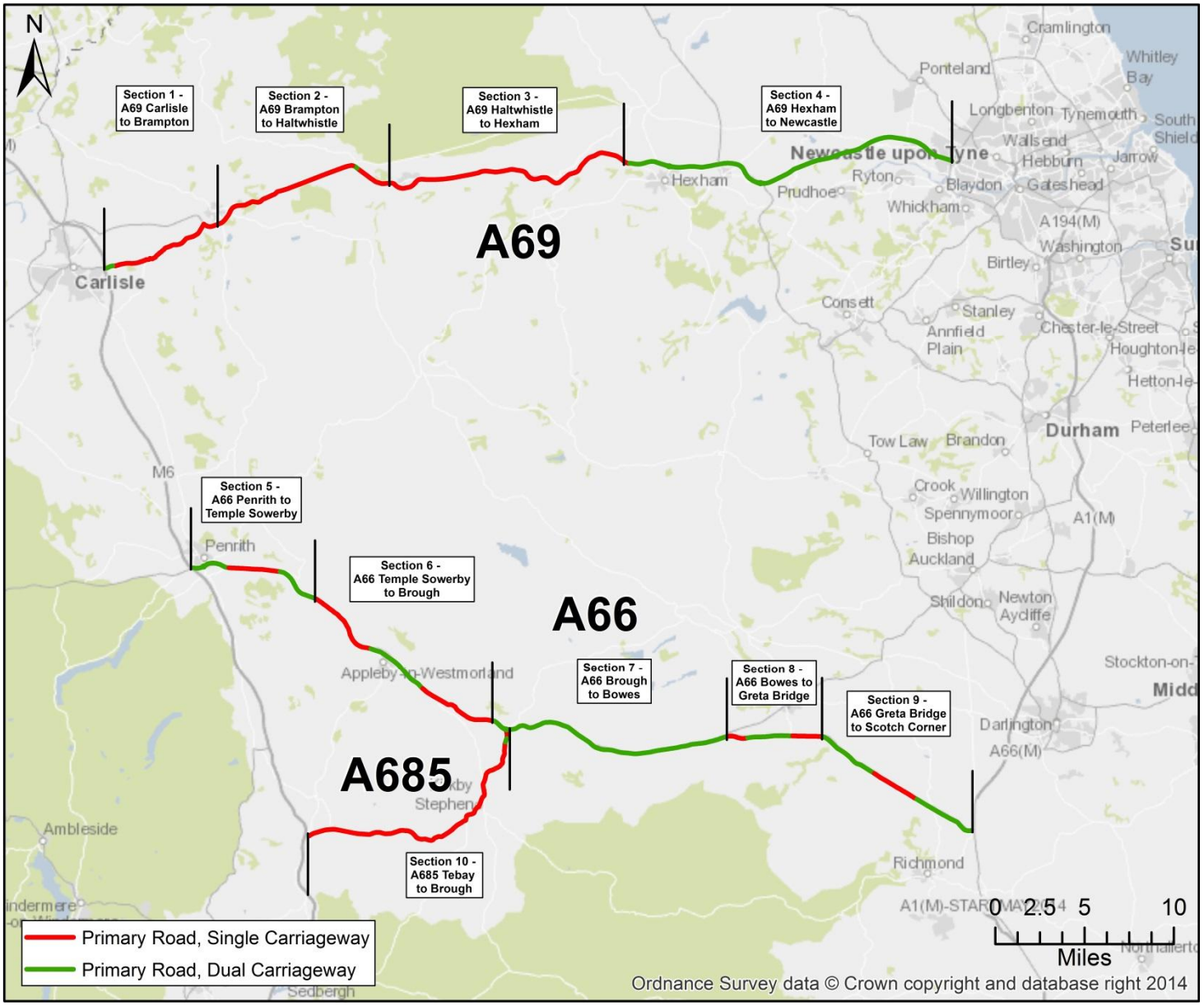


Table 1-2: Individual Sections of the A69 and A66/A685 Corridors

Section Number	Route Number	Section Name	Section Length	Single Carriageway	Dual Carriageway
1	A69	Carlisle to Brampton	07.26 miles	06.73 miles (93%)	00.53 miles (7%)
2	A69	Brampton to Haltwhistle	10.81 miles	10.52 miles (97%)	00.29 miles (3%)
3	A69	Haltwhistle to Hexham	14.50 miles	14.50 miles (100%)	00.00 miles (0%)
4	A69	Hexham to Newcastle upon Tyne	19.75 miles	00.28 miles (1%)	19.47 miles (99%)
5	A66	Penrith to Temple Sowerby	07.53 miles	02.87 miles (38%)	04.66 miles (62%)
6	A66	Temple Sowerby to Brough	12.76 miles	09.01 miles (71%)	03.75 miles (29%)
7	A66	Brough to Bowes	13.93 miles	00.00 miles (0%)	13.93 miles (100%)
8	A66	Bowes to Greta Bridge	05.23 miles	02.70 miles (52%)	02.53 miles (48%)
9	A66	Greta Bridge to Scotch Corner	10.06 miles	02.62 miles (26%)	07.44 miles (74%)
10	A685	Tebay to Brough	15.55 miles	15.32 miles (99%)	00.23 miles (1%)

1.4 Study Stages and Programme

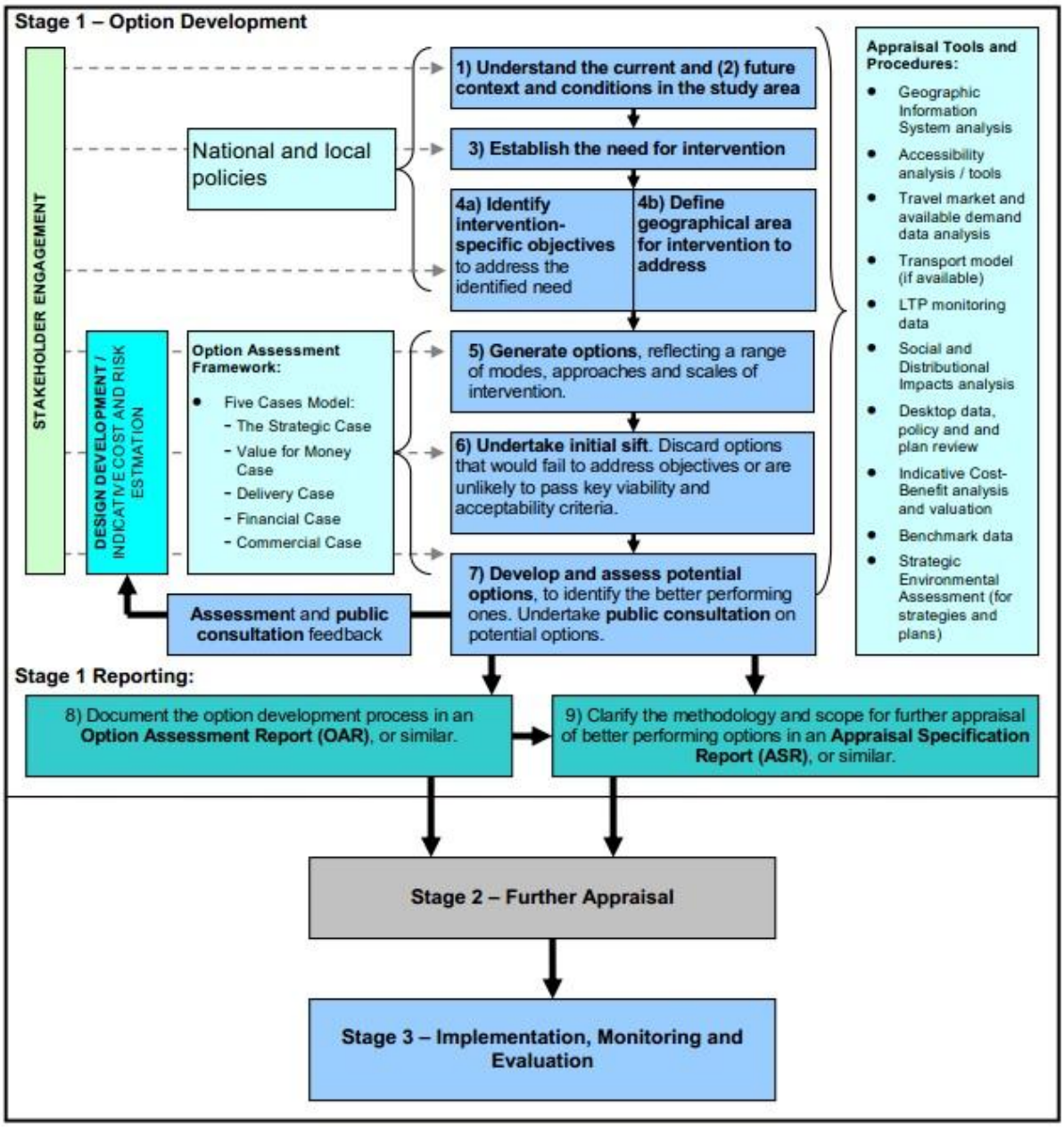
1.4.1 The NTPR study will be delivered in three distinct stages as described in Table 1-3.

Table 1-3: Northern Trans-Pennine Routes Strategic Study Deliverables Schedule

Stage	Deliverable	DfT Timescale
1	Initial report assessing current transport situation/future situation and establishing the need for intervention an identifying intervention specific objectives.	January 2016
2	Generating a longer list of options – develop a range of alternative measures or interventions that look likely to achieve the intervention-specific objectives. It is important to consider as wide a range of options as possible, including all modes. Options should include measures that reduce the need to travel, as well as those that involve capital spend.	January 2016
3a	Initial sifting – should be undertaken to identify any show stoppers that would clearly fail to meet the key objectives identified for intervention. Options should be considered or discarded on the basis of evidence and the Early Assessment and Sifting Tool (EAST). The methodology used for assessing potential options should be clearly recorded along with production of an Option Assessment Report (OSR).	May 2016
3b	Document the appraisal of the short list of better performing options, including the development of an Appraisal Specification Report (ASR) where proposals are to be taken forward for further appraisal. Wider economic benefits should be appraised using the approach consistent with WebTAG, which is being developed post TIEP. If it is not possible to develop a strategic outline business case, document further work necessary to develop the proposals to a stage which Government would be able to take investment decisions.	October 2016

1.4.2 The study has been undertaken in line with the Nine Step Process of Option Development contained within Transport Analysis Guidance - Unit 2.1.2D. Figure 1-2 presents a diagrammatic representation of the nine steps involved and provides an overview of the work flow which will be associated with the NTPR study. The proposed methodology will ensure that any potential options are developed in a manner which ensures proportionate analysis that will provide a sound basis for identifying problems and developing interventions for future funding opportunities.

Figure 1-2: TAG Transport Appraisal Process



1.4.3 This document presents the high-level strategic case for intervention on one or both of the A69 and A66/A685 corridors. This study has been informed by the available evidence base relating to the existing/forecast future position on the strategic road network local to the routes under consideration and is reported under the following headings:

- Understanding the Current Situation.
- Understanding the Future Situation.
- Establishing the Need for Intervention.

1.5 Stakeholder Reference Group

1.5.1 There is significant local interest in the NTPR study and a Stakeholder Reference Group (SRG) has been established to provide input into the project as it develops. The names of the various organisations which have been invited to provide evidence and data input are contained at Appendix 2. This Stakeholder Reference Group list is maintained by the Department for Transport and is being used to identify key organisations that will be consulted as the study progresses.

1.5.2 Meetings between the integrated delivery team and representatives of the Stakeholder Reference Group were conducted in 2015 in order to establish the views of various parties and all relevant feedback has been taken into account during the preparation of this Stage 1 report.

1.5.3 A further event was held in January 2016 in order to review the existing evidence base and the intervention-specific objectives. The results of the initial sifting stage and assessment of shortlisted schemes will then be reported through a meeting scheduled for April 2016. A further Stakeholder Reference Group meeting will be undertaken later in 2016 to discuss the emerging findings of the study prior to the production of a finalised report.

1.5.4 In order to establish specific requirements with regards to the responsibilities of both parties, a Stakeholder Reference Group Terms of Reference document has been prepared by Highways England.

1.6 Stage 1 Objectives

1.6.1 Stage 1 of the NTPR study consists of the preparation of initial and interim reports to confirm the high-level strategic case for upgrading one or both the A66 and A69 to provide a high-performance road link (in line with the study Terms of Reference discussed previously). The analysis will seek to:

- Understand the current and future context/conditions within the study area, including a review of previous studies, current policy, travel patterns, road congestion and capacity, safety, journey times, bus/rail patronage, environmental constraints, future development, topology, community amenity, socio economics and labour markets.
- Examine if there is a case for intervention through the preparation of a sound body of analysis to demonstrate the need for development of an appropriate improvement scheme.

1.7 Stage 1 Report Structure

1.7.1 Following this 'Introduction and Study Objectives' section, the NTPR study is structured as follows:

- **Chapter 2 – Current Situation:** This section provides information on current transport policy, the existing socio-economic context, network performance, operations/safety and environmental considerations within the study corridors.
- **Chapter 3 – Future Situation:** This section provides an insight into the forecast economic and transport context associated with the operation of the study routes.
- **Chapter 4 – Need for Intervention:** This section provides a summary of the need for intervention.

2 Current Situation

2.1 Introduction

2.1.1 This section of the NTPR study establishes the current situation with regards to the operation of the A69 and A66/A685 corridors, providing a detailed insight into:

- Relevant Policies
- Economic Context
- Transport Context
- Network Operation
- Safety Record
- Environmental Considerations

2.2 Relevant Policies

2.2.1 The current policy base relevant to the context of the NTPR study is set out within this section of the report. The following documents have been reviewed and the key aspirations summarised below:

- National Policy
  - Road Investment Strategy
  - National Infrastructure Plan 2014
  - National Infrastructure Commission
  - 2010-2015 Government Policy: Freight
  - Highways England: Licence
  - Highways England: Strategic Business Plan 2015-2020
  - Highways England: Delivery Plan 2015-2020
- Regional Policy
  - One North
  - North East Growth Deal
  - Tees Valley Growth Deal
  - York, North Yorkshire and East Riding Growth Deal
  - Cumbria Growth Deal
- Local Policy
  - Northumberland Local Plan: Core Strategy Pre-Submission Draft
  - Core Strategy/Urban Core Plan for Gateshead and Newcastle upon Tyne 2010-2030
  - Durham Local Plan
  - Darlington Local Development Framework: Core Strategy
  - Richmondshire Local Plan
  - Proposed Carlisle District Local Plan 2015-2030
  - Eden Local Plan: Preferred Options Consultation 2014-2032

National Policy

Road Investment Strategy

2.2.2 In December 2014 the Department for Transport (DfT) published the Road Investment Strategy (RIS). It aimed to tackle the Strategic Road Network's inconsistent and insufficient investment by addressing the following key problems:

- Condition of the network.
- Capacity of the roads.
- Connectivity of the road network.
- Certainty of investment.
- Construction of housing and creation of jobs.

2.2.3 The RIS provides an element of certainty, with over £15 billion to be invested in major roads between 2015/16 and 2020/21. This investment is estimated to benefit up to 250,000 people by reducing the noise impact of the Strategic Road Network (SRN). It is also expected to help prevent over 2,500 deaths or serious injuries on the network over five years.

2.2.4 In terms of the NTPR, the RIS states that the government is dedicated to creating a Northern Powerhouse connecting major cities within the region. The Road Investment Strategy: Overview (pages 19 and 33) states that strategic connections in Cumbria are heavily biased towards north-south movements and that a study will be commissioned to examine the case for upgrading the A69 and/or A66.

National Networks National Policy Statement

2.2.5 The National Networks National Policy Statement (NNNPS) was formally designated by Parliament in January 2015 and provides guidance regarding how decisions will be made relating to development consent orders for nationally significant infrastructure projects. The NNNPS rejects a "predict and provide" approach in favour of a package of improvements that will ensure that economic benefits are balanced against social and environmental effects or value for money considerations.

2.2.6 The NNNPS establishes a presumption in favour of granting development consent for projects that fall within an identified need for infrastructure. DCO applications can be considered primarily with regard to local impact and the extent to which these are outweighed by the need or alternative benefits.

2.2.7 The NNNPS expressly avoids the identification of specific locations for new road and rail infrastructure, however, it does provide context in relation to regional road congestion and deficiencies in SRFI facilities. It also identifies the need for investment in networks and facilities that improve connections with the country's ports/airports.

2.2.8 Whilst recognising that most investment will be driven by economic activity, population and the location of existing transport networks, the NNNPS requires scheme promoters to undertake "proportional option consideration" at the investment decision stage to demonstrate that an appropriate assessment of alternatives has been undertaken.

2.2.9 National Network projects should be designed to minimise social/environmental impacts and to improve quality of life. Applications should include evidence that reasonable opportunities to deliver environmental and social benefits have been considered and that developments have been designed so as to be sensitive to potential adverse impacts. However, the NNNPS does acknowledge that the nature of major infrastructure projects is such that some adverse effects may remain, even when allowing for sensitive design and mitigation.

National Infrastructure Plan 2014

2.2.10 In December 2014 the HM Treasury published the National Infrastructure Plan 2014 (NIP 14) which states that there is a strong economic case for infrastructure investment and that it is a key element of the Government's long-term economic plan. Its objective is to create a national road network that improves economic productivity, thus supporting jobs and growth across the country. It seeks to:

- Increase capacity.
- Tackle congestion.
- Support development.
- Strengthen connectivity.
- Improve reliability and resilience.
- Ensure a road network of the best possible quality.

2.2.11 NIP 14 states that the road network is vital to the economic sustainability of the UK and that well connected road infrastructure enables people to travel for work/leisure (with over 90% of passenger miles made by road) and businesses to transport goods (with over 65% of freight movements made by road).

2.2.12 With gross domestic product (GDP) and population levels expected to rise, demand for travel on the Strategic Road Network (SRN) is forecast to increase further. DfT analysis estimates that by 2040 traffic in England will be between 27% and 57% higher than observed 2013 operating conditions.

National Infrastructure Commission (NIC)

2.2.13 The National Infrastructure Commission was created on 5th October 2015. It was set up to provide an analysis of the UK's long-term infrastructure needs. It will deliver a long-term plan and assessment of national infrastructure needs early in each parliament, setting out what Government is expected to do over the next five year period. One of the focus areas of the NIC is a plan to transform the connectivity of the Northern cities. The Commission will publish advice to the Government on these issues before the 2016 Budget. It will also begin work on a national infrastructure assessment, looking ahead to requirements for the next 30 year period.

2010-2015 Government Policy: Freight

2.2.14 The '2010 to 2015 Government Policy: Freight' was developed by the previous Conservative and Liberal Democrat Coalition Government and its objective was to create an efficient freight transportation system that can help support the national economy. The focus was to facilitate the transportation of goods from one place to another at a reasonable cost and with the minimum impact on the environment or surrounding communities.

2.2.15 The Coalition Government also set out within the policy document that a principal aim of the strategy is to work with the freight industry to assist in cutting costs and reducing greenhouse gas emissions. Effective and proportionate regulation was identified as being of importance to ensure that goods can be moved safely/securely across the UK and abroad. No plans have been revealed to date by the current Conservative Government to revise this policy.

Highways England: Licence

2.2.16 As part of the Infrastructure Act 2015 the Secretary of State appointed Highways England Company Limited as strategic partner (with effect 1st April 2015), resulting in the body adopting the role of highways, traffic and street authority for the Strategic Road Network (SRN).

2.2.17 The Highways England: Licence states that the network for which the company is responsible shall be considered a critical national asset, which it must operate and manage in the public interest, in

respect of both current activities/needs and in providing effective stewardship of its long-term operation/integrity.

Highways England: Strategic Business Plan 2015-2020

2.2.18 The Highways England: Strategic Business Plan 2015-2020 recognises that the roads which make up the SRN are a key enabler of economic growth/prosperity and are essential to quality of life across the nation. It states that 98% of UK manufacturers consider the condition of roads on the network to be critical to the potential success of a business and that 60% of congestion is caused by a general lack of available capacity.

2.2.19 Highways England consider that in order to improve the capacity and performance of the network, it will be required to:

- Modernise the network.
- Maintain the network.
- Operate the network.

Highways England: Delivery Plan 2015-2020

2.2.20 The Highways England: Delivery Plan 2015-2020 builds on the Strategic Business Plan discussed previously and provides detail on how the company intends to deliver strategic outcomes, measure success, identify goals and plan for the future. Its focus will be on:

- Supporting economic growth.
- A safe and serviceable network.
- A more free-flowing network.
- Improved environment.
- An accessible and integrated network.

Regional Policy

One North - Transport for the North

2.2.21 One North was published in July 2014 and is led by the city regions of Leeds, Liverpool, Manchester, Newcastle and Sheffield. Its ambition is for the North to be a dynamic counterweight which complements the London and South-East economy, a destination of choice for investors, helping rebalance and grow the national economy. It acknowledges that transport for freight and people will be central to this ambition and for economic success in the North. Journey times across the North are generally much slower, service frequencies are lower and the interconnectivity of the transport networks is much weaker.

2.2.22 The strategic economic plans of all five city regions, prepared by the respective Local Enterprise Partnerships, each recognise the importance of improving transport links to achieve economic growth. One North identifies that poor transport links could be limiting the competitiveness of the North as a region. It also states that whilst the individual cities of the North may be relatively small, experience in the most prosperous European nations tends to demonstrate that clusters of highly interconnected cities can perform very well in economic terms.

2.2.23 One North looks to build on the Northern Way Transport Compact, which started in 2006 and forged a strong pan-northern strategic direction for transport, driven by economic objectives. Many of the short and medium term priorities identified by the Northern Way are now complete, under construction, in programme or in a project pipeline.

2.2.24 In terms of the NTPR, One North accepts that resilience of routes throughout this area of the country at times of severe adverse weather is an issue and demands the use of technology to achieve the very best possible network performance.

Transport for the North (TfN) has subsequently been established to oversee development of travel based infrastructure throughout the region and to identify how best to drive economic growth through investment in transport links.

The Northern Powerhouse: One Agenda, One Economy, One North

2.2.25 The Northern Powerhouse: One Agenda, One Economy, One North – A Report on the Northern Transport Strategy was published in March 2015 by the Government, Northern city regions and Local Enterprise Partnerships (LEPs) working with Highways England, Network Rail and HS2 Ltd (as the Transport for the North Partnership Board). It sets out a plan for Transport in the North including rail, highways, freight and logistics, integrated and smart travel, airports and local connectivity.

2.2.26 The 'Our Highways Plan' section of the report documents aspirations to develop a strategy that will explore options to significantly upgrade the A66 from Scotch Corner to Penrith and the A69 from Newcastle upon Tyne to Carlisle, thus connecting the A1 in the east with the M6 in the west. It is believed that improvements of this nature could potentially create two additional major east-west connections in the North of England to complement the M62.

2.2.27 The 'Our Freight and Logistics Plan' section of the report states that action will be taken to study options to dual the A66 or the A69 in the Northern Pennines. It is believed that improvements to these routes would provide vital additional east-west road capacity and significantly enhance the resilience of the network by providing a reasonable diversionary route for the M62.

2.2.28 The 'Our Rail Plan' section of the report states that aspirations for services across the north will be designed so as to radically improve journey times and frequencies between major cities in an attempt to support a single economy through major investment in rail infrastructure. The focus will be on improving east-west connectivity (which is identified as a major weakness in the current network) building on existing commitments to the Northern Hub and the electrification of the East-coast Mainline. It sets out a vision for faster east-west journey times delivered by an electrified, high speed line capable of supporting 140mph services between destinations in the north.

Local Growth Deals

2.2.29 The previous Conservative and Liberal Democrat Coalition Government expanded Growth Deals as part of its long-term plan to build a stronger economy and a more balanced society. Agreement was reached with all 39 Local Enterprise Partnerships (LEPs) to expand significantly the Growth Deals published in July 2014. The funding deals are to be devolved from Central Government into the hands of Local Authorities, businesses, colleges and universities with the intention of facilitating transport improvements to assist with local economic growth.

North East Growth Deal

2.2.30 The North East LEP Growth Deal states that it will drive growth across the area and support the ambition to create thousands of additional jobs over the next decade. The deal was negotiated following publication of the North East LEP Strategic Economic Plan (SEP), with the cornerstone of the review and SEP being the need to create over 60,000 new private sector jobs in the North East to create a balanced and sustainable economy. The North East LEP has secured £289.3m from the Local Growth Fund and by 2021 it is expected that the Growth Deal will have created at least 4,000 jobs within the region.

Tees Valley Growth Deal

2.2.31 The Tees Valley Growth Deal states that it will boost the economic growth of the region with investments in key transport, infrastructure, skills, innovation and business support projects. The Growth Deal will bring together local, national and private funding in addition to providing the freedom and flexibility to focus on three key priority areas as identified in the LEP Strategic Economic Plan (SEP). The Tees Valley LEP has secured £90.3m from the Local Growth Fund and by 2021 it is expected that the Growth Deal will have created at least 1,000 jobs and will facilitate the construction of around 1,500 new homes. The more recently published Tees Valley Devolution Agreement states that a Combined Tees Valley Authority will be created as soon as possible. The Tees Valley Devolution Agreement will enable the Combined Authority to create an Investment Fund, through a 30 year initial allocation of funding for capital financing of at least £15 million a year.

York, North Yorkshire and East Riding Growth Deal

2.2.32 The York, North Yorkshire and East Riding (YNYER) Growth Deal states that it supports the area's ambition to become a national and international centre for the science of food, agri-tech and bio-renewables. The Growth Deal builds on a strong local track record in supporting small and micro businesses to thrive and grow. It also addresses the key issues of housing availability and affordability in key growth towns across the LEP area, in addition to improving the existing transport network to support local growth. The York, North Yorkshire and East Riding LEP has secured £110.1m from the Local Growth Fund and by 2021 it is expected that the Growth Deal will have created at least 3,000 jobs and will facilitate the construction of around 4,000 new homes.

Cumbria Growth Deal

2.2.33 The Cumbria Growth Deal states that it will build on the existing strengths of the county across manufacturing, tourism, agriculture and logistics which have already seen economic growth of 46.1% between 2002 and 2012. The Cumbria LEP has secured £26.8m from the Local Growth Fund and by 2021 it is expected that the Growth Deal will have created at least 2,000 jobs and will facilitate the construction of 3,000 new homes. Additionally there is also an aspiration to deliver in excess of 62,000m^2 of commercial floorspace within the region.

Local Policy

Local Plans

2.2.34 National policy guidance places Local Plans at the heart of the planning system, where they are responsible for establishing a clear vision and a framework for the future development of an area.

2.2.35 These plans have been created to address local needs and opportunities in relation to housing, the economy, community facilities and infrastructure, in addition to providing the basis for safeguarding the environment, adapting to climate change and securing good design.

Northumberland Local Plan: Core Strategy Pre-Submission Draft

2.2.36 Consultation on the Northumberland Local Plan: Core Strategy ended in November 2015 and the document established a desire to develop healthier communities which are more resilient, sustainable and competitive by 2031.

2.2.37 By this time the Core Strategy also plans to provide 381ha of available land for economic development and 24,320 new homes (i.e. an average of around 1,216 residential dwellings per annum).

Core Strategy and Urban Core Plan for Gateshead and Newcastle upon Tyne 2010-2030

2.2.38 The Core Strategy was adopted in March 2015 and establishes a vision for 2030 that Gateshead and Newcastle will be prosperous and sustainable cities, which are unique, distinctive places to live, work and visit. An aspiration is present that residents are able to realise their full potential and enjoy a high quality of lifestyle within the region.

2.2.39 The Gateshead and Newcastle population has been estimated to increase by more than 50,000 people by 2030 which will require the creation of 30,000 new homes, 22,000 jobs and a minimum of 150 hectares of employment development.

2.2.40 In order to respond to these requirements the Urban Core is expected to see the creation of 3,750 new homes, at least 380,000m^2 of new office space and 50,000m^2 of additional retail space.

Durham Local Plan

2.2.41 The Durham Local Plan was rejected by the Inspector and subsequently withdrawn. The Plan's main aims were to create 23,000 new jobs in Country Durham, including 411Ha of new employment land, and providing 31,400 additional homes. A revised Local Plan is currently being drafted with the examination of associated evidence base material anticipated during spring of 2016.

Darlington Local Development Framework: Core Strategy

2.2.42 The Darlington Local Plan is currently under development, however, the corresponding Local Development Framework was adopted in May 2011 and covered the period 2011-2026. It states that provision will be made for up to 235ha of additional land for general and mixed use employment across the borough.

2.2.43 An additional 12,000m^2 of comparison retail space is expected to be required during the five-year period up to 2021. Over the period 2011-2026 it has been forecast that around 8,675 additional homes will be required within the borough of Darlington (with 1,325 of those required between 2016-2021).

Richmondshire Local Plan

2.2.44 The Richmondshire Local Plan 2012-2028 Core Strategy was adopted on 9 December 2014. Its vision for 2028 is that sustainable growth in the Richmondshire plan area's towns and villages supports the quality of life of rural communities and addresses their needs for local homes, work and leisure, through development and the provision of services. It states that housing provision will be based on 180 dwellings per annum and that 12 hectares of land for employment development will be brought forward in the period to 2028.

The Proposed Carlisle District Local Plan 2015-2030

2.2.45 The vision of the proposed Carlisle District Local Plan is that by 2030 the wider district (with the city at its heart) will have successfully asserted its position as a centre for activity and prosperity, as the capital and economic engine for a region encompassing Cumbria, the western fringes of Northumberland and extending into South West Scotland. Strategic growth is planned within the District of Carlisle, with an annual average of at least 565 new homes and an additional 45ha of employment related development constructed between 2015 and 2030. Sufficient land will also be identified within the city centre to accommodate around 18,700m^2 of comparison retail space.

Eden Local Plan: Preferred Options Consultation 2014-2032

2.2.46 The Eden Local Plan is a draft issue, with consultation now closed. Its vision is that by 2032 Eden will have created a more diverse and sustainable population with provision of housing, jobs, facilities and transport that meets the needs of the elderly and encourages younger people to stay in the district or

relocate from elsewhere. It states that a minimum of 200 homes per year (a total of 3,600) will be built in Eden between 2014/15 and 2031/32.

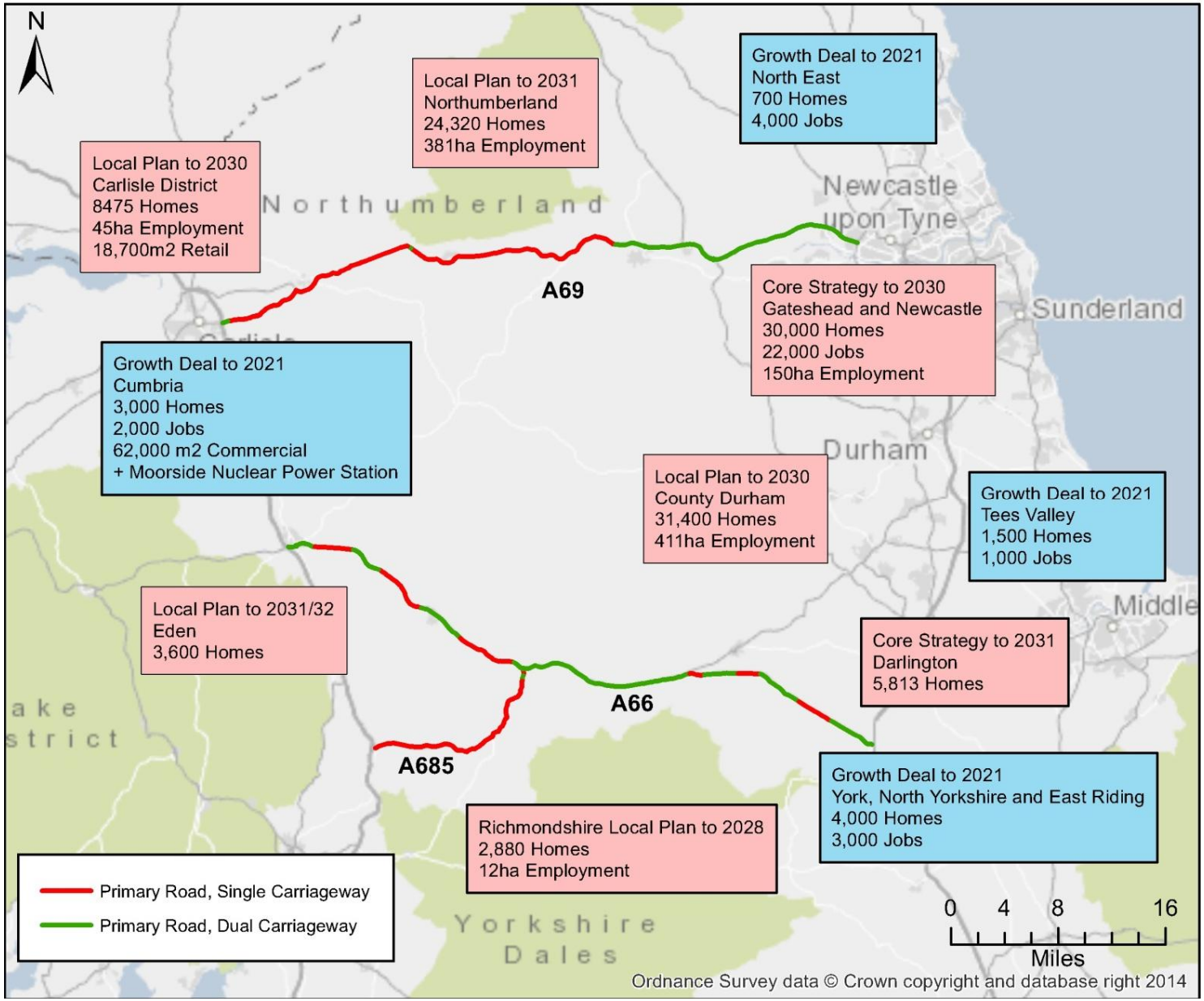
Summary of Growth Deal and Local Plan Aspirations

2.2.47 As discussed previously, projected development forecasts considered pertinent to the NTPR study have been assessed, with Table 2-1 providing details of the anticipated number of new homes and jobs, which will be associated with growth aspirations in the study area prior to 2031/32. Figure 2-1 illustrates the volume of residential and commercial development proposed for delivery prior to 2032.

Table 2-1: Growth Deal and Local Plan Development Forecasts to 2031/2032

Document	Homes	Jobs
North East Growth Deal	700	4,000
Tees Valley Growth Deal	1,500	1,000
York, North Yorkshire and East Riding Growth Deal	4,000	3,000
Cumbria Growth Deal	3,000	2,000
Northumberland Local Plan: Core Strategy Pre-Submission Draft	24,320	-
Core Strategy/Urban Core Plan for Gateshead and Newcastle upon Tyne	30,000	22,000
Durham Local Plan	31,400	22,000
Darlington Local Development Framework: Core Strategy	5,813	-
Proposed Carlisle District Local Plan	8,475	-
Eden Local Plan: Preferred Options Consultation	3,000	-
Total	**112,208**	**54,000**

Figure 2-1: Growth Deal and Local Plan Development Forecasts to 2031/2032



2.3 Socio-Economic Context

2.3.1 This section provides an insight into the current socio-economic context of the A69 and A66/A685 corridors. The specific details are presented in accordance with the following structure:

- Local Economic Performance
- Socio Demographic Overview
- Deprivation
- Journey to Work Patterns
- Skills and Qualifications
- Business Register Employment Survey

2.3.2 In order to gain an understanding of how the local area which forms part of this NTPR study may potentially benefit from enhancement options, consideration is given to the socio-economic characteristics of communities which surround the two corridors under consideration.

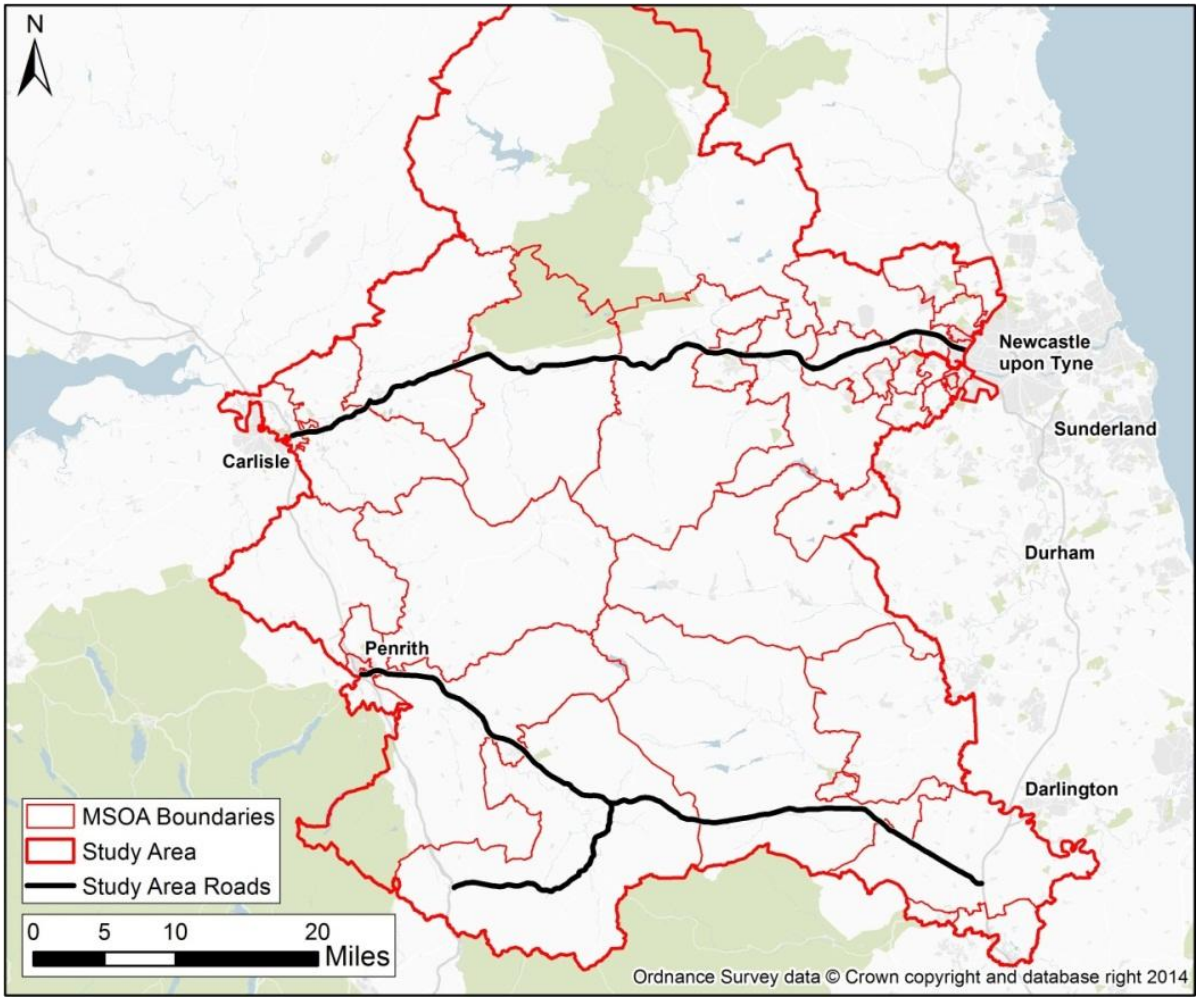
2.3.3 The starting point for such a study is recognition of the towns and conurbations immediately to the east and west of the two highway routes under consideration. The socio-economic characteristics of the Tyne and Wear conurbation and the city of Carlisle district are, therefore, considered within the context of a study of the A69 corridor.

2.3.4 The settlements of Darlington and the Tees Valley and Penrith/Kendal are considered within the context of a study of the A66/A685 corridor. Additionally the broader socio-economic conditions of the North East and North West regions are also analysed.

Local Economic Performance

2.3.5 In order to analyse the socio-economic context of the local area, which it is considered may potentially be affected by intervention options on the A69 and A66/A685 route sections that are the subject of this study, a Local Economic Impact Area (LEIA) has been defined. This is shown in Figure 2-2 on the following page of this report.

Figure 2-2: Local Economic Impact Area



2.3.6 The LEIA has been defined using the Medium Super Output Area (MSOA)[1] geography that is used by the Office of National Statistics (ONS) for analysis and presentation of Census data. Visual inspection of open source Census 2011 Journey to Work (JTW) data revealed JTW movements to/from settlements along the A66/A685 and A69 corridors were tightly concentrated around the roads in question. Bounded by the M6 to the west and the A1 to the east, to capture these movements within a LEIA, a 5km buffer was defined around the A66/A685 and A69 and included any MSOA that was entirely or partially within this area.

A decision was taken not to sub-divide MSOAs in order to avoid the application of any arbitrary rules on splitting data. Reflecting the rural nature of the area served by the A66/A685 and A69, MSOAs in the vicinity of the two roads are large and this decision not to sub-divide MSOAs results in a contiguous area. Manual adjustments were made to include two MSOAs in the upper Wear Valley and remove one MSOA south and west of Carlisle that was predominantly located away from the immediate vicinity of the A69.

[1] Super Output Areas are built up from groups of Output Areas and are a geographic hierarchy designed to improve the reporting of small area statistics in England and Wales. Middle layer super output areas (MSOAs) have a minimum resident population of 5,000 and a minimum resident household of 2,000.

Socio- Demographic Overview

2.3.7 The age profile of the LEIA population is illustrated in Table 2-2. Within the LEIA, there are a larger proportion of people within the 65+ year age range compared to the national, North West (NW) and North East (NE) average. While the proportion of working population (17-64 years) in the NW and NE is comparable to the national average, in the LEIA the proportion of working population is smaller.

2.3.8 Looking at the neighbouring area, the proportion of people within the 65+ year age range in Carlisle, Tyne and Wear and Darlington is similar to the national average, whereas in Kendal the proportion of people within this age range is comparable to the LEIA as shown in Table 2-3. While the proportion of working population (17-64 years) in Kendal and Darlington is comparable to the LEIA, in Tyne and Wear and Carlisle the proportion of working population is larger and similar to the national average.

2.3.9 The economic status of the LEIA working age population is similar to the national average, with 63.9% of the population in full time employment as shown in Table 2-4. The proportion of population in full time employment in the NW and NE is lower than the LEIA and National average and there is greater unemployment in the NW and NE compared to the LEIA. Overall the working age population in the LEIA has a higher proportion in work than the regions within which it sits.

Table 2-2: LEIA Population and Age Profile

Age Group	LEIA Population	% of LEIA Population	% of National (England/Wales) Population	% of NW Population	% of NE Population
0-16 years	53,580	17.0	18.9	17.5	16.6
17-64 years	196,191	62.2	64.7	65.9	66.1
65+ years	65,443	20.8	16.4	16.6	17.3
Total	**315,214**	**100**	**100**	**100**	**100**

Data Source: ONS Census 2011 QS601EW - Economic activity

Table 2-3: Outer Study Area Population and Age Profile

Age Group	Carlisle	% of population	Kendal	% of population
0-16 years	16,011	18.6	5,989	18.3
17-64 years	54,926	63.7	20,369	62.1
65+ years	15,320	17.8	6,456	19.7
Age Group	Tyne & Wear	% of population	Darlington and Tees Valley	% of population
0-16 years	182,145	18.6	135,965	20.5
17-64 years	638,052	65.2	415,895	62.7
65+ years	158,309	16.2	110,931	16.7

Data Source: ONS Census 2011 QS601EW - Economic activity

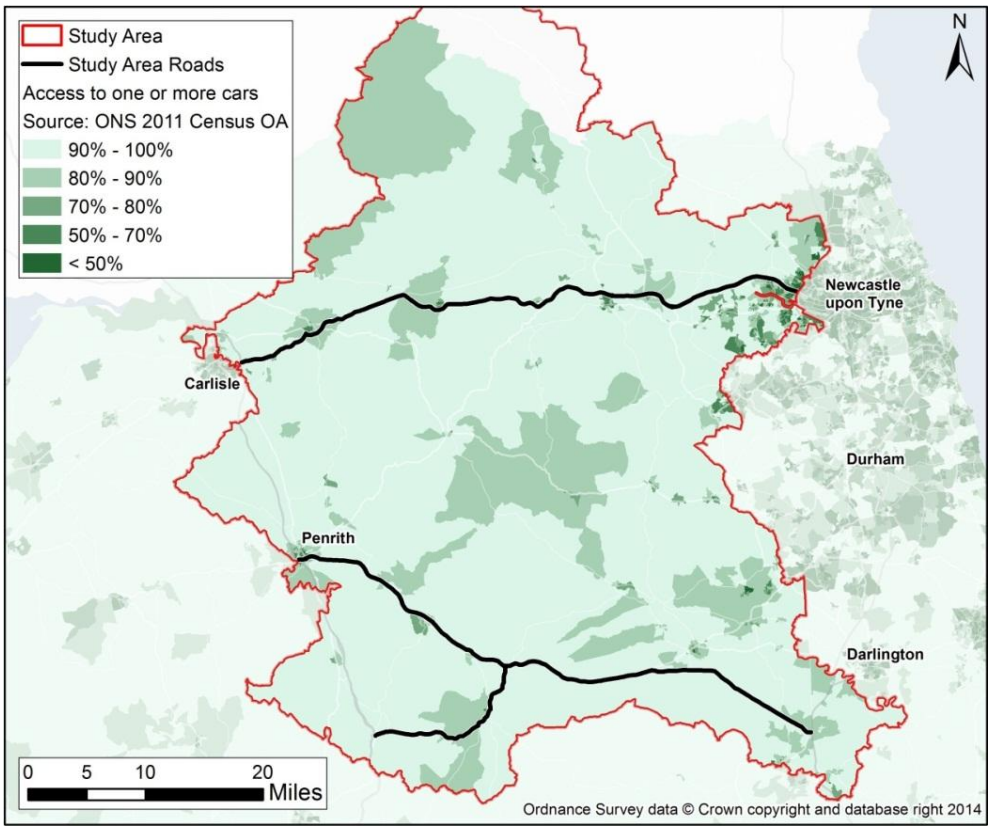
Table 2-4: LEIA Working Age Population – Economic Status

	LEIA Adult Population	% of LEIA Adult Population	% of National Adult Population	% of NW Population	% of NE Population
Employed	147,728	63.9	61.9	59.6	57.5
In education	5,789	2.5	3.4	3.5	3.3
Unemployed seeking work	7,579	3.3	4.4	4.7	5.4
Economically Inactive	70,213	30.4	30.3	32.2	33.9
Total	**231,309**	**100**	**100**	**100**	**100**

Data Source: ONS Census 2011 QS601EW - Economic activity

2.3.10 Figure 2-3 shows levels of household car ownership. Within the rural areas of the LEIA access to one or more car is generally high (80–100%) but lower in settlements along the A69 corridor and immediately to the west of the A1 in Newcastle compared to the A66 corridor. Access to one or more car is also slightly lower along the A685 corridor compared to the A66 corridor. These figures are notably higher than the England (including London) and Wales average where access to one or more car is 74%.

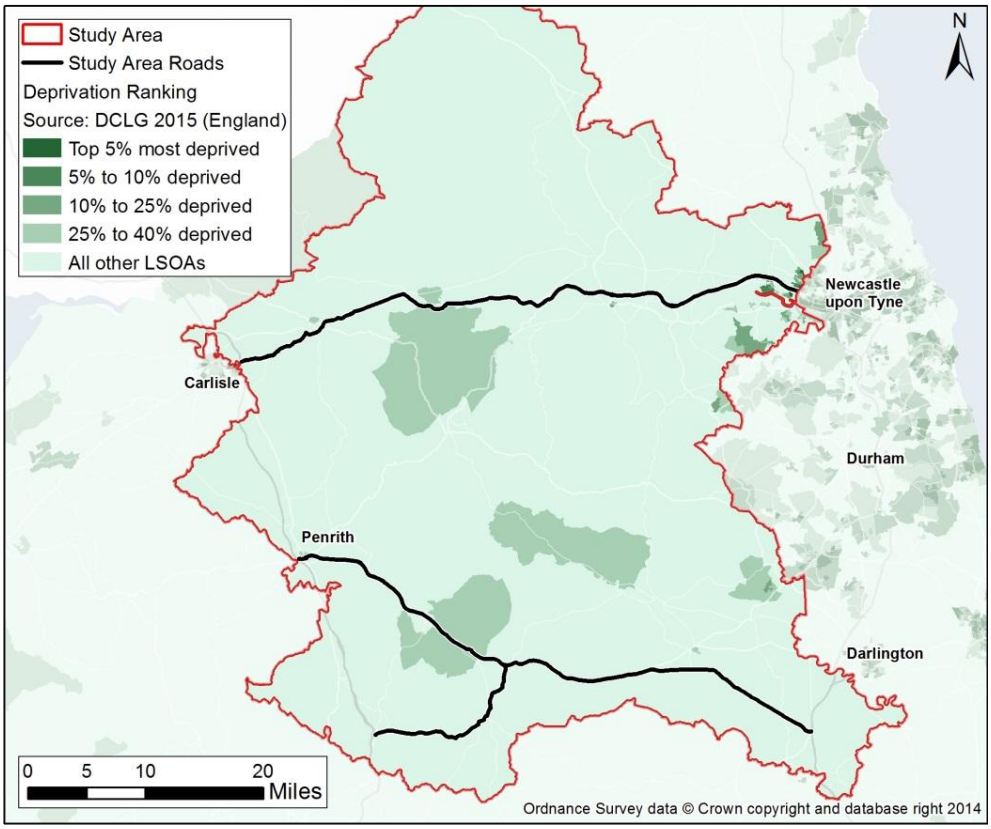
Figure 2-3: Local Economic Impact Area – Car Ownership



Deprivation

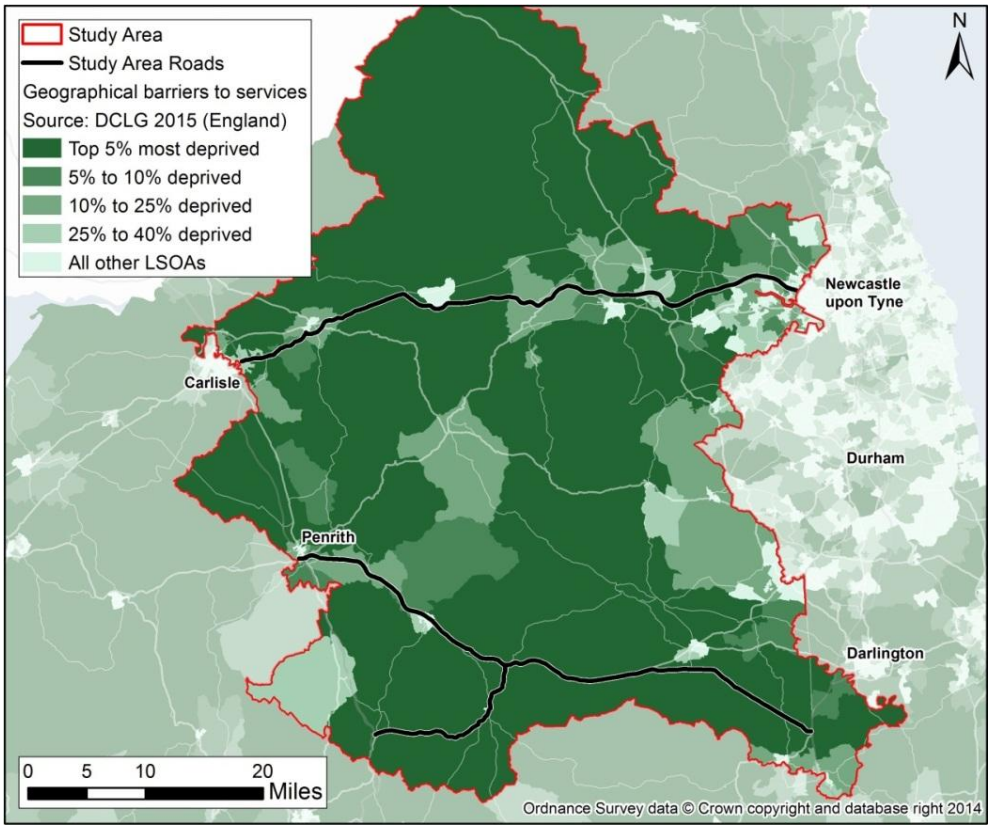
2.3.11 The English Indices of Multiple Deprivation 2015 identify the most deprived areas across the country. They combine a number of indicators - chosen to cover a range of economic, social and housing issues - into a single deprivation score for each area which is an overall measure of deprivation. The indices are used widely to analyse patterns of deprivation and identify areas that would benefit from special initiatives or programmes. Within the LEIA, the different dimensions of deprivation mostly reveal a low score as shown in Figure 2-4. The exception is the barrier to services domain which measures barriers to key local services, including road distance to a GP surgery, supermarket, primary school and Post Office.

Figure 2-4: Index of Multiple Deprivation



2.3.12 It can be seen from Figure 2-5 that a large number of MSOAS along the A66 corridor are ranked within the top 5% most deprived in the country due to distances between settlements, suggesting a reliance on the A66 for access to services and suggests that much of the LEIA may, therefore, be a priority for intervention through infrastructure improvements. The A69 corridor also scores highly on this particular index, although in a less marked way than the A66 corridor. Ultimately, the high deprivation scores on this index are a simple reflection of the rural nature of the LEIA.

Figure 2-5: Geographical barriers to services



Journey to Work Patterns

2.3.13 The 2011 Census based JTW dataset provides information on the modes and distances travelled by residents within a defined area to a place of work. Origin and destination information can also be used to reveal commuting patterns into and out of a particular area. Figure 2-6 shows the patterns of travel to work for those residents driving a car who have an origin within the LEIA. Using the same scale, Figure 2-7 and Figure 2-8 similarly show the patterns of travel to work for those residents commuting by bus and rail.

Figure 2-6: Journey to Work trips – Origin in LEIA Driving a Car

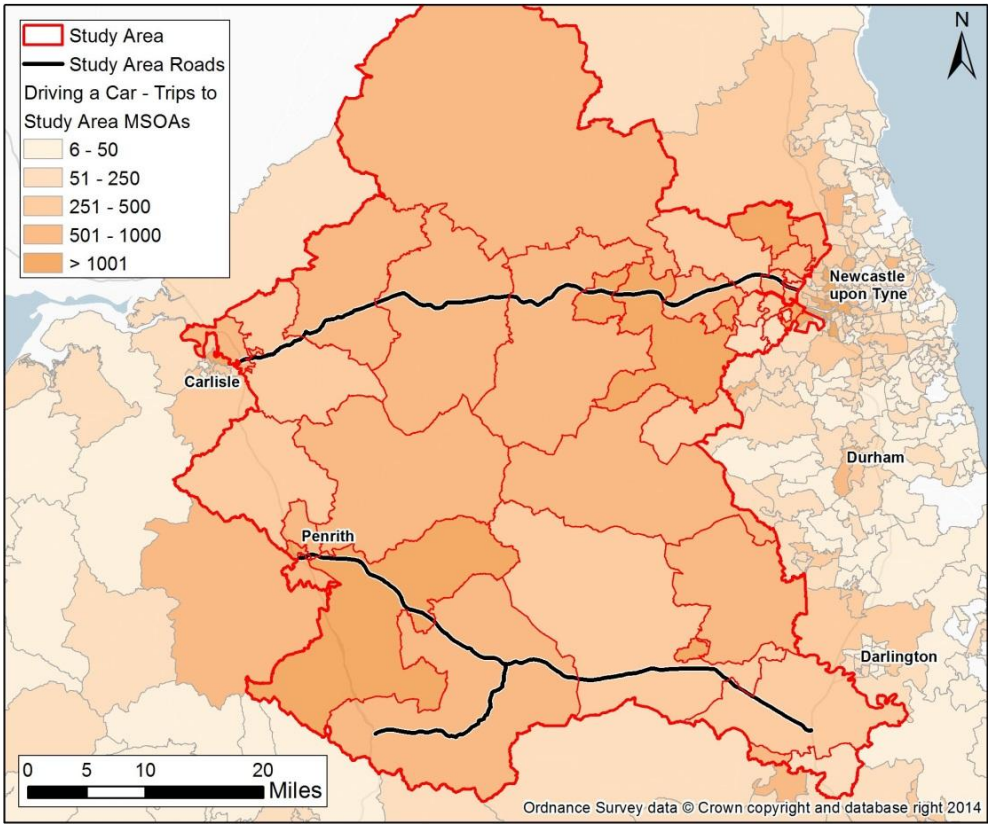


Figure 2-7: Journey to Work trips – Origin in LEIA Bus

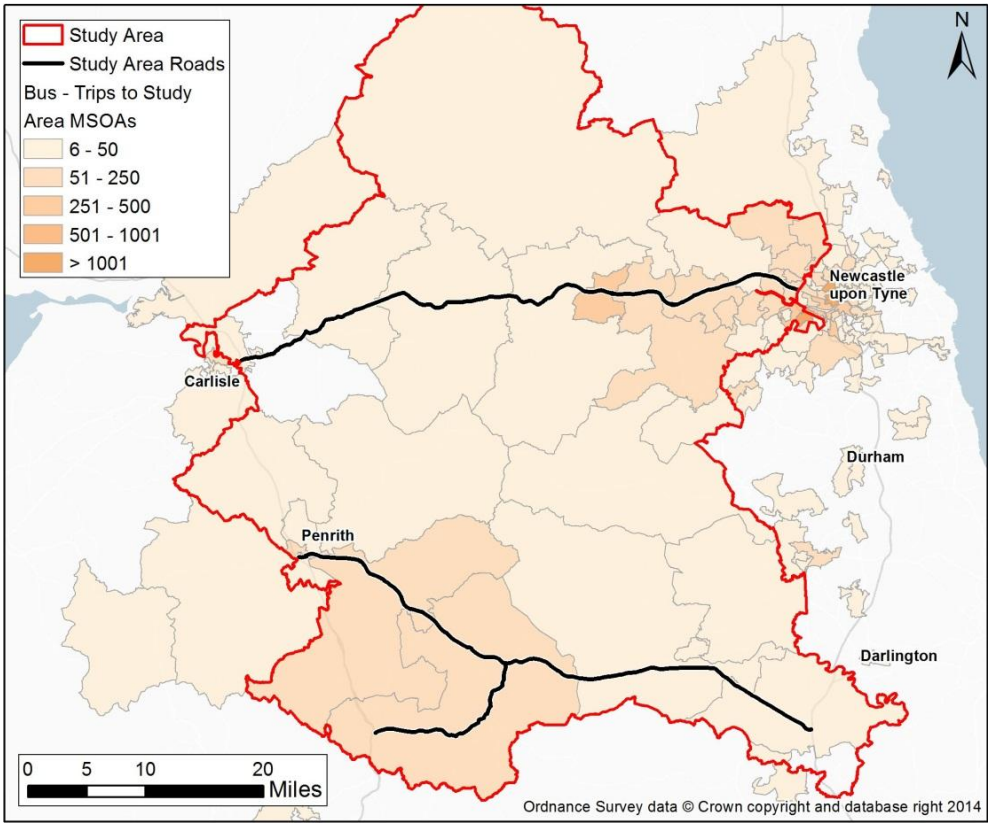
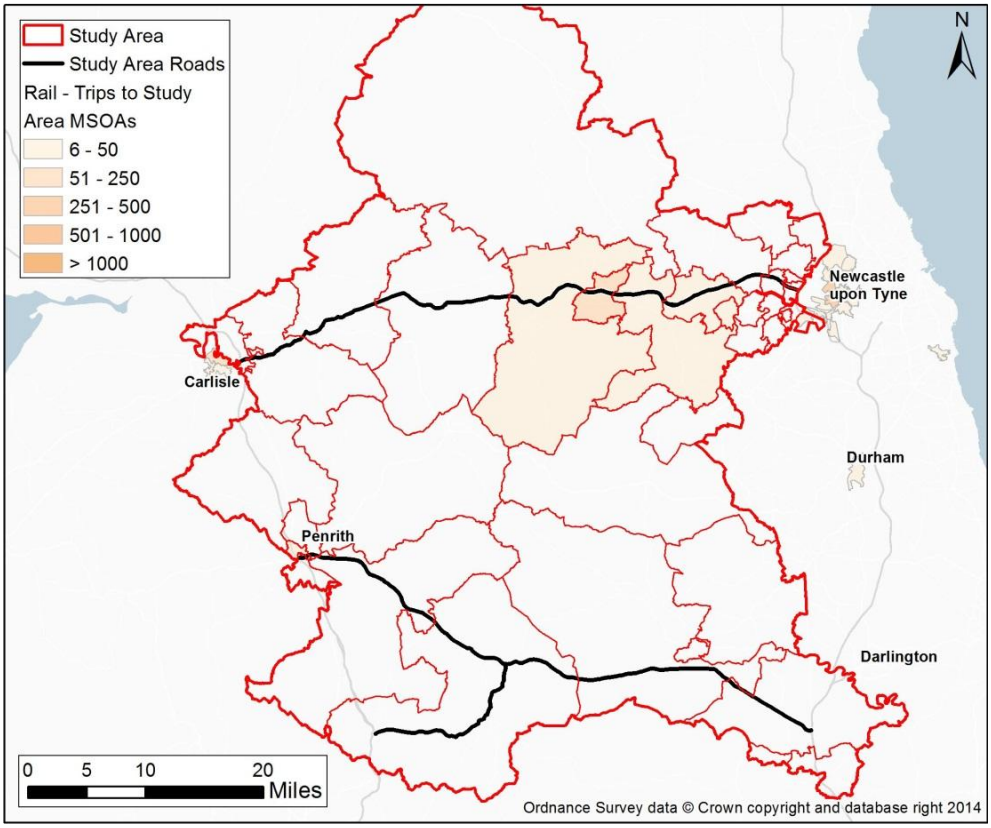


Figure 2-8: Journey to Work trips – Origin in LEIA Rail



2.3.14 The most popular mode for commuting to work is by car (75.2%), followed by bus (9.3%) and rail (0.9%) as shown at Table 2-5. The high proportion of trips using a car as the main mode for accessing jobs reflects the rural nature of the LEIA and the lack of public transport alternatives.

2.3.15 Table 2-6 illustrates that the majority of people within the LEIA have a destination either within the LEIA (50,019) or elsewhere within the NE or Yorkshire and the Humber (60,049). A smaller proportion of people have a destination in the NW (6,924). The large number of trips to destinations outside the LEIA are due to commuter flows from the suburbs of Newcastle (located to the west of the A1 and so within the LEIA) to employment opportunities within Newcastle and the NE.

2.3.16 Table 2-7 further illustrates the majority of people working within the LEIA have an origin within the LEIA or travel to the LEIA from the NE or Yorkshire and the Humber (33,325). In all cases, the most popular mode for commuting to work is by car.

2.3.17 The total number of residents with a destination in the LEIA or elsewhere in the NW, NE or Yorkshire and The Humber does not total the number of trips with an origin in the LEIA. Some of this difference of 1,725 trips is due to long distance commuter flows to other destinations in England and Wales. Some is considered to be a facet of mis-coding or some Census respondents detailing the headquarters of their employer rather than their usual place of work when answering the JTW questions.

Table 2-5: Journeys to Work – Mode Share

Mode	Mode Share – Origin in LEIA	Mode Share – Origin & Destination in LEIA
Car (driving a car + passenger in a car)	89,296 (75.2%)	35,178 (70.3%)
Bus	11,066 (9.3%)	2,529 (5.1%)
Rail	1,096 (0.9%)	170 (0.3%)
Other*	17,259 (14.5%)	12,142 (24.3%)
Total	**118,717**	**50,019**

Data Source: 2011 Census JTW data; * Other is derived from the following methods of travel to work: work mainly at or from home; underground, metro, light rail, tram; taxi; motorcycle, scoter or moped; bicycle; on foot; other method of travel to work; not in employment.

Table 2-6: Journeys to Work – Origins in LEIA

Origin in LEIA	Destination in LEIA	Destination elsewhere in NW	Destination elsewhere in NE or Yorkshire & The Humber
Car (driving a car + passenger in a car)	35,178	6,170	46,710
Bus	2,529	245	8,169
Rail	170	124	695
Other	12,142	385	4,475
Total	**50,019**	**6,924**	**60,049**

Data Source: 2011 Census JTW data. Note, origins in NW, NE or Yorkshire & The Humber exclude any MSOAs located within the LEIA.

2.3.18 Further analysis of the JTW data shows commuter travel from MSOAs that make up Carlisle and Kendal is predominantly to destinations in the NW, with some commuter flows to the east from Carlisle to destinations in the LEIA (Table 2-7).

Table 2-7: Journeys to Work – Destinations in LEIA

Destination in LEIA	Origin in LEIA	Origin in NW	Origin in NE or Yorkshire & The Humber
Car (driving a car + passenger in a car)	35,178	8,023	27,500
Bus	2,529	916	2,374
Rail	170	101	225
Other	12,142	1,054	3,226
Total	**50,019**	**10,094**	**33,325**

Data Source: 2011 Census JTW data. Note, origins in NW, NE or Yorkshire & The Humber exclude any MSOAs located within the LEIA.

2.3.19 Commuter flows to destinations in the NE and Yorkshire and The Humber are minimal. Conversely, commuter travel from MSOAs that make up Tyne and Wear and Tees Valley and Darlington are predominantly to destinations in the NE and Yorkshire and The Humber (Table 2-8). These two tables show that commuting from one end of the LEIA to the other is minimal. Figure 2-9 to Figure 2-11 further illustrates this 'watershed' across which employees are unlikely to commute.

Table 2-8: Journeys to Work – Origins West of LEIA

Origin	Destination in NW	% Destination in NW	Destination in LEIA	% Destination in LEIA	Destination in NE or Yorkshire & The Humber	% Destination in NE or Yorkshire & The Humber	Total
Carlisle	29,769	81.5%	6,218	17.0%	248	0.78%	36,520
Kendal	13,487	96.8%	266	1.9%	84	0.6%	13,926

Data Source: 2011 Census JTW data. Note, destinations in NW, NE or Yorkshire & The Humber exclude any MSOAs located within the LEIA

2.3.20 Analysis of JTW trips by car within the LEIA (Figure 2-9 and Figure 2-10) reveal a smaller number of trips are generated compared to destinations to the east and west of the LEIA. In rural MSOAs in the LEIA (such as Allendale, Figure 2-9) the majority of commuter trips generated have destinations within the MSOA. The analysis suggests the LEIA is a generator of trips rather than an attractor.

Figure 2-9: Journey to Work trips – Driving a Car

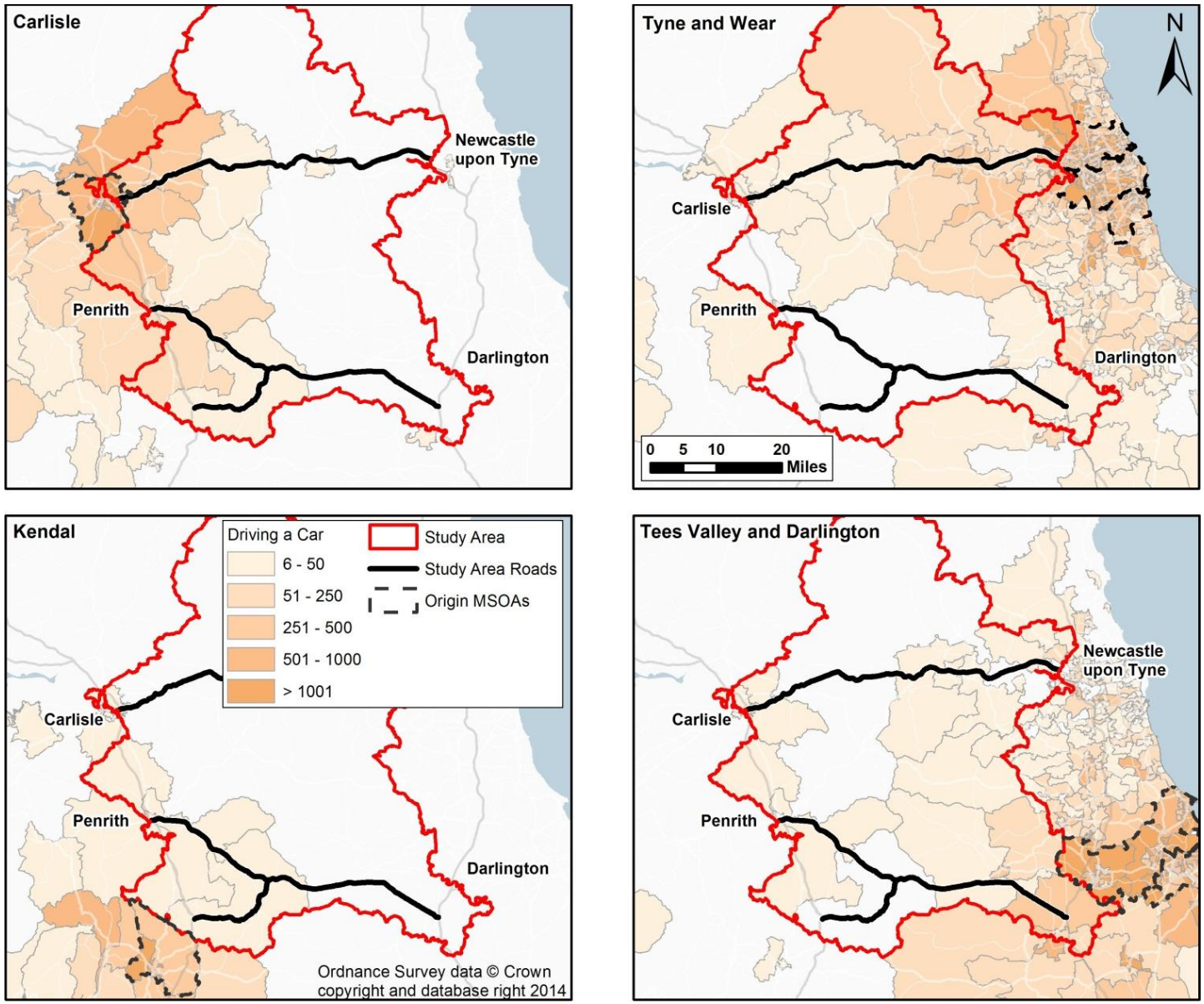


Figure 2-10: A69 Journey to Work trips - Driving a Car A69

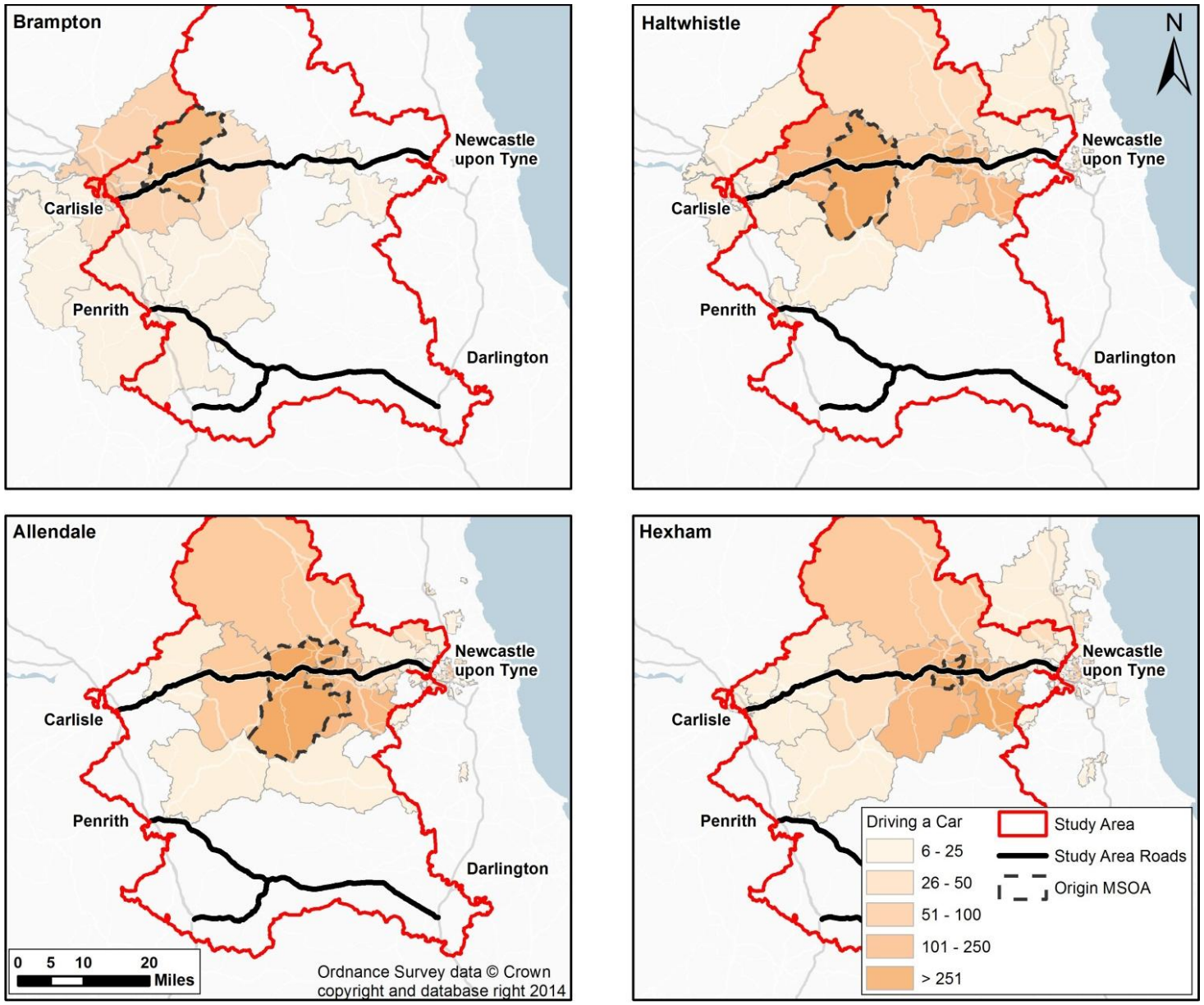
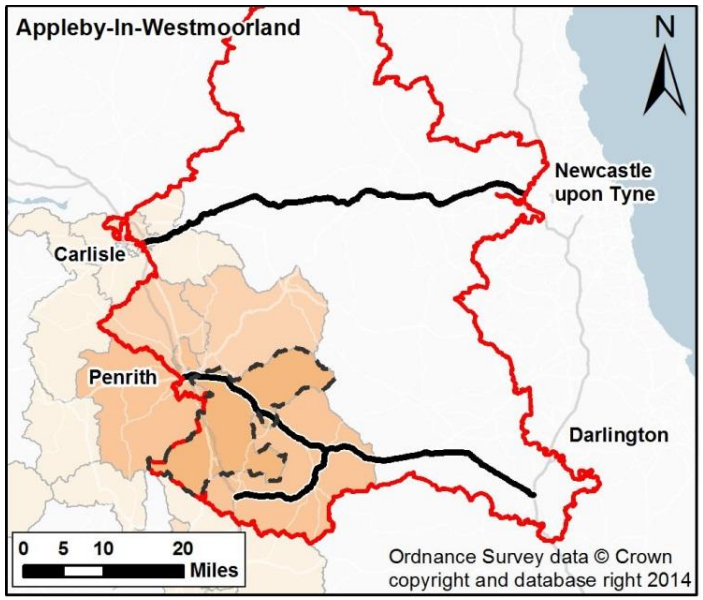
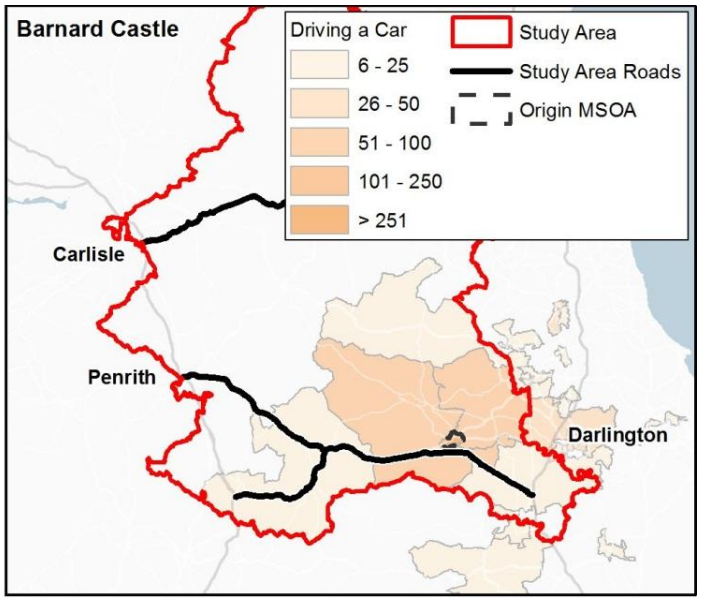


Figure 2-11: A66

Journey to Work trips – Driving a Car A66





Skills and Qualifications

2.3.21 Within the LEIA the level of skills (as measured by qualifications) is comparable to the England and Wales average, with over 40% of the population qualified to Level 4 or above (Table 2-9). Within the NW and NE, the corresponding proportion of population with a higher education qualification of NVQ Level 4 is lower, at 36.6% and 34.3% respectively. Similarly, in Carlisle, Tyne and Wear and Darlington, the proportion of population qualified to Level 4 or above is lower, ranging from 26.9-28.6% (Table 2-10). Overall, the population of the LEIA is more highly qualified than its surrounding area.

Table 2-9: Journeys to Work – Origins East of LEIA

Origin	Destination in NE or Yorkshire & The Humber	% Destination in NE or Yorkshire & The Humber	Destination in LEIA	% Destination in LEIA	Destination in NW	% Destination in NW	Total
Tyne & Wear	351,163	93.8%	15,367	4.1%	1,346	0.4%	374,204
Tees Valley and Darlington	237,542	97.7%	3,606	1.5%	636	0.3%	243,134

Data Source: 2011 Census JTW data. Note, destinations in NW, NE or Yorkshire & The Humber exclude any MSOAs located within the LEIA

Table 2-10: LEIA Education Attainment (as percentage of total 'qualifications' population)

	LEIA Population	% of LEIA Population	% of National Population
Level 1	34,842	19.4	19.5
Level 2	41,836	23.3	22.4
Level 3	30,572	17.0	18.1
Level 4 or above	72,193	40.2	40.0
Total	**179,443**	**100**	**100**

Data Source: ONS Census 2011 KS501EW - Qualifications and students

2.3.22 The occupational breakdown of the LEIA (as measured by occupation workforce) is also comparable to the England and Wales average as a whole and to the NW and NE (Table 2-11). One notable difference is an increase in the proportion of workforce in skilled trades occupations within the LEIA compared to the NW, NE and National average. The occupational breakdown of towns outside the LEIA (Carlisle, Kendal, Tyne and Wear and Darlington) also show an increase in the proportion of workforce in skilled trades occupations compared to the national average (Table 2-12). These towns show a large increase in the proportion of elementary occupations compared to the LEIA and national average. Further, in Carlisle, Tyne and Wear and Darlington there is a decrease in professional occupations compared to the LEIA and national average.

Table 2-11: Outer Study Area Education Attainment (as percentage of total 'qualifications' population)

	Carlisle	% of working population	Kendal	% of working population
Level 1	10,795	19.7	3,533	17.5
Level 2	11,592	21.1	4,387	21.5
Level 3	9,133	16.6	3,370	16.5
Level 4+ or above	14,758	26.9	8,111	39.8
	Tyne & Wear	% of working population	Darlington and Tees Valley	% of working population
Level 1	110,827	17.4	72,967	17.5
Level 2	121,302	19.0	86,725	20.9
Level 3	107,705	16.9	70,225	16.9
Level 4+ or above	182,278	28.6	110,042	26.5

Data Source: ONS Census 2011 KS501EW - Qualifications and students

Table 2-12: LEIA Occupation (as percent of Occupation workforce)

	LEIA Population	% of LEIA Population	% of National Population
Managers, directors and senior officials	16,777	11.1	10.8
Professional occupations	24,633	16.1	17.4
Associate professional and technical	17,265	11.3	12.7
Administrative and secretarial	16,499	10.8	11.4
Skilled trades occupations	22,153	14.5	11.5
Caring, leisure and other service	14,669	9.6	9.4
Sales and customer service	12,664	8.3	8.4
Process, plant and machine operatives	11,797	7.7	7.2
Elementary occupations	16,071	10.5	11.1
Total	**152,528**	**100**	**100**

Data Source: ONS Census 2011 KS608EW to KS610EW - Occupation by sex

Table 2-13: Outer Study Area Occupation (as percentage of Occupation workforce)

	Carlisle	% of working population	Kendal	% of working population
Managers, directors and senior officials	5,124	9.3	2,602	12.8
Professional occupations	7,417	13.5	4,038	19.8
Associate professional and technical	5,233	9.5	2,334	11.5
Administrative and secretarial	7,991	14.5	3,041	14.9
Skilled trades occupations	8,076	14.7	3,720	18.3
Caring, leisure and other service	6,071	11.1	2,239	11.0
Sales and customer service	7,533	13.7	2,802	13.8
Process, plant and machine operatives	8,746	15.9	1,995	9.8
Elementary occupations	11,285	20.5	3,547	17.4

Data Source: ONS Census 2011 KS608EW to KS610EW - Occupation by sex

Table 2-14: Outer Study Area Occupation (as percentage of Occupation workforce)

	Tyne & Wear	% of working population	Darlington and Tees Valley	% of working population
Managers, directors and senior officials	49,426	7.7	34,799	8.4
Professional occupations	95,045	14.9	58,824	14.1
Associate professional and technical	64,464	10.1	42,624	10.2
Administrative and secretarial	93,099	14.6	54,111	13.0
Skilled trades occupations	86,869	13.6	62,078	14.9
Caring, leisure and other service	63,389	9.9	47,248	11.4

	Tyne & Wear	% of working population	Darlington and Tees Valley	% of working population
Sales and customer service	87,300	13.7	54,028	13.0
Process, plant and machine operatives	68,775	10.8	50,178	12.1
Elementary occupations	122,430	19.2	80,838	19.4

Data Source: ONS Census 2011 KS608EW to KS610EW - Occupation by sex

Business Register Employment Survey

2.3.23 The Business Register and Employment Survey (BRES) is a source of workplace-based employment data. It is comprehensive in terms of the geographic granularity at which the data can be extracted. Data can be extracted by MSOA and Lower Super Output Area (LSOA) as well as a less granular level of geography such as Local Authority District (LAD) and Government Office Region (GOR).

2.3.24 BRES is comprehensive in terms of industrial sector disaggregation. Data is extracted at 5 digit SIC (Standard Industrial Classification)[2] level, 2/3/4 digit SIC level and Broad Industrial Category level.

2.3.25 To gain an overview of the industrial makeup of employment in the LEIA, jobs by broad industrial category have been analysed. Broadly, the analysis shows that significant industries in the LEIA are manufacturing, accommodation/food services, wholesale/retail services and human health activities.

2.3.26 Location quotients show the level of concentration of an industry compared to the scale of that same industry at a national level. A location quotient of one indicates that the concentration of an industry at a local level is the same as the concentration at a national level. A location quotient above one indicates higher concentration and a location quotient below one indicates lower concentration. It is a good way of gauging clustering at a local level. We have developed location quotients of the LEIA by industry. The results in Table 2-15 show that mining is a particularly strong industry in the study area with a location quotient of 3.63, which means that employment concentration in the mining industry in the LEIA is 3.63 times greater than it is at a national level.

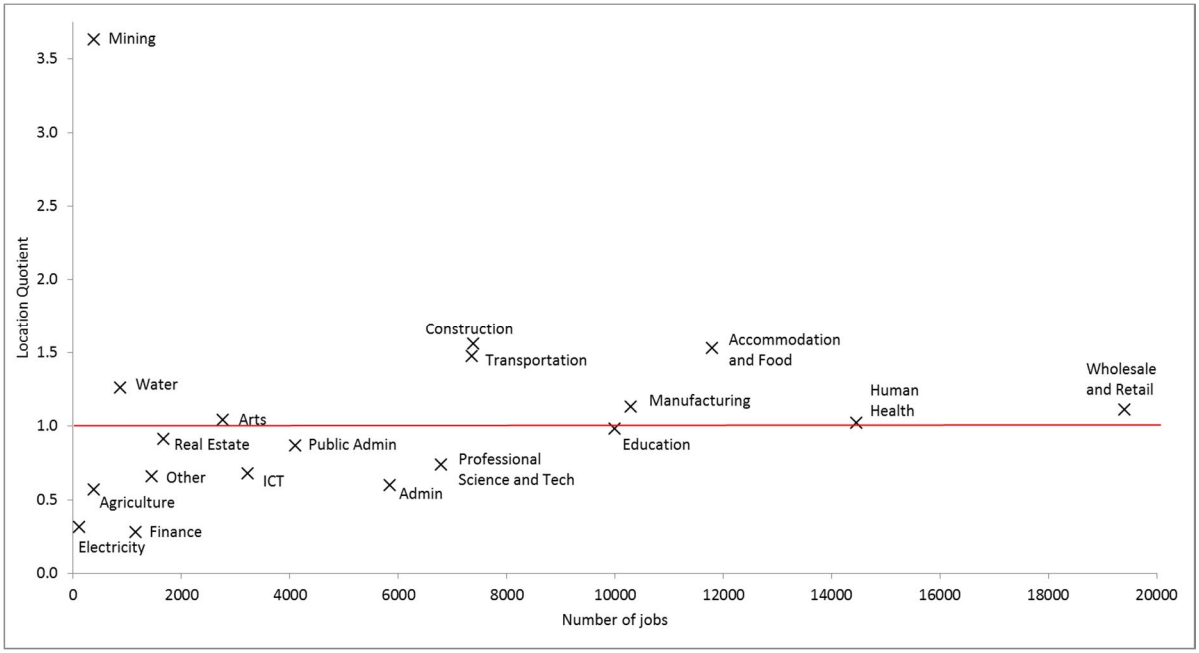
Table 2-15: LEIA Jobs by Industry

Industry	LEIA Jobs	% of LEIA Jobs	Location Quotient (LQ)	Industry % of National Jobs
Agriculture	393.0	0.4%	0.57	0.6%
Mining	386.0	0.4%	3.63	0.1%
Manufacturing	10295.0	9.4%	1.13	8.3%
Electricity	121.0	0.1%	0.31	0.4%
Water	874.0	0.8%	1.26	0.6%
Construction	7394.0	6.7%	1.56	4.3%
Wholesale and retail	19413.0	17.7%	1.11	16.0%

[2] Standard Industrial Classification (SIC) levels are used to classify business establishments and other statistical units by the type of economic activity in which they are engaged.

Industry	LEIA Jobs	% of LEIA Jobs	Location Quotient (LQ)	Industry % of National Jobs
Transportation	7363.0	6.7%	1.47	4.6%
Accomm and food	11803.0	10.8%	1.53	7.0%
ICT	3226.0	2.9%	0.68	4.3%
Finance	1158.0	1.1%	0.28	3.8%
Real estate	1677.0	1.5%	0.91	1.7%
Professional, science and tech	6801.0	6.2%	0.74	8.4%
Admin	5845.0	5.3%	0.60	8.9%
Public admin	4112.0	3.8%	0.87	4.3%
Education	9998.0	9.1%	0.98	9.3%
Human health	14468.0	13.2%	1.02	12.9%
Arts	2766.0	2.5%	1.04	2.4%
Other	1459.0	1.3%	0.66	2.0%
Total	**109552.0**	**100%**		**100%**

Figure 2-12: LEIA Jobs by Industry and Location Quotient



2.3.27 To add further context to this clustering analysis it is important to report the size of industry rather than just its employment concentration compared to the employment concentration at a national level.

2.3.28 Figure 2-12 shows the importance of applying this context. As already stated mining has a high location quotient, but this is due to the very low employment concentration of the mining industry at a national level rather than a strong mining industry in the LEIA. This chart demonstrates that of the

industries that provide jobs for a significant portion of the workforce, construction, transport and accommodation/food services have location quotients above 1.5. These industries are particularly strong in the LEIA.

2.3.29 It is important to note that these industries are not projected to grow as fast as knowledge based industries such as finance and professional, science and tech industries (based on estimates and projections of employment as part of the Working Futures project[3]). The knowledge based industries - which are growing quickly - are underrepresented in the LEIA. Finance, for instance has a location quotient of 0.28 and overall jobs total of 1,158 in the LEIA.

2.3.30 Analysis of the size of industries to the east and west of the LEIA reveal human health, wholesale/retail, manufacturing and education account for over half the jobs as show in Table 2-16 and Table 2-17. These industries also account for almost half (49.5%) of the jobs in the LEIA, whereas nationally, these industries account for a smaller proportion of jobs (46.5%) as shown earlier in Table 2-15.

Table 2-16: Outer Study Area (East) Jobs by Industry

Industry	Darlington and Tees Valley		Tyne and Wear	
	Jobs	LQ	Jobs	LQ
Agriculture	48	0.03	79	0.03
Mining	1314	5.47	62	0.14
Manufacturing	22886	1.11	49065	1.27
Electricity	1153	1.33	3466	2.13
Water	1671	1.07	1364	0.46
Construction	13038	1.22	16598	0.82
Wholesale and retail	41032	1.04	65354	0.88
Transportation	10893	0.96	19057	0.90
Accom and food	13050	0.75	28189	0.86
ICT	3980	0.37	16396	0.81
Finance	5731	0.61	13493	0.77
Real estate	3459	0.83	8035	1.03
Professional, science & tech	18095	0.87	24724	0.63
Admin	16023	0.73	40894	0.99
Public admin	13517	1.26	36321	1.81
Education	25002	1.09	41748	0.97
Human health	47797	1.49	79548	1.33
Arts	5610	0.94	11163	0.99

[3] Working Futures 2012 – 2022, UK Commission for Employment and Skills.

Industry	Darlington and Tees Valley		Tyne and Wear	
	Jobs	LQ	Jobs	LQ
Other	3152	0.63	9035	0.96
Total	**247451**	-	**464591**	-

Data Source: BRES

Table 2-17: Outer Study Area (West) Jobs by Industry

Industry	Carlisle		Kendal	
	Jobs	LQ	Jobs	LQ
Agriculture	16	0.05	9	0.08
Mining	9	0.20	5	0.29
Manufacturing	5097	1.30	2390	1.62
Electricity	59	0.36	124	2.00
Water	196	0.66	179	1.60
Construction	2226	1.09	819	1.07
Wholesale and retail	9428	1.25	3999	1.42
Transportation	2800	1.30	327	0.40
Accom and food	2971	0.89	1230	0.99
ICT	667	0.33	295	0.38
Finance	860	0.48	250	0.37
Real estate	971	1.22	379	1.27
Professional, science & tech	1985	0.50	746	0.50
Admin	2714	0.65	569	0.36
Public admin	2778	1.36	829	1.08
Education	3455	0.79	1397	0.85
Human health	8942	1.46	2913	1.27
Arts	1043	0.91	690	1.61
Other	1021	1.07	547	1.53
Total	**47238**	**-**	**17697**	**-**

Data Source: BRES

Current Socio-Economic Context – Key Points
Within the Local Economic Impact Area (LEIA) there is a larger proportion of people aged 65+ than the national, NW and NE averages; the working age population has a higher proportion in work than surrounding regions; access to more than one car is higher than the national average.
The LEIA scores low on most Indices of Multiple Deprivation (IMD) except the barriers to service domain where most parts of the LEIA are within the top 5% most deprived areas of England, a reflection of the rural nature of the area.
75% of journeys to work are made by car and less than 1% are made by rail.
70% of journeys to work from the LEIA are to destinations outside the LEIA, and there is a clear north-south watershed across which employees are unlikely to commute.
Overall the population of the LEIA is more highly qualified than its surrounding area, with a higher proportion of people in skilled trades than the NW, NE and national average.
Construction, transport, accommodation and food services are particularly strong industries within the LEIA.

2.4 Transport Context

2.4.1 This section provides an insight into the current transport context associated with the A69 and A66/A685 corridors. The specific details are presented in accordance with the following structure:

- Strategic Highways Overview
- Rail Infrastructure and Services
- Long Distance Bus and Coach Services
- Freight Demand
- Ports and Airports

Strategic Highways Overview

2.4.2 In order to establish the current situation with regards to the transport context on the A69 and A66/A685 corridors, a strategic overview of the two routes has been prepared, which presents an evidence base relating to the following specific subject areas:

- Network Description and Statistics
- Traffic Flow Profile
- Traffic Congestion
- Journey Times and Reliability

Network Description and Statistics

2.4.3 The North Pennines region of England is located between Darlington to the east and Carlisle to the west. It is bounded by the Tyne Valley to the north and the Stainmore Gap to the south. The A69 and A66/A685 represent the primary east-west corridors which cross the North Pennines region. In the context of the wider national strategic road network, the two routes are relatively lightly trafficked in terms of average daily flows, with commercial vehicle usage typically averaging around 10-30% of the total volume of vehicle movements.

2.4.4 Throughout this NTPR study commercial traffic will be defined as any vehicle exceeding 6.5 metres in length. This methodology allows the total quantum of traffic using the various corridors to be

compared against the volume of freight based trips, which commonly consist of Light Goods Vehicles (LGV) and Heavy Goods Vehicles (OGV1/OGV2).

2.4.5 Figure 2-13 shows the A69 and A66/A685 corridors in the context of the North Pennines region of England and identifies road classification associated with highway links adjacent to the study area. Figure 2-14 identifies residential settlements which are located within 1 kilometre of these routes.

Figure 2-13: A69 and A66/A685 Corridors with the Road Classification of Surrounding Highway Links

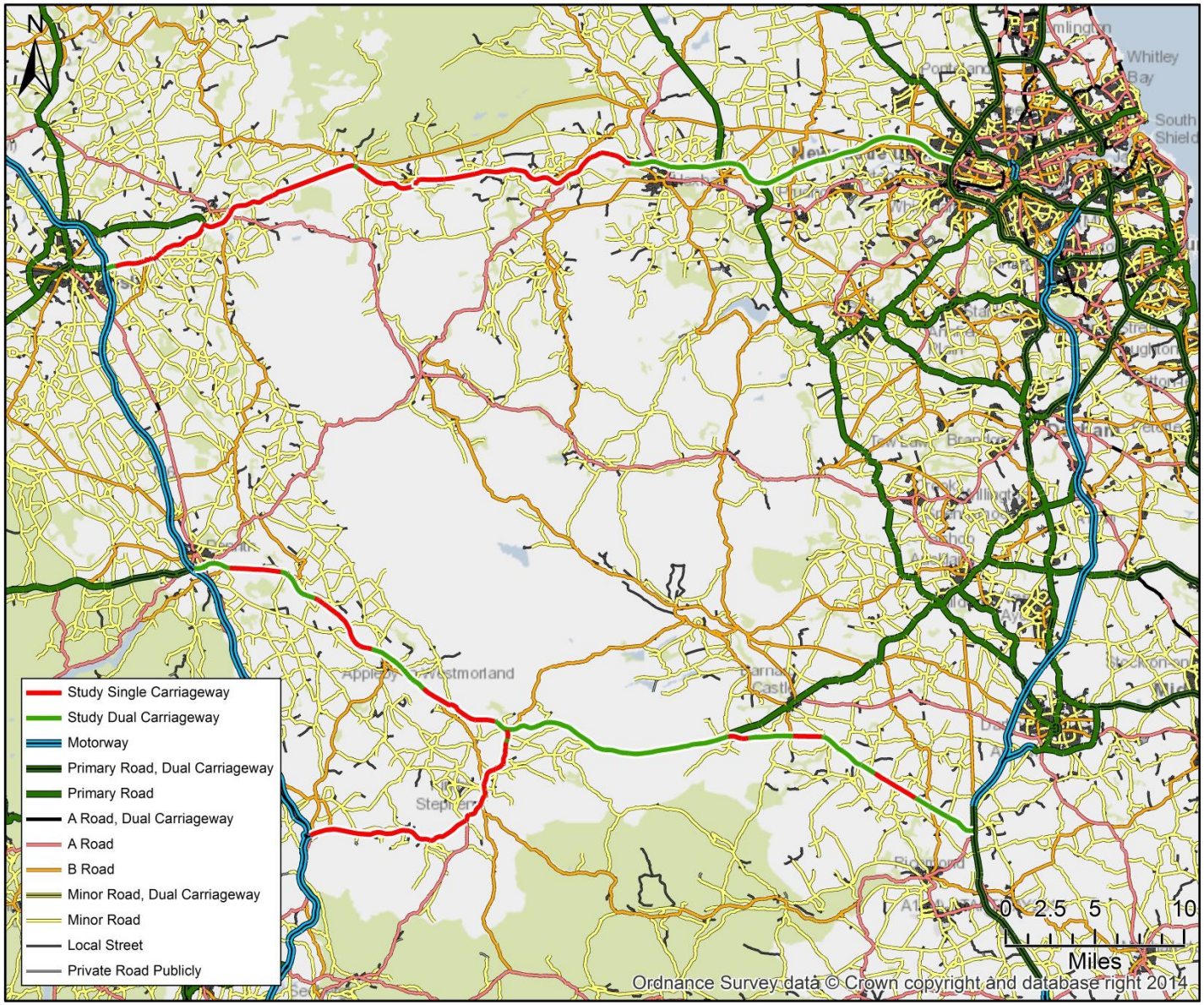
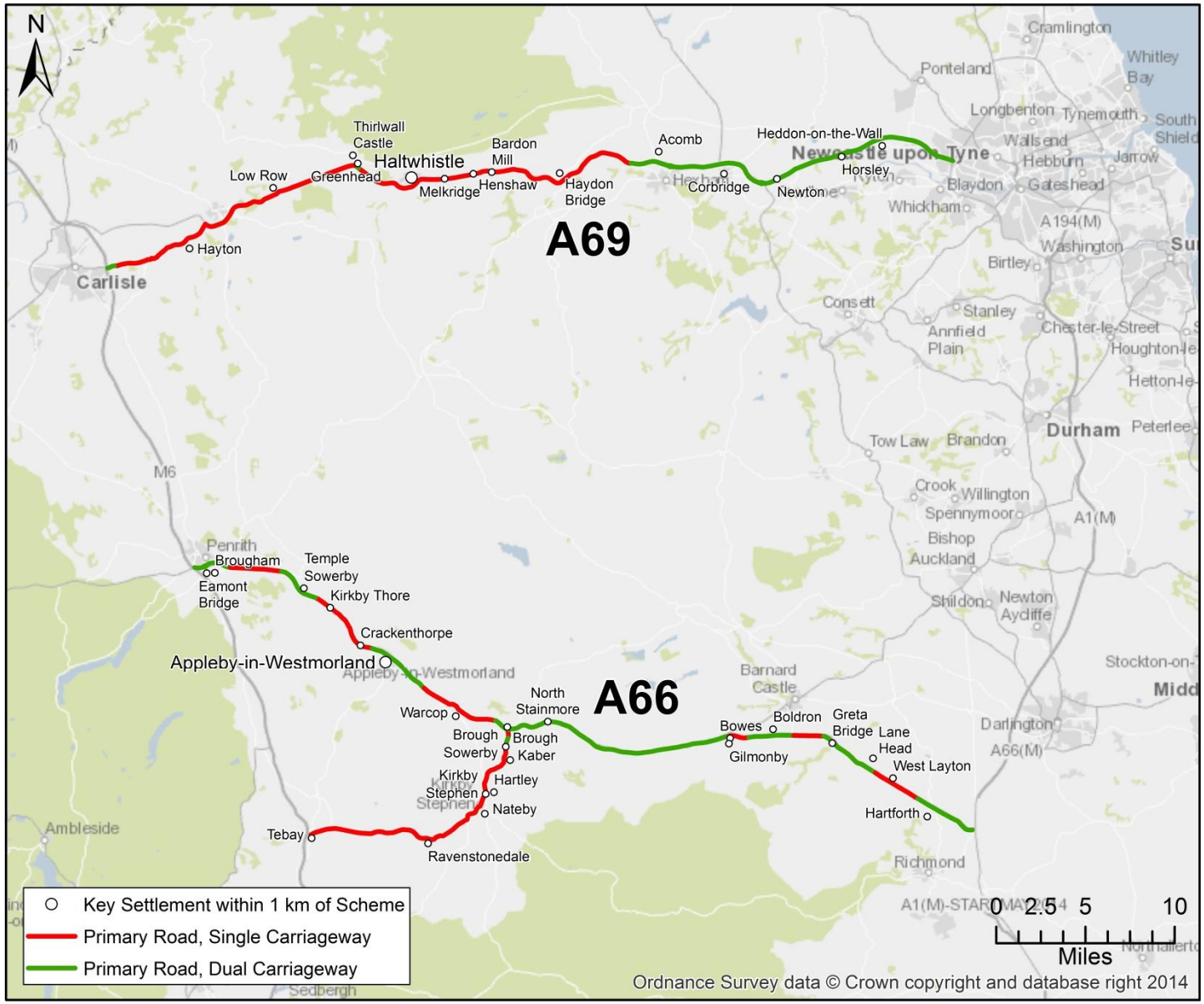


Figure 2-14: Location of Residential Settlements within 1 Kilometre of the A69 and A66/A685 Corridors



A69 Corridor

2.4.6 The A69 corridor provides a direct connection between the A1 at Newcastle upon Tyne and the M6 at Carlisle (with a section length of approximately 52.3 miles) linking industrial centres of the North East with those located in the North West of England and Scotland. It also facilitates a connection with Northern Ireland via numerous west coast ports and harbours.

2.4.7 The road is a Design, Build, Finance and Operate (DBFO) route, which forms part of the Trans-European Network (TEN-T). The route is primarily rural in nature and is entirely dual carriageway for the easternmost 19.47 mile section between Newcastle upon Tyne and Hexham. The westernmost 32.85 mile section between Hexham and Carlisle is single carriageway, with the exception of a short stretch of dual carriageway at the junction interface with B630 (Greenhead) and on the approach to the grade-separated roundabout junction with the M6 (as documented in Table 2-18).

Table 2-18: A69 Corridor Sections and Corresponding Carriageway Standard

Section	Start	End	Carriageway Standard
M6 – Scotby	M6 J43	Scotby	Dual Carriageway (1970)
Scotby – Brampton	Scotby	Brampton (W)	Single Carriageway
Brampton Bypass	Brampton (W)	Brampton (E)	Single Carriageway
Brampton – Greenhead	Brampton (E)	Greenhead (W)	Single Carriageway
Greenhead Bypass	Greenhead (W)	Greenhead (E)	Dual Carriageway (1986)
Greenhead - Haltwhistle	Greenhead (E)	Haltwhistle (W)	Single Carriageway
Haltwhistle Bypass	Haltwhistle (W)	Haltwhistle (E)	Single Carriageway
Haltwhistle – Haydon Bridge	Haltwhistle (E)	Haydon Bridge (W)	Single Carriageway
Haydon Bridge Bypass	Haydon Bridge (W)	Haydon Bridge (E)	Single Carriageway
Haydon Bridge – Hexham	Haydon Bridge (E)	Hexham (W)	Single Carriageway
Hexham Bypass	Hexham (W)	Hexham (E)	Dual Carriageway (1977)
Hexham – Corbridge	Hexham (E)	Corbridge (W)	Dual Carriageway (1977)
Corbridge Bypass	Corbridge (W)	Corbridge (E)	Dual Carriageway (1977)
Corbridge – Horsley	Corbridge (E)	Horsley (W)	Dual Carriageway (1988)
Horsley Bypass – A1	Horsley (W)	A1 J75	Dual Carriageway (1976)

2.4.8 The A69 corridor is currently responsible for carrying in excess of 12,000 vehicles per day in each direction (approximately 9-10% of which consists of commercial traffic) between the A1 at Newcastle upon Tyne and the A68 at Corbridge. To the west, traffic movement between the A68 and M6 at Carlisle is typically over 6,000 vehicles per day in each direction (approximately 7-16% of which

consists of commercial traffic). As will be discussed in greater detail later in this section, current annual average daily traffic (AADT) volumes are considerably below the theoretical operational capacity of a highway link of this standard.

2.4.9 On the western section of the corridor, the A69 passes through the village of Warwick Bridge (City of Carlisle District of Cumbria) where there is a 30mph speed limit that acts as a traffic calming measure throughout the rural settlement. This is the only 30mph section of trunk road which forms part of the A69 route and the impact on reduced vehicular speed at this point on the network can result in the formation of localised traffic delay during peak operating periods.

2.4.10 Figure 2-15 to Figure 2-18 shows the individual sections of the A69 corridor which fall within the study area, highlighting the presence of existing highway infrastructure such as roundabouts, bridges, flyovers, tunnels, merge points and the length of any single or dual carriageway sections of road. It can clearly be seen that existing roundabout junctions with the M6, A1, A68, A689 and A6079 all have the potential to disrupt the free-flow of traffic using the A69 to travel between east and west.

Figure 2-15: Highway Infrastructure Plan of the A69 Corridor (Section 1 – Carlisle to Brampton)

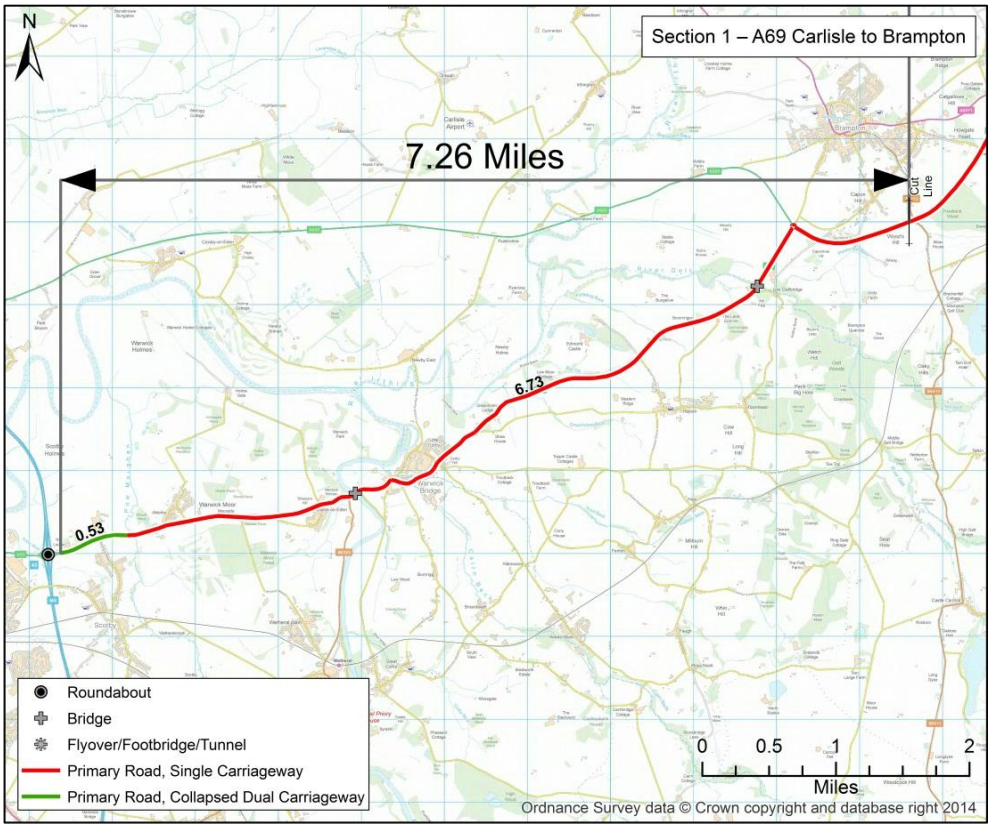


Figure 2-16: Highway Infrastructure Plan of the A69 Corridor (Section 2 – Brampton to Haltwhistle)

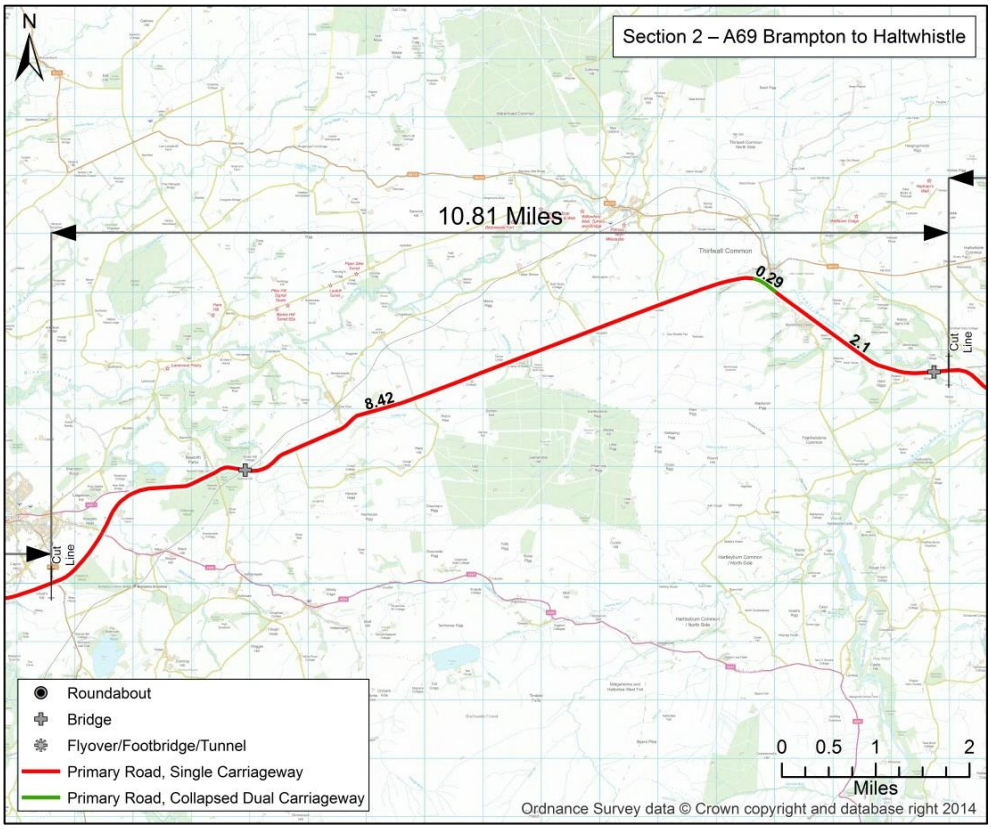


Figure 2-17: Highway Infrastructure Plan of the A69 Corridor (Section 3 – Haltwhistle to Hexham)

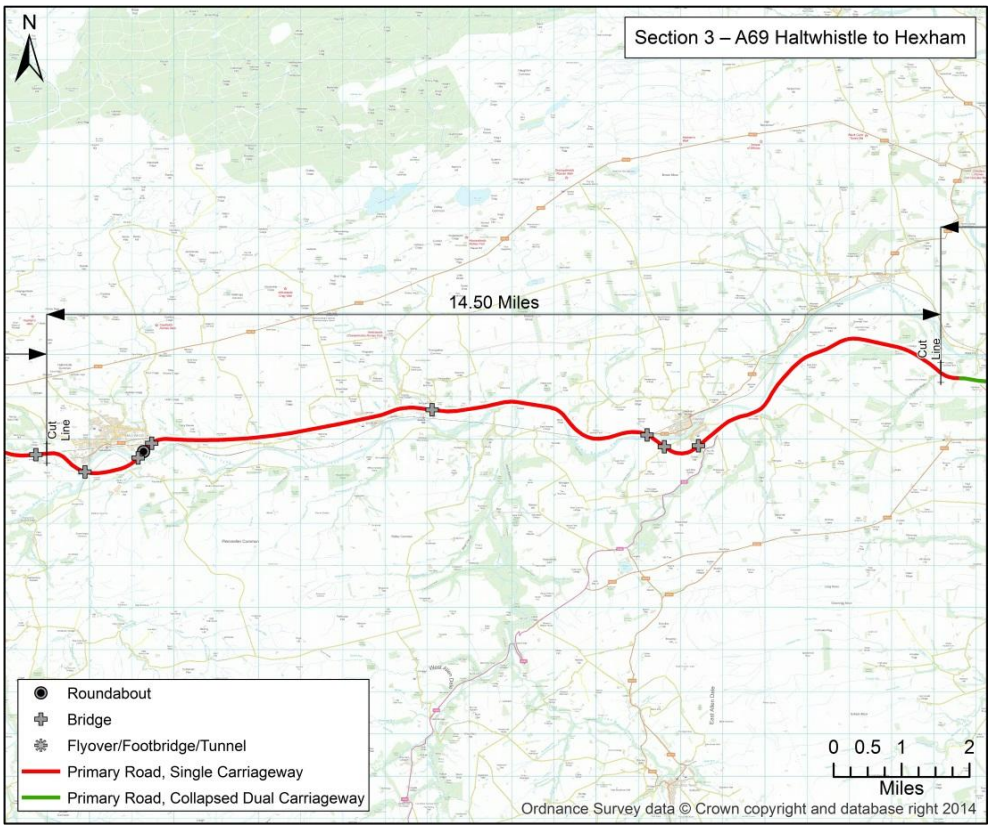
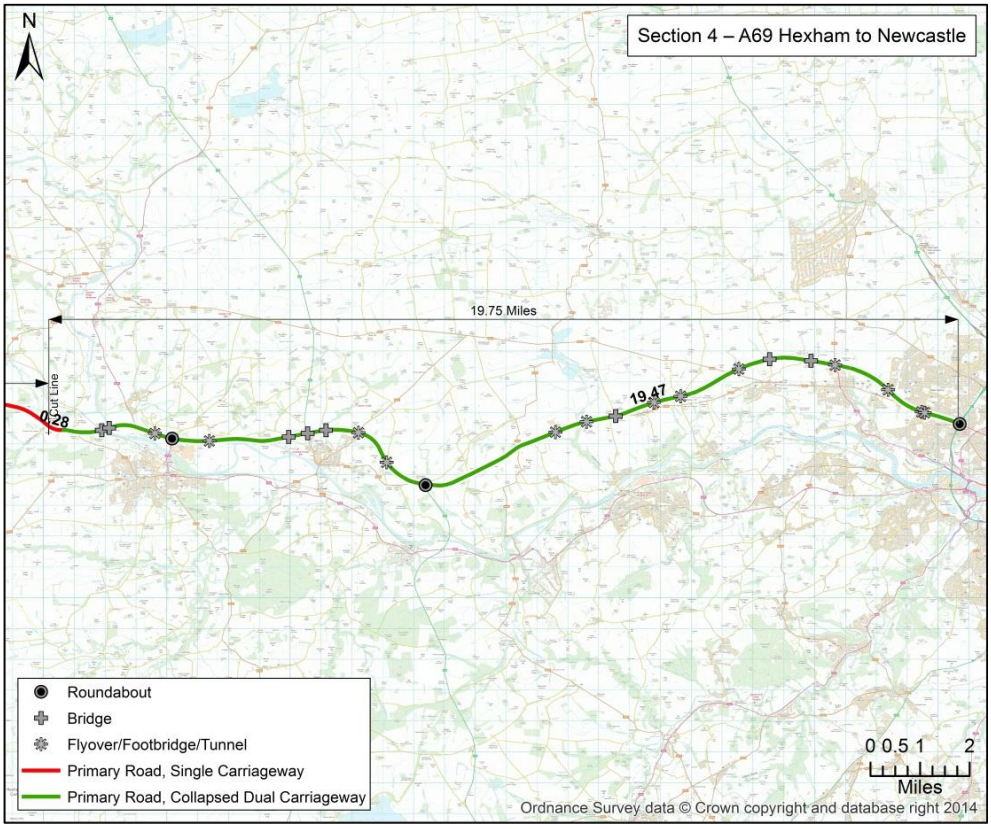


Figure 2-18: Highway Infrastructure Plan of the A69 Corridor (Section 4 – Hexham to Newcastle)



A66 Corridor

2.4.11 The A66 provides a direct connection between the A1 at Scotch Corner and the M6 at Penrith (with a section length of approximately 49.5 miles) before continuing to the west coast town of Workington, providing one of the primary corridors used by visitors to the Lake District National Park. To the east, the A66/A66(M) provides an onward connection to the A19, forming a strategic road link between the Tees Valley region and the wider highway network. The route is primarily rural in nature and currently includes a mix of single and dual carriageway sections of road (as documented in Table 2-19).

Table 2-19: A66 Corridor Sections and Corresponding Carriageway Standard

Section	Start	End	Carriageway Standard
M6 – A6	M6 J40	A6	Dual Carriageway (1971)
Penrith Bypass	A6	Brougham	Dual Carriageway (1971)
Penrith – Temple Sowerby	Brougham	Winderwath	Single Carriageway
Temple Sowerby Bypass	Winderwath	Temple Sowerby (E)	Dual Carriageway (2007)
Temple Sowerby – Appleby	Temple Sowerby (E)	Crackenthorpe	Single Carriageway
Appleby Bypass	Crackenthorpe	Coupland	Dual Carriageway (1982)

Section	Start	End	Carriageway Standard
Warcop Bypass	Coupland	Brough (W)	Single Carriageway
Brough Bypass	Brough (W)	Brough (E)	Dual Carriageway (1977)
Brough - Stainmore	Brough (E)	Stainmore	Dual Carriageway (1994)
Stainmore Bypass	Stainmore	Banks Gate	Dual Carriageway (1992)
Bowes Moor	Banks Gate	Bowes (W)	Dual Carriageway (1993)
Bowes Bypass	Bowes (W)	Bowes (E)	Single Carriageway
Boldron Bypass	Bowes (E)	Cross Lanes	Dual Carriageway (1983)
Cross Lanes – Greta Bridge	Cross Lanes	Greta Bridge (W)	Single Carriageway
Greta Bridge Bypass	Greta Bridge (W)	Greta Bridge (E)	Dual Carriageway (1980)
Greta Bridge – Stephen Bank	Greta Bridge (E)	Stephen Bank	Dual Carriageway (2008)
Stephen Bank – Carkin Moor	Stephen Bank	Carkin Moor	Single Carriageway
Carkin Moor – A1	Carkin Moor	A1 J55	Dual Carriageway (2007)

2.4.12 The A66 corridor is currently responsible for carrying in excess of 12,000 vehicles per day in each direction (approximately 17-20% of which consists of commercial traffic) between the M6 and A6 adjacent to Penrith. To the east, traffic movement between the A6 and the A1 at Scotch Corner is typically over 7,000 vehicles per day in each direction (approximately 23-27% of which consists of commercial traffic). As will be discussed in greater detail later in this section, current AADT volumes are considerably below the theoretical operational capacity of a highway link of this standard.

2.4.13 When compared against the current AADT levels observed on the A69 corridor, it can clearly be seen that the total volume of vehicular flow is marginally higher on the A66 corridor, however, the percentage of commercial vehicles using the route is approximately double.

2.4.14 The route facilitates the movement of a high volume of relatively long-distance journeys, which consist of both commercial trips and seasonal tourist related journeys. Between the A1 and M6, the route is also frequently used by slow moving agricultural vehicles making short distance journeys, which can have an impact upon the free flow of strategic traffic on single carriageway sections.

2.4.15 Figure 2-19 to Figure 2-23 shows the individual sections of the A66 corridor which fall within the study area, highlighting the presence of existing highway infrastructure such as roundabouts, bridges, flyovers, tunnels, merge points and the length of any single or dual carriageway sections of road. It can clearly be seen that existing roundabout junctions with the M6, A1 and A6 all have the potential to disrupt the free-flow of traffic using the A66 to travel between east and west.

Figure 2-19: Highway Infrastructure Plan of the A66 Corridor (Section 5 – Penrith to Temple Sowerby)

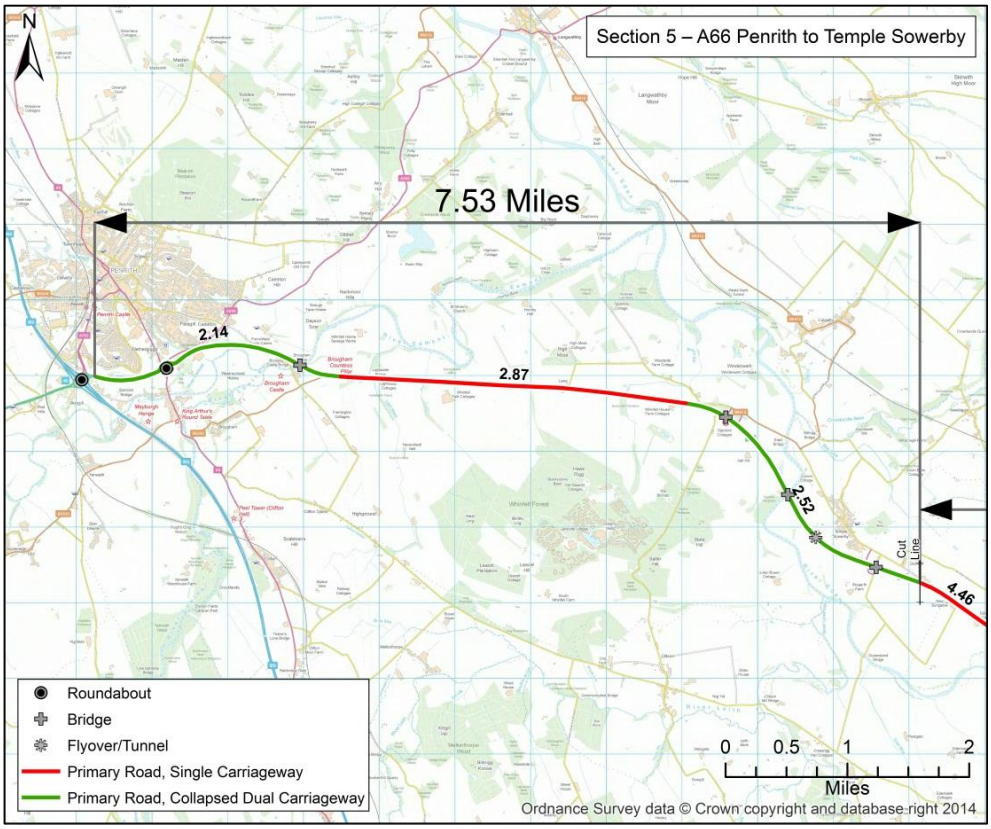


Figure 2-20: Highway Infrastructure Plan of the A66 Corridor (Section 6 – Temple Sowerby to Brough)

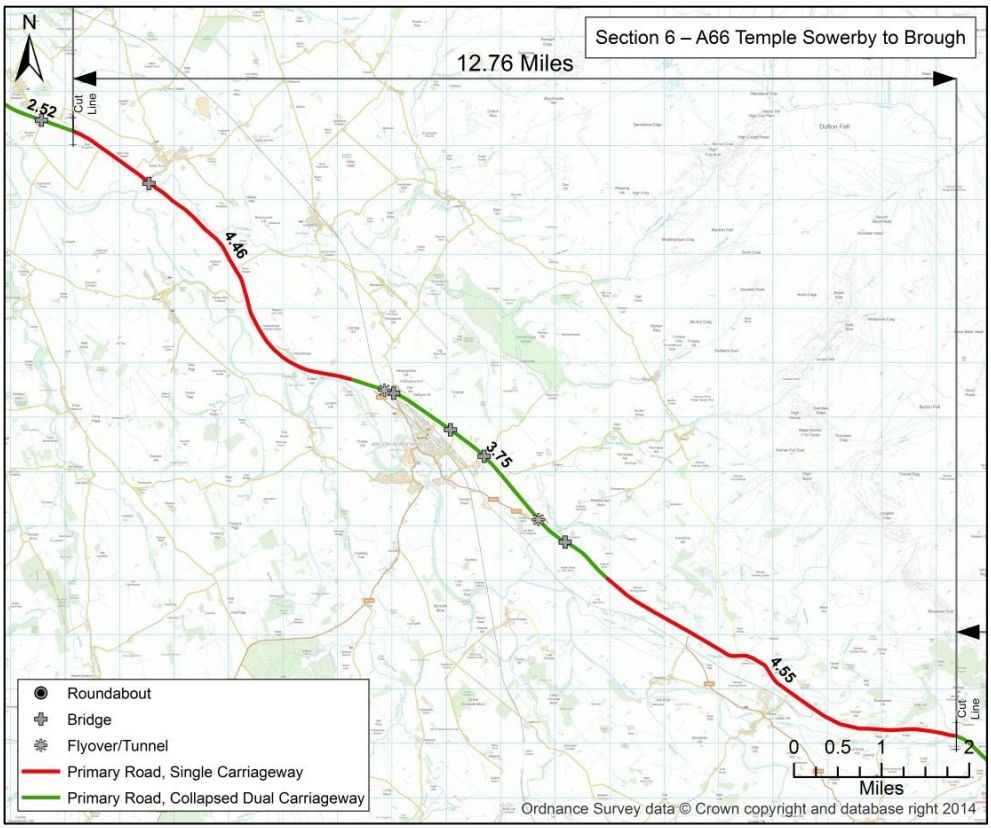


Figure 2-21: Highway Infrastructure Plan of the A66 Corridor (Section 7 – Brough to Bowes)

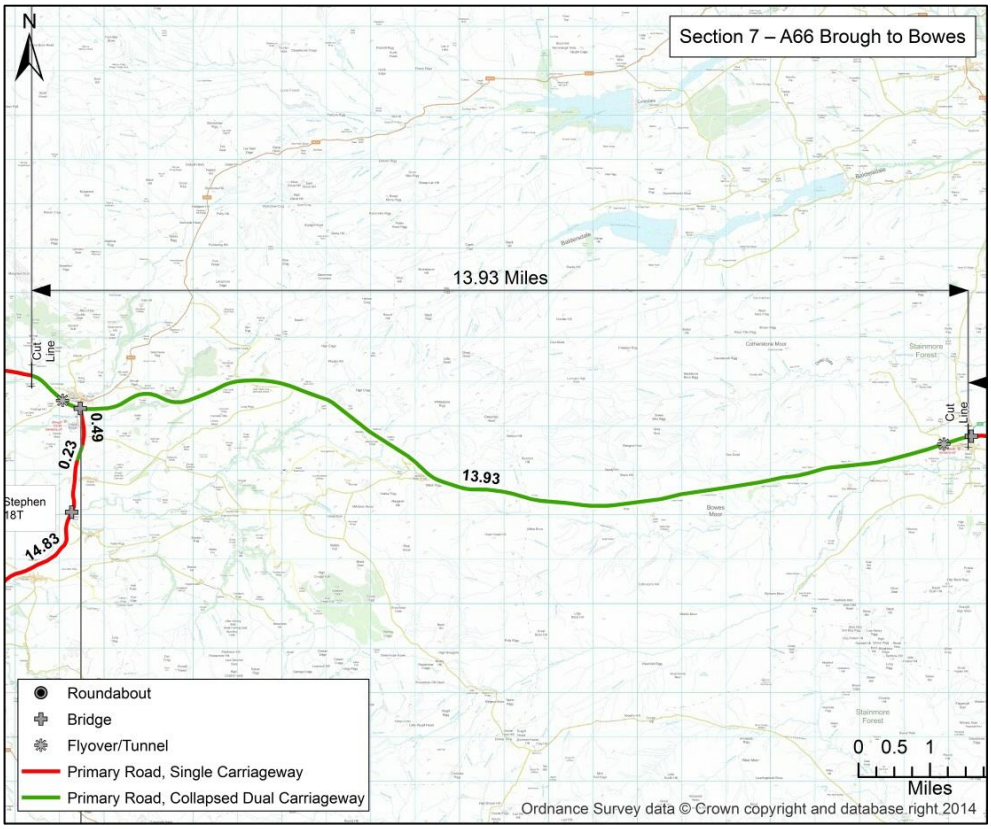


Figure 2-22: Highway Infrastructure Plan of the A66 Corridor (Section 8 – Bowes to Greta Bridge)

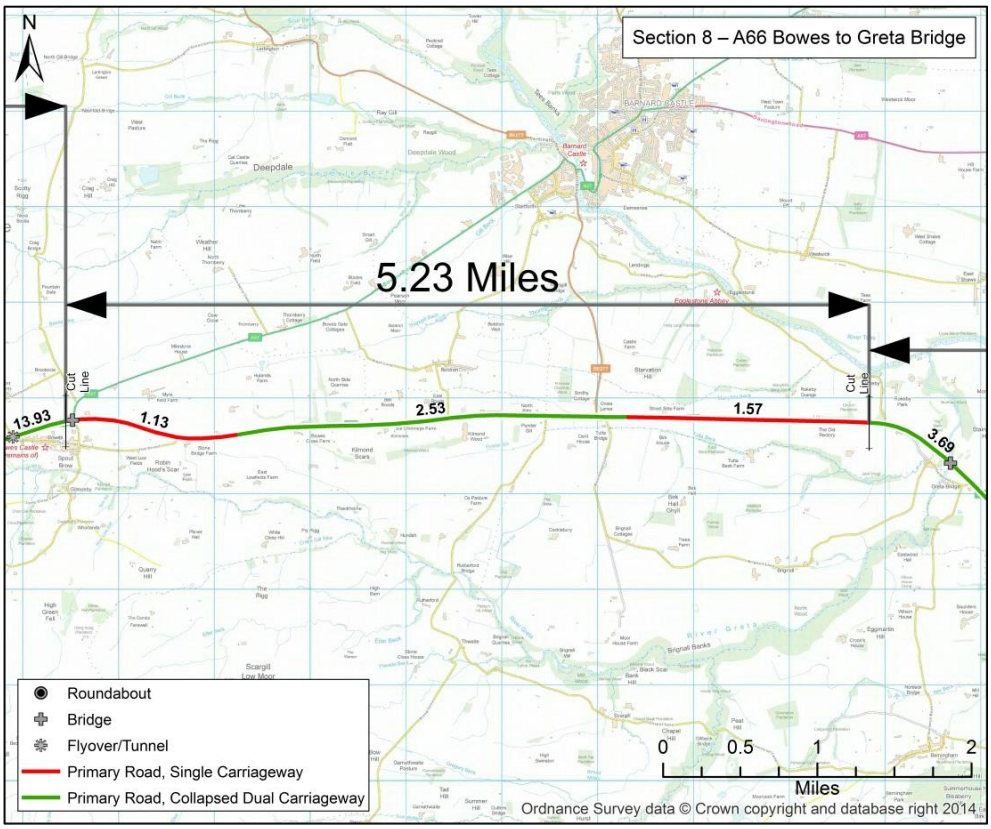
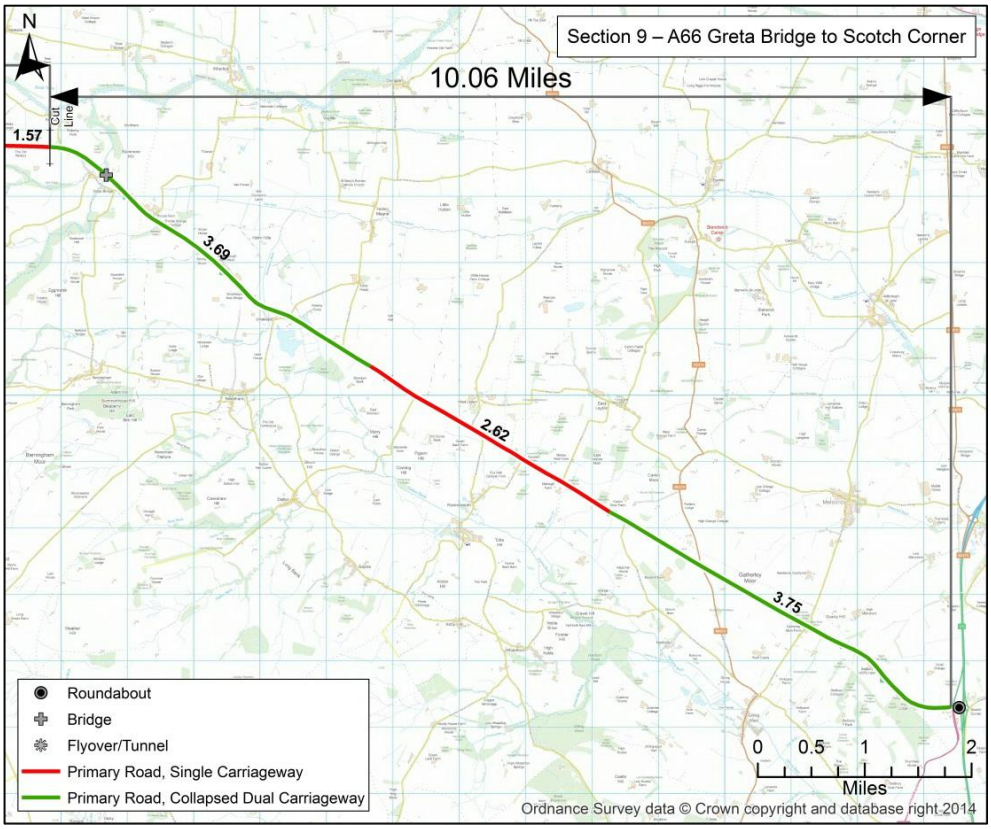


Figure 2-23: Highway Infrastructure Plan of the A66 Corridor (Section 9 – Greta Bridge to Scotch Corner)



A685 Corridor

2.4.16 The A685 corridor provides a direct connection between the A66 at Brough and the M6 at Tebay (with a section length of approximately 15.5 miles) before continuing southwest towards Kendal. The route is primarily rural in nature and is entirely single carriageway, except for a short length of dual carriageway to aid overtaking between the villages of Church Brough and Brough Sowerby.

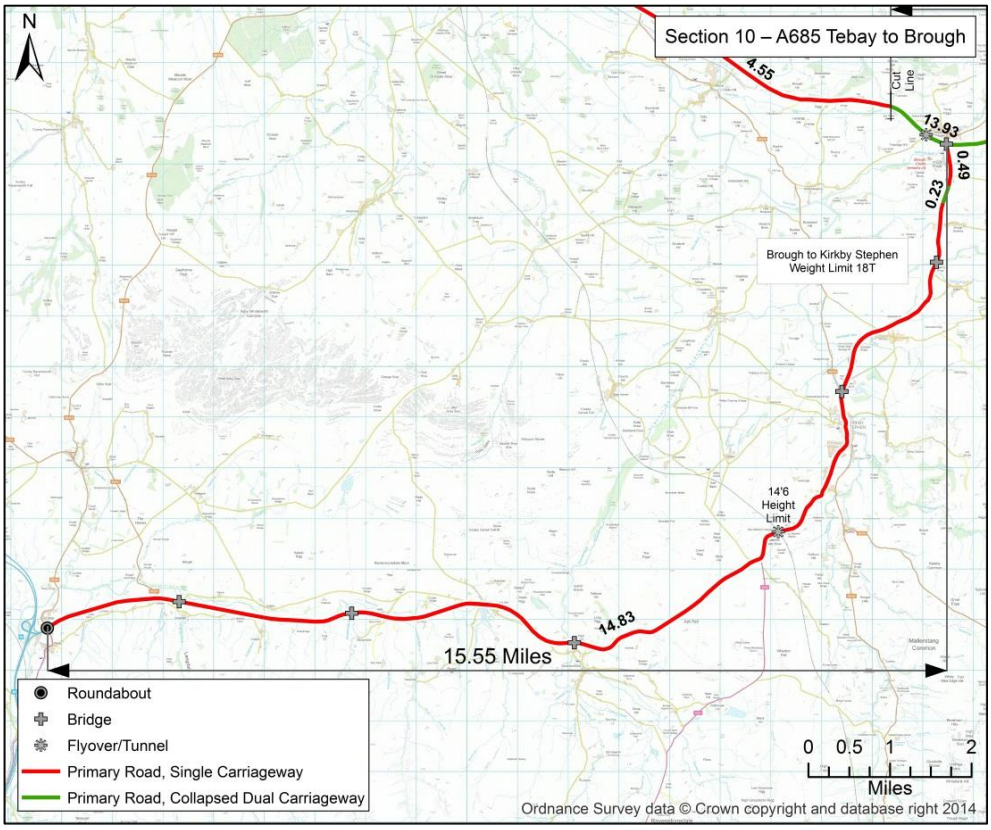
2.4.17 The A685 is currently responsible for carrying in excess of 2,500 vehicles per day in each direction (approximately 4-5% of which consists of commercial traffic) between the A66 at Brough and the M6 at Tebay. The route primarily facilitates the movement of localised shorter-distance journeys. As will be discussed in greater detail later in this section, current annual average daily traffic volumes are considerably below the theoretical operational capacity of a highway link of this standard.

2.4.18 Vehicles weighing in excess of 18 tonnes are currently restricted from using the A685 between Brough and Kirkby Stephen, except for access, permit holders or vehicles using livestock. The standard advisory route for commercial movements between Brough and the M6 is to use the A66 corridor and take access at the Junction 40 interchange.

2.4.19 Whilst the A685 therefore has less strategic importance than the A66 in terms of facilitating the movement of freight traffic, it is considered that the route is a valid alternative for car borne trips between the M6 to the south of Penrith and A66 east of Brough.

2.4.20 Figure 2-24 shows the section of the A685 corridor which falls within the study area, highlighting the presence of existing highway infrastructure such as roundabouts, bridges, flyovers, tunnels, merge points and the length of any single or dual carriageway sections of road. It can clearly be seen that height and weight restrictions associated with existing bridge infrastructure in Kirkby Stephen has the potential to act as a barrier to traffic which could potentially use the A685 to travel between east and west.

Figure 2-24: Highway Infrastructure Plan of the A685 Corridor (Section 10 – Tebay to Brough)



Traffic Flow Profiles

2.4.21 In order to establish the current situation on the A69 and A66/A685 corridors, recently recorded traffic flow profiles have been obtained from the Highways England maintained Traffic Flow Data System (TRADS) and utilised in order to present the baseline scenario with regards the operational performance of the Strategic Road Network within the study area.

2.4.22 Traffic flow data has been extracted between January and December 2014 (i.e. the latest full twelve month period available) in order to provide a detailed overview of the average peak hour and daily traffic profiles associated with the two routes within the identified study area.

2.4.23 Figure 2-25 and Figure 2-26 identify the location/reference number of the automatic traffic counts and illustrate the Annual Average Daily Traffic (AADT) flow profile of the total volume of traffic and the commercial vehicles recorded on an hourly basis (over a typical 24 hour period) throughout 2014, demonstrating how the observed traffic flow profile was generated throughout the day. Details of the relationship between current AADT volumes and theoretical operational capacity will be discussed in greater detail later in this section of the NTPR study.

2.4.24 The information demonstrates that the A69 corridor experiences a traditional AM peak period (at approximately 08:00) with traffic levels generally reducing thereafter (until approximately 12:00), before rising throughout the afternoon and achieving a maximum flow during a PM peak period (at approximately 17:00). This shows that the route typically experiences a commuter generated traffic flow profile, supporting trips to/from urban conurbations and employment centres.

2.4.25 The A66 corridor, however, experiences an AM peak period (at approximately 08:00) with traffic levels then generally continuing to rise throughout the day, before achieving a maximum flow during a PM peak period (at approximately 17:00). This may be indicative that the route typically experiences a strategic traffic flow profile rather than being generated by commuter traffic.

Figure 2-25: Location of Automatic Traffic Counts on A69 Corridor (Average 24 Hourly Flow Profile 2014)

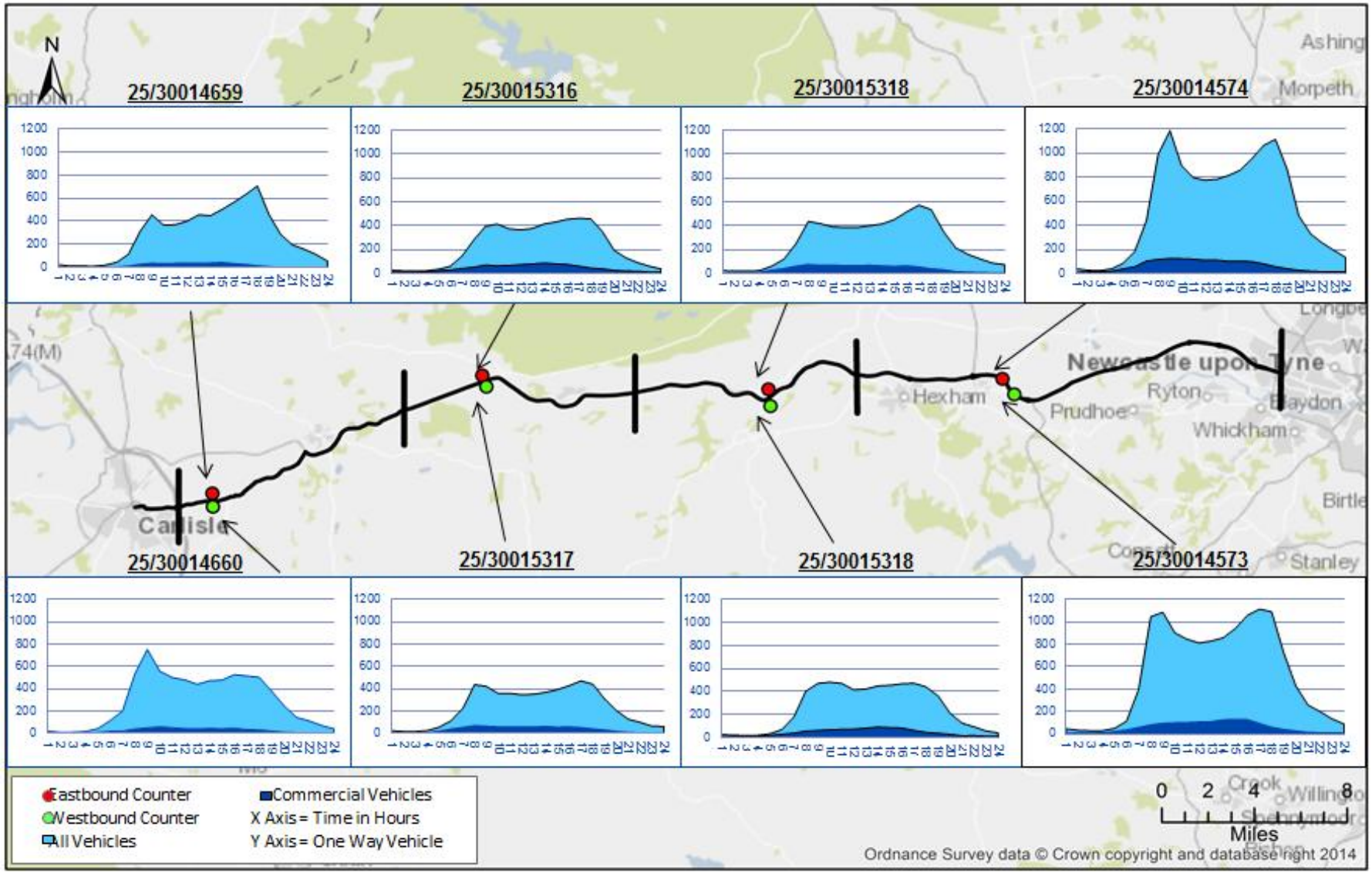
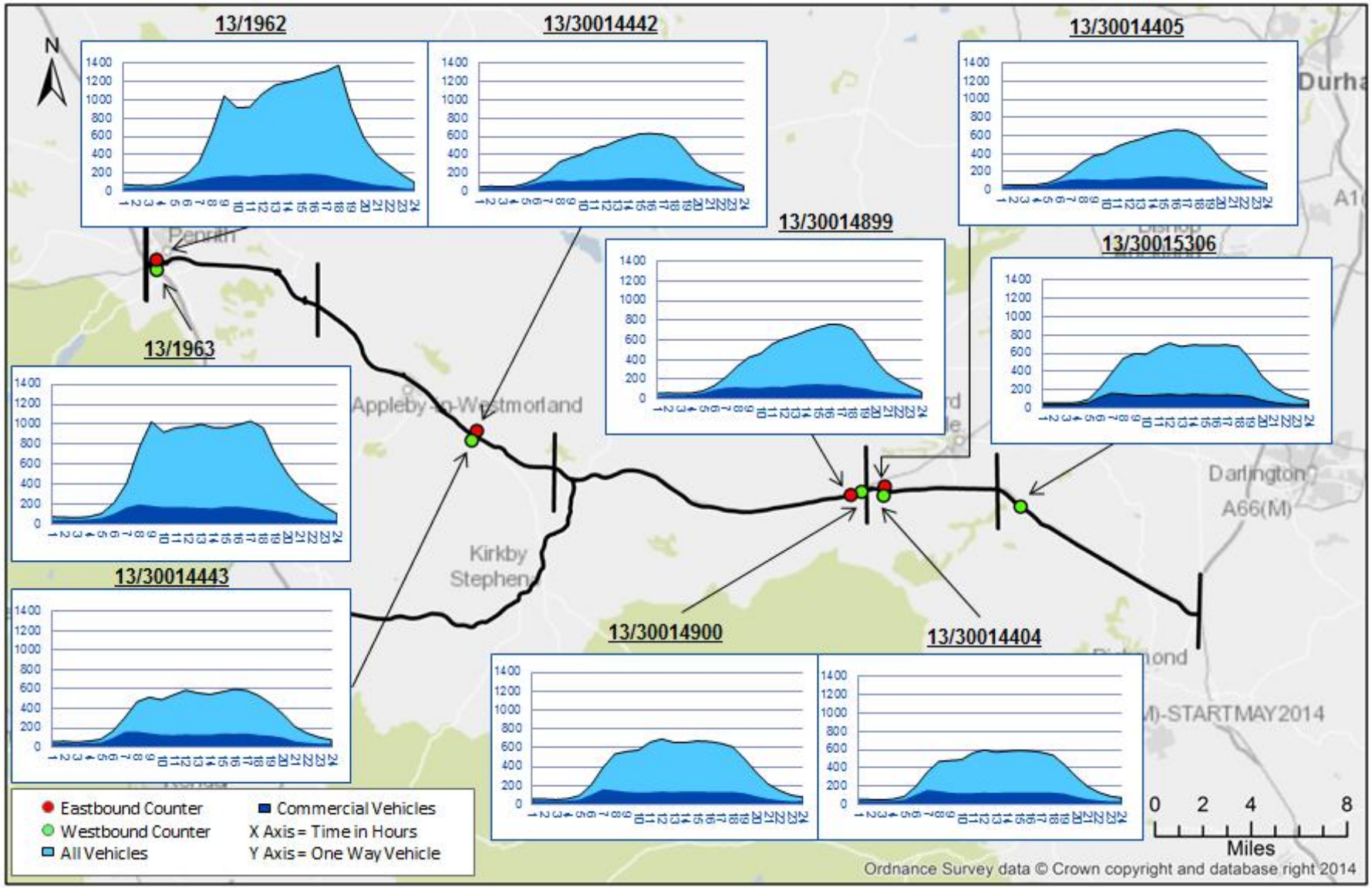


Figure 2-26: Location of Automatic Traffic Counts on A66 Corridor (Average 24 Hourly Flow Profile 2014)


13/1962
13/30014442
13/30014405
13/30014899
13/30015306
13/1963
13/30014443
13/30014900
13/30014404
N
Penrith
Appleby-in-Westmorland
Kirkby Stephen
Darlington
A66(M)
Eastbound Counter
Westbound Counter
All Vehicles
Commercial Vehicles
X Axis = Time in Hours
Y Axis = One Way Vehicle
0 2 4 8
Miles
Ordnance Survey data © Crown copyright and database right 2014

2.4.26 The figures presented above further demonstrate that the 24 hour flow profile of both the A69 and A66 routes generally do not experience a specific 'inter-peak' hour with traffic flows materially higher than either the AM or the PM peak hour (despite the tendency for flows to gradually increase throughout the day on the A66 corridor due to the strategic movement of traffic and then decrease after 18:00). For the purposes of reporting, therefore, the remainder of this NTPR study will focus on analysis of the following peak periods:

- AM Peak (08:00-09:00)
- PM Peak (17:00-18:00)

2.4.27 Figure 2-27 and Figure 2-28 provide flow diagrams which detail the two-way total traffic flow recorded throughout 2014, during the AM and PM peak periods respectively, for the ten study area sections.

Figure 2-27: Average Traffic Flows on the A69 and A66/A685 Corridors - AM Peak Period (2014)

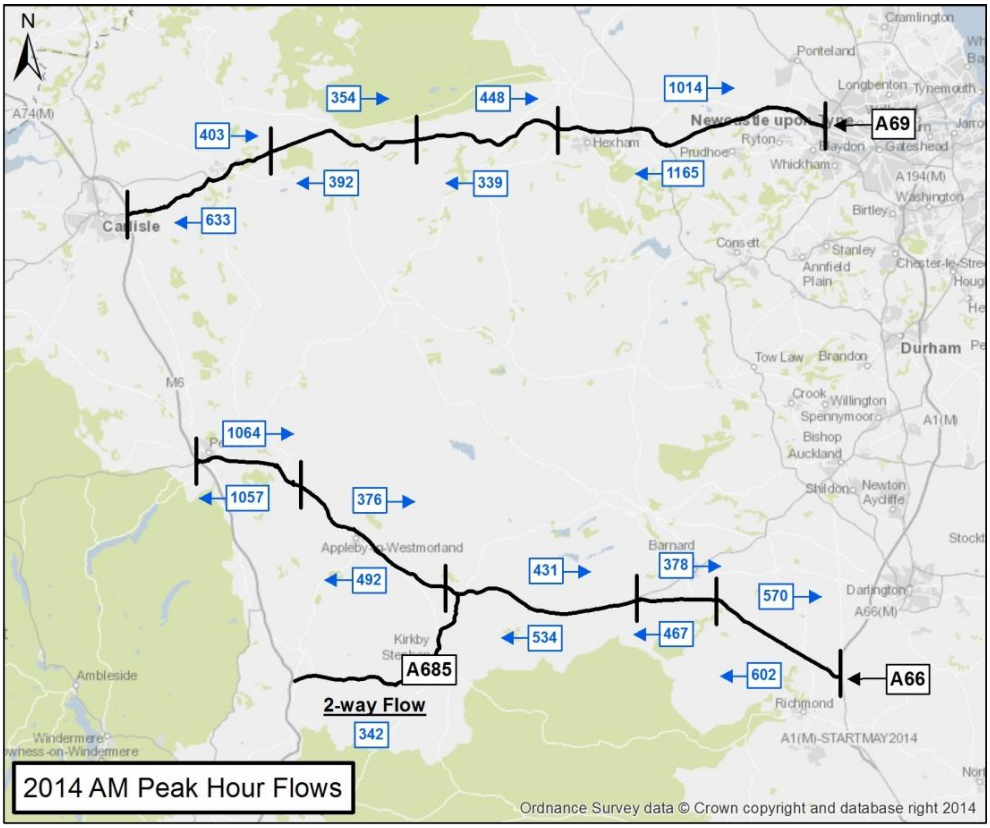
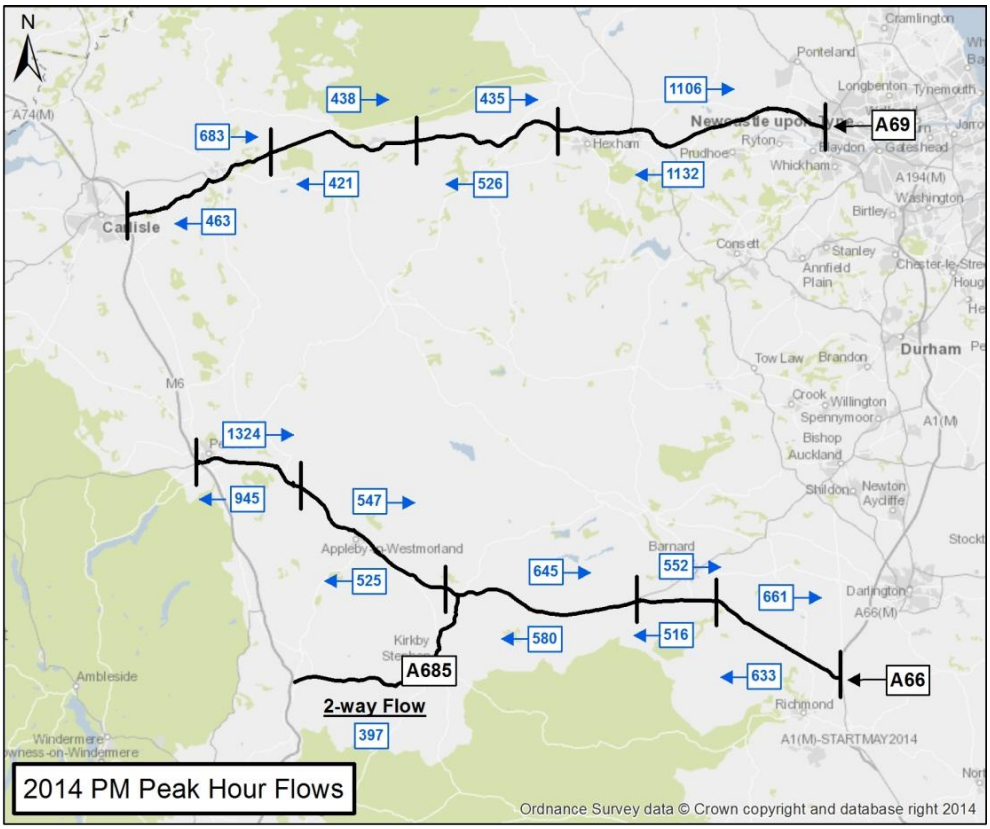


Figure 2-28: Average Traffic Flows on the A69 and A66/A685 Corridors - PM Peak Period (2014)



2.4.28 The information presented previously in Figure 2-27 and Figure 2-28 demonstrates that the A69 corridor experiences two-way traffic flows in the region of 2,179 trips during the AM peak period and 2,238 trips during the PM peak period between the A1 at Newcastle upon Tyne and the A68 at Corbridge. To the west, two-way traffic flows between the A68 and M6 at Carlisle are typically between 746 - 1,036 during the AM peak period and 859 - 1,146 during the PM peak period.

2.4.29 The A66 corridor currently experiences two-way traffic flows in the region of 2,121 trips during the AM peak period and 2,269 trips during the PM peak period between the M6 and A6 adjacent to Penrith. To the east, two-way traffic flows between the A6 and the A1 at Scotch Corner are typically between 845 - 1,172 during the AM peak period and 1,068 - 1,294 during the PM peak period.

2.4.30 The A685 corridor experiences two-way traffic flows in the region of 342 trips during the AM peak period and 397 trips during the PM peak period between the A66 at Brough and the M6 at Tebay.

2.4.31 In order to demonstrate the volume of traffic which used the A69 and A66/A685 corridors on a typical day in 2014, annual average daily traffic (AADT) flows have been extracted from the TRADS database. Figure 2-29 and Figure 2-30 illustrate the total quantum of daily traffic and the percentage of commercial vehicles using these routes to travel from east to west during the study period.

Figure 2-29: Total Traffic Flow on the A69 and A66/A685 Corridors - AADT (2014)

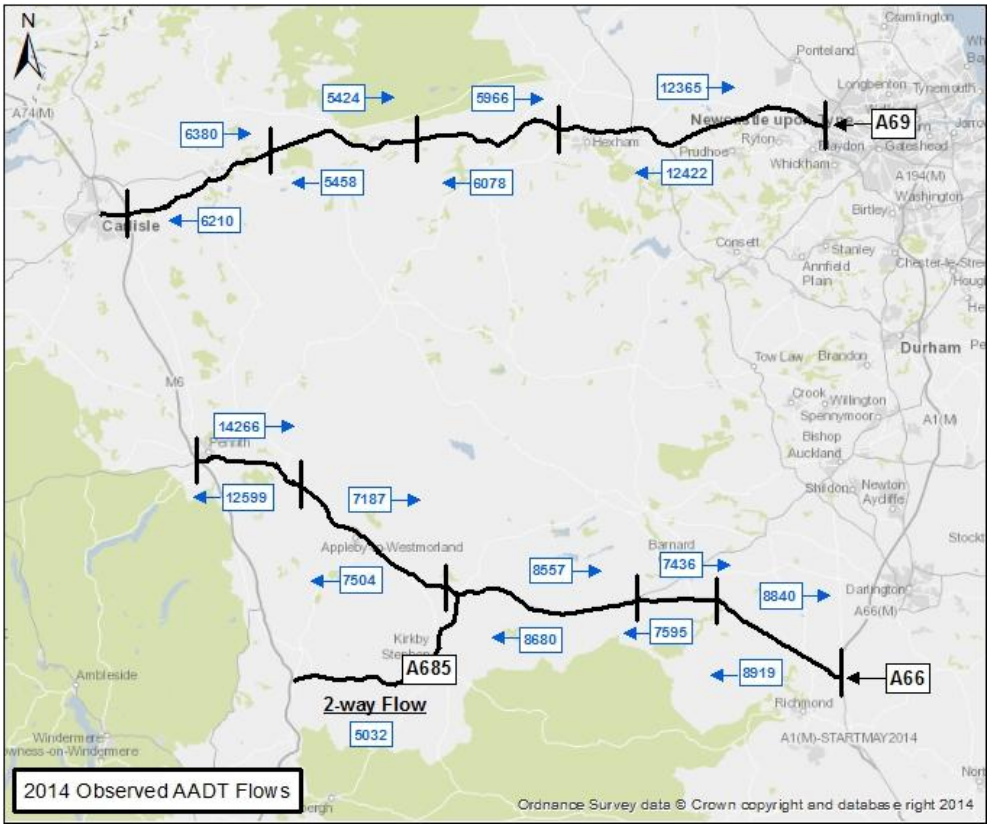
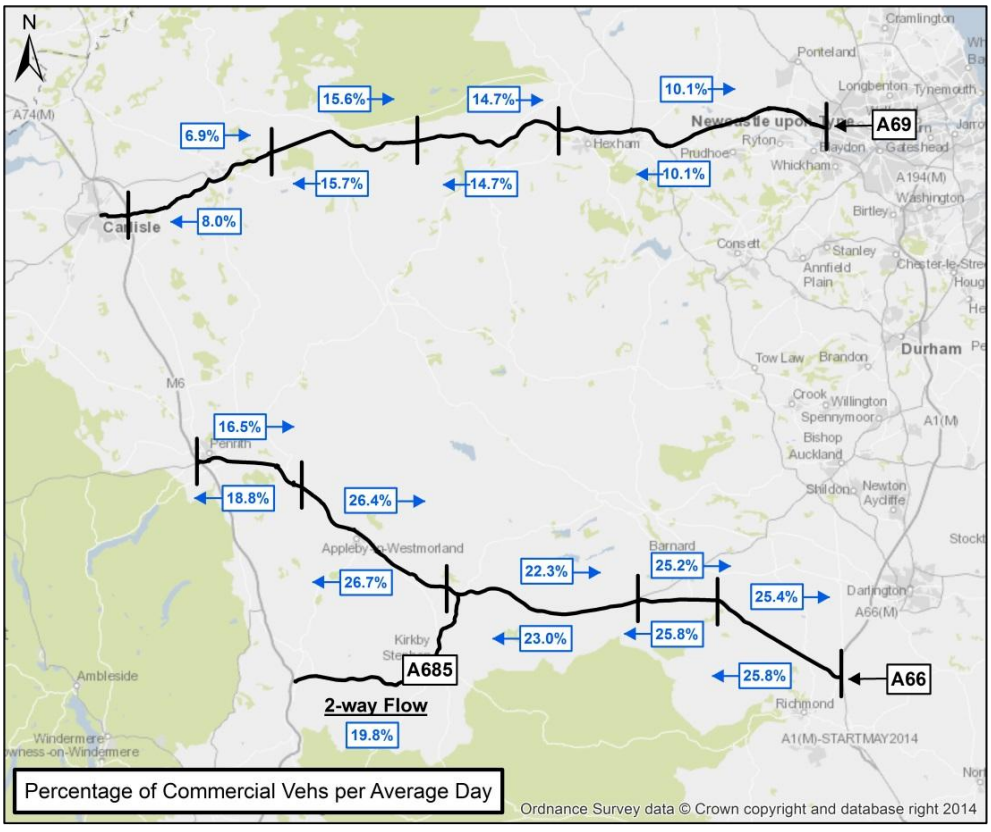


Figure 2-30: HGV Percentage of Total Traffic Flow on the A69 and A66/A685 Corridors - AADT (2014)



2.4.32 The information presented above demonstrates that the A69 corridor currently experiences two-way traffic flows in the region of 24,787 trips per day between the A1 at Newcastle upon Tyne and the A68 at Corbridge (approximately 10% of which consists of commercial traffic). To the west, two-way traffic flows between the A68 and M6 at Carlisle are typically around 10,882 - 12,590 per day (approximately 7-16% of which consists of commercial traffic).

2.4.33 The A66 corridor experiences two-way traffic flows in the region of 26,865 trips per day between the M6 and A6 adjacent to Penrith (approximately 17-19% of which consists of commercial traffic). To the east, two-way traffic flows between the A6 and the A1 at Scotch Corner are typically around 14,691 - 17,759 per day (approximately 22-27% of which consists of commercial traffic).

2.4.34 The A685 corridor experiences two-way traffic flows in the region of 5,032 trips per day between the A66 at Brough and the M6 at Tebay (approximately 20% of which consists of commercial traffic).

2.4.35 The ten sections of the A69 and A66/A685 corridors which form the study area, have been categorised in terms of the most heavily trafficked, with the findings presented at Table 2-20.

Table 2-20: Most Heavily Trafficked Sections of the A69 and A66/A685 within the Study Area (2014)

Rank	Route	Route/Section	Annual Average Daily Traffic (AADT)
1	A66	Section 5 – Penrith to Temple Sowerby	26,865
2	A69	Section 4 – Hexham to Newcastle upon Tyne	24,787
3	A66	Section 9 – Scotch Corner to Greta Bridge	17,759
4	A66	Section 7 – Brough to Bowes	17,237
5	A66	Section 8 – Bowes to Greta Bridge	15,031
6	A66	Section 6 – Temple Sowerby to Brough	14,691
7	A69	Section 1 – Carlisle to Brampton	12,590
8	A69	Section 3 – Haltwhistle to Hexham	12,044
9	A69	Section 2 – Brampton to Haltwhistle	10,882
10	A685	Section 10 – Tebay to Brough	5,032

2.4.36 The information provided above demonstrates that four of the top five most heavily trafficked sections of the study area are located on the A66 corridor, with the busiest stretch of this corridor located on the western section of the route, between the M6 at Penrith and Temple Sowerby.

2.4.37 The A685 corridor between Brough and Tebay is relatively lightly trafficked by comparison with the adjacent A66 route, with the figures presented above demonstrating that it typically carries broadly one third of the average volume of traffic (between Tebay and Brough) that the trunk road accommodates (between Penrith and Scotch Corner).

2.4.38 With regards the A69 corridor it is evident that the busiest stretch of the link is located on the eastern section of the route, between the A1 at Newcastle upon Tyne and Hexham. The figures presented above, demonstrate that the A69 route typically carries broadly two thirds of the average volume of traffic (Between Carlisle and Newcastle) that the A66 accommodates (between Penrith and Scotch Corner).

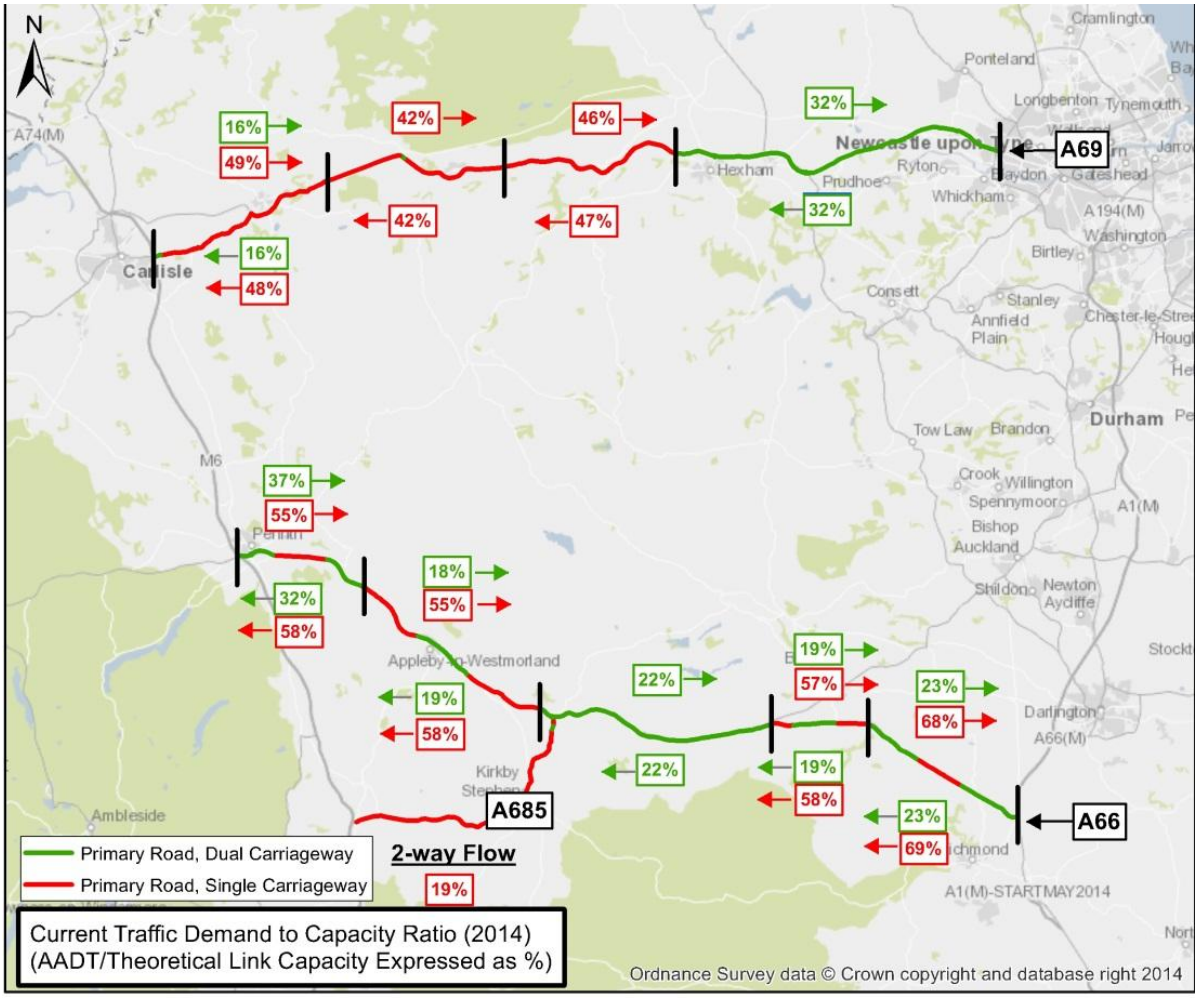
2.4.39 In order to demonstrate how the current traffic demand profile relates to the theoretical link capacity of the A69 and A66/A685 corridors, the Design Manual for Roads and Bridges: Volume 1, Section 5, Part 3 – TA 46/97 has been used to ascertain recommended maximum flows associated with urban all-purpose roads. Table 2-21 presents the desirable opening year AADT per carriageway for the two road standards present within the study area.

Table 2-21: DMRB Recommended Opening Year Economic Flow Ranges for S2 and D2AP Roads

Carriageway Standard	Opening Year AADT Flow per Carriageway
Single Carriageway Two Lane All Purpose Road (S2)	13,000
Dual Carriageway Two Lane All Purpose Road (D2AP)	39,000

2.4.40 Figure 2-31 illustrates how the current traffic demand observed on each section of road within the study area, relates to the theoretical link capacity provided within the Design Manual for Roads and Bridges: Volume 1, Section 5, Part 3 – TA 46/97.

Figure 2-31: Traffic Demand (AADT) Expressed as a Percentage of the Theoretical Link Capacity (2014)



2.4.41 It is evident from the information presented above that the routes under consideration are currently operating within their theoretical link capacities, with the following data observed:

- A69 is typically operating at around 42-49% of the theoretical capacity of single carriageway sections and 16–32% of the theoretical capacity of dual carriageway sections of road.
- A66 is typically operating at around 55-69% of the theoretical capacity of single carriageway sections and 18-37% of the theoretical capacity of dual carriageway sections of road.
- A685 is typically operating at around 19% of the theoretical capacity of single carriageway sections of road.

2.4.42 It is evident from the figures presented above that the single carriageway sections of the A66 corridor are generally operating below 60% of the theoretical link capacity associated with urban all-purpose roads (provided within the Design Manual for Roads and Bridges: Volume 1, Section 5, Part 3 – TA 46/97). The traffic flows associated with the single carriageway section of road between Greta Bridge and Scotch Corner are, however, currently operating at around 68-69% of its theoretical link capacity. The single carriageway sections of the A685 and A69 corridors are currently operating below 19% and 49% (respectively) of their theoretical link capacities.

2.4.43 Whilst it is considered appropriate to study the operation of the A69 and A66/A685 corridors in terms of average annual daily traffic flows, it is also important to understand how traffic flows vary on a monthly basis throughout the year, in light of the importance of these routes to the movement of seasonal traffic associated with tourist attractions in Cumbria.

2.4.44 In order to develop a more detailed understanding of how traffic flow profiles varied throughout the year, the average daily traffic flow for each section of the study area is presented on a monthly basis at Table 2-22 and Table 2-23 respectively. A seasonality index (which presents the recorded traffic flows proportionately against a 12 month baseline position) has been prepared in order to demonstrate how these trends vary on the A69 and A66 relative to the total quantum of traffic recorded over the course of the year.

Table 2-22: Monthly/Seasonal 24 Hour Average Daily Traffic Flows on the A69 Corridor (2014)

Month	24 Hour Average Daily Two-way Traffic Flows (2014)			
	1) A69 Carlisle to Brampton	2) A69 Brampton to Haltwhistle	3) A69 Haltwhistle to Hexham	4) A69 Hexham to Newcastle
Jan	10,844*	9,026	10,052	21,329
Feb	11,616*	9,878	11,059	23,215
Mar	12,214*	10,395	11,517	26,080
Apr	12,675*	10,959	12,090	27,069
May	12,547*	11,297	12,455	27,207
Jun	12,874*	11,351	12,528	25,929
Jul	13,240*	9,157	12,900	26,099
Aug	13,524*	12,100	13,245	25,863
Sep	13,147*	11,437	12,536	25,656
Oct	12,871*	11,330	12,500	25,568
Nov	12,590*	10,882	12,044	24,787
Dec	11,614*	8,422	10,763	22,995
Month	Seasonality Index			
	1) A69 Carlisle to Brampton	2) A69 Brampton to Haltwhistle	3) A69 Haltwhistle to Hexham	4) A69 Hexham to Newcastle
Jan	0.87*	0.86	0.84	0.85
Feb	0.93*	0.94	0.93	0.92
Mar	0.98*	0.99	0.96	1.04
Apr	1.02*	1.04	1.01	1.08
May	1.01*	1.07	1.04	1.08
Jun	1.03*	1.08	1.05	1.03
Jul	1.06*	0.87	1.08	1.04
Aug	1.08*	1.15	1.11	1.03
Sept	1.05*	1.09	1.05	1.02
Oct	1.03*	1.08	1.05	1.02
Nov	1.01*	1.03	1.01	0.99
Dec	0.93*	0.80	0.90	0.91

* 2013 Data

Table 2-23: Monthly/Seasonal 24 Hour Average Daily Traffic Flows on the A66 Corridor (2014)

Month	24 Hour Average Daily Two-way Traffic Flows (2014)				
	5) A66 Penrith to Temple Sowerby	6) A66 Temple Sowerby to Brough	7) A66 Brough to Bowes	8) A66 Bowes to Greta Bridge	9) A66 Greta Bridge to Scotch Corner
Jan	21,915	11,047	12,265	10,737	12,717
Feb	23,032	12,049	13,829	12,127	14,588
Mar	25,066	13,172	15,104	13,234	15,966
Apr	26,865	14,691	17,237	15,031	17,661
May	27,028	14,736	17,331	15,088	18,337
Jun	27,570	15,271	17,592	15,268	18,436
Jul	29,028	16,419	18,753	16,688	19,533
Aug	29,008	16,860	19,912	17,359	19,758*
Sep	28,047	15,606	17,709	15,607	17,416*
Oct	25,709	14,761	17,358	15,494	17,204*
Nov	25,445	13,496	15,559	13,698	15,620*
Dec	22,835	11,901	13,783	12,286	13,634*
Month	Seasonality Index				
	5) A66 Penrith to Temple Sowerby	6) A66 Temple Sowerby to Brough	7) A66 Brough to Bowes	8) A66 Bowes to Greta Bridge	9) A66 Greta Bridge to Scotch Corner
Jan	0.84	0.78	0.75	0.75	0.76
Feb	0.89	0.85	0.84	0.84	0.87
Mar	0.97	0.93	0.92	0.92	0.95
Apr	1.03	1.04	1.05	1.04	1.06
May	1.04	1.04	1.06	1.05	1.10
Jun	1.06	1.08	1.07	1.06	1.10
Jul	1.12	1.16	1.15	1.16	1.17
Aug	1.12	1.19	1.22	1.21	1.18*
Sept	1.08	1.10	1.08	1.08	1.04*
Oct	0.99	1.04	1.06	1.08	1.03*
Nov	0.98	0.95	0.95	0.95	0.93*
Dec	0.88	0.84	0.84	0.85	0.81*

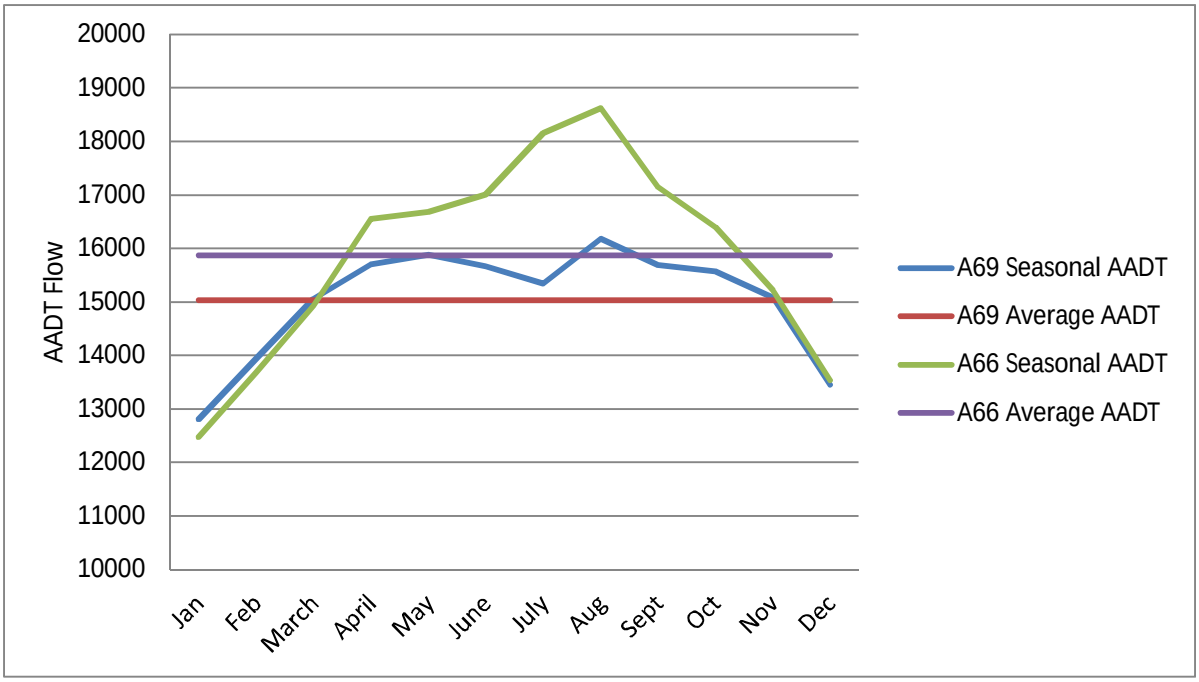
* 2013 Data

Note: Only westbound average daily traffic flows were available for the Scotch Corner to Greta Bridge section of the network. The volume of westbound traffic at this point on the network has been uplifted to represent a two-way flow based upon the

average percentage split of 49.5% eastbound and 50.5% westbound recorded at the adjacent Greta Bridge to Bowes and Bowes to Brough sections of the study area.

2.4.45 The evidence presented above clearly demonstrates that the two routes are on average more heavily trafficked throughout the month of August than at any other time of the year. The A66 corridor evidently experiences a greater bias during the summer period (when compared against Spring, Autumn and Winter) than the A69 corridor as demonstrated on the graph presented at Figure 2-32. This is indicative of the fact the A66 is of greater importance with regards the movement of seasonal tourist trips between the east/south-east of the country and the South Lakes district of Cumbria.

Figure 2-32: Monthly/Seasonal 24 Hour Average Daily Traffic Flows on the A69 & A66 Corridors (2014)



Traffic Congestion

2.4.46 In order to understand the current transport congestion on the A69 and A66/A685 corridors, a snapshot of aggregated traffic speeds recorded during 2014 has been generated using Streetmap Premium Traffic Data and utilised in order to present the baseline scenario with regards the operational performance of the Strategic Road Network within the study area.

2.4.47 Figure 2-33 to Figure 2-34 show the sections of the network which experienced either stop and go, slow, moderate or free flow conditions on an average day throughout 2014 for the following periods:

- AM Peak (08:00-09:00)
- PM Peak (17:00-18:00)

2.4.48 The operational peak periods generally correlate with timeframes which yield the highest levels of traffic demand on the various routes and a study of average vehicular speeds, therefore, provides context to the typical levels of congestion experienced on the network.

2.4.49 The figures presented below clearly demonstrate that the majority of the network operates under free-flow conditions during the AM and PM peak periods, with the exception of some moderate speeds observed around Brampton, Hexham and Warwick Bridge on the A69.

Figure 2-33: Traffic Conditions on the A69 and A66/A685 Corridors (AM Peak Period)

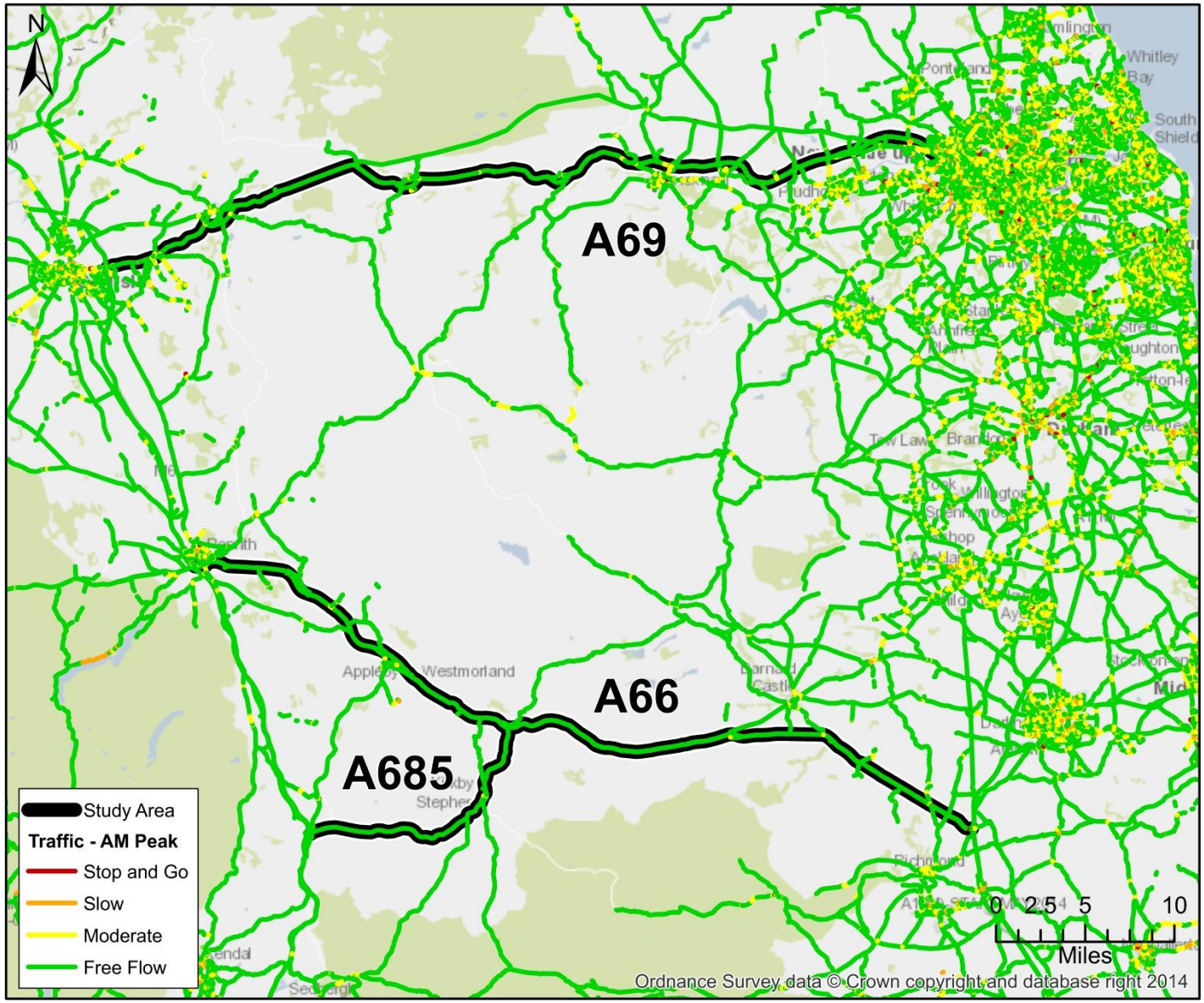
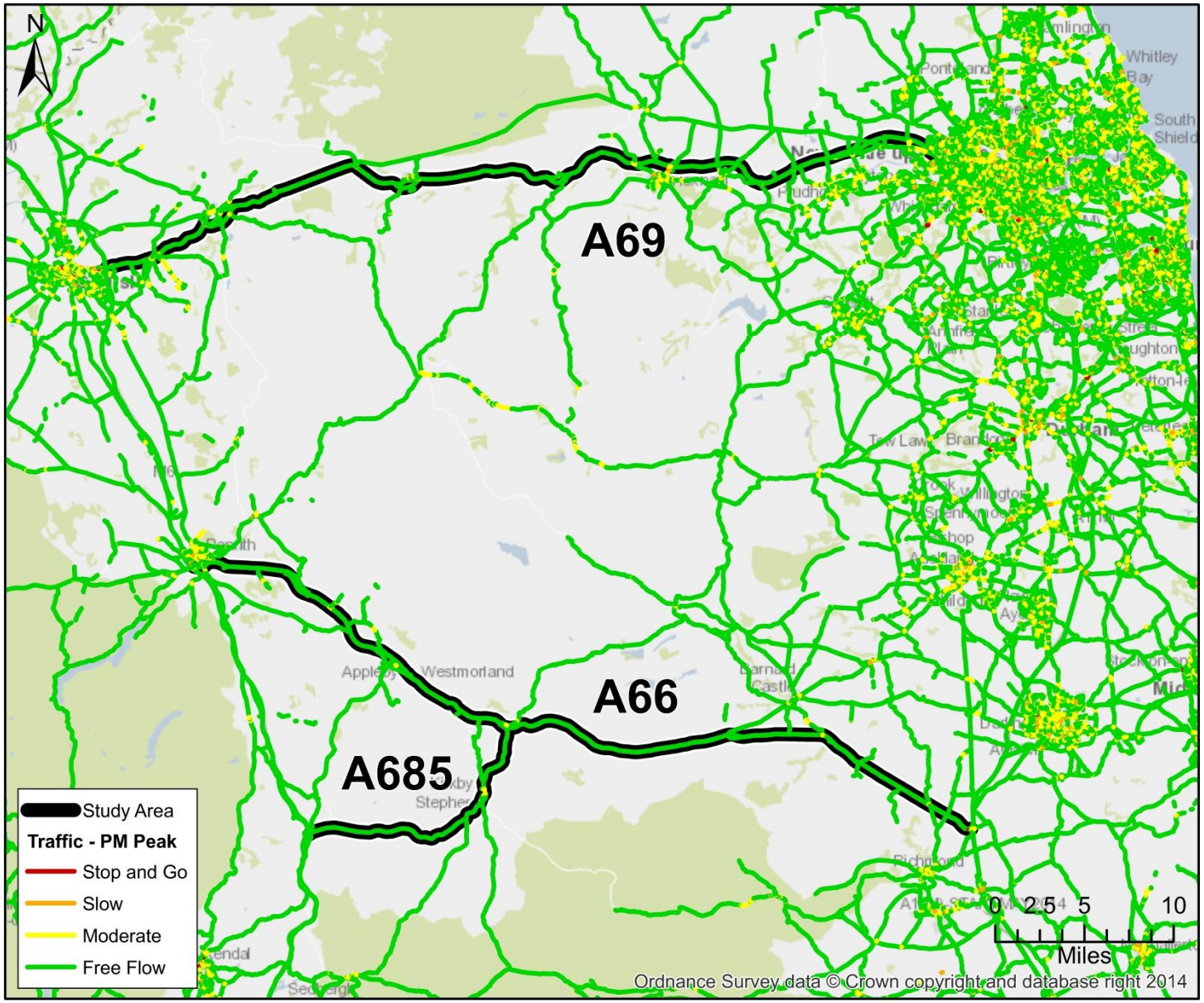


Figure 2-34: Traffic Conditions on the A69 and A66/A685 Corridors (PM Peak Period)



2.4.50 Whilst the Streetmap Premium Traffic Data is capable of presenting a visual indication of sections within the study area which are currently experiencing free flow conditions during the average peak period, it is not capable of indicating how this relates to the average speed of vehicles using the A69 and A66/A685 corridors. In order to establish average traffic speeds on the network, recently recorded data has been extracted from the Traffic Master system which is maintained by the Department for Transport.

2.4.51 Table 2-24 (and the graphs at Appendix 3) presents the average speed of vehicular traffic recorded between September 2014 and August 2015 for the individual sections of the A69 and A66/A685 within the study area during the following periods:

- AM Peak (08:00-09:00)
- PM Peak (17:00-18:00)

Table 2-24: Average Peak Hour Speed between Sections on A69 and A66/A685 Corridors (2014-15)

Period	Average Speed Recorded During the AM / PM Peak Period (mph)				
	1) A69 Carlisle to Brampton	2) A69 Brampton to Haltwhistle	3) A69 Haltwhistle to Hexham	4) A69 Hexham to Newcastle	5) A66 Penrith to Temple Sowerby
Speed Limit	60mph (30 / 40mph Warwick Bridge)	60mph	60mph	70mph	70mph
AM Peak	33 mph (EB)	47 mph (EB)	47 mph (EB)	46 mph (EB)	47 mph (EB)
	33 mph (WB)	50 mph (WB)	48 mph (WB)	47 mph (WB)	47 mph (WB)
PM Peak	33 mph (EB)	47 mph (EB)	46 mph (EB)	49 mph (EB)	47 mph (EB)
	34 mph (WB)	49 mph (WB)	47 mph (WB)	49 mph (WB)	46 mph (WB)
Period	Average Speed Recorded During the AM / PM Peak Period (mph)				
	6) A66 Temple Sowerby to Brough	7) A66 Brough to Bowes	8) A66 Bowes to Greta Bridge	9) A66 Greta Bridge to Scotch Corner	10) A685 Tebay to Brough
Speed Limit	60 / 70mph	60 / 70mph (40mph Kirkby Thore)	70mph	60 / 70mph	60mph (40mph Brough and Brough Sowerby 30mph Kirkby Stephen)
AM Peak	50 mph (EB)	57 mph (EB)	55 mph (EB)	49 mph (EB)	38 mph (EB)
	50 mph (WB)	55 mph (WB)	49 mph (WB)	46 mph (WB)	36 mph (WB)
PM Peak	48 mph (EB)	57 mph (EB)	56 mph (EB)	49 mph (EB)	38 mph (EB)
	49 mph (WB)	54 mph (WB)	48 mph (WB)	46 mph (WB)	35 mph (WB)

2.4.52 The highest average speeds throughout the course of the year were recorded on the A66 between Brough and Bowes, with vehicles typically achieving around 56 mph. By contrast, the lowest average speeds were recorded on the A69 between Carlisle and Brampton, with vehicles typically achieving around 33 mph (which is partly caused by the fact that this section of the corridor experiences a 30mph speed limit as it passes through the village of Warwick Bridge). This confirms the information presented within Streetmap Premium Traffic Data plots which observed moderate speeds around Brampton and Warwick Bridge.

2.4.53 The information provided above demonstrates that average speeds during the operational peak hours are generally lower than the maximum speed limit on both the single and dual carriageway sections of the routes under consideration. Average speeds recorded on the three corridors were are as follows:

- A69 Range: 33-50 mph Average: 44 mph
- A66 Range: 46-57 mph Average: 50 mph
- A685 Range: 35-38 mph Average: 37 mph

2.4.54 In order to demonstrate how the speeds presented previously relate to unconstrained operating conditions, Table 2-25 presents the average speed of vehicular traffic recorded between September 2014 and August 2015 for the individual sections of the A69 and A66/A685 within the study area during an off peak period of 22:00-23:00.

Table 2-25: Average Off Peak Speed between Sections on A69 and A66/A685 Corridors (2014-15)

Period	Average Speed Recorded During the Off Peak Period (mph)				
	1) A69 Carlisle to Brampton	2) A69 Brampton to Haltwhistle	3) A69 Haltwhistle to Hexham	4) A69 Hexham to Newcastle	5) A66 Penrith to Temple Sowerby
Speed Limit	60mph (30 / 40mph Warwick Bridge)	60mph	60mph	70mph	70mph
Off Peak	40 mph (EB)	58 mph (EB)	55 mph (EB)	56 mph (EB)	52 mph (EB)
	40 mph (WB)	58 mph (WB)	55 mph (WB)	52 mph (WB)	55 mph (WB)

Period	Average Speed Recorded During the Off Peak Period (mph)				
	6) A66 Temple Sowerby to Brough	7) A66 Brough to Bowes	8) A66 Bowes to Greta Bridge	9) A66 Greta Bridge to Scotch Corner	10) A685 Tebay to Brough
Speed Limit	60 / 70mph	60 / 70mph (40mph Kirkby Thore)	70mph	60 / 70mph	60mph (40mph Brough and Brough Sowerby 30mph Kirkby Stephen)
Off Peak	54 mph (EB)	64 mph (EB)	65 mph (EB)	60 mph (EB)	42 mph (EB)
	54 mph (WB)	58 mph (WB)	53 mph (WB)	53 mph (WB)	39 mph (WB)

2.4.55 The information demonstrates that average speeds recorded during the off peak hour on the three corridors were are as follows:

- A69 Range: 40-58 mph Average: 52 mph
- A66 Range: 52-65 mph Average: 57 mph
- A685 Range: 39-42 mph Average: 41 mph

2.4.56 The peak hour average speeds at Table 2-24, are further presented at Table 2-26 with data provided for the individual single and dual carriageway sections of road within the study area. Additionally this average speed data is also shown within the graphs at Figure 2-35 to Figure 2-38, with the daily average peak hour speed recorded on each Tuesday, Wednesday and Thursday during the following months:

- March
- April
- May
- June
- September
- October

2.4.57 The average peak hour speed recorded on a daily basis demonstrates the relative variation which was recorded within a sample of the six most neutral traffic months, when compared with the annual average figures presented at Table 2-24 previously.

Table 2-26: Average Peak Hour Speed between Sections on A69 and A66/A685 Corridors (2014-15)

Section	Speed Limit	Carriageway	Length	AM Peak		PM Peak	
1) A69 Carlisle to Brampton	60mph (30 / 40mph Warwick Bridge)	Dual	0.53 mi	33 mph (EB)	35 mph (WB)	33 mph (EB)	34 mph (WB)
		Single	6.73 mi	33 mph (EB)	32 mph (WB)	33 mph (EB)	32 mph (WB)
2) A69 Brampton to Haltwhistle	60mph	Single	8.42 mi	45 mph (EB)	47 mph (WB)	45 mph (EB)	45 mph (WB)
		Dual	0.29 mi	40 mph (EB)	43 mph (WB)	36 mph (EB)	42 mph (WB)
		Single	2.10 mi	47 mph (EB)	51 mph (WB)	48 mph (EB)	51 mph (WB)
3) A69 Haltwhistle to Hexham	60mph	Single	14.50 mi	47 mph (EB)	48 mph (WB)	46 mph (EB)	47 mph (WB)
4) A69 Hexham to Newcastle	70mph	Single	0.28 mi	49 mph (EB)	53 mph (WB)	49 mph (EB)	54 mph (WB)
		Dual	19.47 mi	44 mph (EB)	45 mph (WB)	47 mph (EB)	47 mph (WB)
5) A66 Penrith to Temple Sowerby	70mph	Dual	2.14 mi	33 mph (EB)	33 mph (WB)	32 mph (EB)	49 mph (WB)
		Single	2.87 mi	52 mph (EB)	49 mph (WB)	51 mph (EB)	59 mph (WB)
		Dual	2.52 mi	59 mph (EB)	59 mph (WB)	60 mph (EB)	46 mph (WB)
6) A66 Temple Sowerby to Brough	60 / 70mph	Single	4.46 mi	48 mph (EB)	47 mph (WB)	46 mph (EB)	47 mph (WB)
		Dual	3.75 mi	53 mph (EB)	57 mph (WB)	55 mph (EB)	55 mph (WB)
		Single	4.55 mi	49 mph (EB)	49 mph (WB)	47 mph (EB)	48 mph (WB)
7) A66 Brough to Bowes	60 / 70mph (40mph Kirkby Thore)	Dual	13.93 mi	57 mph (EB)	55 mph (WB)	57 mph (EB)	54 mph (WB)

Section	Speed Limit	Carriageway	Length	AM Peak		PM Peak	
8) A66 Bowes to Greta Bridge	70mph	Single	1.13 mi	58 mph (EB)	58 mph (WB)	58 mph (EB)	56 mph (WB)
		Dual	2.53 mi	55 mph (EB)	52 mph (WB)	56 mph (EB)	53 mph (WB)
		Single	1.57 mi	56 mph (EB)	50 mph (WB)	55 mph (EB)	50 mph (WB)
9) A66 Greta Bridge to Scotch Corner	60 / 70mph	Dual	3.69 mi	52 mph (EB)	53 mph (WB)	51 mph (EB)	54 mph (WB)
		Single	2.62 mi	50 mph (EB)	48 mph (WB)	48 mph (EB)	45 mph (WB)
		Dual	3.75 mi	47 mph (EB)	38 mph (WB)	47 mph (EB)	39 mph (WB)
10) A685 Tebay to Brough	60mph (40mph Brough and Brough Sowerby 30mph Kirkby Stephen)	Single	0.49 mi	41 mph (EB)	39 mph (WB)	42 mph (EB)	39 mph (WB)
		Dual	0.23 mi	50 mph (EB)	50 mph (WB)	49 mph (EB)	51 mph (WB)
		Single	14.83 mi	39 mph (EB)	39 mph (WB)	38 mph (EB)	39 mph (WB)

Figure 2-35: Average AM Peak Hour Speed and Daily Variation of Eastbound Traffic between Sections on A69 and A66/A685 Corridors (2014-15)

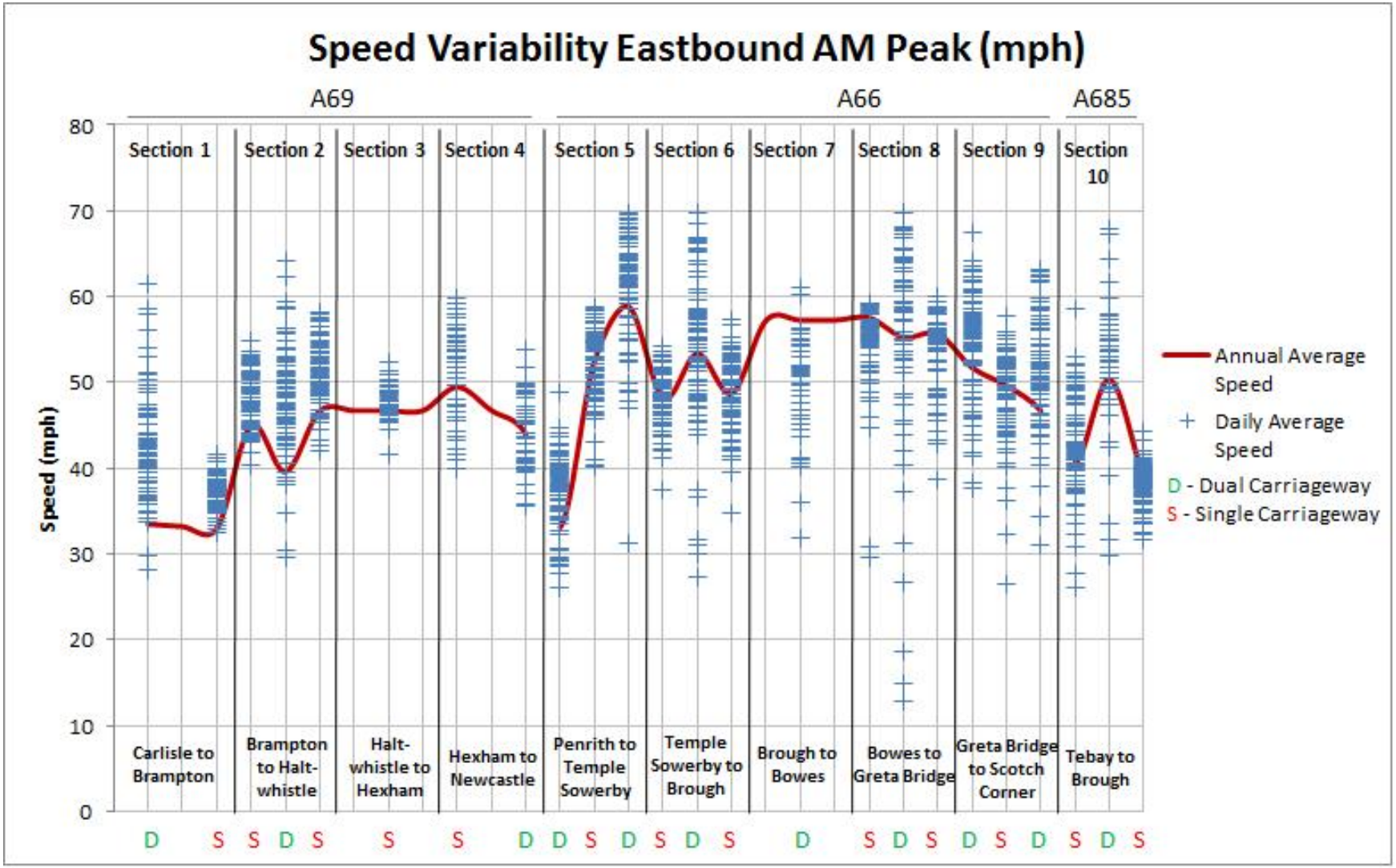


Figure 2-36: Average AM Peak Hour Speed and Daily Variation of Westbound Traffic between Sections on A69 and A66/A685 Corridors (2014-15)

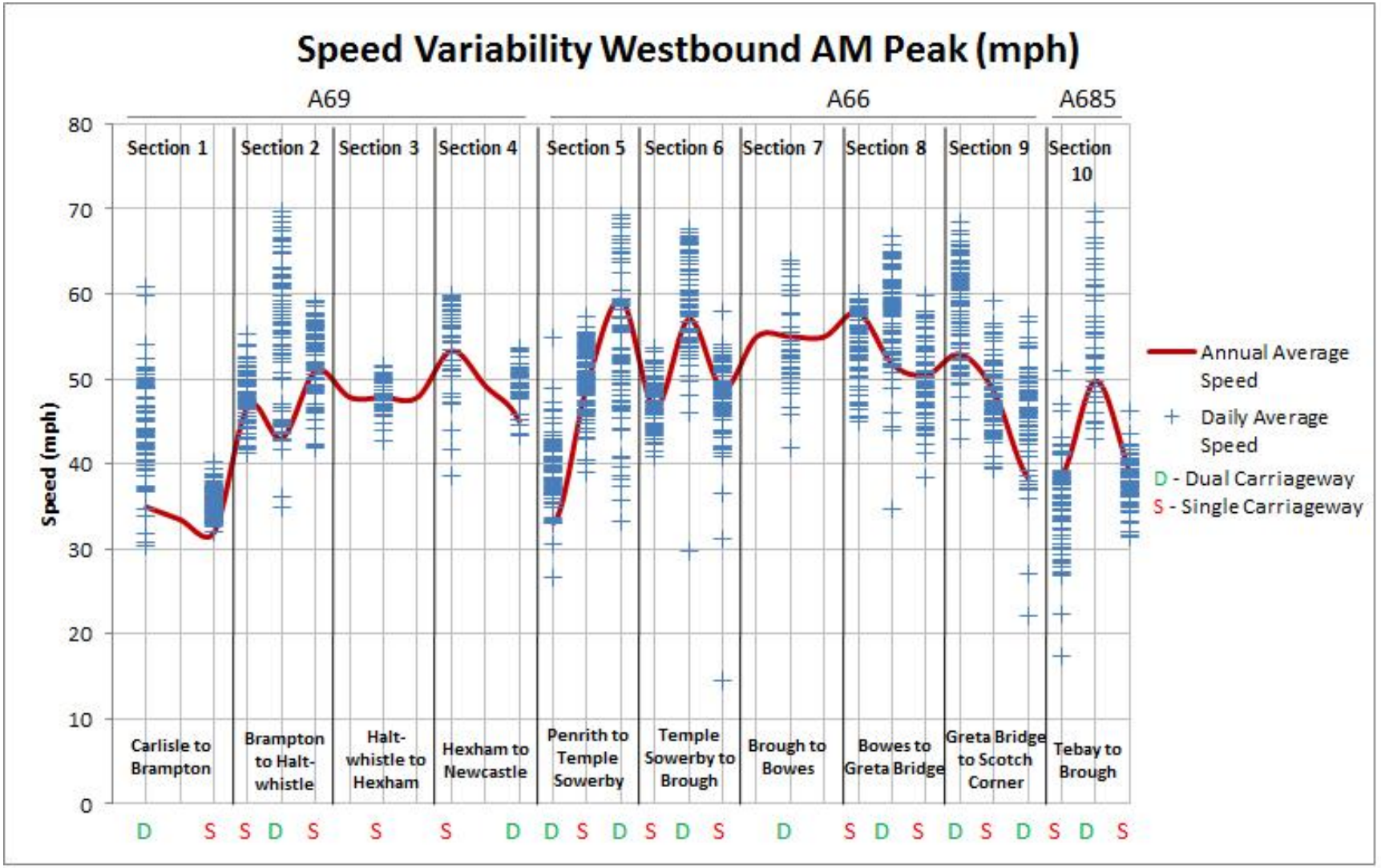


Figure 2-37: Average PM Peak Hour Speed and Daily Variation of Eastbound Traffic between Sections on A69 and A66/A685 Corridors (2014-15)

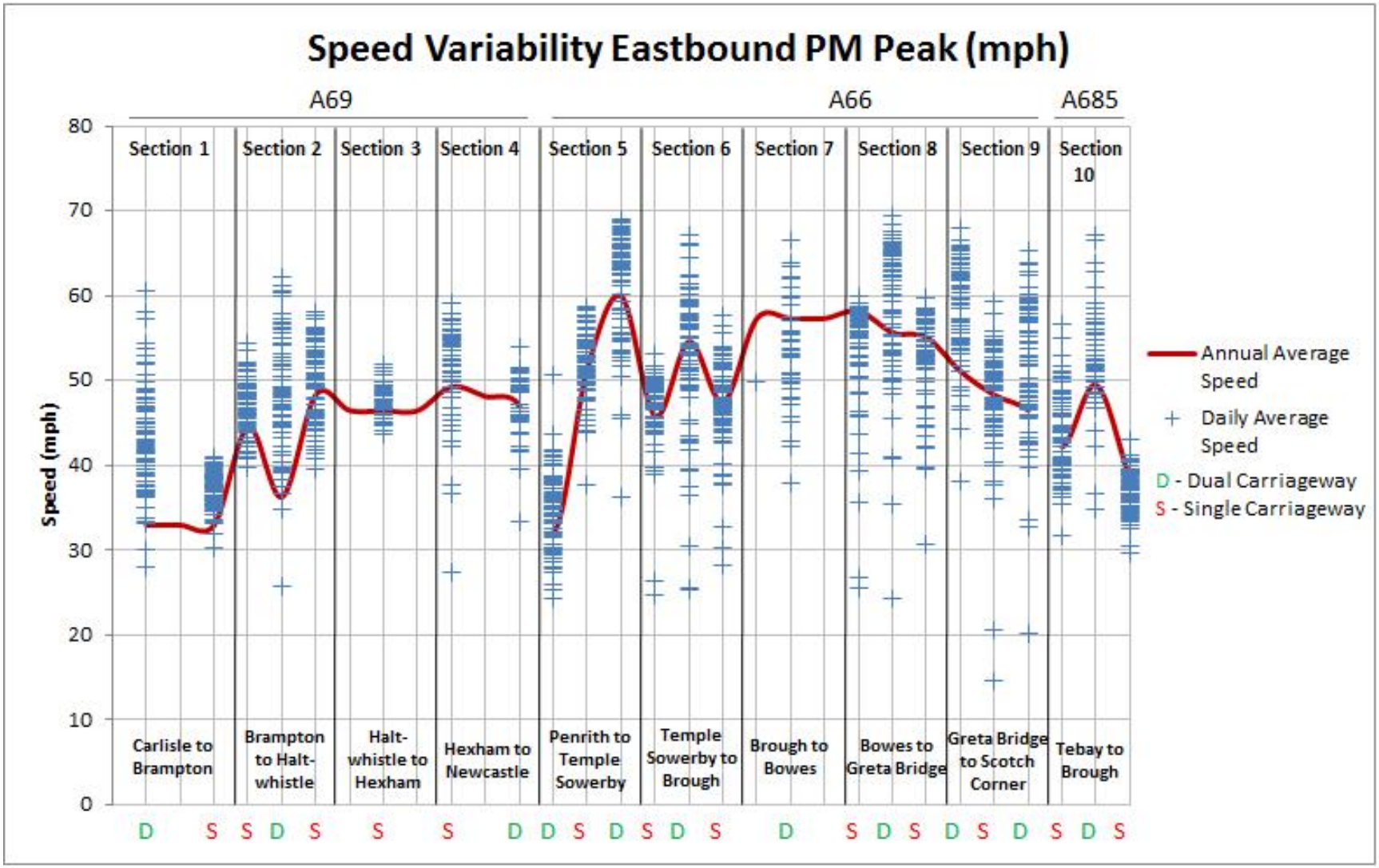
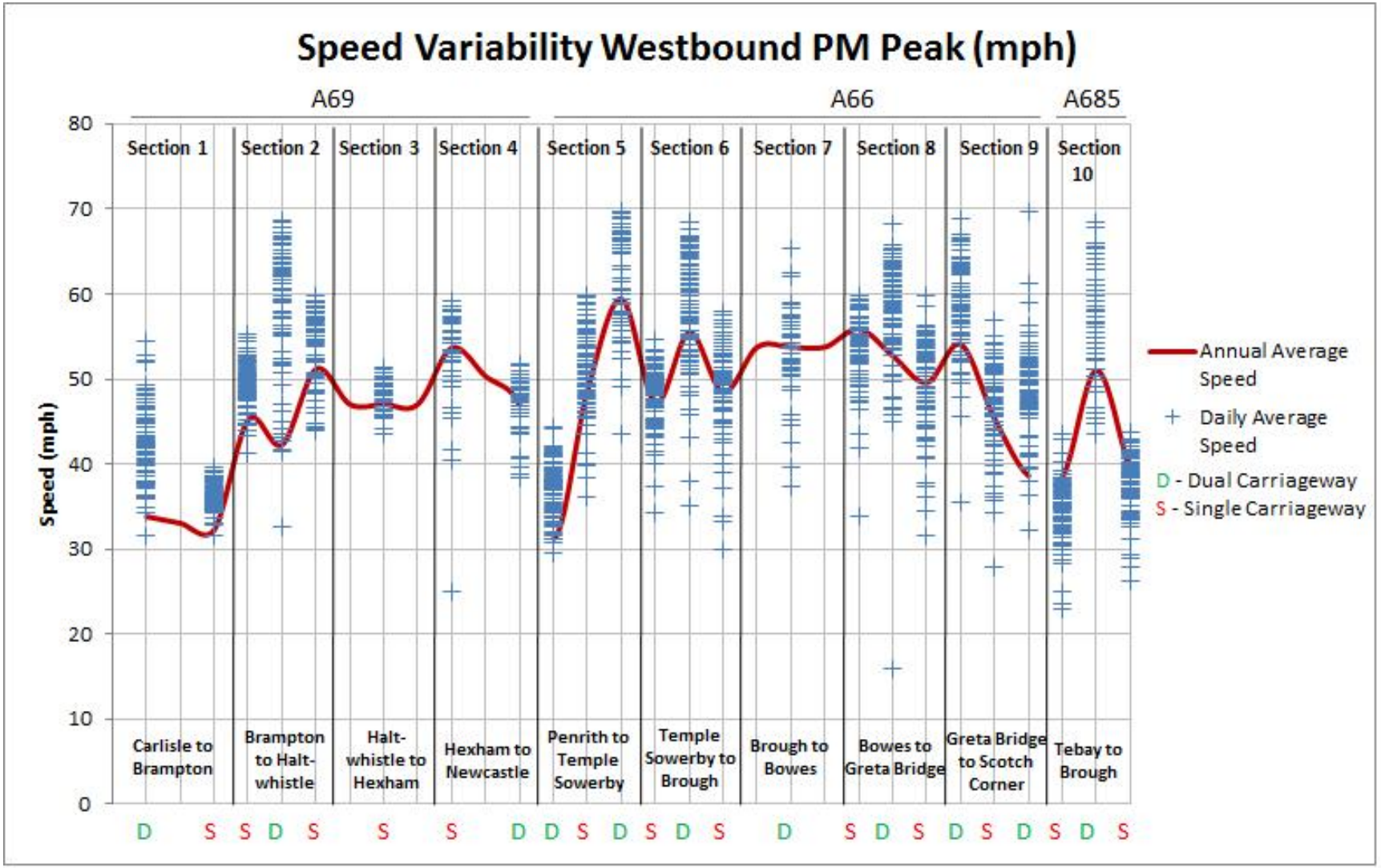


Figure 2-38: Average PM Peak Hour Speed and Daily Variation of Westbound Traffic between Sections on A69 and A66/A685 Corridors (2014-15)



Journey Times and Reliability

2.4.58 In order to understand the current transport context with regards journey times and reliability, similar recently recorded data has also been extracted from the Department for Transport maintained Traffic Master system.

2.4.59 Table 2-27 presents the average journey time of vehicular traffic recorded between September 2014 and August 2015 for the individual sections of the A69 and A66/A685 within the study area during the following periods:

- AM Peak (08:00-09:00)
- PM Peak (17:00-18:00)

Table 2-27: Average Journey Time between Sections on A69 and A66/A685 Corridors (2014-15)

Period	Average Journey Time Recorded During the AM / PM Peak Period (hrs/mins/secs)				
	1) A69 Carlisle to Brampton	2) A69 Brampton to Haltwhistle	3) A69 Haltwhistle to Hexham	4) A69 Hexham to Newcastle	5) A66 Penrith to Temple Sowerby
AM Peak	00:15:59 (EB)	00:13:24 (EB)	00:17:29 (EB)	00:23:50 (EB)	00:09:14 (EB)
	00:13:11 (WB)	00:12:48 (WB)	00:16:59 (WB)	00:21:47 (WB)	00:09:57 (WB)
PM Peak	00:12:11 (EB)	00:12:21 (EB)	00:17:27 (EB)	00:21:04 (EB)	00:09:38 (EB)
	00:12:41 (WB)	00:12:57 (WB)	00:17:02 (WB)	00:20:47 (WB)	00:10:16 (WB)
Period	Average Journey Time Recorded During the AM / PM Peak Period (hrs/mins/secs)				
	6) A66 Temple Sowerby to Brough	7) A66 Brough to Bowes	8) A66 Bowes to Greta Bridge	9) A66 Greta Bridge to Scotch Corner	10) A685 Tebay to Brough
AM Peak	00:15:20 (EB)	00:14:10 (EB)	00:05:28 (EB)	00:11:51 (EB)	00:21:18 (EB)
	00:15:18 (WB)	00:14:12 (WB)	00:05:55 (WB)	00:14:36 (WB)	00:20:48 (WB)
PM Peak	00:16:11 (EB)	00:14:02 (EB)	00:05:37 (EB)	00:12:08 (EB)	00:21:25 (EB)
	00:15:26 (WB)	00:14:44 (WB)	00:06:05 (WB)	00:15:07 (WB)	00:20:58 (WB)

2.4.60 The information provided above demonstrates that the average journey time to travel from east to west across the entire length of the three corridors under consideration was in accordance with the figures at Table 2-28:

Table 2-28: Average Journey Time Over the Entire Length of A69 and A66/A685 Corridors (2014-15)

Period	Average Journey Time Recorded During the AM / PM Peak Period (hrs/mins/secs)		
	A69 Newcastle upon Tyne to Carlisle	A66 Scotch Corner to Penrith	A685 Brough to Tebay
AM Peak	01:10:42 (EB)	00:56:04 (EB)	00:21:18 (EB)
	01:04:45 (WB)	00:59:58 (WB)	00:20:48 (WB)
PM Peak	01:04:03 (EB)	00:57:36 (EB)	00:21:25 (EB)
	01:03:26 (WB)	01:01:37 (WB)	00:20:55 (WB)

2.4.61 In order to demonstrate how the figures presented previously relate to unconstrained operating conditions, Table 2-29 presents the average journey time of vehicular traffic recorded between September 2014 and August 2015 for the individual sections of the A69 and A66/A685 within the study area during an off peak period of 22:00-23:00.

Table 2-29: Average Journey Time between Sections on A69 and A66/A685 Corridors (2014-15)

Period	Average Journey Time Recorded During the Off Peak Period (hrs/mins/secs)				
	1) A69 Carlisle to Brampton	2) A69 Brampton to Haltwhistle	3) A69 Haltwhistle to Hexham	4) A69 Hexham to Newcastle	5) A66 Penrith to Temple Sowerby
Off Peak	00:10:09 (EB)	00:12:06 (EB)	00:15:42 (EB)	00:19:36 (EB)	00:08:42 (EB)
	00:10:10 (WB)	00:11:47 (WB)	00:15:13 (WB)	00:19:26 (WB)	00:08:59 (WB)
Period	Average Journey Time Recorded During the AM / PM Peak Period (hrs/mins/secs)				
	6) A66 Temple Sowerby to Brough	7) A66 Brough to Bowes	8) A66 Bowes to Greta Bridge	9) A66 Greta Bridge to Scotch Corner	10) A685 Tebay to Brough
Off Peak	00:15:08 (EB)	00:14:29 (EB)	00:05:20 (EB)	00:11:34 (EB)	00:18:54 (EB)
	00:14:55 (WB)	00:14:10 (WB)	00:05:17 (WB)	00:15:10 (WB)	00:17:30 (WB)

2.4.62 The information provided above demonstrates that the average journey time to travel from east to west across the entire length of the three corridors under consideration was in accordance with the figures at Table 2-30:

Table 2-30: Average Journey Time over the Entire Length of A69 and A66/A685 Corridors (2014-15)

Period	Average Journey Time Recorded During the Off Peak Period (hrs/mins/secs)		
	A69 Newcastle upon Tyne to Carlisle	A66 Scotch Corner to Penrith	A685 Brough to Tebay
Off Peak	00:54:30 (EB)	00:55:13 (EB)	00:18:54 (EB)
	00:56:36 (WB)	00:58:31 (WB)	00:17:30 (WB)

2.4.63 The differential between an average of the AM/PM peak period and the recorded off peak period journey times to travel from east to west across the entire length of the three corridors is presented at Table 2-31:

Table 2-31: Difference in Average Journey Time between the AM/PM and the Off Peak Periods (2014-15)

Period	Difference in Journey Time between Average AM/PM and Off Peak Period (hrs/mins/secs)		
	A69 Newcastle upon Tyne to Carlisle	A66 Scotch Corner to Penrith	A685 Brough to Tebay
Off Peak	00:12:53 (EB)	00:01:37 (EB)	00:02:28 (EB)
	00:07:30 (WB)	00:02:17 (WB)	00:03:22 (WB)

2.4.64 In order to illustrate the typical journey times currently associated with travel throughout the study area, drive time isochrones are presented at Figure 2-39 to Figure 2-42 which show the distance that can be travelled in 30 minute intervals up to a maximum of 2 hours. The images clearly demonstrate that greater distances are currently achievable per time segment in a north to south direction than in an east-west direction.

2.4.65 This is likely due to the availability of motorway standard receptors such as the A1/M1 (to the east) and M6 (to the west) which facilitate the movement of traffic in a north to south trips direction. These roads benefit from higher average speeds and greater levels of journey time reliability, when compared with the alternative east to west routes such as the A69 and A66/A685 (with differing standards of single and dual carriageway road available).

Figure 2-39: Indicative Drive Time Isochrones from the A69 at Newcastle upon Tyne

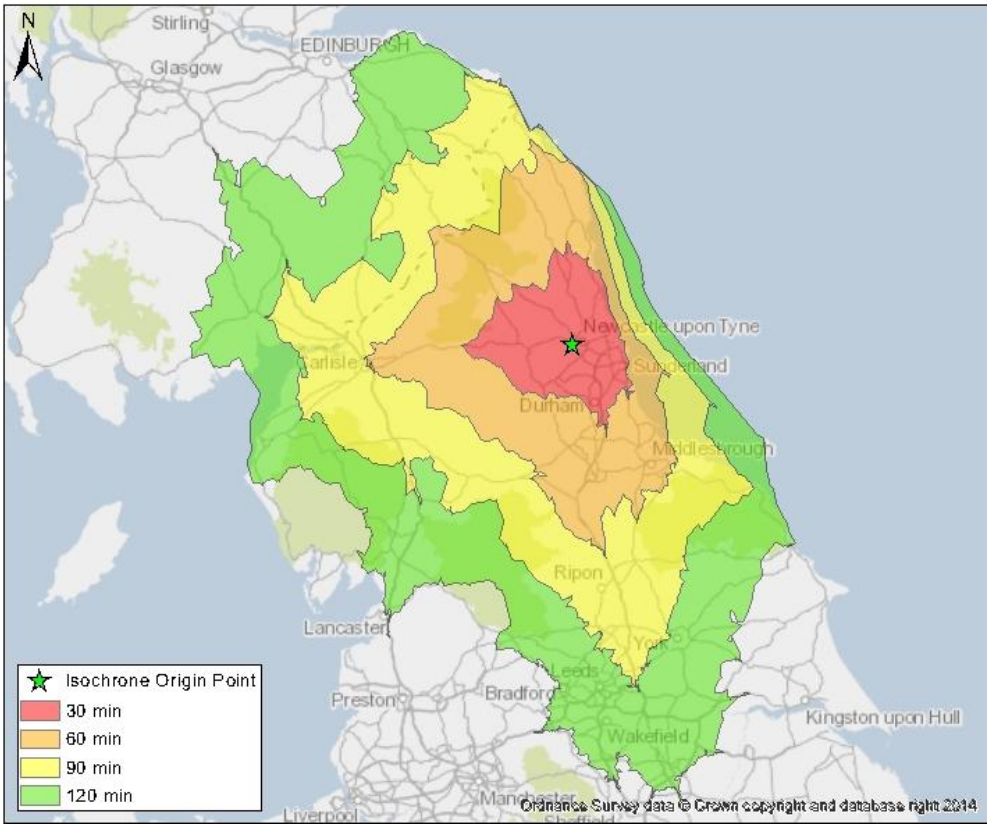


Figure 2-40: Indicative Drive Time Isochrones from the A69 at Carlisle

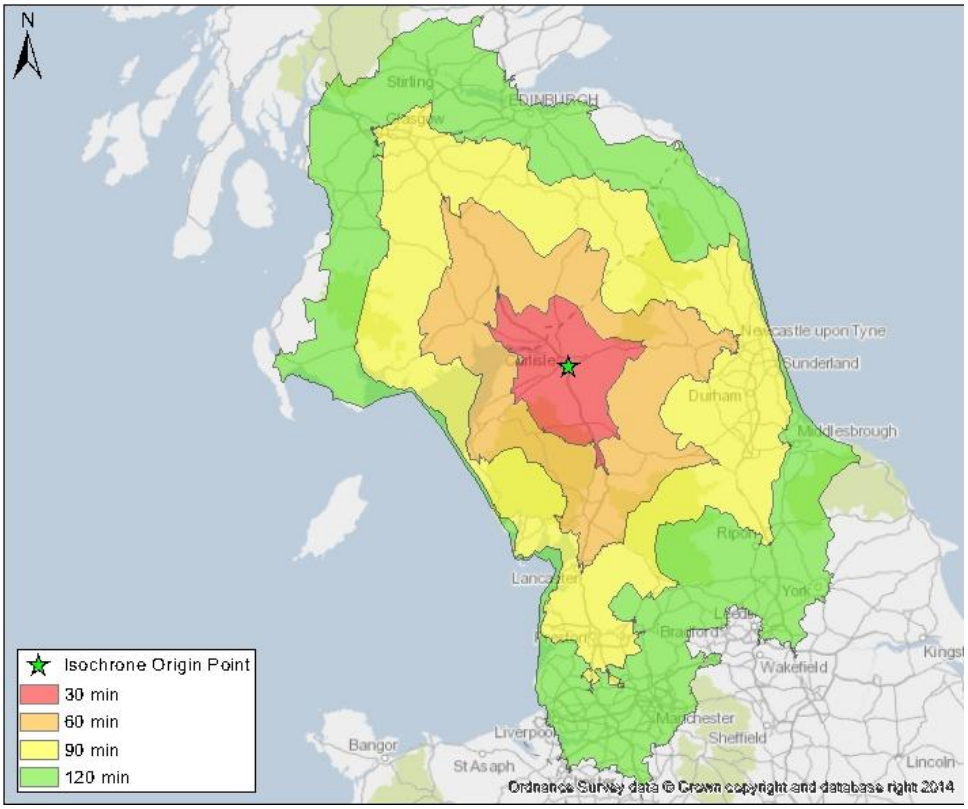


Figure 2-41: Indicative Drive Time Isochrones from the A66 at Scotch Corner

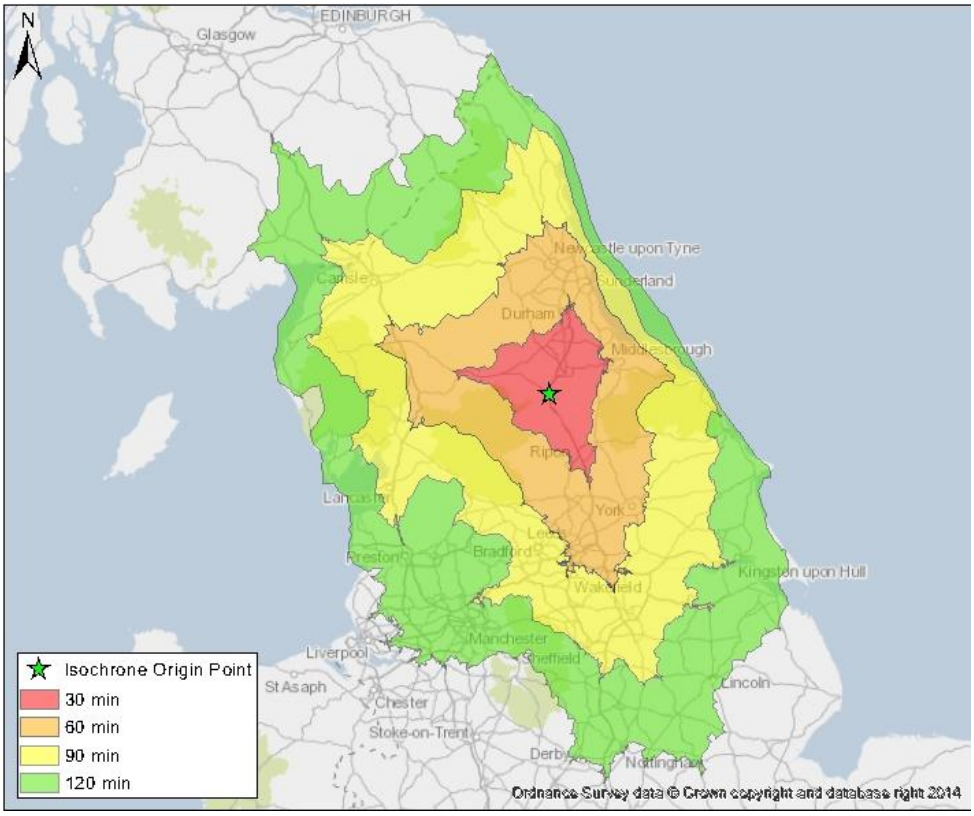
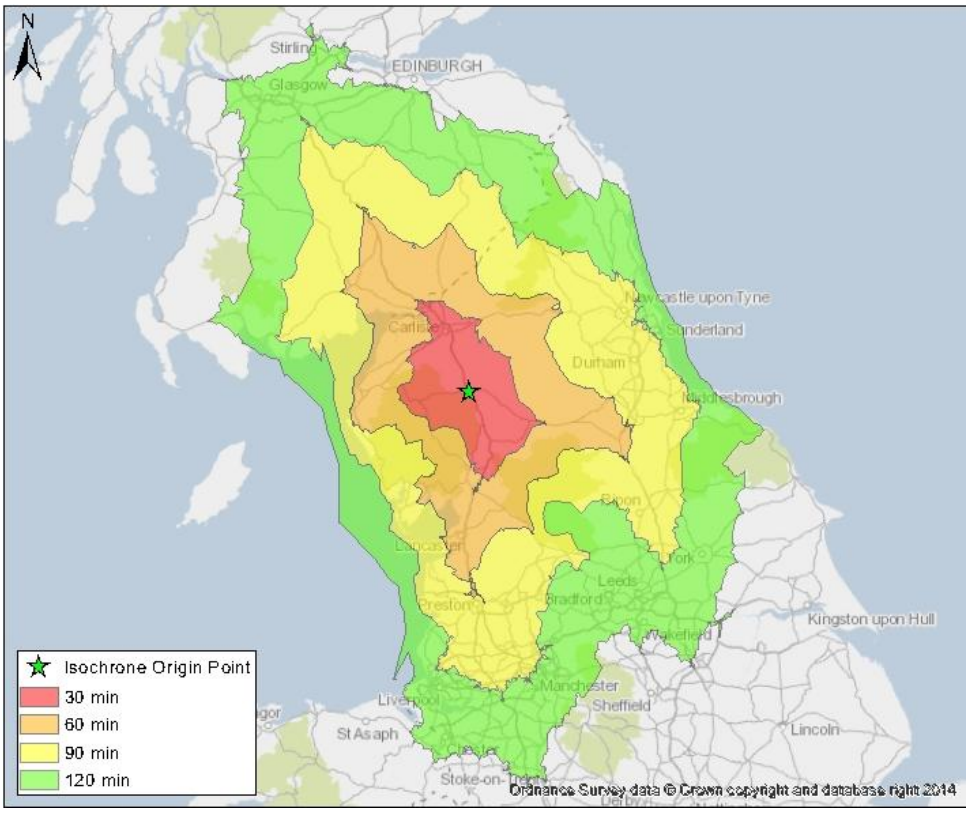


Figure 2-42: Indicative Drive Time Isochrones from the A66 at Penrith



2.4.66 In order to demonstrate how the travel data presented above, relates to journey time reliability associated with the various routes, a study has been conducted of the daily variation throughout the course of the entire year.

2.4.67 In accordance with the recommendations of Web Tag, the information has been tabulated in order to illustrate the proportion of journeys between September 2014 and August 2015 which were completed in a time-frame that falls within a reliability threshold (based around one standard deviation either side of the average journey time) for that section of the study area.

2.4.68 These figures are presented at Table 2-32 and provide an indication of the percentage of daily journey times across the individual sections of the study area which were considered reliable.

Table 2-32: Journey Time Reliability for Sections on A69 and A66/A685 Corridors (2014-15)

Period	Average Journey Time Recorded During the AM / PM Peak Period (hrs/mins/secs)				
	1) A69 Carlisle to Brampton	2) A69 Brampton to Haltwhistle	3) A69 Haltwhistle to Hexham	4) A69 Hexham to Newcastle	5) A66 Penrith to Temple Sowerby
AM/PM Peak	97.8%	80.4%	82.9%	77.6%	83.9%
Period	Average Journey Time Recorded During the AM / PM Peak Period (hrs/mins/secs)				
	6) A66 Temple Sowerby to Brough	7) A66 Brough to Bowes	8) A66 Bowes to Greta Bridge	9) A66 Greta Bridge to Scotch Corner	10) A685 Tebay to Brough
AM/PM Peak	91.3%	87.2%	79.6%	88.4%	85.3%

2.4.69 The information provided above demonstrates that the least reliable stretch of the A69 corridor is located on the Hexham to Newcastle section of the route (which correlates with most heavily trafficked part of the route and features at-grade roundabout junctions at either end of the link which can introduce vehicular delay as a result) with an average reliability measure of around 77.6%.

2.4.70 With regards the A66 corridor, the least reliable stretch is located on the Bowes to Greta Bridge section with an average reliability measure of around 79.5%. By comparison, the A685 between Tebay and Brough recorded an average reliability measure of 85.3% during the same time period.

Current Highways Context – Key Points
Both the A66/A685 and A69 routes between the A1 and the M6 are a mix of dual and single carriageway standards.
In terms of traffic flows the A69 corridor displays a typical profile, with flows highest in the AM and PM peak periods, whereas the A66 displays a profile more typical of a strategic route with flows gradually increasing during the day and a maximum flow at around 1700.
4 of the top 5 most heavily trafficked sections of the study area are located on the A66 corridor, with the busiest link located between Penrith and Temple Sowerby. The busiest section on the A69 is between Hexham and Newcastle.
Traffic congestion is no generally an issue on either corridor, with all single and dual carriageway sections operating well within their design capacities.
Average traffic speeds during operational peak hours are generally lower than the maximum speed limit on both single and dual carriageway sections of the route.
The highest average speed is on the A66 section between Brough and Bowes (all dual carriageway) and the lowest average speed is on the A69 section between Carlisle and Brampton (all single carriageway).
Traffic speeds and journey time reliability along both routes are inconsistent.

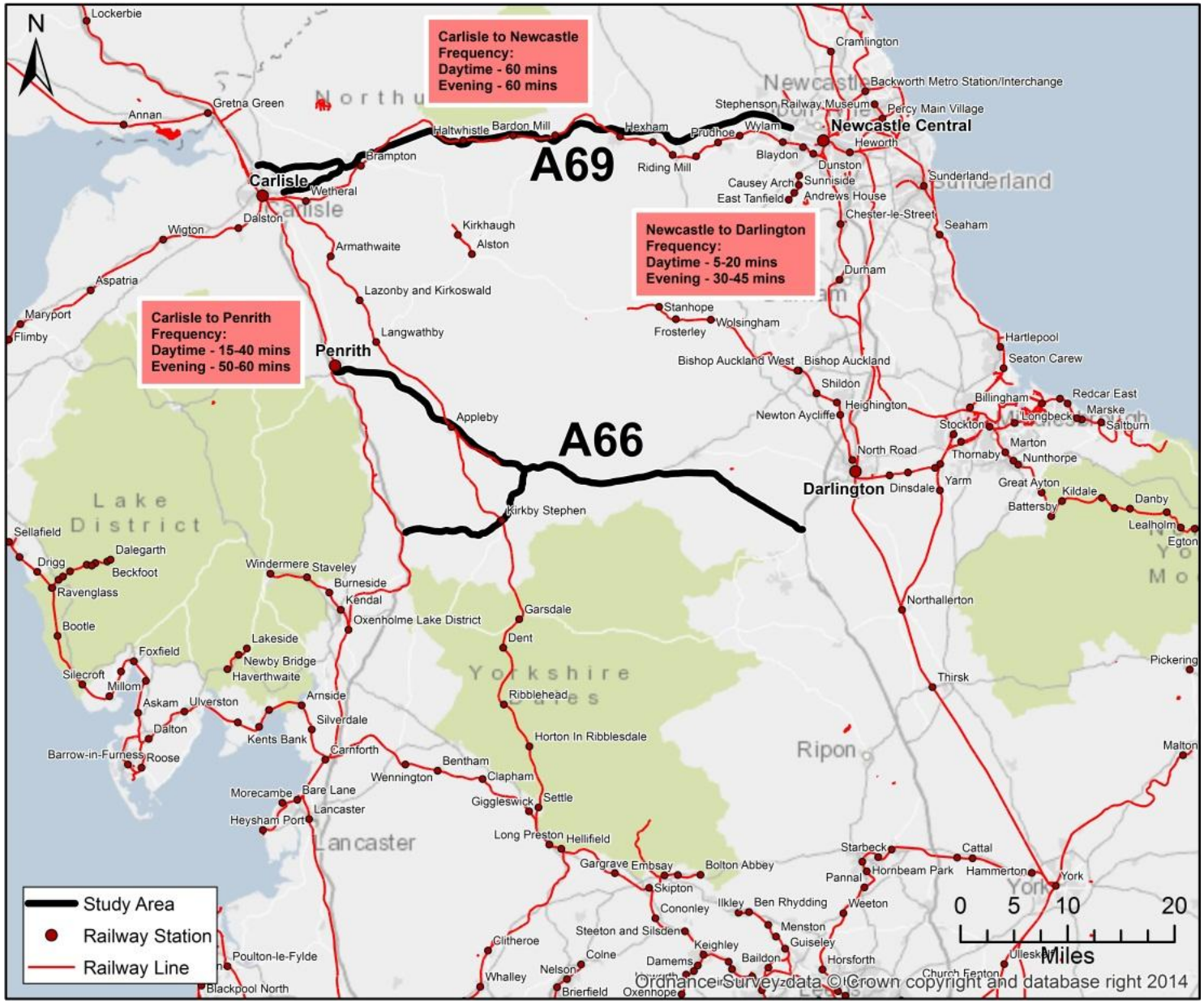
Rail Infrastructure and Services

2.4.71 In order to understand the suitability of rail infrastructure to provide a valid alternative to road based trips within the study area, analysis of the various routes, stations and service frequencies has been conducted. Figure 2-43 illustrates the alignment of major rail lines within the north of England and the location of individual stations relative to the study area.

2.4.72 The image clearly demonstrates that the east-coast and west-coast mainlines (which run between Newcastle upon Tyne-Darlington and Carlisle-Penrith within the study area) form the principal routes for rail travel throughout the north of England.

2.4.73 A Trans-Pennine route also runs between Newcastle upon Tyne and Carlisle broadly along the same alignment as the A69 corridor. There is currently no rail line which provides an alternative to the A66 for rail travel between Darington and Penrith.

Figure 2-43: Major Railway Stations/Lines and Average Service Frequency



2.4.74 Table 2-33 provides details of services which operate in the North Pennines region and the frequencies available to commuters travelling between Newcastle upon Tyne, Darlington, Carlisle and Penrith.

Table 2-33: Rail Service Frequencies between Major Urban Conurbations Located within the Study Area

Newcastle upon Tyne to Darlington Services	Day	Evening
Virgin Trains – Inverness, Aberdeen, Dundee, Glasgow, Edinburgh, Newcastle, Durham, Darlington, York, Leeds, Lincoln, Peterborough, London Kings Cross	5-20 mins	30-45 mins
Carlisle to Penrith Services	**Day**	**Evening**
Virgin Trains – Glasgow, Edinburgh, Carlisle, Penrith, Lancaster, Preston, Wigan, Stafford, Birmingham, Coventry, Milton Keynes, Watford, London Euston	15-40 mins	50-60 mins
Carlisle to Newcastle upon Tyne Services	**Day**	**Evening**
Scot Rail – Glasgow, Barrhead, Kilmarnock, Dumfries, Carlisle, Newcastle	60 mins	60 mins

2.4.75 It is evident from the timetable information detailed above that that typical daytime frequencies on the east-coast mainline between Newcastle upon Tyne and Darlington provide commuters with services at a maximum of 20 minute intervals, whilst the west-coast mainline provides services at a maximum of 40 minute intervals and the Trans-Pennine route provides services at around 60 minute intervals.

2.4.76 Typical average weekday journey times between the key urban conurbations pertinent to this NTPR study are presented below:

- Newcastle upon Tyne to Darlington (approximately 32 miles): 32 mins
- Carlisle to Penrith (approximately 18 miles): 14 mins
- Carlisle to Newcastle upon Tyne (approximately 53 miles): 90 mins

2.4.77 This information indicates that the east-coast mainline is currently considered to represent the route of most strategic importance with regards rail movement both within the northern region and in terms of facilitating onward connections to the remainder of the United Kingdom. Accessibility to major train stations in the study area by road and alternative public transport corridors is shown at Figure 2-44 and Figure 2-45 with typical travel times presented at ten minute intervals.

2.4.78 Furthermore, it can also be seen that the typical average weekday journey time associated with the Trans-Pennine line between Carlisle and Newcastle upon Tyne is considerably slower (approximately 35mph on average) than either the east-coast or west-coast mainlines (approximately 60mph and 77mph on average respectively).

2.4.79 It must be noted that the east-coast mainline records a slower average speed than the west-coast mainline due to the fact that the majority of services stop in Durham between Newcastle upon Tyne and Darlington, whereas all services between Carlisle and Penrith provide a direct connection.

2.4.80 Similarly, it must also be noted that the Trans-Pennine line records the slowest average speed under consideration due to the fact that many services provide connections at numerous local stations between Carlisle and Newcastle upon Tyne. Rail infrastructure operating along the route is also typically less advanced than that operating along the east-coast and west-coast mainlines.

Figure 2-44: Drive Time Isochrones to/from Major Railway Stations within the Study Area

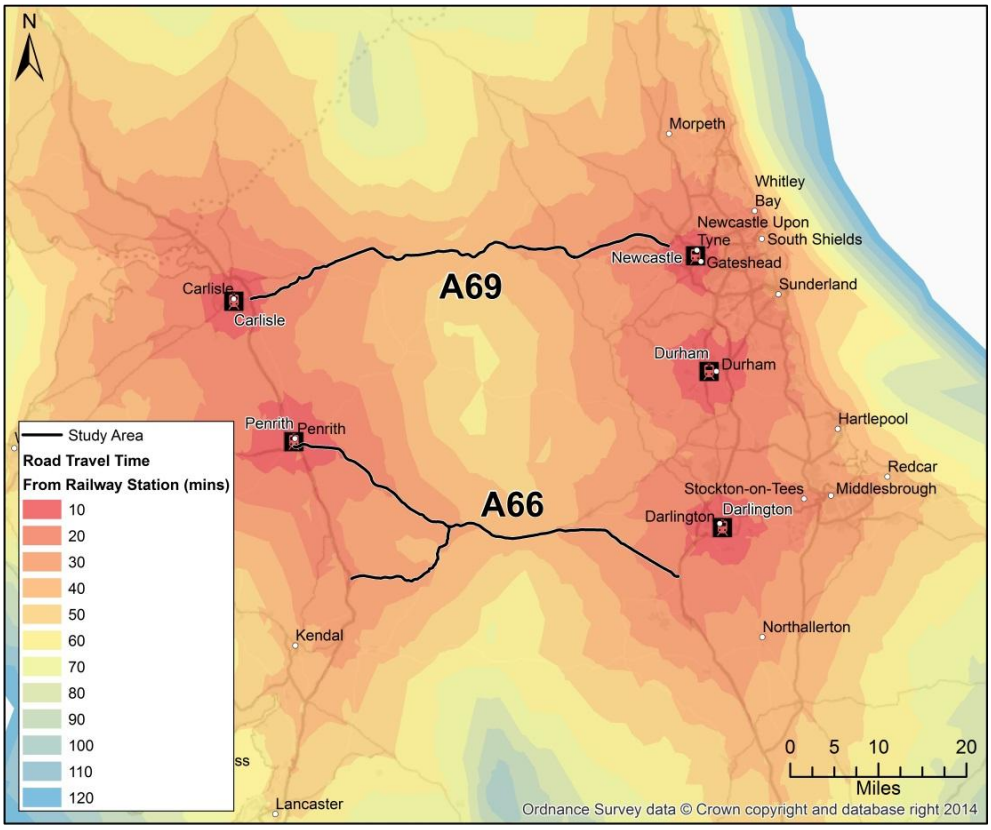
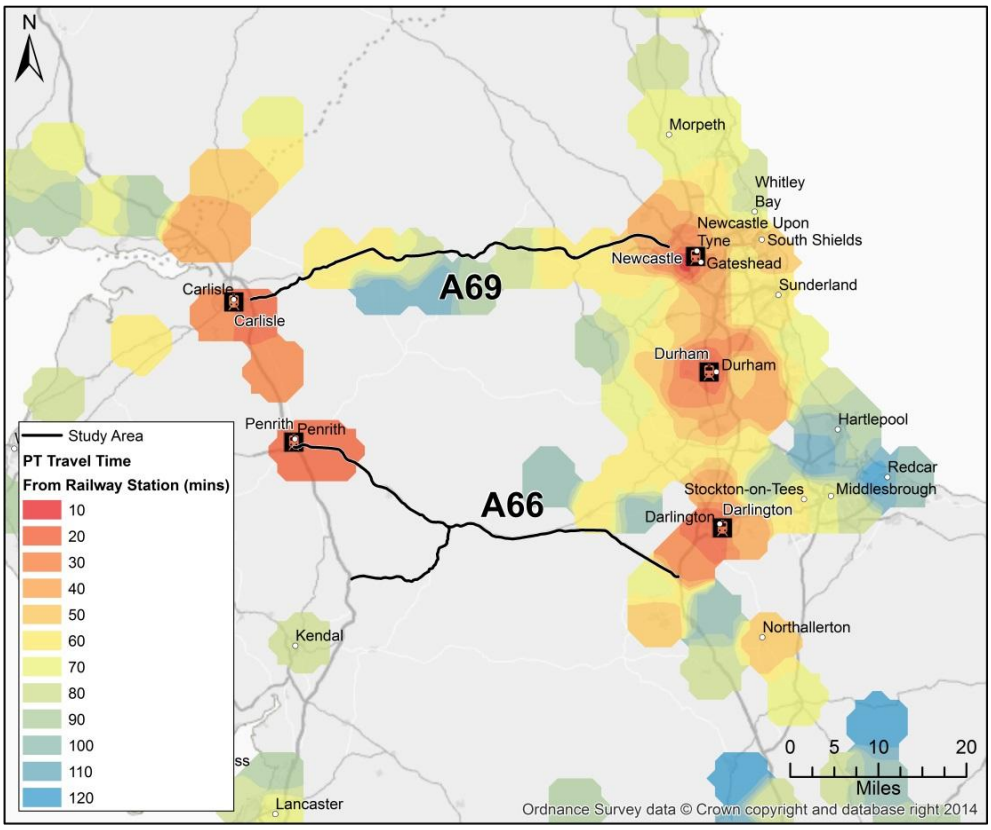


Figure 2-45: Public Transport Isochrones to/from Major Railways Stations within the Study Area



Bus and Coach Services

2.4.81 In order to understand the current transport context with regards the suitability of bus infrastructure to provide a valid alternative to car-borne trips, analysis of the various routes and service frequencies has also been conducted. Figure 2-42 provides an indicative illustration of the route followed by bus/coach routes which run from east to west along the A69 and A66/A685 corridors.

2.4.82 The image clearly demonstrates that the A69 provides limited bus service coverage between Newcastle upon Tyne-Carlisle, with minor services operating between Brampton-Carlisle and Newcastle Upon Tyne-Hexham utilising the same route. The A66 does not currently facilitate the operation of any bus or coach services which run between the Penrith and Darlington areas, however, a minor service operates between Penrith and Kirkby Stephen which partially utilises the route.

2.4.83 Table 2-34 provides details of services which operate within the study area and the typical frequency available to commuters travelling between urban conurbations adjacent to the A69 and A66/A685.

Table 2-34: Bus Service Frequencies between Major Urban Conurbations Located within the Study Area

Service	Services Operating on the A66 Corridor - Route Description	Day	Evening
563	Penrith - Appleby - Brough - Penrith	Infrequent	No Service
Service	Services Operating on the A69 Corridor - Route Description	Day	Evening
85/685	Newcastle - Throxley - Hexham - Haydon Bridge - Haltwhistle - Brampton - Warwick Bridge - Scotby - Carlisle	60 mins	No Service
95	Brampton - Heads Nook - Great Corby - Wetheral - Scotby Road End - Carlisle	Infrequent	No Service
X84/X85	Newcastle - Throxley - Ovington - Hexham	30 mins	30 mins

2.4.84 It is evident from the timetable information detailed above that that typical daytime frequency of buses operating on the A69 corridor between Newcastle upon Tyne and Carlisle provide commuters with services at standard 60 minute intervals. Commuters journeying between Newcastle upon Tyne and Hexham benefit from a greater service frequency which operates at 30 minute intervals.

2.4.85 This information indicates that the commuters journeying between Penrith and Kirkby Stephen suffer from an infrequent service frequency with a maximum of 4 buses per day available on the route. It is, therefore, considered that the A69 currently benefits from greater provisions with regards Trans-Pennines bus journeys than the A66, although it must be emphasised that neither route benefits from a high frequency service due to the rural nature of the study area.

2.4.86 The travel times associated with the various bus services available at Newcastle upon Tyne, Carlisle, Scotch Corner and Penrith are shown at Figure 2-46 to Figure 2-50 with typical travel times presented at ten minute intervals.

2.4.87 These figures further highlight the fact that services from Newcastle upon Tyne and Carlisle not only facilitate travel within/around these respective cities, but they also provide an additional function by offering commuter travel across the A69 corridor to communities such as Throxley, Hexham, Haydon Bridge, Haltwhistle, Brampton, Warwick Bridge and Scotby.

2.4.88 It is clear that services from Scotch Corner and Penrith tend to facilitate local trips, with destinations in Teesside/County Durham and Eden District being achievable within 2 hours. Options for public transport usage travel along the A66/A685 corridor are extremely limited, however, with only partial coverage and infrequent service times available to travellers.

Figure 2-46: Trans-Pennines Bus/Coach Service Frequency and Routes

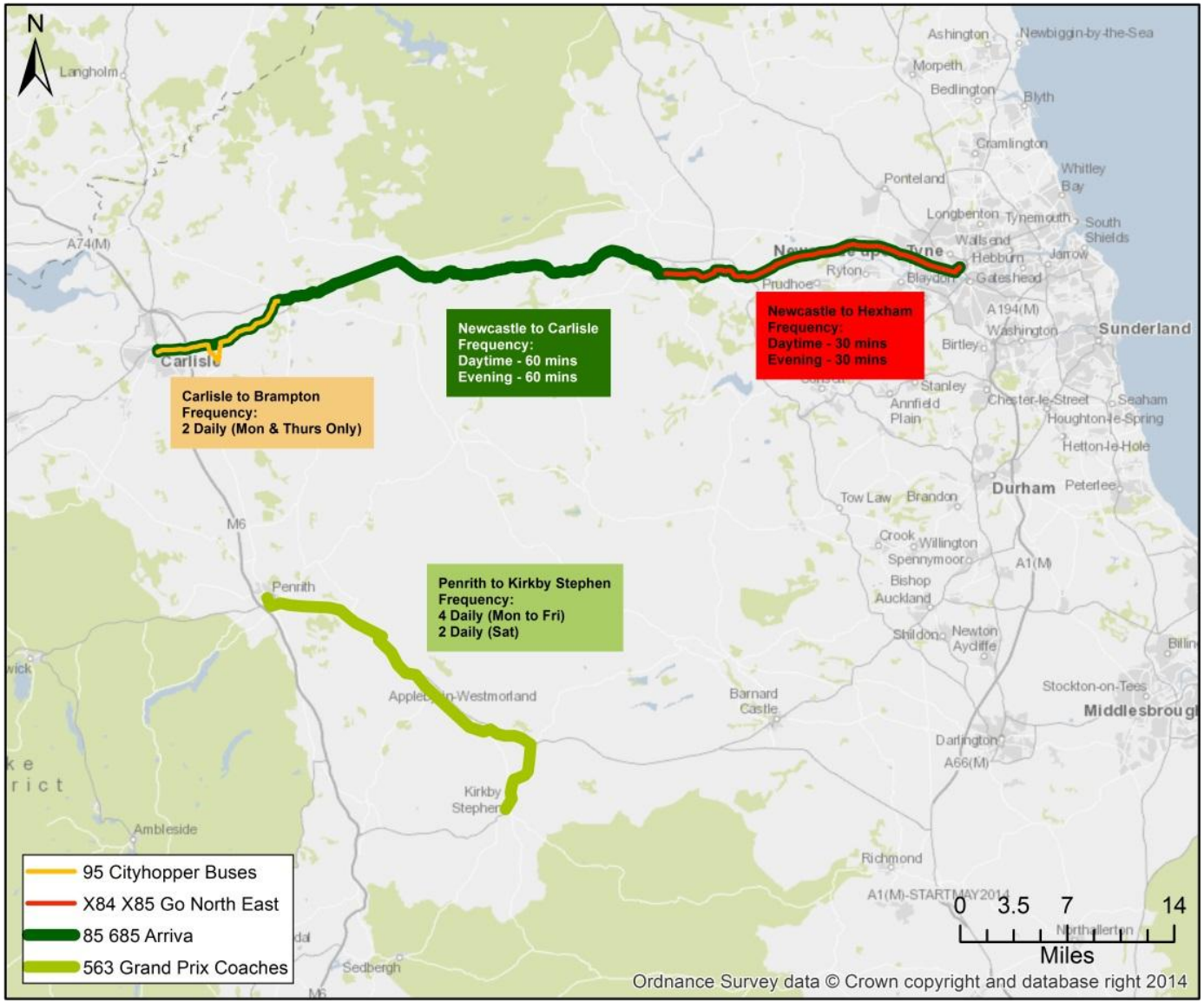


Figure 2-47: Bus Travel Isochrones to/from Services available at Newcastle upon Tyne

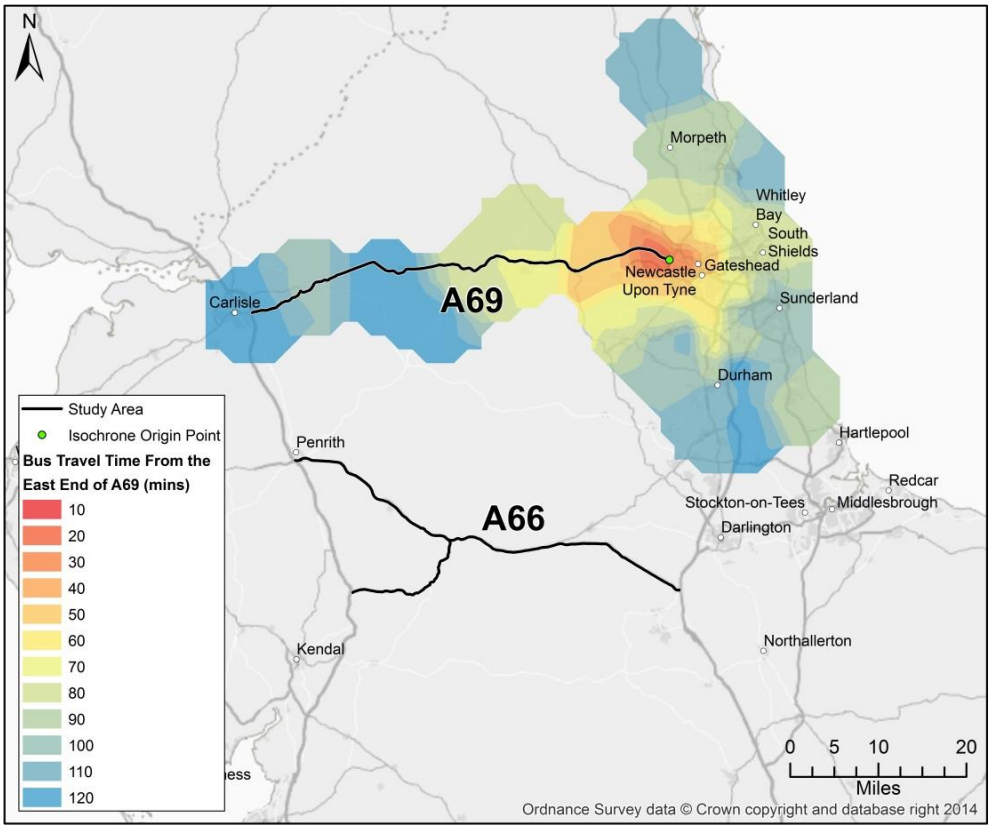


Figure 2-48: Bus Travel Isochrones to/from Services available at Carlisle

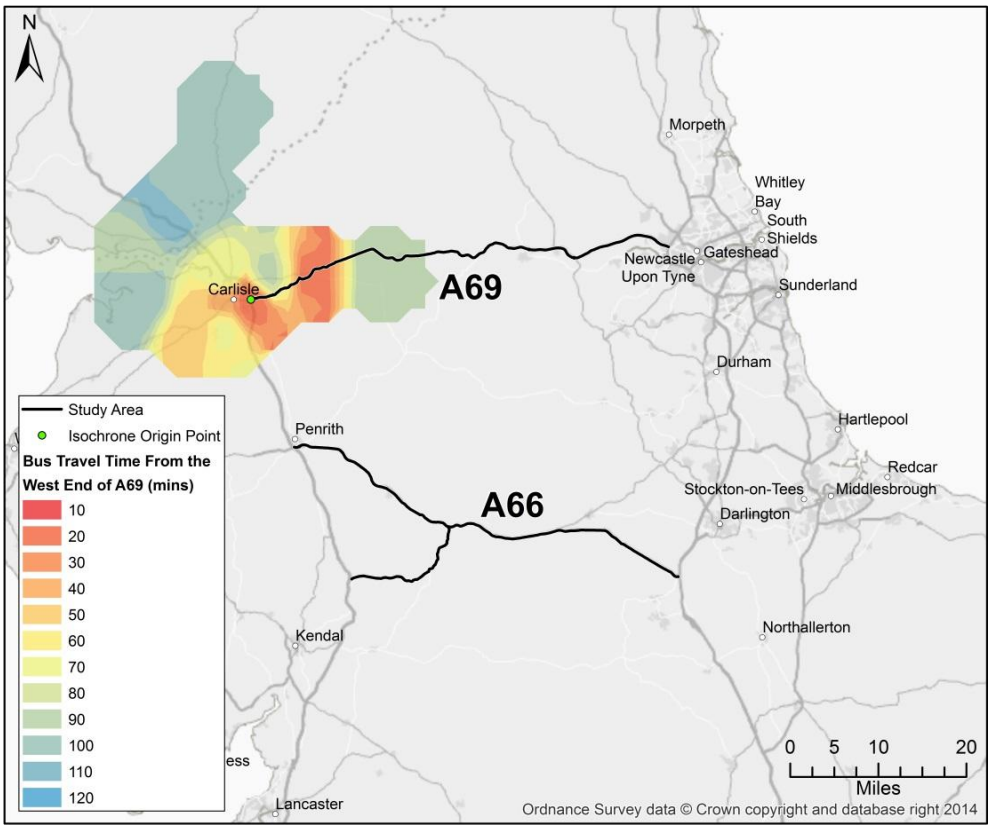


Figure 2-49: Bus Travel Isochrones to/from Services available at Scotch Corner

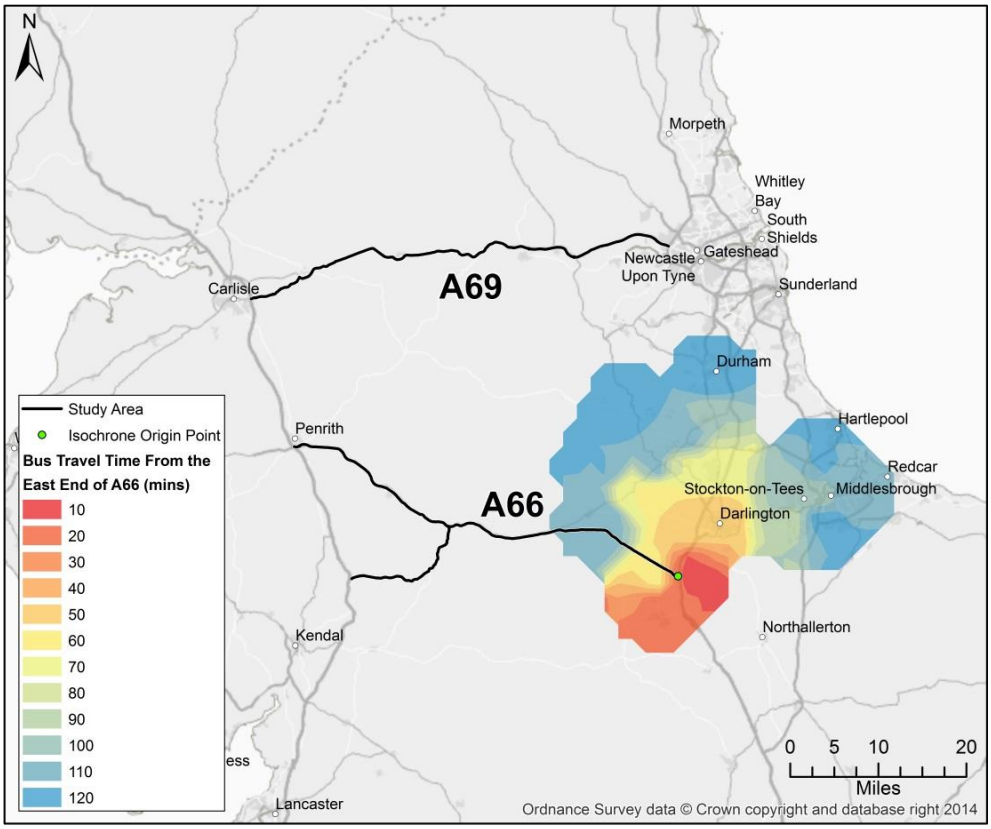
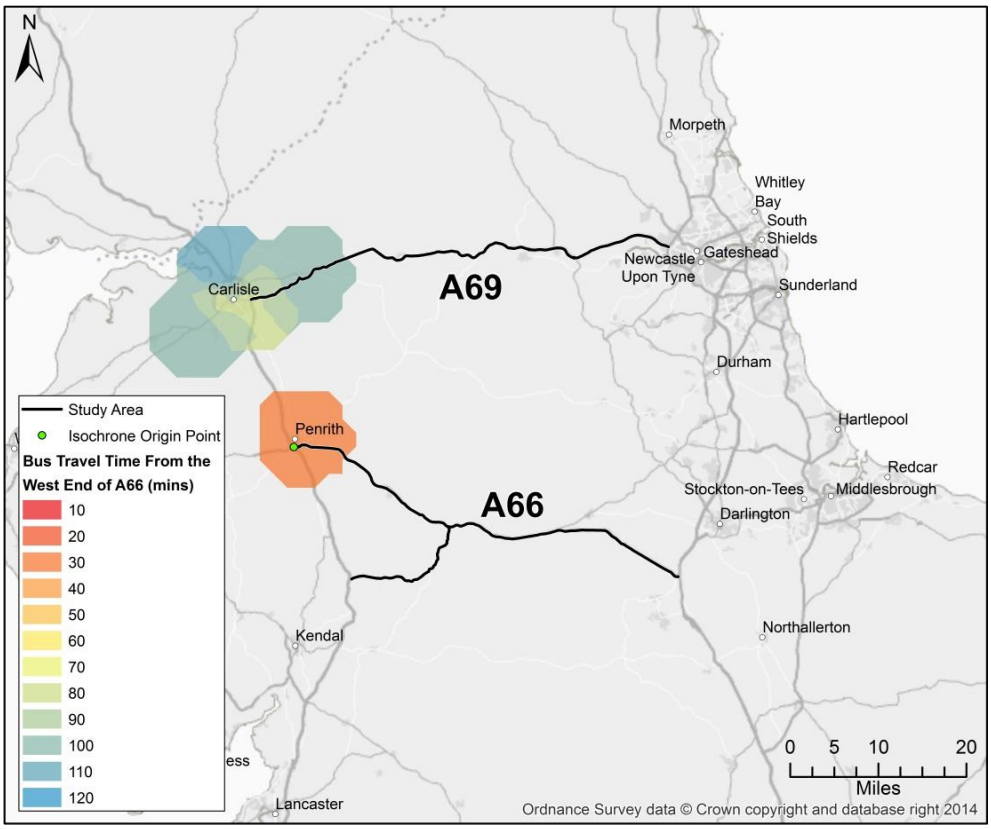


Figure 2-50: Bus Travel Isochrones to/from Services available at Penrith



Current Public Transport Context – Key Points
The east coast and west coast lines provide strategic north-south rail links either side of the study area.
The only east-west rail link is the one between Newcastle and Carlisle which broadly follows the same alignment as the A69 corridor, but there is no rail line alternative to the A66 between Darlington and Penrith.
Current journey speeds on the Newcastle-Carlisle are slow (average of 35mph), compared with the north-south links and rail services are infrequent.
There is very little bus service provision along the A66/A685 corridor, with no services covering the whole journey between Darlington and Penrith.
Bus service provision on the A69 is better, with an hourly service between Newcastle and Carlisle, and express bus services between Hexham and Newcastle.

Freight Demand

2.4.89 Transport for the North has established aspirations to facilitate long-term transformational changes to connectivity between the city regions of Leeds, Liverpool, Manchester, Newcastle and Sheffield. It has subsequently identified a series of priorities for 2015/16 relating to rail, road, freight, integrated smart travel, strategy, city connectivity and governance.

2.4.90 With specific regard to its freight strategy, Transport for the North has commissioned a Freight and Logistics Study across the north to:

- Establish the baseline position with regards freight movements by all modes of travel, including road, rail, air and water.
- Identify and model potential infrastructure requirements for the network, including complementary rail and road work-streams as appropriate.
- Inform the development of national freight and logistics policy, strategy, etc.

2.4.91 As part of this Freight and Logistics Study, MDS Transmodal has been commissioned to perform analysis of the likely impact of delivering a Trans-Pennine tunnel in terms of HGV routing, and potential user benefits.

2.4.92 The study uses the Department for Transport 'GB Freight Model' which is a component of the 'National Transport Model' and includes an origin-destination matrix of current HGV movements at a postcode district level (which equates to approximately 2,600 individual zones nationwide). The information has been used to present an existing baseline (2014) and future (2033) forecast of commercial movements anticipated to travel between the east and west via a newly constructed Trans-Pennine tunnel. The matrix assigns trips onto the strategic road network based upon the lowest generalised cost which would be incurred by a freight operator, with links defined in terms of average HGV speed.

2.4.93 With specific regard to the development of this NTPR study a collaborative work-stream has been developed with MDS Transmodal in order to establish the quantum of commercial trips currently using the A69, A66 and M62 routes.

2.4.94 The 'GB Freight Model' has been used to forecast the total number of HGVs currently using the three routes and the direction of travel. The extracted information also provides details relating to the anticipated origin/destination of trips (between postcode districts) and the highway link utilised to complete the journey, as summarised at Table 2-35.

Table 2-35: Total Quantum of HGVs Forecast to Use the A66/A69/M62 Corridors for Trans-Pennine Travel

Route	Eastbound	Route % Split	Westbound	Route % Split	Two-way	Route % Split
A69	198,954	54%	168,582	46%	367,536	5%
A66	849,298	47%	955,522	53%	1,804,820	23%
M62	2,735,458	49%	2,867,566	51%	5,603,024	72%
Total	**3,783,710**	**49%**	**3,991,670**	**51%**	**7,775,380**	**100%**

2.4.95 In order to validate the information extracted from the 'GB Freight Model' a similar exercise has been conducted using a Department for Transport maintained traffic count database, which provides the average daily two-way flows recorded throughout the year of 2014 for the three receptors under consideration. The extracted flows have been factored to represent an annual figure and are summarised at Table 2-36, with a comparison of the numbers presented by the 'GB Freight Model' and the percentage difference between actual recorded and forecast flows.

Table 2-36: Comparison of GB Freight Model and DfT Traffic Flows for HGV Trans-Pennine Travel

Route	GBFM	Route % Split	DfT Counts	Route % Split	% Difference
A69	367,536	5%	469,755	6%	-1%
A66	1,804,820	23%	942,795	13%	+10%
M62	5,603,024	72%	5,934,170	81%	-9%
Total	**7,775,380**	**100%**	**7,346,720**	**100%**	**0%**

2.4.96 From the information presented above it can clearly be seen that the 'GB Freight Model' has forecast that a total of 7,775,380 two-way HGV trips are anticipated to use the three Trans-Pennine routes to travel east to west. Traffic counts held by the Department for Transport indicate that the actual recorded figures for 2014 represented a total of 7,346,720 two-way HGV trips, which is 428,660 (approximately 5-6%) less than the forecast delivered by the 'GB Freight Model'. MDS Transmodal has advised that this falls within accepted tolerance thresholds and that the global model is, therefore, considered representative. It is, however, evident from the figures presented above that the 'GB Freight Model' has a tendency to over-allocate trips onto the A66 corridor and under-allocate them on the M62 corridor.

2.4.97 The data extracted from the 'GB Freight Model' forecasts that of the 7,775,380 two-way commercial trips currently using the three Trans-Pennine routes to travel east to west, there is a clear bias towards use of the M62 corridor between Leeds and Manchester (i.e. approximately 72% in total). This is confirmed by the information extracted from the Department for Transport traffic count data (although in reality the bias may prove to be as great as 81% in total). Of the various Trans-Pennine routes available to commercial traffic, this link represents the only motorway standard receptor which is dual carriageway (or greater) in nature along its entire length and is subsequently more attractive to freight operators.

2.4.98 A comparison of the forecast associated with A66 and A69 corridors demonstrates that of the 7,775,380 two-way commercial trips currently using the three Trans-Pennine routes to travel east to west, it is anticipated that, on journey times alone, the A66 should carry 1,804,820 two-way trips (i.e. approximately 23% in total) and the A69 could carry 367,536 two way trips (i.e. approximately 5% in

total). This indicates a bias towards use of the A66 between Scotch Corner and Penrith rather than the A69 between Newcastle upon Tyne and Carlisle. Once more, this is confirmed by the information extracted from the Department for Transport traffic count data (although in reality the bias may be closer to 13% and 6% respectively).

2.4.99 The differential between the 'GB Freight Model' forecast and the actual quantum of commercial trips recorded throughout 2014 suggests that there is an element of supressed demand within base model assumptions. Approximately 9-10% of journeys which are predicted to use the A66 corridor due to cost and journey time benefits may actually be opting to use the M62 due to its perceived attractiveness as a route for commercial traffic (i.e. due to the motorway standard of the link and the constant dual carriageway nature of the entire length).

2.4.100 Figure 2-51 to Figure 2-53 provide indicative diagrams illustrating the origin and destination at postcode district level of the total number of commercial trips forecast by the 'GB Freight Model' to use the three routes to facilitate Trans-Pennine movement between east and west.

Figure 2-51: Origin and Destination (Postcode District) of HGV Trans-Pennine Trips Currently Using A69

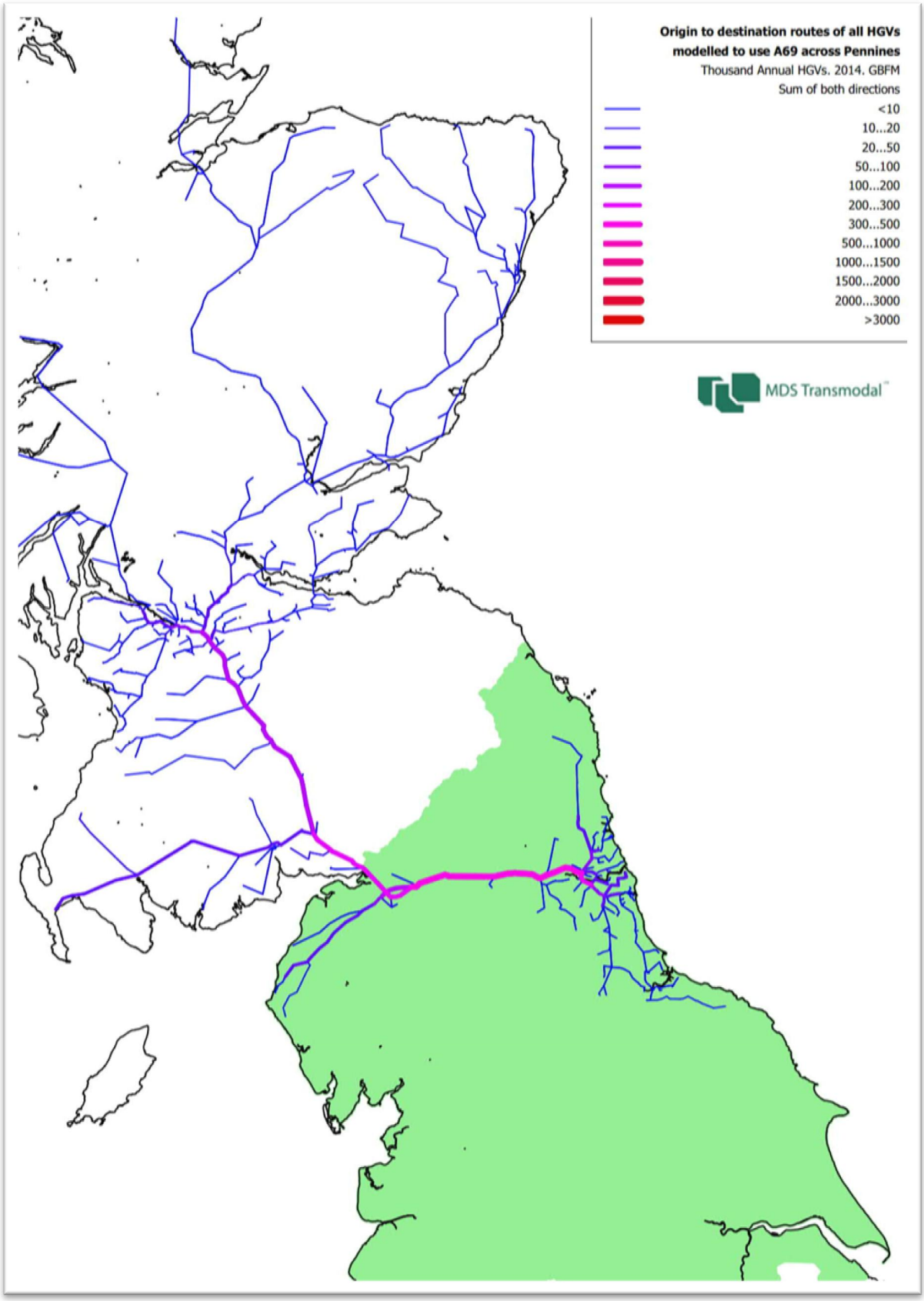


Figure 2-52: Origin and Destination (Postcode District) of HGV Trans-Pennine Trips Currently Using A66

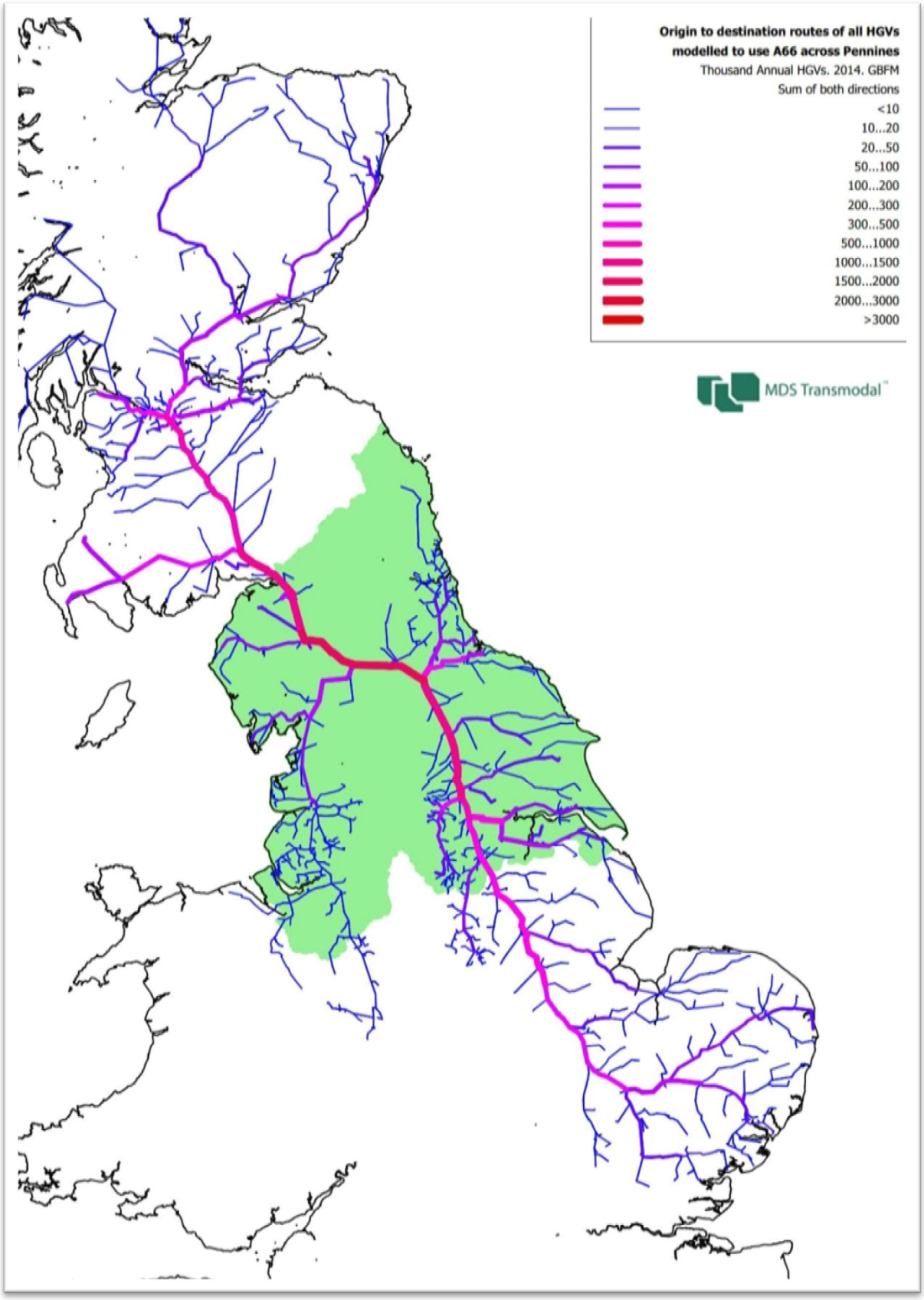
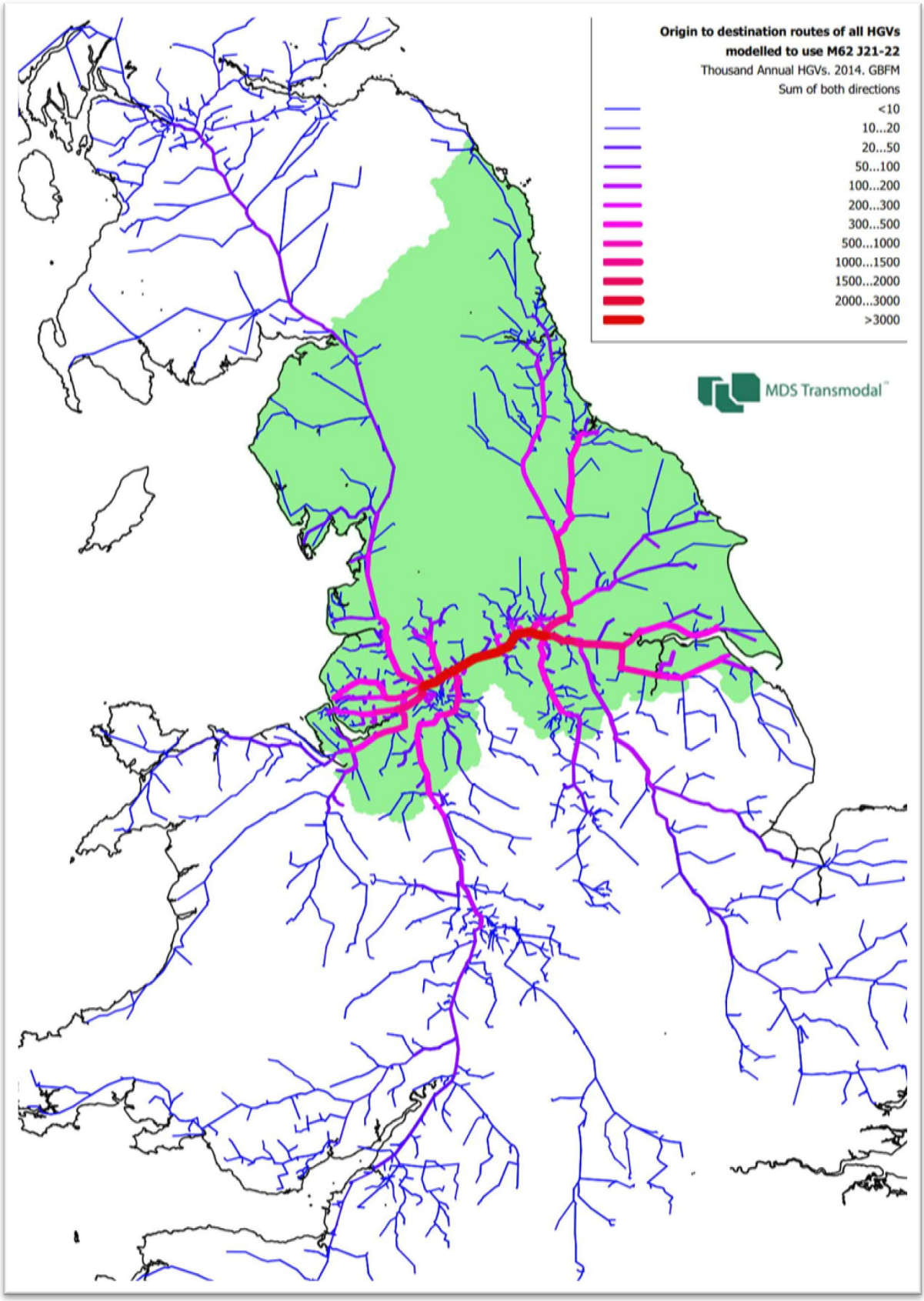


Figure 2-53: Origin and Destination (Postcode District) of HGV Trans-Pennine Trips Currently Using M62



Current Freight Context – Key Points
Transport for the North is currently undertaking a Freight and Logistics Study, which utilizes the "GB Freight Model" to model current and forecast freight demand, and is identifying potential network improvements to facilitate long-term transformational changes to connectivity.
Both the A66/A685 and A69 corridors are important regional freight links, with the A66 being a significant national strategic link as well.
A comparison of modelled and actual freight flows shows that the A66 is under-utilised by freight traffic, with approximately 10% of total journeys (using the M62, A66 and A69) which could use the A66 opting to use the M62 instead.
Consultation with stakeholders suggests that the unreliability of both routes, particularly the A66, make them unattractive for freight use.

Ports and Airports

2.4.101 In addition to the total quantum of commercial trips currently using the three routes under consideration, MDS Transmodal has also interrogated the 'GB Freight Model' and forecast the total number of commercial trips associated with port activity. The extracted information provides details relating to the anticipated origin/destination of trips and the highway link utilised to complete the journey, as summarised at Table 2-37.

Table 2-37: Total Quantum of HGVs Currently Using A69/A66/M62 Corridors for Trans-Pennine Travel

Port Location	A69	Percentage	A66	Percentage	M62	Percentage
Cairnryan/Stranraer	27,720	46%	235,770	57%	225	0%
Felixstow	0	0%	6,748	2%	3,351	1%
Heysham/Fleetwood	0	0%	14,391	4%	81,134	7%
Humber	0	0%	30,398	7%	447,305	40%
Mersey	0	0%	271	0%	403,836	36%
Tees/Hartlepool	1,100	2%	111,883	27%	168,702	15%
Tyne	31,960	52%	11,101	3%	13,621	1%
Workington	0	0%	369	0%	0	0%
Total	60,780	100%	410,931	100%	1,118,174	100%
	4%		**26%**		**70%**	

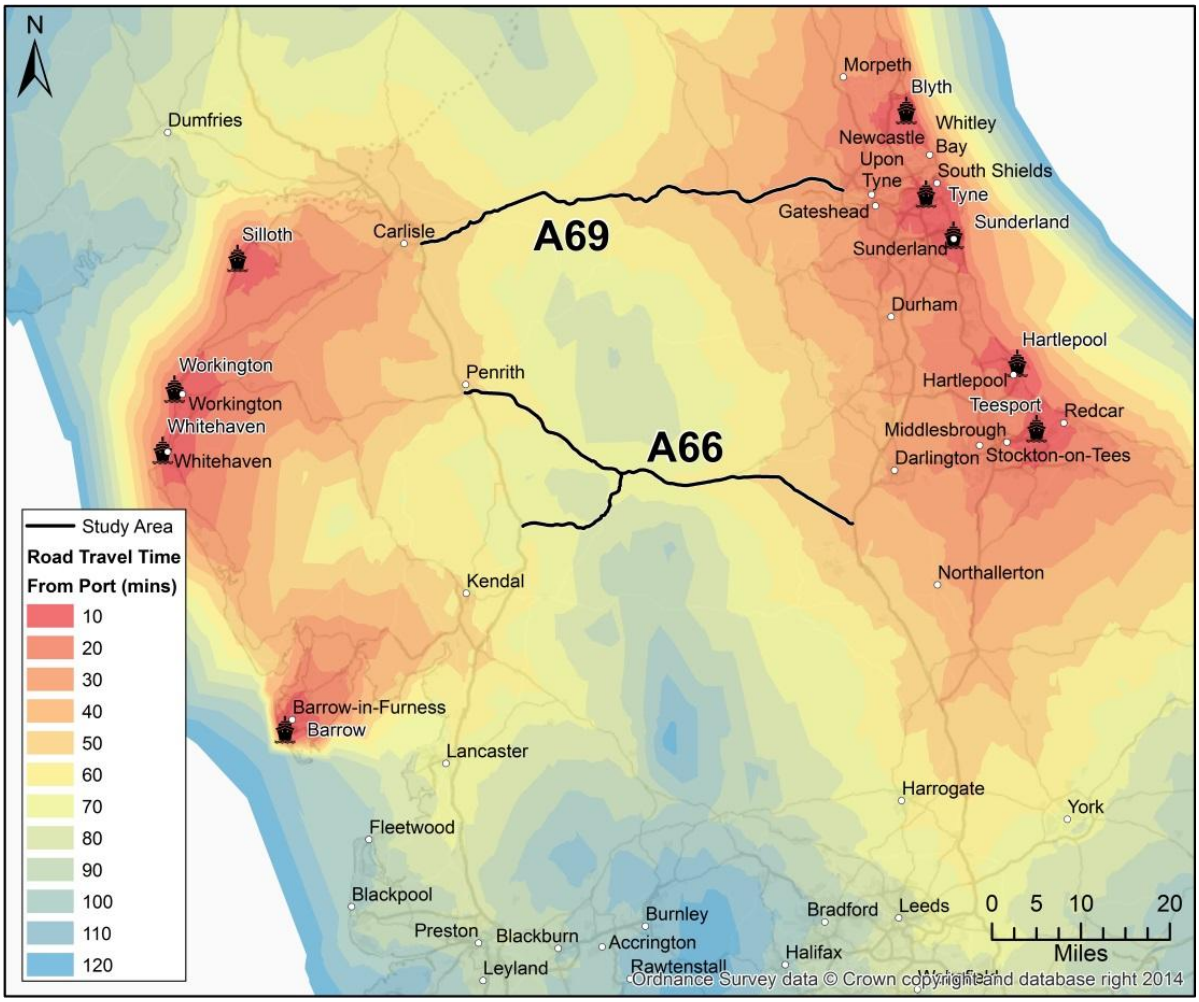
2.4.102 From the information presented above it can be seen that the 'GB Freight Model' has forecast that a total of 1,589,885 two-way commercial trips may currently be using the three Trans-Pennine routes to travel east to west and it is anticipated that the M62 is carrying 1,118,174 two-way trips. This indicates that there is a clear bias towards use of the M62 corridor between Leeds and Manchester (i.e. approximately 72% in total). This figure confirms that the route is similarly attractive to port based commercial movements as it is to road based freight traffic.

2.4.103 A comparison of the forecast associated with A66 and A69 corridors demonstrates that of the 1,589,885 two-way commercial trips currently using the three Trans-Pennine routes to travel east to west, it is anticipated that the A66 could carry 410,931 two-way trips (i.e. approximately 26% in total)

and the A69 could carry 60,780 two way trips (i.e. approximately 4% in total). This indicates a bias towards use of the A66 between Scotch Corner and Penrith rather than the A69 between Newcastle upon Tyne and Carlisle (which is once again similar to the figures predicted for road based commercial trips).

2.4.104 Accessibility to major ports within the study area by road corridors is shown at Figure 2-54. The image clearly demonstrates that the various terminals are currently accessible to residents from across the entire study area within a journey time of less than 2 hours.

Figure 2-54: Drive Time Isochrones to/from Major Ports within the Study Area



2.4.105 In order to understand the current transport context with regards activity associated with major airports located adjacent to the study area, analysis has been conducted of passenger services and freight/mail movements at:

- Newcastle International Airport
- Durham Tees Valley Airport
- Carlisle Lake District Airport

2.4.106 Table 2-38 provides details of current passenger/service levels and freight/mail statistics recorded by the three Airports during 2014.

Table 2-38: Current Passenger, Freight and Mail Activity at Airports within the Study Area (2014)

Name	Passengers	Services	Freight (Tonnes)	Mail (Tonnes)
Newcastle International	4,516,739	59,114	4,450	4,738
Durham Tees Valley	142,370	17,940	2	0
Carlisle Lake District	0	0	0	0

2.4.107 It is evident from the information presented above that Newcastle International Airport was the most heavily trafficked of the three interchanges during 2014, with a higher quantum of passengers and services, in addition to significant levels of freight and mail traffic.

2.4.108 Durham Tees Valley Airport facilitated less than one third of the total number of services that Newcastle International Airport recorded during 2014, however, passenger levels were significantly lower. This is indicative of the fact that Durham Tees Valley Airport generally supports a greater level of smaller scale local flights.

2.4.109 No passenger services or commercial activity was recorded at Carlisle Lake District Airport during 2014. The facility is home to the Solway Aviation Museum and has been responsible for flight training/local sight-seeing trips in recent years, with Carlisle Flight Training and Aero Club, Border Air and Northumbria Helicopters operating from the base.

2.4.110 The accessibility of these airports by road and public transport corridors is shown at Figure 2-55 and Figure 2-56 with typical travel times presented at ten minute intervals. The two images clearly demonstrate that the various terminals are currently accessible to residents from across the entire study area by a range of travel modes, within a journey time of less than 2 hours.

2.4.111 Once again, it is evident that public transport links provide far more localised access options than road based routes and, hence, car and freight based journeys to these airports is likely to be predominant.

Figure 2-55: Drive Time Isochrones to/from Major Airports within the Study Area

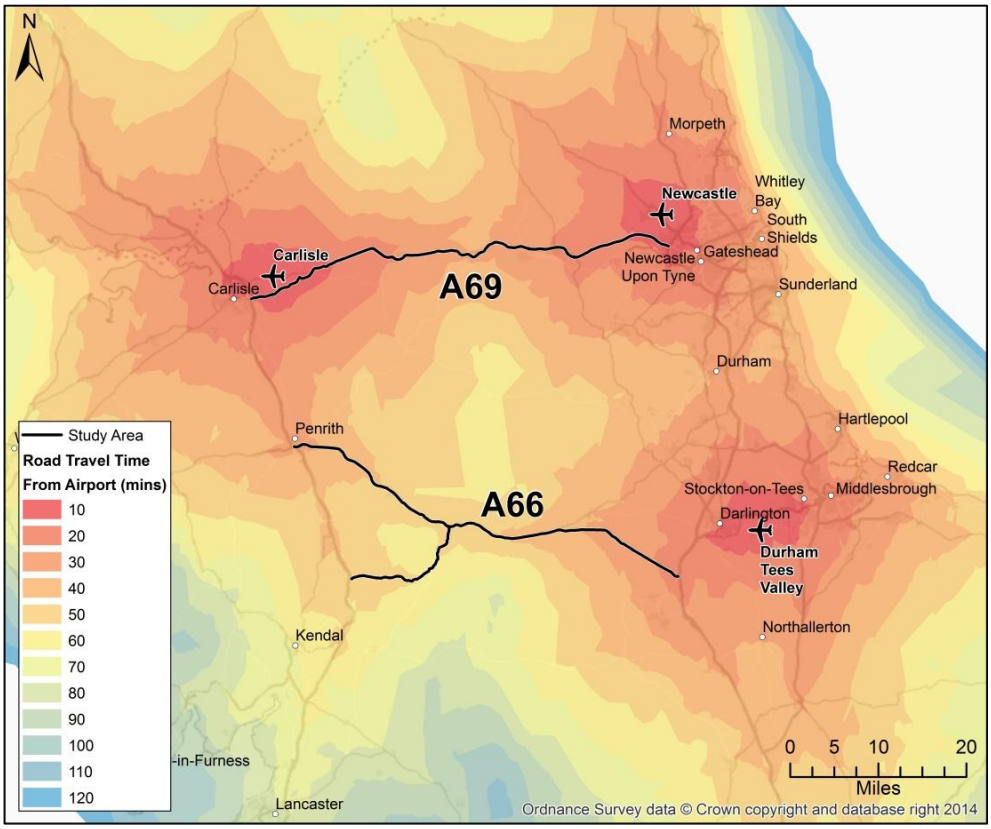
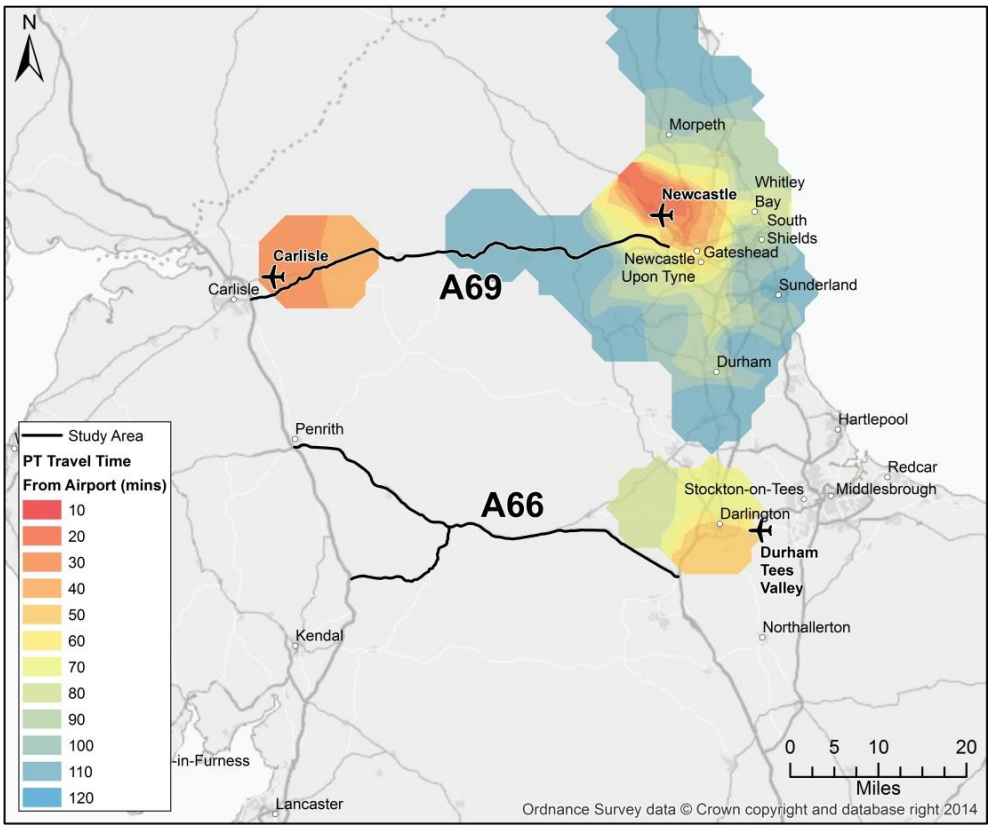


Figure 2-56: Public Transport Isochrones to/from Major Airports within the Study Area



Current Ports and Airports Context – Key Points
The A66 is a key link between a number of east coast ports and Cairnryan/Stranraer for freight traffic to and from Ireland. **Although the quantum of freight journeys between ports is much lower on the A69, is still a key freight link between the Tyne ports and Cairnryan/Stranraer.** **There are three airports at the edge of the study area – Newcastle International; Durham Tees Valley and Carlisle Lake District – although Newcastle is the only one at present which has significant levels of passenger and commercial use.**

2.5 Network Operations

2.5.1 This section provides an insight into the current network operations context associated with conditions on the A69 and A66/A685 corridors. The specific details are presented in accordance with the following structure:

- Weather Resilience
- Road Closures
- Diversionary Routes
- Maintenance
- Signage and Technology
- Lighting
- Non-Motorised User Provision

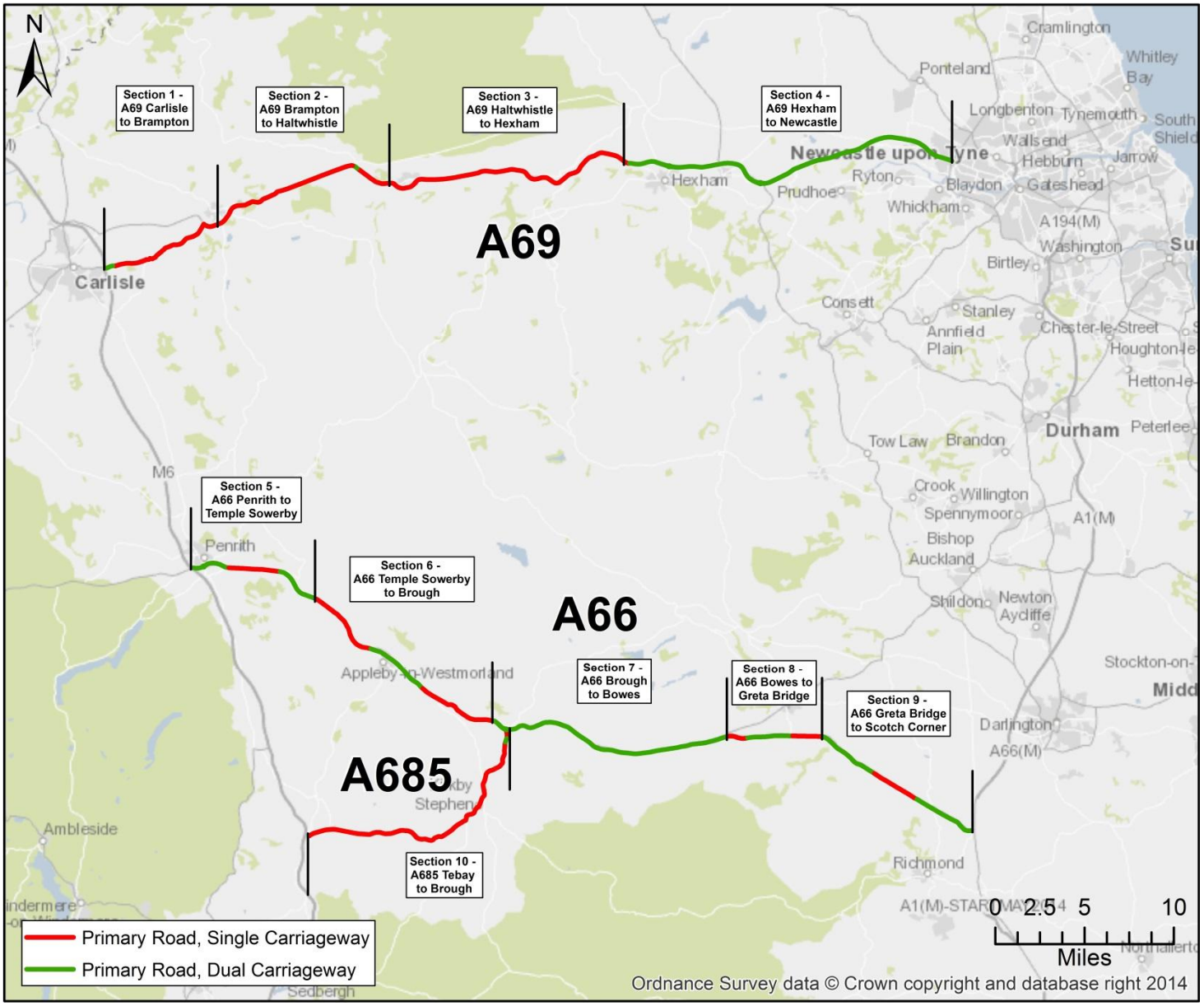
2.5.2 As discussed previously, for the purposes of this NTPR study the respective corridors have been split into ten individual sections (as described at Table 2-39 below and presented at Figure 2-57) in order to facilitate detailed analysis of the routes under consideration.

Table 2-39: Individual Sections of the A69 and A66/A685 Corridors

Section Number	Route Number	Section Name	Section Length	Single Carriageway	Dual Carriageway
1	A69	Carlisle to Brampton	07.26 miles	06.73 miles (93%)	00.53 miles (7%)
2	A69	Brampton to Haltwhistle	10.81 miles	10.52 miles (97%)	00.29 miles (3%)
3	A69	Haltwhistle to Hexham	14.50 miles	14.50 miles (100%)	00.00 miles (0%)
4	A69	Hexham to Newcastle upon Tyne	19.75 miles	00.28 miles (1%)	19.47 miles (99%)
5	A66	Penrith to Temple Sowerby	07.53 miles	02.87 miles (38%)	04.66 miles (62%)
6	A66	Temple Sowerby to Brough	12.76 miles	09.01 miles (71%)	03.75 miles (29%)

Section Number	Route Number	Section Name	Section Length	Single Carriageway	Dual Carriageway
7	A66	Brough to Bowes	13.93 miles	00.00 miles (0%)	13.93 miles (100%)
8	A66	Bowes to Greta Bridge	05.23 miles	02.70 miles (52%)	02.53 miles (48%)
9	A66	Greta Bridge to Scotch Corner	10.06 miles	02.62 miles (26%)	07.44 miles (74%)
10	A685	Tebay to Brough	15.55 miles	15.32 miles (99%)	00.23 miles (1%)

Figure 2-57: Study Area Illustrating the A69 and A66/A685 Corridors in the Context of the North Pennines



Weather Resilience

A66 Corridor

2.5.3 The A66 Trans Pennine Route from Scotch Corner to Penrith extends to a height of 426m above sea level and as a result certain locations on the network are particularly vulnerable to severe weather conditions. Bowes Moor and Stainmore which fall within study sections 6 and 7, have the highest risk of snowfalls and prolonged sub-zero temperatures. Snow gates are in place at Bowes and Brough and are closed when the weather conditions become severe. The A66 is also susceptible to strong winds which could affect high sided vehicles. There are high wind protocols in place and these will be enforced when conditions dictate. Strong winds have also led to snow drifting across the carriageway which can hamper efforts to keep the road open. Snow fences have been installed to help combat this issue. They are located at:

- 2 miles west of Bowes village.
- Stainmore.

2.5.4 In addition, steep gradients, particularly in the Stainmore area can cause HGV's to loose traction. Flooding has also resulted in sections of the route being closed and further details of the closures are discussed in the following section of the report.

A69 Corridor

2.5.5 Table 2-40 shows the vulnerable locations identified within the A69 Severe Weather Plan 2015/16. These locations are recognised as requiring special consideration and mitigation measures.

Table 2-40: Vulnerable Locations along the A69 Corridor

Location	Problem
A69 Greenhead to Cumbria Boundary	Long Steep Gradient and High Altitude
A69 Stagshaw to Styford	Strong Cross Winds
A69 Nafferton, Melkridge & Temon	Seepage of Water from Adjacent Land
A69 Haydon Bridge & Warwick Bridge	Flood Plain
A69 Bankfoot, Greenhead	Tributary Flooding

2.5.6 It is understood that despite the topography of the A69 the route is not prone to the effects of winter to the extent of the A66 and the road is rarely if ever closed.

Road Closures

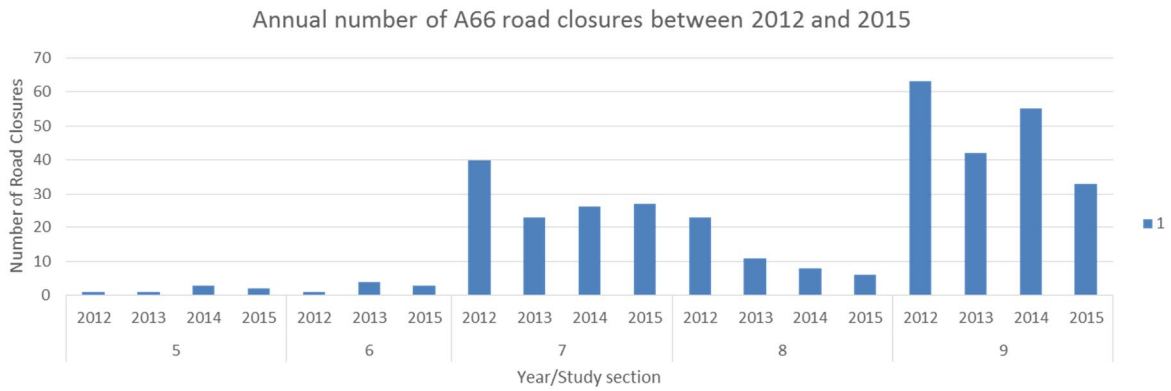
A66 Corridor

2.5.7 Road closure data for the A66 has been sourced from the relevant Highways England Service Providers for the period 2012-2015. A total of 372 closures were implemented on the A66 during this period. The greatest number of those occurred on Section 9 (Greta Bridge to Scotch Corner).

2.5.8 Section 7 (Bowes to Brough) has the second highest number of closures for the period 2012-2015 with section 5 (Temple Sowerby to Penrith) having the lowest.

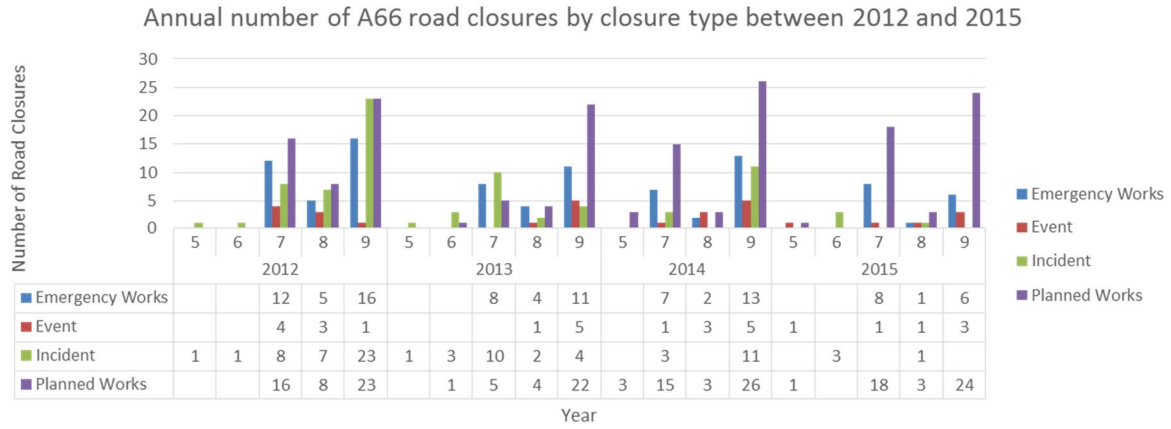
2.5.9 The graph in Figure 2-58 shows the total number of annual closures on the A66 by study section:

Figure 2-58: Annual Number of A66 Road Closures



2.5.10 The graph in Figure 2-59 shows the type of closures that are included in the analysis:

Figure 2-59: Annual Number of A66 Road Closures by Type



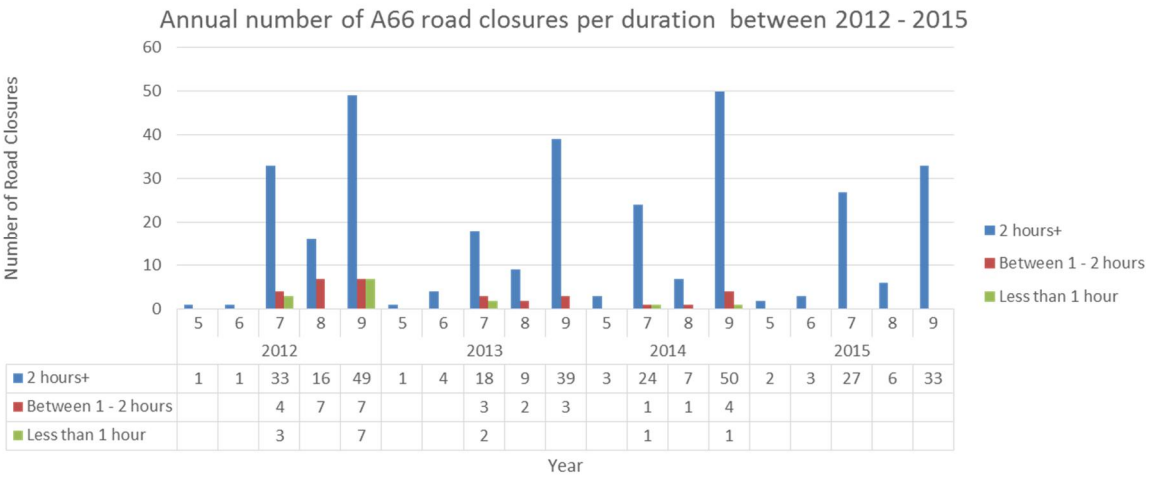
	2012					2013					2014					2015				
	5	6	7	8	9	5	6	7	8	9	5	7	8	9	5	6	7	8	9
Emergency Works			12	5	16			8	4	11		7	2	13			8	1	6
Event			4	3	1				1	5		1	3	5	1		1	1	3
Incident	1	1	8	7	23	1	3	10	2	4		3		11		3		1	
Planned Works			16	8	23		1	5	4	22	3	15	3	26	1		18	3	24

2.5.11 The largest proportion of closures (46%) were the result of planned works i.e. routine maintenance activities and area renewal work. Closures due to incidents equate to 21% of the overall total. Analysis of the data identified two closures which could directly be linked to severe snow falls. The first occurred in March 2013 when the road was closed between the 22nd and the 24th, the second closure occurred on the 29th January 2015 between the hours of 03:45 and 11:20.

2.5.12 Closures have also been implemented due to high winds and flooding. On the 25th November 2012 the A66 was closed between the hours of 04:36 and 10:50 and between the 20th/21st December 2012 the road was closed at the Fox Hall Pub (located in study section 9) – all were due to flooding. On the 15th January 2015 the A66 was closed between the A685 and the A67 as a result of high winds.

2.5.13 The duration of each closure between 2012 and 2015 is shown in Figure 2-60. It is not surprising to see that the largest proportion of closures were in excess of 2 hours when you consider that 46% were for planned works.

Figure 2-60: Duration of Road Closures

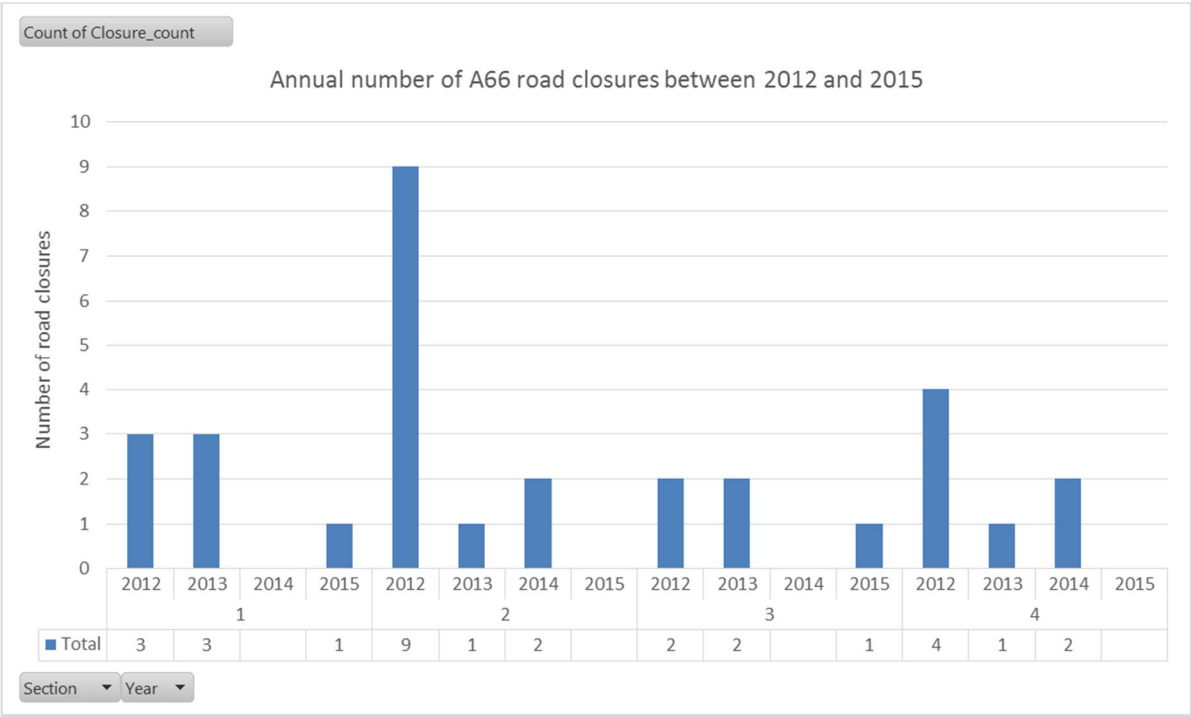


	5	6	7	8	9	5	6	7	8	9	5	7	8	9	5	6	7	8	9
	2012					2013					2014				2015				
2 hours+	1	1	33	16	49	1	4	18	9	39	3	24	7	50	2	3	27	6	33
Between 1 - 2 hours			4	7	7			3	2	3		1	1	4					
Less than 1 hour			3		7			2				1		1					

A69 Corridor

2.5.14 Road closure data for the A69 has been sourced from the relevant Highways England Service Provider for the period 2012-2015 and is presented in Figure 2-61. During this period a total of 31 closures were implemented along the study length. The greatest number of those occurred within the Haltwhistle to Brampton section. (Section 2) particularly during 2012. Section 3 (Hexham to Haltwhistle) has the lowest number of closures for the period, with only 5 occurring between 2012 and 2015.

Figure 2-61: Annual Number of A69 Road Closures



	2012	2013	2014	2015	2012	2013	2014	2015	2012	2013	2014	2015	2012	2013	2014	2015
	1				2				3				4			
Total	3	3		1	9	1	2		2	2		1	4	1	2	

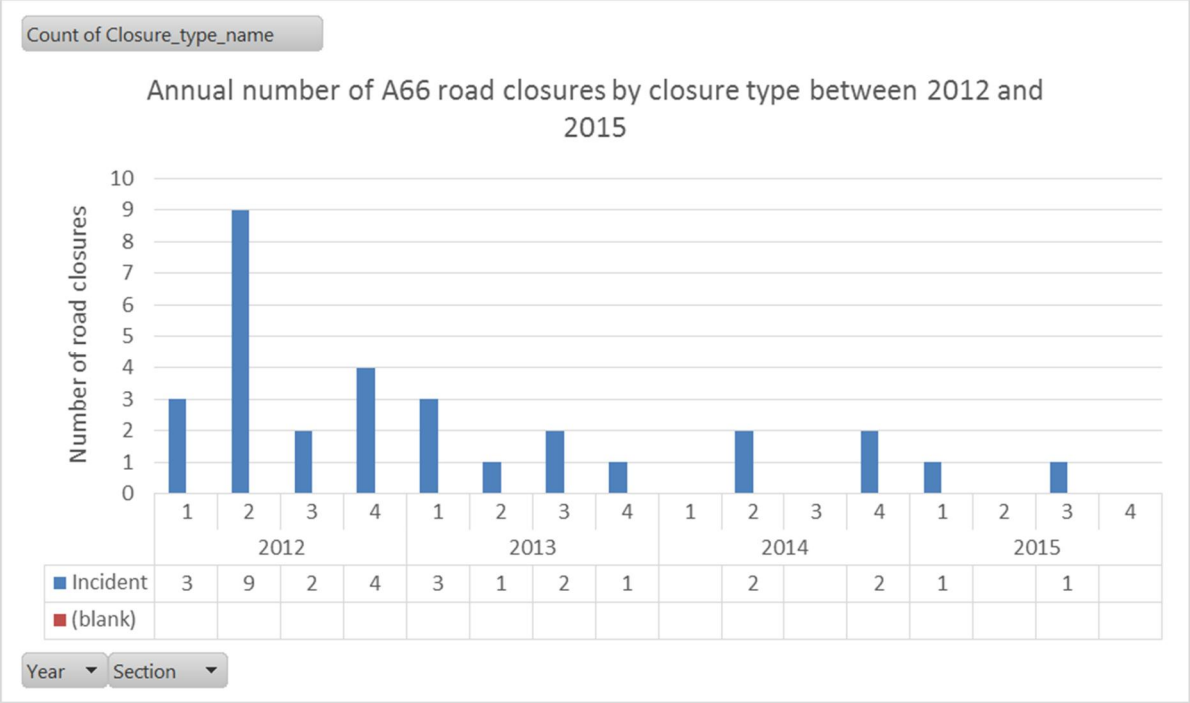
2.5.15 All the closures instigated were the result of incidents. Analysis of the data identified that the 9 road closures within section 2 during 2012 were the result of the following:

- 4 were attributed to flooding.
- 5 were road traffic collisions, two of which were fatal accidents.

2.5.16 Three of the four flooding events occurred on the 28th June 2012; one at Henshaw, one between Bank Foot and Greenhead and the other at Melkridge. The fourth flooding event occurred on the 11th July 2012 at Melkridge.

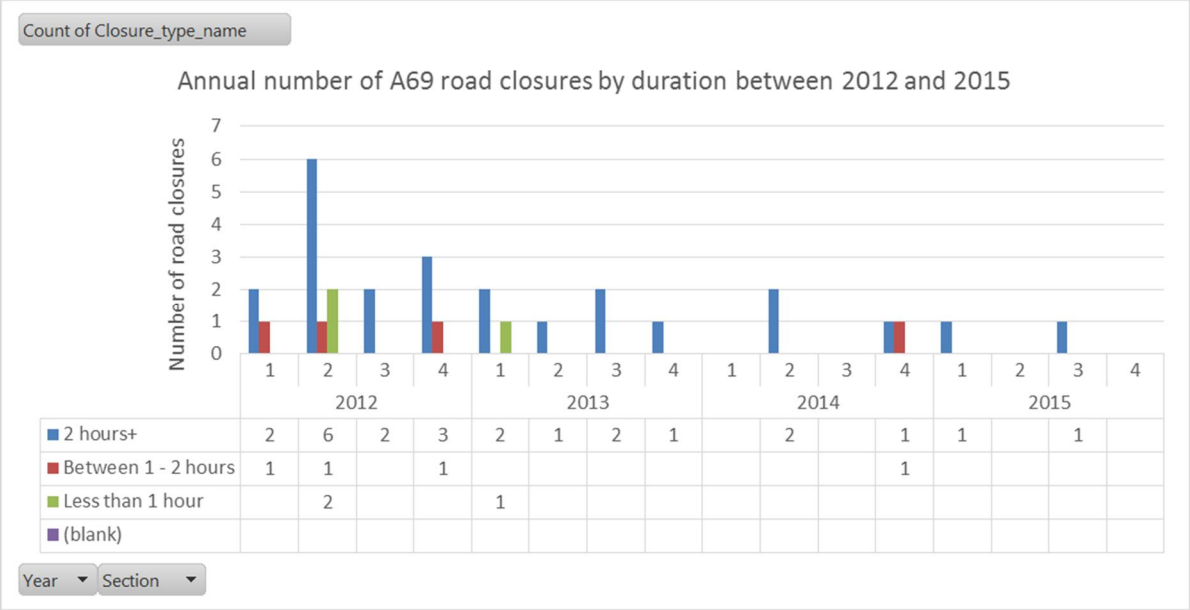
2.5.17 The two fatal accidents both happened within study section 2. The first occurred on the 20th July at Reaygarth junction and the second occurred on the 23rd October and involved a pedestrian. Figure 2.62 shows the breakdown by year and section.

Figure 2-62: Annual Number of A69 Road Closures by type



2.5.18 The duration of each closure between 2012 and 2015 is shown in Figure 2-63. The largest proportion of closures were in excess of 2 hours. Analysis of the data shows that there were no road closures in sections 1 (Brampton to Carlisle) and 3 (Hexham to Haltwhistle) during 2014. Similarly there were no closures during 2015 in sections 2 (Haltwhistle to Brampton) and section 4 (Newcastle to Hexham).

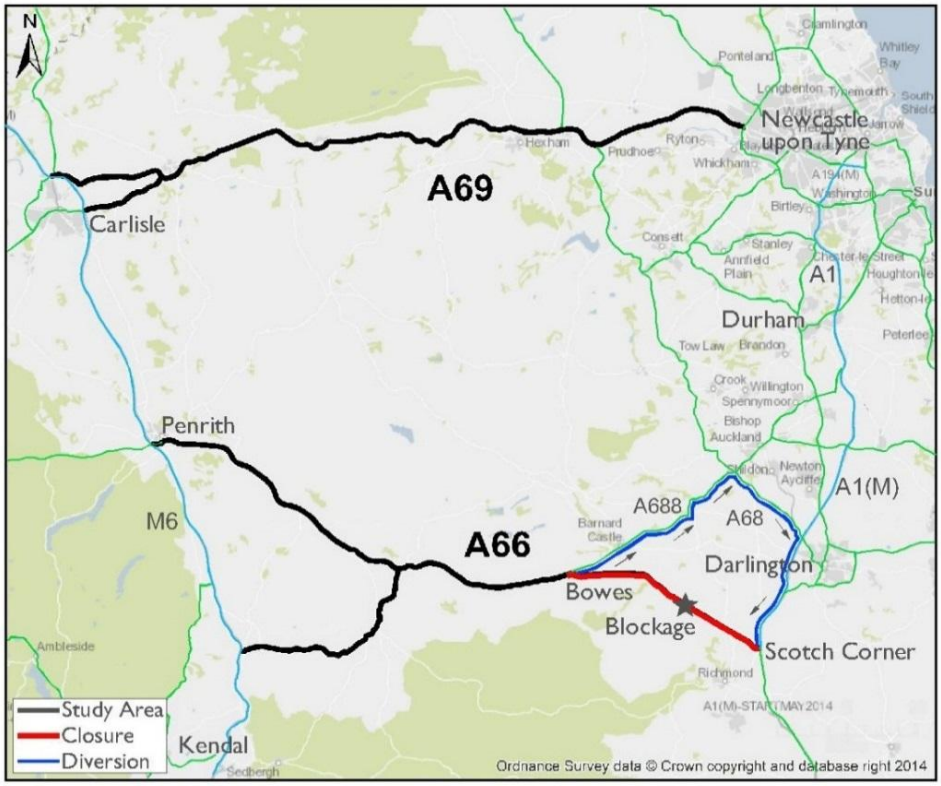
Figure 2-63: Annual Number of A69 Road Closures by duration



Diversionary Routes

2.5.19 Service Providers are required to agree tactical diversion routes in consultation with their Local Police Authority and neighbouring Local Authority. The plans shown at Figure 2-64 have been obtained from each Service Provider and show the eastbound diversion route as the same route will be taken if westbound traffic is affected.

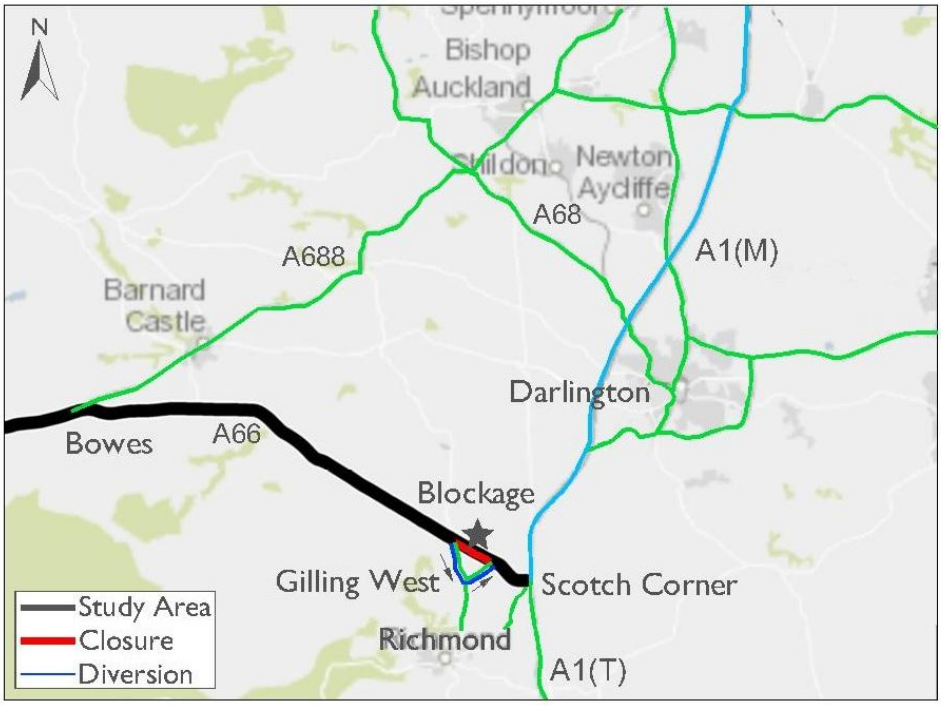
Figure 2-64: Diversion Route for Closure between Study Sections 7, 8 and 9



2.5.20 The diversion route shown in Figure 2-65 follows the A688 and the A68 before joining the A1M at Junction 58. The route through Barnard Castle is unsuitable for HGV's as there is a 7.5 tonne weight restriction on County Bridge.

2.5.21 Should an incident occur at the location indicated in Figure 2-61 vehicles will be diverted onto the B6274 toward the village of Gilling West.

Figure 2-65: Diversion Route for Closure Effecting Study Section 9



2.5.22 In the event that the A66 is closed between study sections 5 and 6 the diversion that will be implemented follows the M6 south from Penrith to junction 38 at Tebay before heading east on the A685 as shown in Figure 2-66. Vehicles weighing in excess of 18 tonnes are currently restricted from using the A685 between Brough and Kirkby Stephen, except for access, permit holders or vehicles using livestock. On entry into Kirkby Stephen there is also a height restriction of 4.4m, therefore, it cannot be used as a diversionary rout for commercial traffic.

Figure 2-66: Diversion Route for Closure between Study Sections 5 and 6

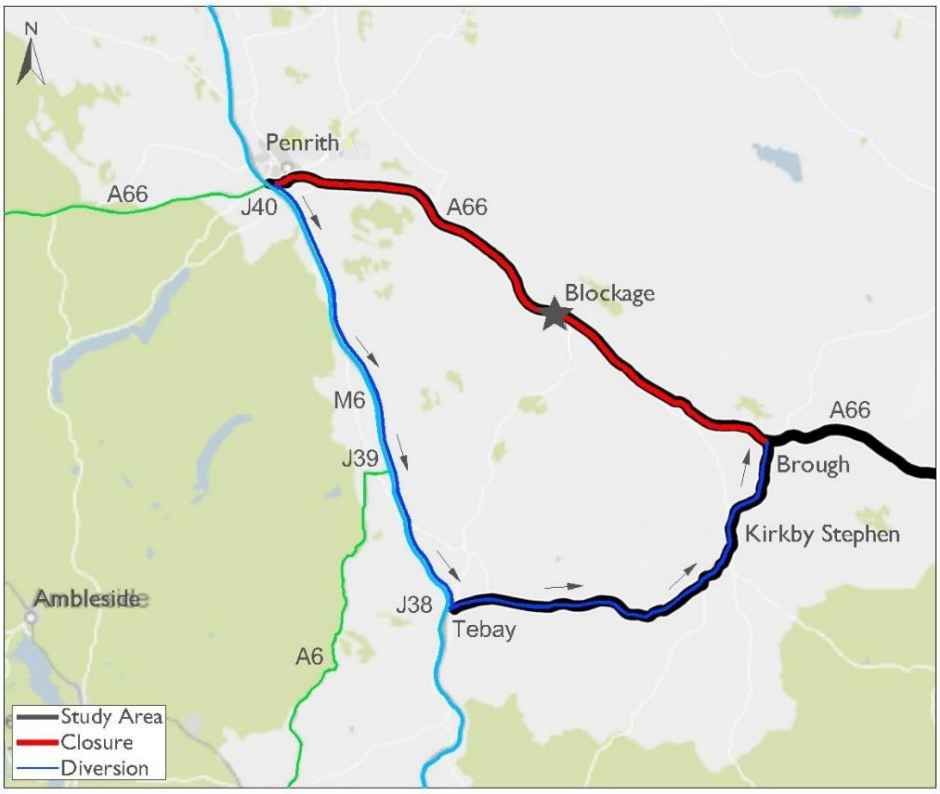
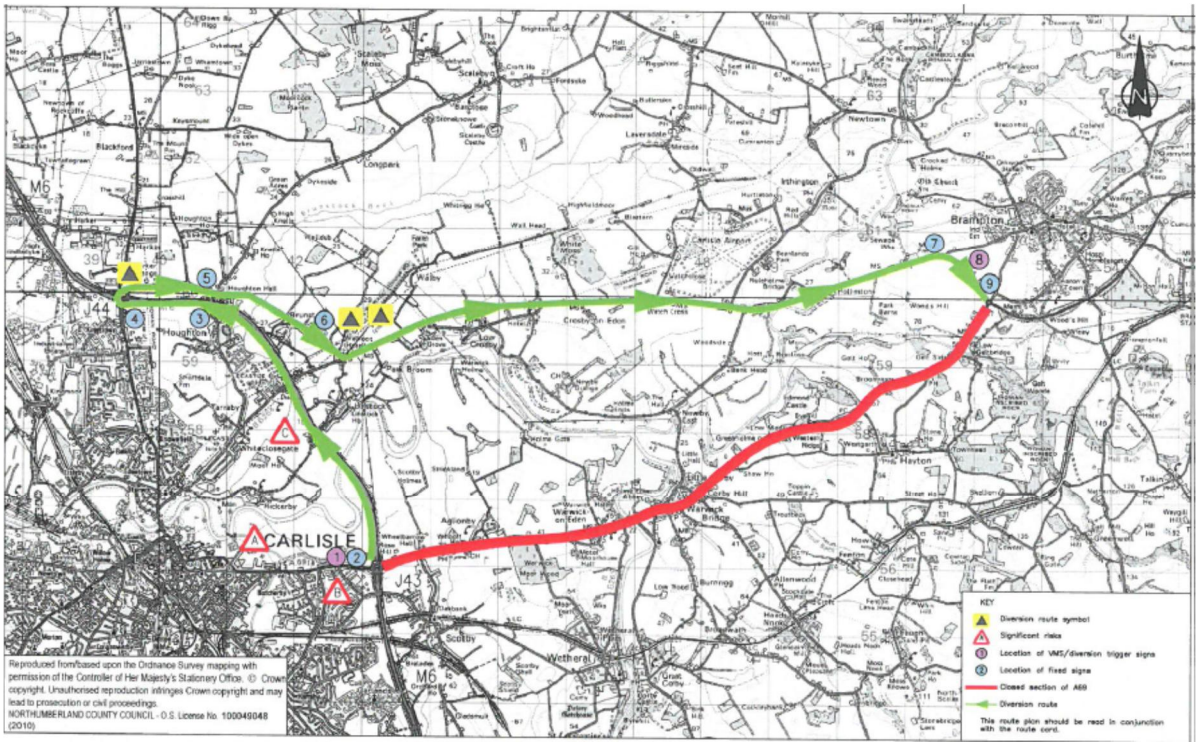
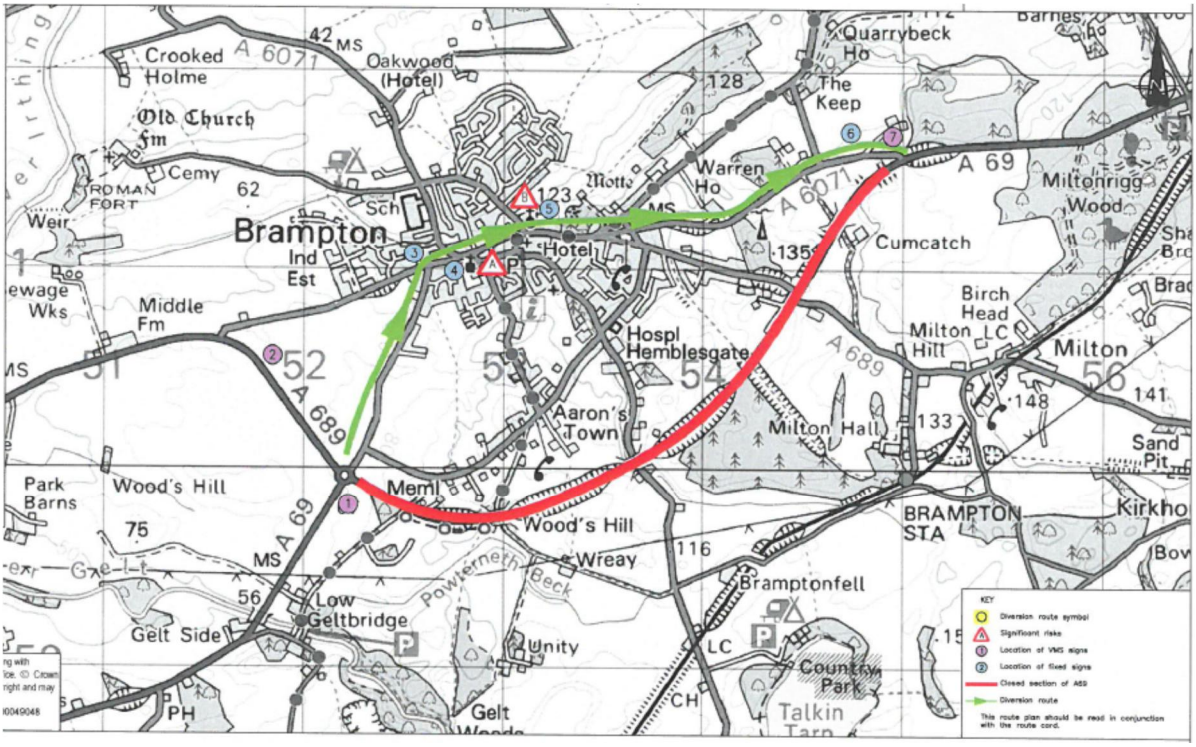


Figure 2-67: Diversion Route for Closure Effecting Study Section 1



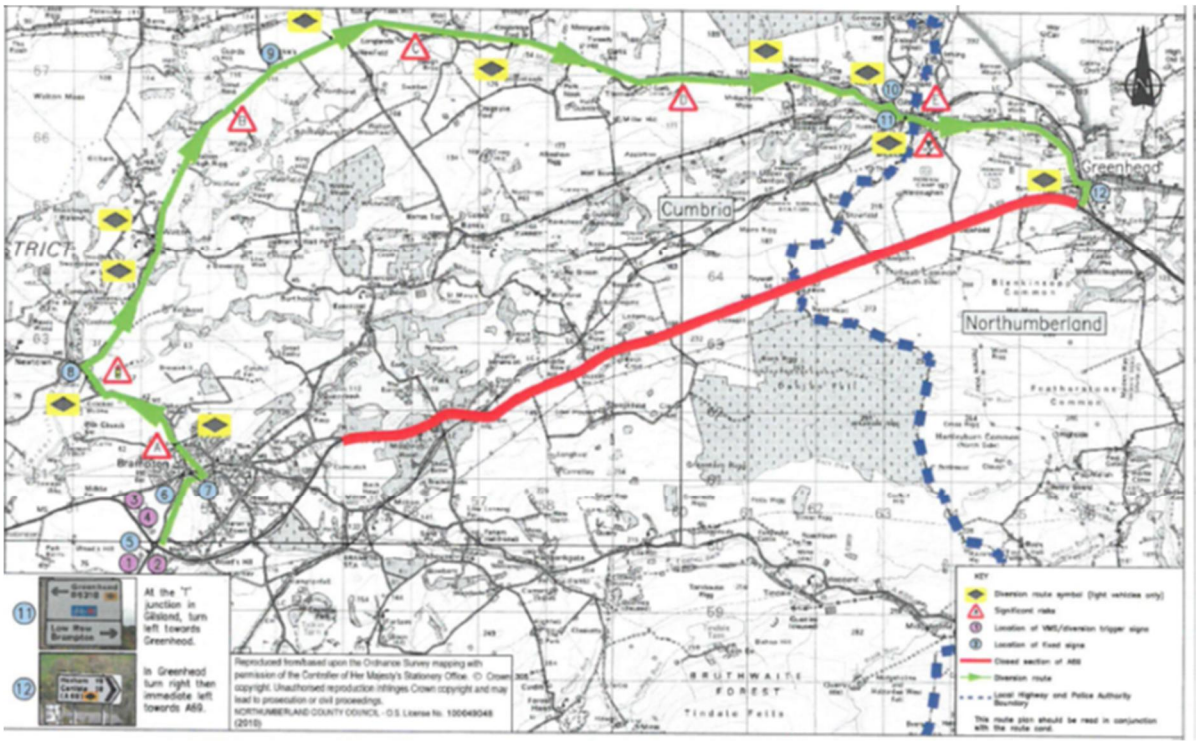
2.5.23 Should an incident occur on the A69 between Carlisle and Brampton the diversion that will be implemented follows the M6 north from junction 43 before heading east on the A689 at Junction 44, however, the diversion route is only suitable for motorway compliant vehicles.

Figure 2-68: Diversion Route for Closure on Study Section 2



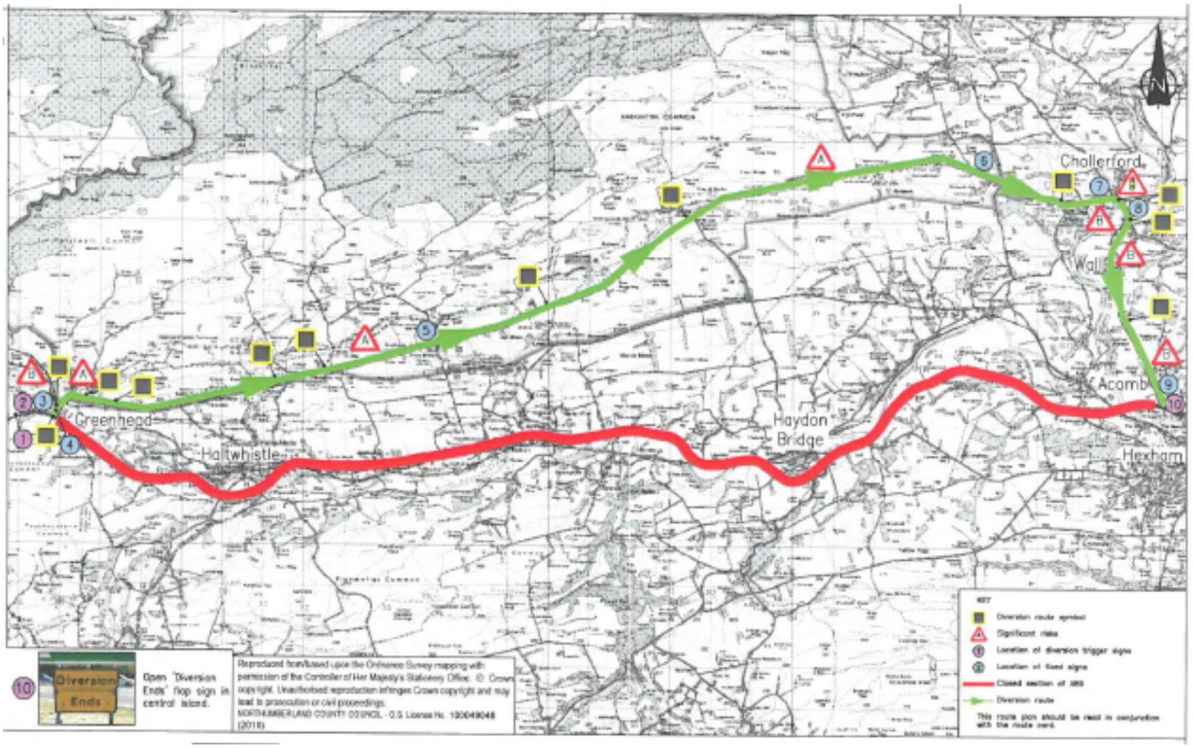
2.5.24 The diversion route shown in Figure 2-69 follows the A689 through Brampton. Traffic joins the A69 again at New Trout Mills Farm.

Figure 2-69: Diversion Route for Closure on Study Sections 1 and 2



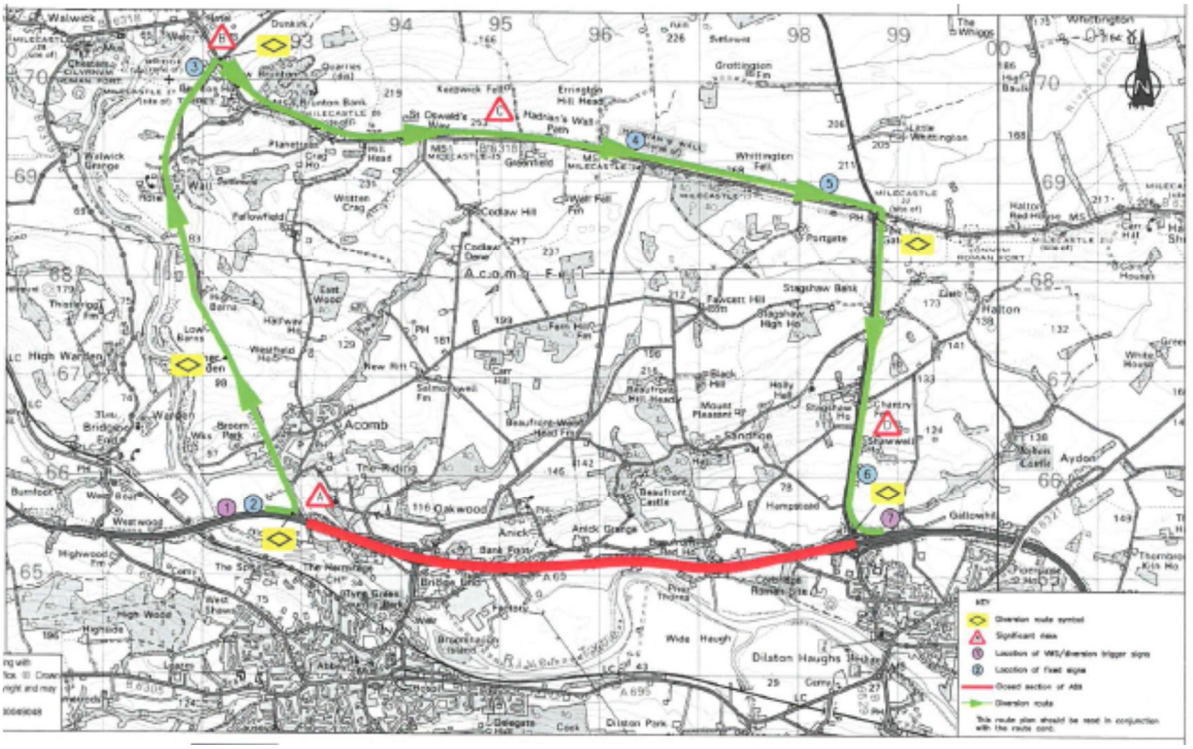
2.5.25 A closure of the A69 between Brampton and Greenhead results in an eastbound diversion along the A6071 and B6318. This route consists of narrow lanes and sharp bends. There is also a low bridge at Gilsland which would restrict vehicles over a height of 3.4m. The westbound diversion follows the C324 and the C323 before joining the A689. This route also has restrictions including blind crests, sharp bends, as well as a level crossing at Milton which may cause large vehicles to ground.

Figure 2-70: Diversion Route for Closure on Study Section 3



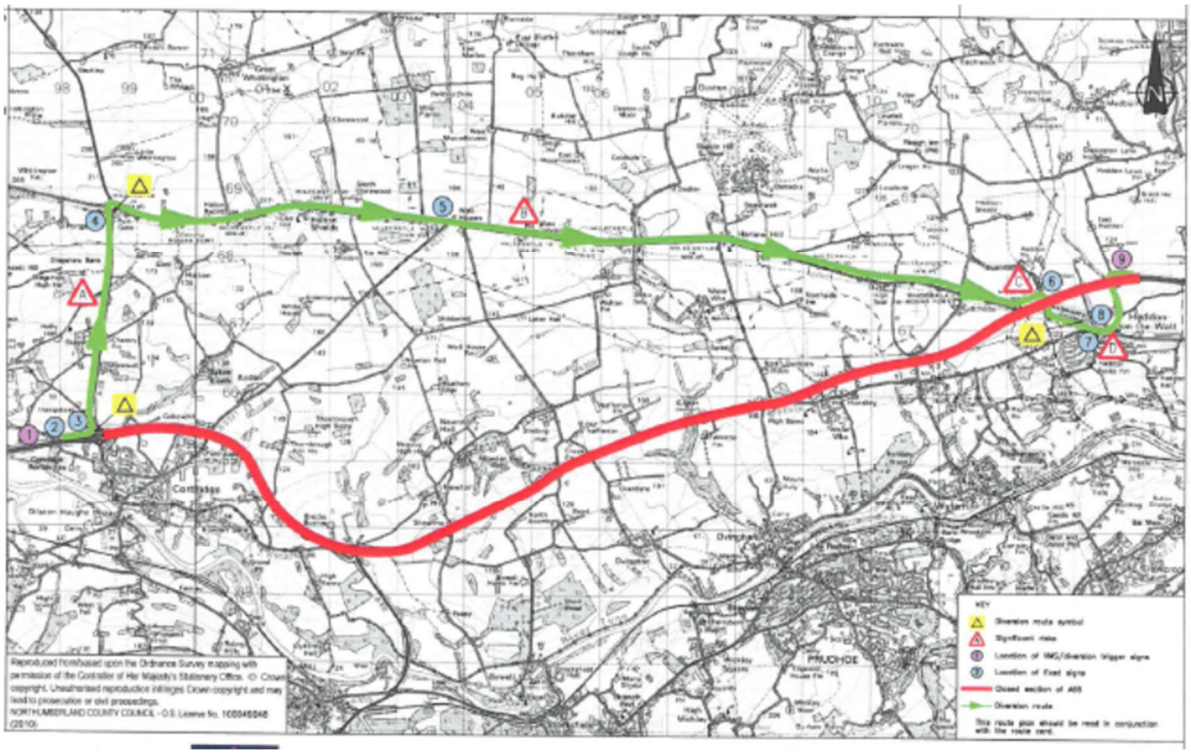
2.5.26 The diversion route in Figure 2-71 will be implemented if the A69 is closed between Greenhead and Hexham. The route uses the B6318 and the A6079. The B6318 is narrow and is exposed to relatively high altitude, steep gradients, soft verges and hidden dips.

Figure 2-71: Diversion Route for Closure on Study Section 4



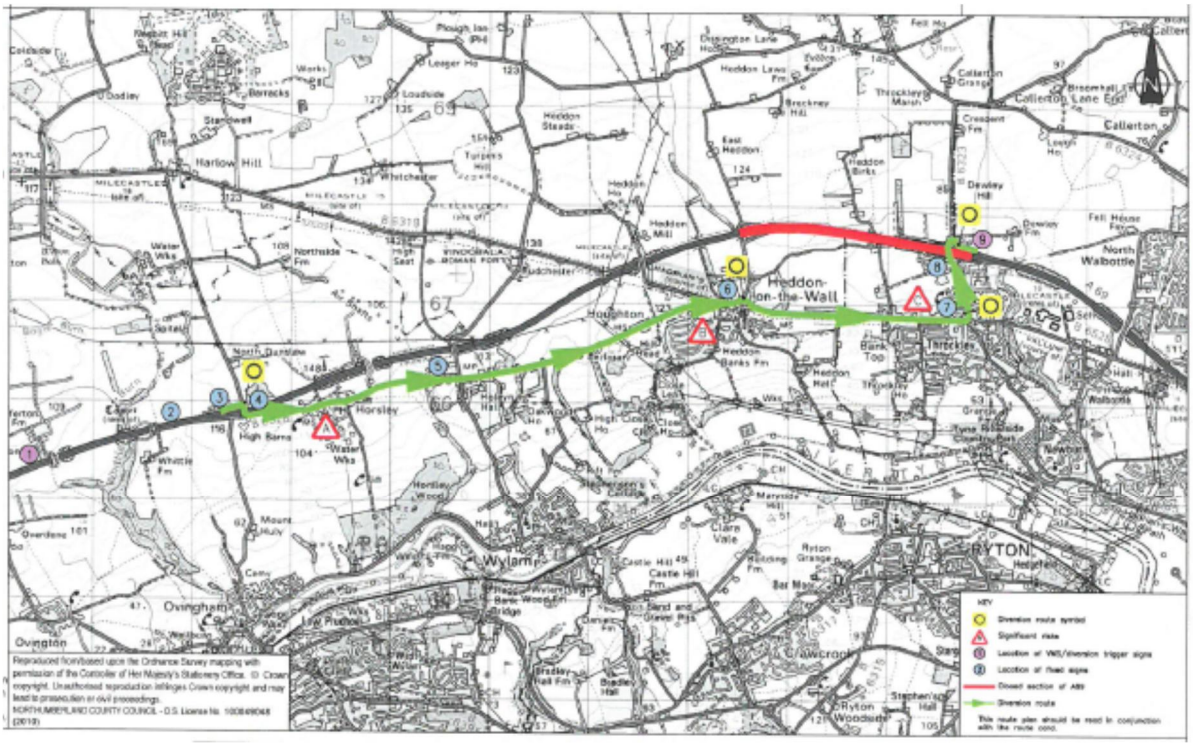
2.5.27 Should an incident occur on the A69 between Hexham and Corbridge the diversion that will be implemented follows the A6089 north before heading east on the B6318 then south on the A68.

Figure 2-72: Diversion Route for Closure on Study Section 4



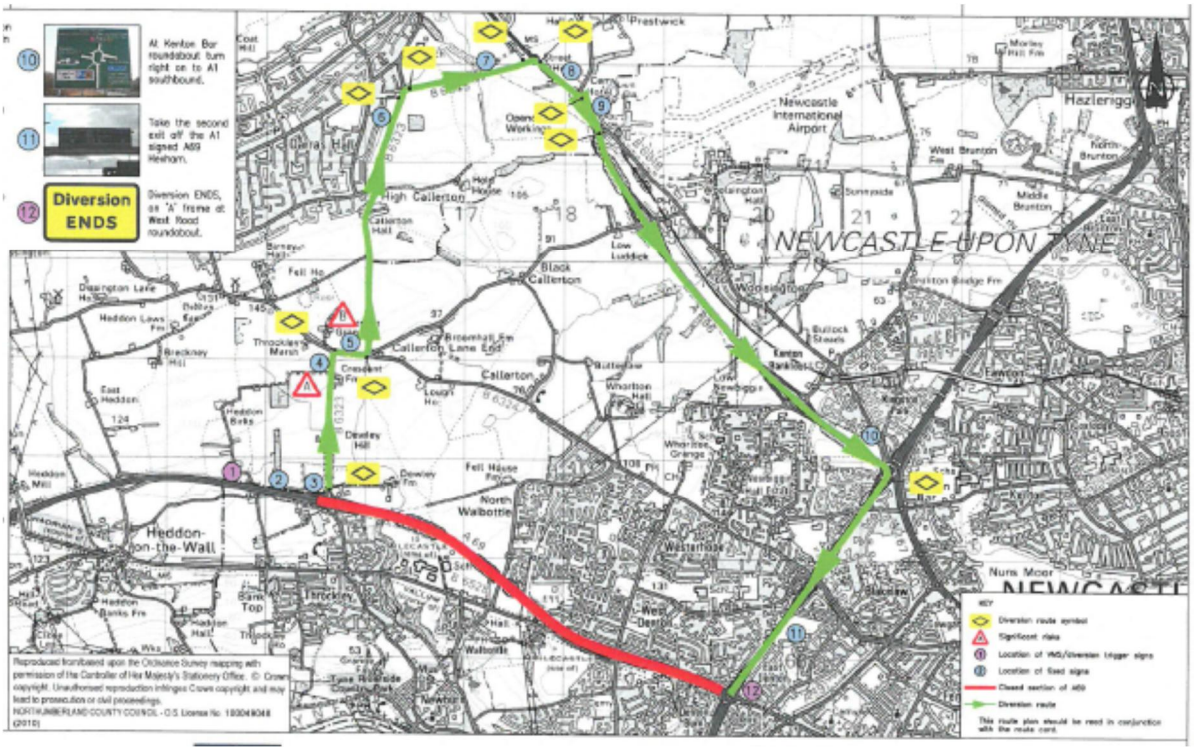
2.5.28 The diversion route used when a closure of the A69 occurs between Corbridge and Heddon uses the A68, the B6318 and the B6528 before re-joining the A69.

Figure 2-73: Diversion Route for Closure on Study Section 4



2.5.29 When a closure of the A69 occurs between the Horsley and Throckley junctions the diversion route will take traffic on the B6528 before re-joining the A69. The village of Horsley is narrow with on street parking which could cause issues with large vehicles.

Figure 2-74: Diversion Route for Closure on Study Section 4



2.5.30 Should an incident occur on the A69 between the Throckley junction and the A1 the diversion that will be implemented follows the B6323 towards Ponteland before heading east on the B6545 then south on the A696 past Newcastle Airport.

Non-Motorised User Provision

Strategic Cycle Network

2.5.31 Within the North Pennines region of England there are a number of cycle routes present which run adjacent to and intersect with the A69 and A66/A685 corridors at various locations. Figure 2-75 shows the strategic cycle network within the study area and demonstrates that the following routes interface with the highway links under consideration as follows:

A69 Corridor

- National Cycle Route 68 (Pennine Cycleway) at Haltwhistle
- National Cycle Route 72 (Hadrian's Cycleway) at Anick, Bardon Mill, Brampton, Corbridge, Corby Hill and Hexham

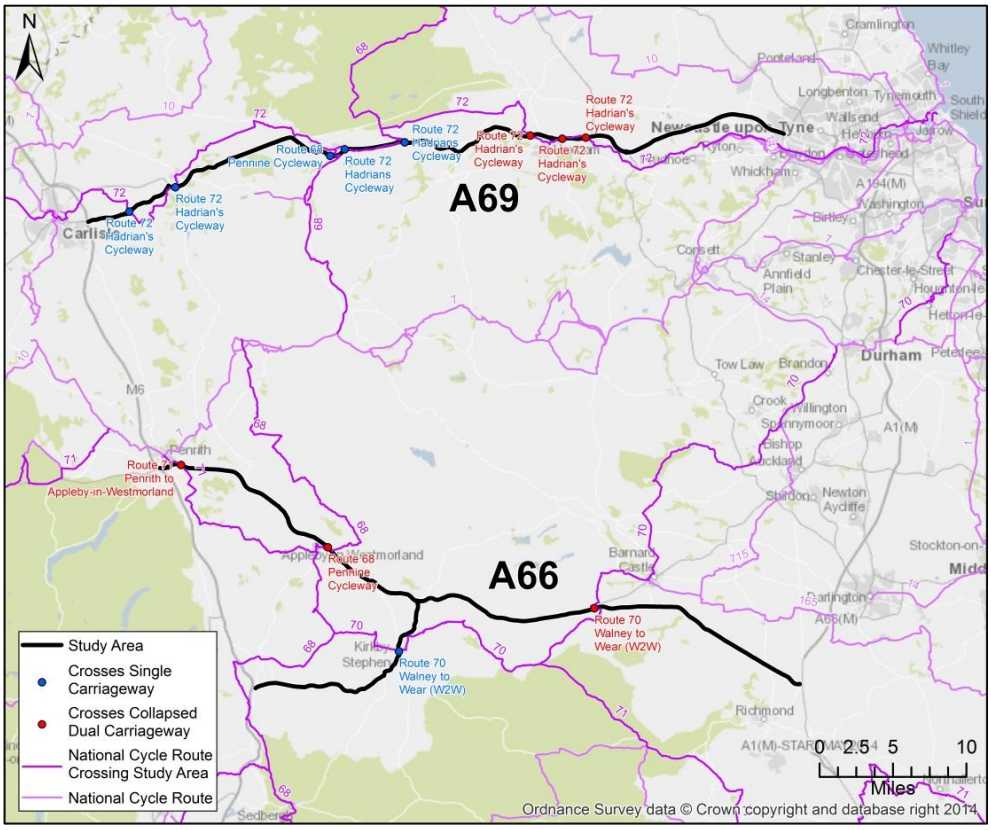
A66 Corridor

- National Cycle Route 68 (Pennine Cycleway) at Appleby-in-Westmorland
- National Cycle Route 70 (Walney to Wear) at Barnard Castle
- National Cycle Route 71 (Penrith to Appleby-in-Westmorland) at Penrith

A685 Corridor

- National Cycle Route 70 (Walney to Wear) at Kirkby Stephen

Figure 2-75: Strategic Cycle Network within the North Pennines Region



Other NMU Provisions

2.5.32 There are limited numbers of NMU routes that run parallel with, adjoin or pass over or under the A66 between Scotch Corner and Brough. The most significant route is the path of the Pennine Way, which is a popular long distance walking route. This passes under the A66 in the vicinity of Pasture End Farm in study section 7 utilising a cattle creep/subway.

2.5.33 Another leg of the Pennine Way, which branches off the main route, for those who wish to stop off in Bowes village, passes over Clint Lane bridge at Bowes. This bridge is also on the line of a long distance cycle route known as the W2W (Walney to Wear) route.

2.5.34 A further bridleway route from the north links to the A66 at the turning area associated with Bowes Snow Gates (study section 8), although no carriageway crossing point or other facilities are provided and this route is largely abandoned. Footway connections are also provided between Clint Bridge and a pair of bus-stop lay-bys, one provided adjacent to both carriageways at Bowes village. Whilst these lay-bys have been installed, few buses stop at these locations as the majority of bus services pass through the village of Bowes and utilise the bus turning facility to exit the village.

2.5.35 There are two NMU routes crossing the A66 Trunk Road taking the form of at-grade Public Footpath crossings, located at Broats Cross Farm and Boldron Junctions in study section 7. Currently, both crossing facilities have flag-post signs in the south and north verges respectively. No footways, paved NMU facilities or bus-stop lay-bys exist throughout the length between Low Broats to Cross Lanes Junction.

2.5.36 There are three NMU routes located between Cross Lanes and Abbey Lane on the single carriageway section, taking the form of Public Rights of Way, only one of which crosses the Trunk Road. Two public footpaths are associated with the Tutta Beck Farm Junction both starting in the northern verge heading north towards Dowson's Gill and one crossing the Trunk Road at Church Plantation in a north/south orientation. Currently, all three public rights of way have flag-post signs in the north verge only. The verge to the north is overgrown and flag-post signs are difficult to locate as a result. There is no evidence to suggest significant use of the NMU routes near Tutta Beck Farm. However, the cross-carriageway route at Church Plantation is accessed through the churchyard gates and heads north to the 'Teesdale Way' NMU route. No footways, paved NMU facilities or bus-stop lay-bys exist throughout this section.

2.5.37 Three NMU routes cross the dual carriageways section between Browson Bank and Abbey Lane within study section 9.

- One is located near the Abbey Lane Junction and takes the form of an at-grade Public Right of Way which crosses the Trunk Road in the vicinity of existing bus stops located at Abbey Lane (eastbound) and Greta Bridge (westbound).
- Another NMU route takes the form of a grade-separated Public Right of Way which passes under the Trunk Road at Greta Bridge.
- In the vicinity of Newsham Grange, an at-grade Public Right of Way (footpath) crosses the Trunk Road. Here there is a paved footpath across the north and south verges and a staggered NMU crossing exists in the central reservation VRS.

Approximately 350m east of the NMU footpath crossing, equine corrals have recently been provided to facilitate bridleway crossings at this location. These facilities are supplemented with appropriate warning signs mounted up-stream of the facilities in the eastbound and westbound verges respectively. A Bridleway is located on the north verge near Browson Bank, crossing the A66 Trunk Road in the vicinity of Dick Scott Lane. Currently, this crossing facility has no flag-post signs or corral.

Current Network Operations – Key Points
The A66 extends to a height of 426m above sea level and certain sections of the network are vulnerable to severe weather conditions, such as wind and snow. The route is particularly susceptible to high winds, which affect high-sided vehicles, and high wind closure protocols are in place.
Road closure data shows that although some closures on the A66 are caused by weather conditions, many more are caused by planned road works (46%) and incidents (21%), with a high proportion of closures in excess of 2 hours.
Although the A69 is generally less susceptible to weather conditions, there have been recent closures due to flooding and there is a Severe Weather Plan in place for locations vulnerable to flooding.
On both routes diversionary routes are poor, particularly for freight. Due to height and weight restrictions on the A685 and A688 there is a particular problem for freight traffic on the A66, and diversions generally necessitate the use of the A69 or M62.
There are a number of national walking and cycle routes which cross or adjoin both the A66/A685 and A69 corridors.

2.6 Network Safety

2.6.1 This section provides an insight into the current network safety context associated with operational conditions on the A69 and A66/A685 corridors.

Accidents and Incidents Information

2.6.2 Collision information for the last full three years 2012-2014 inclusive has been derived from the national STATS19 dataset held by TRL. This period of time has been specifically selected in order to reflect the implementation of various road safety improvement schemes which have recently been constructed within the study area. Additional information has been reviewed as supplied by the relevant MAC organisations and from Highways England.

2.6.3 None of the reviewed documents were consistent either in their approach to safety in terms of the length of time considered or in the lengths of road reviewed. Consequently extracting relevant safety information that pertained purely to the study area in a consistent and meaningful manner has not been possible from the information made available. The sections of route on the main corridors of A66 and A69 included in this study did not coincide with any of the section analyses covered in any of these previous reports.

2.6.4 Detailed data from the MACs on reported incidents are only available as daily reports which also contain data that is not relevant to this study and extracting the individual records of interest has not been considered appropriate – except to confirm the validly of a small number of collisions where their classification or location was unclear. This is discussed later in this section.

2.6.5 Therefore consideration of the safety issues across the corridor has been limited to detailed examination of STATS19 records extracted for the following sections of road as shown in Table 2-41.

Table 2-41: Study Network Road Sections

Road	Section No.	From	To	Distance (Km)
A69	**1**	RBT junc A69 /Brampton Bypass	J 43 M6	19.2
	2	A69 junc. with West Road Haltwhistle	RBT junc. A69/Brampton Bypass	10.24
	3	Hexham r/bout	A69 junc. with West Road Haltwhistle	26.88
	4	A1 Newcastle	Hexham r/bout	27.68
	Total		**A69 Total Km**	84.00
A66	**5**	Start of Temple Sowerby bypass	J40 M6	8.16
	6	Start of dual c/way Brough	West end of T/S Bypass	24.32
	7	A67 junc. Bowes	Start of dual c/way Brough	22.4
	8	The St junc. Greta Bridge	A67 junc. Bowes	9.6
	9	A1 Scotch Corner	The St junc Greta Bridge	15.04
	Total		**A66 Total Km**	79.52
A685	**10**	Junc. A66 Brough	J 38 M6 (Tebay)	43.2

2.6.6 Traffic flow Information from the TRADS Database for the A69 and A66/A685 corridors area has also been used to generate collision rates for each of the sections of road identified above and these flows are shown in Table 2-42, together with the relevant section length in kilometres (km).

Table 2-42: Network Section AADT Flows and Lengths

2014 AADT					Section Length(km)
Road	Section No.	Eastbound	Westbound	Combined	
A69	**S1**	6301	6173	12474	10.24
	S2	5227	5293	10520	19.20
	S3	5915	6059	11974	26.88
	S4	12482	12668	25150	27.68
A66	**S5**	13783	12179	25962	8.16
	S6	7011	7156	14167	24.32
	S7	8135	8234	16369	22.40
	S8	7093	7292	14385	9.60
	S9	8374	8458	16832	15.04

2014 AADT					Section Length(km)
Road	Section No.	Eastbound	Westbound	Combined	
A685	**S10**	-	-	5032	43.20

2.6.7 The analysis has considered the relative safety on these corridors compared to average collision rates for similar types of road contained within Reported Road Casualties Great Britain: 2014 Annual Report (RRCGB 2014). Overall there have been a total of 317 collisions resulting in personal injury (PICs) across the study network in the three years 2012 -2014 as shown in Table 2-43 and illustrated at Figure 2-76 to Figure 2-78.

Table 2-43: Collisions by Severity

Section No.	Severity			
	Fatal	Serious	Slight	Total
A69 (S1)		2	34	36
A69 (S2)	2	9	23	34
A69 (S3)	3	3	17	23
A69 (S4)	2	12	53	67
A69 Total				160
A66 (S5)		5	16	21
A66 (S6)		10	35	45
A66 (S7)	1	2	22	25
A66 (S8)			5	5
A66 (S9)		16	32	48
A66 Total				144
A685 (S10)	1	3	9	13
Network Total	**9**	**62**	**246**	**317**

Figure 2-76: Personal Injury Accidents – Slight in Severity (2012-2014)

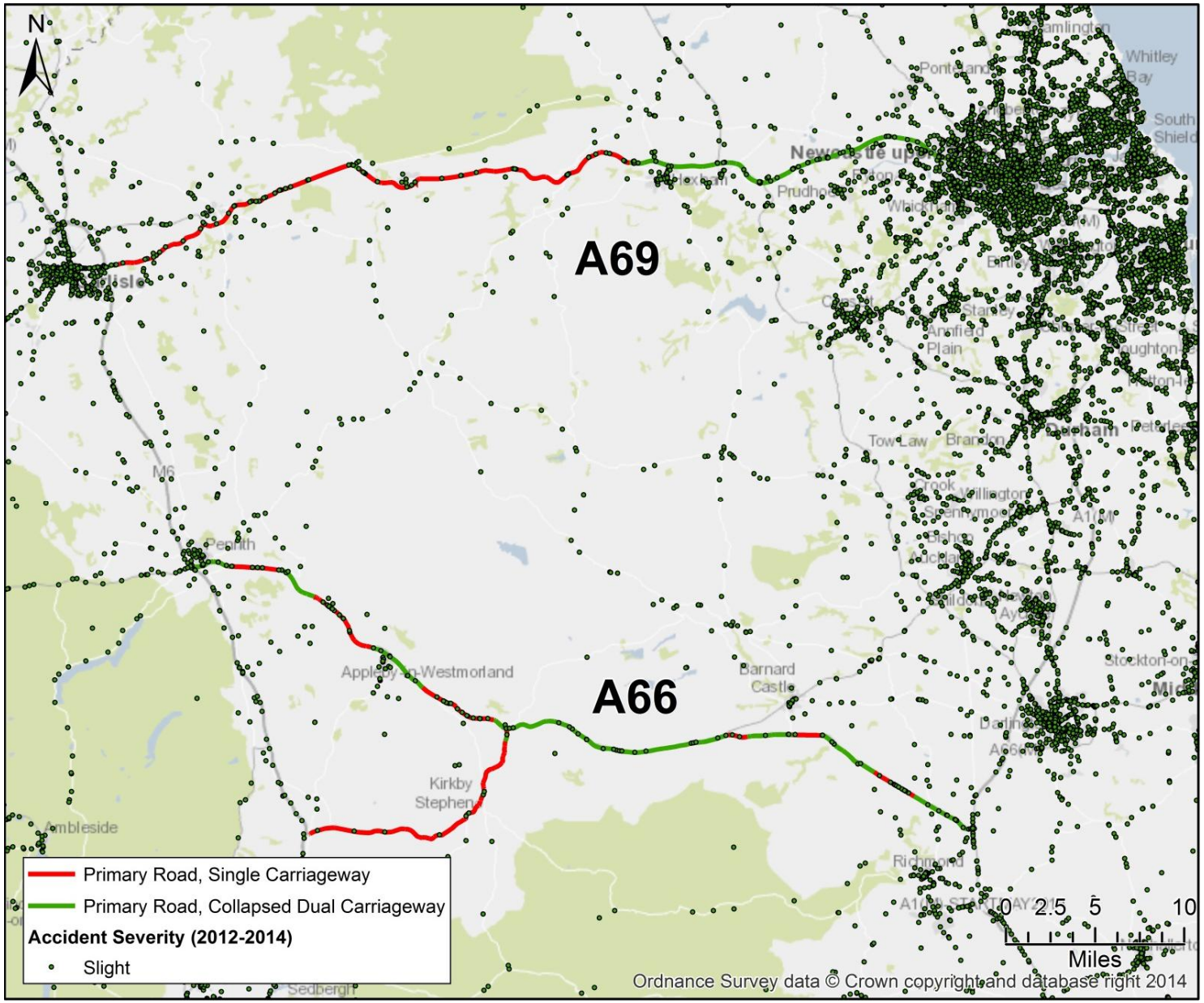


Figure 2-77: Personal Injury Accidents – Serious in Severity (2012-2014)

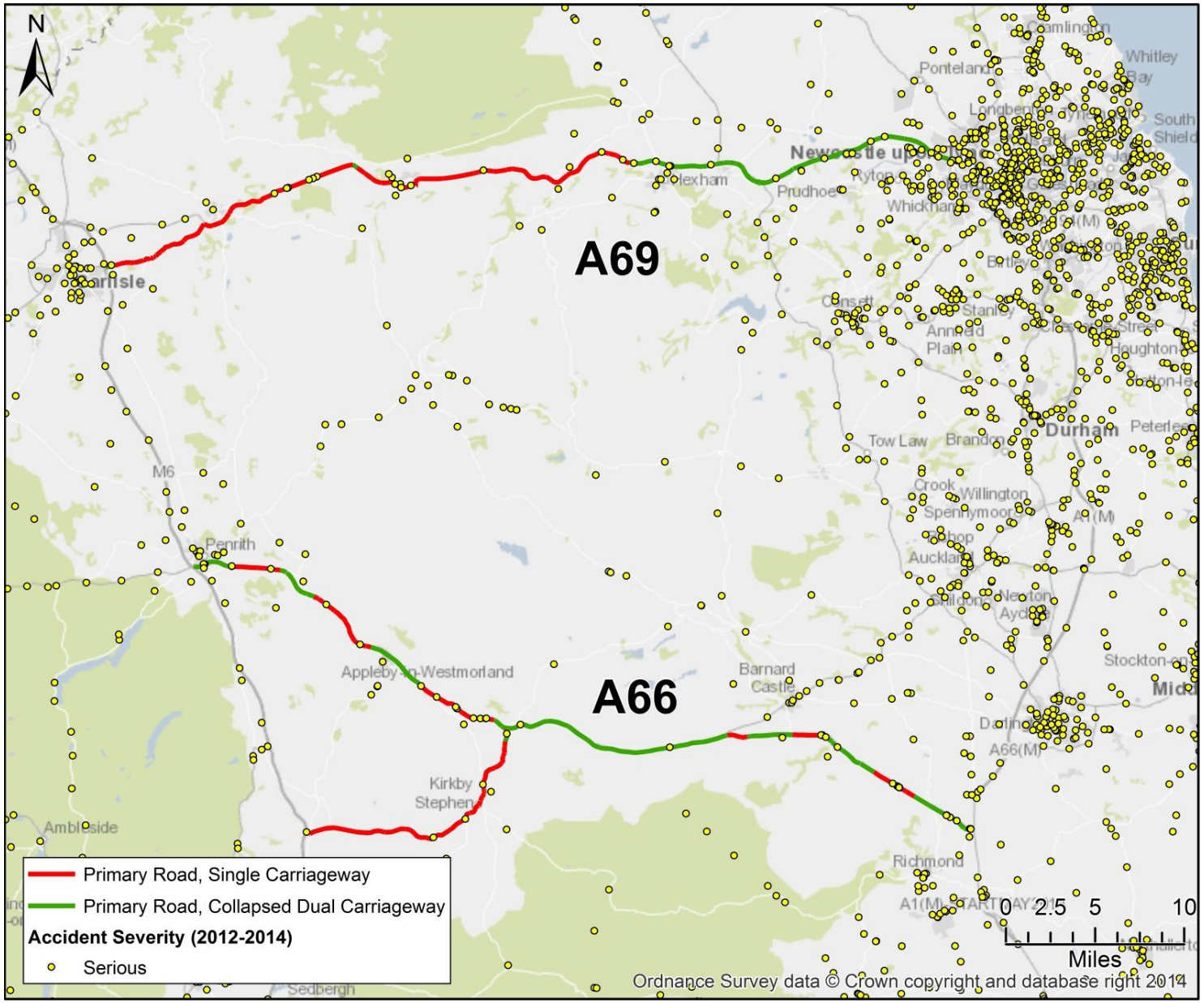
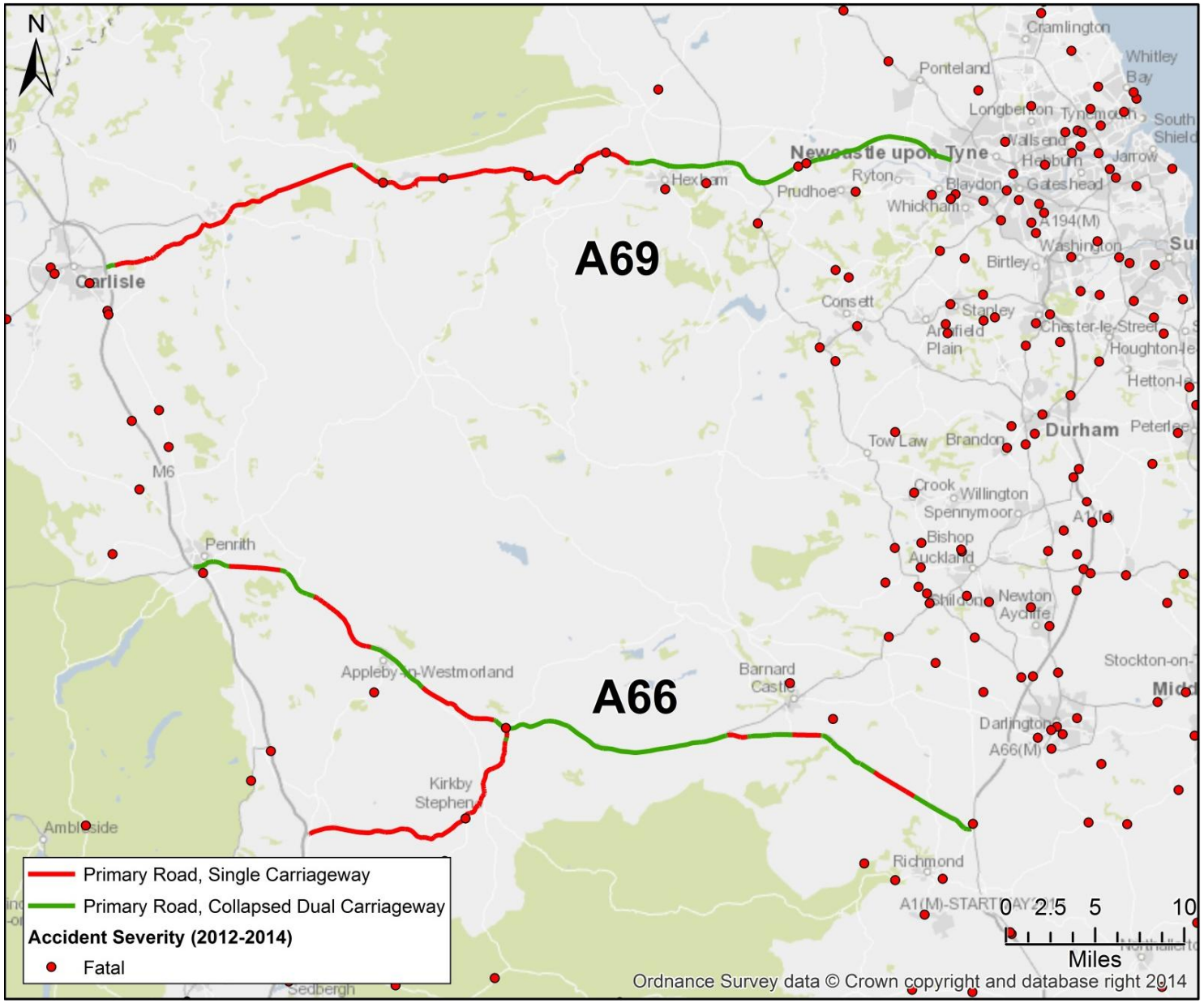


Figure 2-78: Personal Injury Accidents – Fatal in Severity (2012-2014)



2.6.8 The PIC incidents have been combined with the traffic flows quoted previously, to give a collision rate per km for each section of road as detailed in Table 2-44 below.

Table 2-44: Collision Rate per Network km by Section

Section No.	PICs/km			
	Fatal	Serious	Slight	Total
A69 (S1)	0.00	0.20	3.32	3.52
A69 (S2)	0.10	0.47	1.20	1.77
A69 (S3)	0.11	0.11	0.63	0.86
A69 (S4)	0.07	0.43	1.91	2.42
A66 (S5)	0.00	0.61	1.96	2.57
A66 (S6)	0.00	0.41	1.44	1.85
A66 (S7)	0.04	0.09	0.98	1.12
A66 (S8)	0.00	0.00	0.52	0.52
A66 (S9)	0.00	1.06	2.13	3.19
A685 (S10)	0.02	0.07	0.21	0.30
Network Total	**0.04**	**0.30**	**1.19**	**1.53**

2.6.9 Collision rates per km are clearly greatest on A69 between Brampton and Carlisle (Section 1) and on A66 between Scotch Corner and Greta Bridge (Section 9). The next highest rates are evident on the A69 between Newcastle and Hexham (Section 4) and on A66 between Penrith and Temple Sowerby (Section 5). The A685 has the lowest collision rate per km.

2.6.10 Taking traffic flow into account on each section gives the collision rates per billion vehicle kilometres (bvkm) shown in the Table 2-45 below.

Table 2-45: Collision rate by Network Section (bvkm)

Section No.	PIC Severity				vk over 3 yrs	Collisions/bvkm
	Fatal	Serious	Slight	Total		
A69 (S1)		2	34	36	139868467	257
A69 (S2)	2	9	23	34	221172480	154
A69 (S3)	3	3	17	23	352437926	65
A69 (S4)	2	12	53	67	762286440	88
A66 (S5)		5	16	21	231975662	91
A66 (S6)		10	35	45	377272876	119
A66 (S7)	1	2	22	25	401498832	62
A66 (S8)			5	5	151215120	33

Section No.	PIC Severity				vk over 3 yrs	Collisions/bvkm
	Fatal	Serious	Slight	Total		
A66 (S9)		16	32	48	277201517	173
A685 (S10)	1	3	9	13	238033728	55
Total	**9**	**62**	**246**	**317**		

2.6.11 According to RAS 30018 of RRCGB 2014 there were 279 reported injury collisions/billion vehicle miles involving all vehicles on rural A roads. This equates to 175 collisions per billion vehicle kilometres for all vehicles. Collision rates per billion vehicle kilometres on the various sections of the study network show that only the Brampton to Carlisle section of A69 within the study network has a collision rate in excess of the national average for this type of road.

2.6.12 Table 2-46 below shows the distribution of collisions by year and by road section.

Table 2-46: Network Section Collisions by Year and Section Length

Section No.	Year				Section Length
	2012	2013	2014	Total	
A69 (S1)	12	13	11	36	10.24
A69 (S2)	12	11	11	34	19.2
A69 (S3)	10	8	5	23	26.88
A69 (S4)	22	16	29	67	27.68
A69 Total	56	48	56	160	
A66 (S5)	4	5	12	21	8.16
A66 (S6)	16	16	13	45	24.32
A66 (S7)	10	8	7	25	22.4
A66 (S8)	1	1	3	5	9.6
A66 (S9)	22	12	14	48	15.04
A66 Total	53	42	49	144	
A685 (S10)	3	7	3	13	43.2
Total	**112**	**97**	**108**	**317**	

2.6.13 Given the relatively small number of collisions involved on an annual basis and the short time period involved it has not been possible to identify any particular trends in relation to collision variation over time. Even breaking the numbers down into a monthly basis is unlikely to indicate any particular patterns. More insight may be obtained from considering the weather and lighting conditions

2.6.14 Table 2-47 shows collisions on each section of the study network for different recorded weather conditions.

Table 2-47: Network Collisions by Weather Condition and Section

Section No.	Weather									
	Fine		Rain		Snow		Fog/ mist	Other	Un-known	Total
	No high winds	High winds	No high winds	high winds	No high winds	High winds				
A69 (S1)	31	1	3						1	36
A69 (S2)	23	4	7							34
A69 (S3)	21		1				1			23
A69 (S4)	51	2	10	1		1	2			67
A66 (S5)	18		2					1		21
A66 (S6)	37		6				1		1	45
A66 (S7)	10	2	2	7	1	2			1	25
A66 (S8)	5									5
A66 (S9)	41		3		2			1	1	48
A685 (S10)	7	1	2		1	1		1		13
Total	**244**	**10**	**36**	**8**	**4**	**4**	**4**	**3**	**4**	**317**
% of Total Collisions	**77%**	**3.2%**	**11.4%**	**2.5%**	**1.3%**	**1.3%**	**1.3%**	**1%**	**1.3%**	

2.6.15 RRCGB 2014 Table RAS1005 provides a breakdown of collisions by daylight and darkness, road surface condition, built-up and non-built-up roads and severity occurring in Great Britain in 2014. Whilst this does not provide a direct comparison with Rural A roads, overall 82% of all such collisions occurred on rural A roads (Table RAS10002). Even allowing for an unequal distribution across various classes of non-built-up roads, the national average proportion of both wet and dry and dark and daylight collisions is higher nationally than on the study network roads.

2.6.16 Table 2-48 on the following page shows the sections broken down by different lighting conditions.

Table 2-48: Network Collsions by Light Condition and Section

Section No.	Light Conditions					
	Daylight	Darkness			Total	Proportion in Daylight
		Street lights present and lit	No street lights present	Street lighting unknown		
A69 (S1)	29	1	6		36	80.56%
A69 (S2)	24		10		34	70.59%
A69 (S3)	14		9		23	60.87%

Section No.	Light Conditions					
	Daylight	Darkness			Total	Proportion in Daylight
		Street lights present and lit	No street lights present	Street lighting unknown		
A69 (S4)	49	8	10		67	73.13%
A66 (S5)	20		1		21	95.24%
A66 (S6)	33	1	11		45	73.33%
A66 (S7)	17		7	1	25	68.00%
A66 (S8)	3		1	1	5	60.00%
A66 (S9)	38	1	9		48	79.17%
A685 (S10)	10		3		13	76.92%
Total	**237**	**11**	**67**	**2**	**317**	**74.76%**

2.6.17 Table 2-49 below breaks each road section down further to consider the length of single and dual carriageway within each section.

Table 2-49: Length of Dual and Single Carriageway by Network Section

Road	Section No.	Road Type (km)		
		Single	Dual	Total
A69	**(S1)**	9.28	0.96	10.24
	(S2)	18.56	0.64	19.2
	(S3)	23.36	3.52	26.88
	(S4)	0	27.68	27.68
A66	**(S5)**	4.48	3.68	8.16
	(S6)	18.4	5.92	24.32
	(S7)	0	22.4	22.4
	(S8)	5.44	4.16	9.6
	(S9)	4	11.04	15.04
A685	**(S10)**	43.2	0	43.2

2.6.18 This can then be used to consider the collision rates by road type. Table 2-50 on the following page provides detail of the collisions on each section of the network by road type, principally for single or dual carriageway, although a small number of collisions have specifically been identified at the major roundabouts and slip road junctions.

Table 2-50: Collision Rate by Road Type and Section

Section No.	Road Type					PIC/bvkm	
	R/bout	Single C/way	Dual C/way	Slip Road	Total	Single	Dual
A69 (S1)	1	28	7		**36**	221	534
A69 (S2)		34			**34**	159	
A69 (S3)		22	1		**23**	72	22
A69 (S4)	9	4	53	1	**67**		70
A66 (S5)	4	11	6		**21**	86	57
A66 (S6)		39	6		**45**	137	65
A66 (S7)		2	22	1	**25**		55
A66 (S8)		3	2		**5**	35	31
A66 (S9)		29	19		**48**	393	93
A685 (S10)		13			**13**	55	
Total	**14**	**185**	**116**	**2**	**317**		

2.6.19 It should be noted that a total of seven collisions (highlighted in red) have been identified on either single or dual carriageway, when none actually exists in that particular section. At this stage it is not known whether there is miscoding of the road type or location of the record. As noted earlier, the daily incident log from the MACs can be searched for more detail on particular incidents and the anomalies noted above have been checked against this database. However, no records were available for the dates and times identified. Therefore, for the time being they have been regarded as correct but omitted from the analysis of collision rate for each type of road type by section as the length of that type of road in those sections is zero.

2.6.20 Again, the UK average collision rate per billion vehicle kilometres for rural A roads from RRCGB 2014 is 175. Whilst no distinction is made in the national statistics by road type, only the single carriageway length between Scotch Corner and Greta Bridge on A66 now shows a higher rate than the national average. The A69 between Brampton and Carlisle still show a higher than average rate on both the dual and single carriageway sections.

2.6.21 For each section except A69 between Brampton and Carlisle (Section 1) the collision rate on the single carriageway section is higher than for the adjoining dual carriageway portions. Overall, the A66 between Greta Bridge and Brough (Section 8) has the lowest rate for both single and dual carriageway road types.

2.6.22 No indication is given in the data source of collisions recorded at minor road junctions between 2012 and 2014. However, this aspect has been considered by analysing collisions by turning manoeuvre as shown in Table 2-51 on the following page. Due to the size of the table that would result, not all manoeuvres have been included in the table, only those that indicate the possibility of a junction or access.

2.6.23 The turning predominant movement that resulted in collisions on the study network during the period is a right turn which accounts for 8.37% of all vehicles involved in collisions on the network.

2.6.24 It should be noted that this particular analysis from STATS19 data identifies the turning manoeuvre by vehicle rather than by collision. Therefore the total number of vehicles identified is 653 rather than 317 used previously which relates purely to collision numbers. Inevitably there are multiple vehicles involved in most collisions. For the study network this can vary between 1 and 6 vehicles per collision, giving an average involvement rate of 2.05 vehicles per collision.

Table 2-51: Number of Vehicles Involved in Various Turning Movements by Network Section

Section No.	No of Vehicles Involved in					
	U-Turn	Left Turn	Waiting to Turn Left	Turning Right	Waiting to Turn Right	Total Vehicles involved in all movements
A69 (S1)		1		8	2	68
A69 (S2)				5		71
A69 (S3)				5	1	56
A69 (S4)		5	1	9		122
A66 (S5)				2	2	52
A66 (S6)	1	4		3	2	105
A66 (S7)		1		1		39
A66 (S8)						11
A66 (S9)		3		9	3	106
A685 (S10)		2		2		23
Grand Total	**1**	**16**	**1**	**44**	**10**	653
Percentage involved	**0.15%**	**2.45%**	**0.15%**	**6.74%**	**1.53%**	**100%**

2.6.25 A similar analysis can be done to identify the type of vehicle involved in all collisions. Table 2-52 shows that the dominant vehicle type involved in collisions (other than a car or taxi) is a goods vehicle. These account for 22.21% of all vehicles involved in collisions on the study network.

Table 2-52: Numbers of Vehicles by Type Involved in collisions on Each Section of the Study Network

Section No.	Vehicle Type							
	Pedal cycle	PTW	Car or taxi	Minibus or bus	Agricultural vehicle	Goods vehicle	Other	Total
A69 (S1)	1	2	55	1	1	7	1	68
A69 (S2)		2	51			18		71
A69 (S3)			38			18		56
A69 (S4)	1	3	97			21		122

Section No.	Vehicle Type							
	Pedal cycle	PTW	Car or taxi	Minibus or bus	Agricultural vehicle	Goods vehicle	Other	Total
A66 (S5)		1	40			11		52
A66 (S6)		6	66	3	1	24	5	105
A66 (S7)	1	1	21	2	2	12		39
A66 (S8)			7			3	1	11
A66 (S9)		3	75	1		27		106
A685 (S10)	1	2	14		1	4	1	23
Total	**4**	**20**	**464**	**7**	**5**	**145**	**8**	**653**
Percentage of vehicle type involved	**0.61**	**3.06**	**71.06**	**1.07**	**0.77**	**22.21**	**1.23**	

2.6.26 Table RAS 20005 of RRCGB 2014 shows that for rural 'A' roads overall only 11.7% of national collisions involved goods vehicles in 2014. The AADT flow figures extracted from the TRADS database also identifies the percentage of HGV traffic on each section. These percentages are shown in the Table 2-53 below.

Table 2-53: Percentage of HGVs Involved In Collisions

Road	Section No.	Percentage of HGVs			Percentage of HGVs involved in collisions
		Eastbound	Westbound	Total	
A69	S1	3.1	3.6	3.35	10.29
A69	S2	9.7	9.4	9.55	25.35
A69	S3	8.8	8.6	8.7	32.14
A69	S4	5.1	5.1	5.1	17.21
A66	S5	11.7	13.8	12.75	21.15
A66	S6	20.5	20.2	20.35	22.86
A66	S7	17.7	18.6	18.15	30.77
A66	S8	20.3	20.8	20.55	27.27
A66	S9	17.8	18.3	18.05	25.47
A685	S10			4.23	17.39

2.6.27 It appears that HGVs are overrepresented in collisions on the study network, particularly on A69 as are goods vehicles compared to the national average.

Current Network Safety – Key Points
STATS19 accident data shows that there has been a total of 317 collisions resulting in personal injury (PICs) across the two corridors between 2012 and 2014 (9 fatal; 62 serious; 246 slight).
Collision rates are greatest on the A69 between Carlisle and Brampton and the A66 between Greta Bridge and Scotch Corner.
Only the A69 between Carlisle and Brampton, and the single carriageway part of the section between Greta Bridge and Scotch Corner, have collision rates in excess of the national average for the type of roads.
The data shows that HGV involvement in collisions, particularly on the A69, is higher than the national average.

2.7 Environment

2.7.1 This section provides an insight into the current environmental context associated with the study area adjacent to the A69 and A66/A685 corridors. The specific details are presented in accordance with the following structure:

- National and Highways England Policy
- Review of Existing Conditions and Constraints
- A69 Corridor Summary
- A66 and A685 Corridor Summary
- Summary Tables
- Opportunities

2.7.2 The A69 corridor crosses England from the A1 (M) in Newcastle-Upon-Tyne in the east to the M6 motorway in Carlisle in the west. The A69 corridor runs through various environments, from the urban areas within the Newcastle and Carlisle conurbations at the eastern and western ends of the corridor and a predominantly rural area in between. However, there are a large number of small communities along the A69 corridor, ranging from towns such as Corbridge, Hexham, Haltwhistle and Brampton to isolated farmsteads. The topography varies along the corridor from the lowest points within the River Tyne and River Eden valleys to the highest point on Thirlwall Common. The topography ranges between approximately 20m above sea level to approximately230m above sea level.

2.7.3 The A66 corridor crosses the northern Pennines between Scotch Corner on the A1 (M) to the M6 Motorway at Penrith. The A685 runs between the A66 at Brough to the M6 Motorway at Tebay. The A66 and A685 corridors run through a mixture of environments, from urban environments around Brough, Appleby-in-Westmorland and Penrith to rural areas along the majority of the corridors. There are existing residential properties in close proximity of the A66 and the A685 carriageway, particularly in Bowes, Brough, Appleby-in-Westmorland, Kirby Stephen and Penrith. In addition, there are villages, hamlets and isolated properties along the majority of the Scheme corridor. The topography varies across the corridor, from the lowest points in the River Tees and River Eden valleys to the highest point on Bowes Moor. The topography ranges between approximately 100m above sea level to circa to 426m above sea level.

National and Highways England Policy

2.7.4 The key national and Highways England policy documents are as follows:

- Department for Communities and Local Government (2012) National Planning Policy Framework (NPPF).
- Department for Transport (2014) National Networks National Policy Statement (NNNPS).
- Department for the Environment, Food and Rural Affairs (2010) Noise Policy Statement for England.
- Department for Communities and Local Government (2014) National Planning Policy for Waste.
- DfT and Highways England (2015) Route Investment Strategy 2015-2020.
- Highways England (2015) Biodiversity Strategy.

2.7.5 The NPPF states that the purpose of the planning system is to help achieve sustainable development and recognises that there are three separate but inter-linked dimensions: economic, social and environmental. The NPPF recognises the role of planning in contributing to building a strong, responsive and competitive economy and by identifying and coordinating development requirements, including the provision of infrastructure. The policies within the Framework seek to improve health, social and cultural wellbeing for all, deliver sufficient community and cultural facilities and services to meet local needs and secure a good standard of amenity for all existing and future occupants of land and buildings. Development is expected to contribute to the conservation and enhancement of the natural and historic environments and prevent development from contributing to unacceptable levels of pollution. The NPPF places emphasis on good design which is a key aspect of sustainable development and should contribute positively to making places better for people and should avoid significant adverse impacts which can affect health and quality of life.

2.7.6 The NNNPS recognises that for development to be sustainable, these should be designed to minimise social and environmental impacts and improve quality of life. Development should be delivered in an environmentally sensitive way including the consideration of opportunities to deliver environmental benefits. Government policy is to address existing environmental problems and improve performance of the network by reconnecting habitats and ecosystems, enhancing the historic and cultural heritage features, respecting and enhancing landscape character improving water quality and reducing flood risk avoiding significant adverse impacts from noise/vibration and addressing areas of poor air quality.

2.7.7 It requires that studies recognise advice provided within national planning guidance in relation to development proposed within nationally designated areas. The guidance makes clear that great weight should be given to conserving landscape and scenic beauty in nationally designated areas. National Parks, the Broads and Areas of Outstanding Natural Beauty have the highest status of protection in relation to landscape and scenic beauty. Each of these designated areas has specific statutory purposes which help ensure their continued protection, with the Secretary of State having a statutory duty to provide due regard through the decision making process.

2.7.8 The Department for Transport has published its Road Investment Strategy: for the 2015/16 – 2019/20 Road Period which sets out policies relating to the strategic planning and funding of the road network and deliver environmental improvements for both new and existing schemes. The plan includes a statement regarding Northern Trans Pennine routes study: *'This study will examine the case for dualling one or both of these roads and making other improvements along their length. In doing this, we would further help the development of a northern powerhouse'*.

2.7.9 The Highways Biodiversity plan sets five outcomes for biodiversity to be achieved by Highways England over the Road Investment Strategy RIS1 period, i.e. 2015 - 2020. Central to the Highways Biodiversity Plan is the requirement for Highways England to achieve no net loss of biodiversity by

2020 (i.e. within RIS1) and a net gain in biodiversity by 2040, in line with objectives set within the Road Investment Strategy.

Review of Existing Conditions and Constraints

2.7.10 Environmental conditions and constraints within the A69 corridor on a topic basis are provided below:

- **Air Quality:** There are no Air Quality Management Areas (AQMAs) within 2km of the Scheme corridor. There is one Pollution Climate Mapping (PCM) link on the route at the Newcastle end of the scheme which is in exceedance (2013) (above 40µg m^{-3}). The A1(T) which the A69 connects with is also in exceedance at this point.
- **Greenhouse Gases:** The A69 corridor crosses three local authority areas, Newcastle, Northumberland and Carlisle. Whilst the highest total CO_2 emissions overall was recorded in Newcastle (1680ktCO_2), the highest total emissions from the transport sector was in Northumberland (584ktCO_2) and the greatest proportion of total emissions attributed to transport was in Carlisle (c. 31%) based on 2013 data.
- **Cultural Heritage:** Frontiers of the Roman Empire (Hadrian's Wall) World Heritage Site follows the alignment of the corridor and lies within it at the eastern and western ends of the A69 corridor. There are 83 Scheduled Monuments within 2km of the scheme corridor and the A69 carriageway crosses five Scheduled Monuments. There are three Registered Parks and Gardens and one Registered Battlefield within 2km of the Scheme corridor. There are 918 listed buildings within 2km of the scheme corridor, of which 38 are Grade I, 46 Grade II* and 834 Grade II. There are 24 Conservation Areas within 2km of the Scheme corridor.
- **Landscape:** The North Pennines Area of Outstanding Natural Beauty, Northumberland National Park and Northumberland Dark Sky Park are situated within 2km of the Scheme Corridor.
- **Nature Conservation/Biodiversity**: There are four Special Areas of Conservation (SAC) and one Special Protection Area (SPA) within 2km of the Scheme corridor. One SAC (River Eden) traverses the A69 corridor between Brampton and Carlisle. There are 14 Sites of Special Scientific Interest (SSSI), one National Nature Reserve and eight Local Nature Reserves lie within 2km of the Scheme corridor. There is also one RSPB Reserve within 2km of the Scheme corridor, the Geltsdale Reserve, which is situated approximately 1.2km from the A69 carriageway at the closest point. There are 88 sites of Ancient Woodland within 2km of the Scheme corridor.
- **Noise and Vibration:** There are 11 Noise Important Areas (NIA's) within 600m of the route and 9 along the A69 corridor. NIA's for roads are where the top 1% of the population that are affected by the highest noise levels are located according to the results of the Defra strategic noise mapping. The population at these locations is likely to be at the greatest risk of experiencing a significant adverse impact to health and quality of life as a result of their exposure to road traffic noise.
- **Road Drainage and Water Environment:** The majority of the scheme corridor is located within the Flood Zone 1, which indicates a low risk of flooding from fluvial sources. However, sections of the A69 are situated within a mixture of Flood Zones 2/3 indicating a medium/high risk of fluvial flooding. The Environment Agency's Risk of Flooding from Surface Water Map shows the majority of the scheme corridor is at very low and low risk of flooding. However, there are isolated areas, where a medium to high risk of surface water flooding has been identified. The nearest significant watercourses to the scheme are the River Tyne which divides into the River North Tyne and River South Tyne to the north-west of Hexham, and the River Eden. There are also a number of ordinary watercourses which are within/immediately adjacent to the scheme corridor. There are no Groundwater Source Protection Zones within 2km of the scheme corridor.
- **Peoples and Communities:** There are a number of long distance footpaths and cycle routes within 1.5km of the Scheme corridor, in particular the Hadrian's Wall National Trail and National Cycle Route 68 and 72.
- **Geology, Soils and Materials**: There are six SSSIs designated for geological or mixed (biological and geological) reasons along the A69 corridor.

2.7.11 Where appropriate, existing designations have been presented on constraints plan in Appendix 4.

A69 Corridor Summary

2.7.12 A summary table outlining the key environmental constraints on a topic by topic basis with a Red/Amber/Green rating is provided in Table 2-54. The methodology and criteria are detailed in **Deliverable 4 – Appraisal Summary Report**.

Table 2-54: A69 Corridor

Technical Topic	Section			
	1 (A69 Newcastle to Hexham)	2 (A69 Hexham to Haltwhistle)	3 (A69 Haltwhistle to Brampton)	4 (A69 Brampton to Carlisle)
Air Quality				
Cultural Heritage				
Landscape				
Nature Conservation / Biodiversity				
Noise*				
Road Drainage & Water Environment				
Peoples & Communities**				
Geology, Soils & Materials***				

Red – avoidance or minimisation of impact is a key consideration in developing potential scheme options.

Amber – avoidance or minimisation of impact is an important consideration in developing potential scheme options and all options should be designed to facilitate mitigation where avoidance cannot be achieved.

Green – avoidance or minimisation of impact is desirable but is a lesser consideration in development of potential scheme options.

* Note some NIAs relate to individual properties

**Refers to national trails and national and regional cycle routes only.

*** Geological SSSIs only.

2.7.13 A list of the 'red' criteria designations are provided in Appendix 4.

A66 and A685 Corridor Summary

2.7.14 Environmental conditions and constraints within the A66 and A685 corridors on a topic basis are provided below:

- **Air Quality:** There are no Air Quality Management Areas (AQMA's) located within 2km of the Scheme corridor. The A69 at West Denton has PCM links in exceedance at West Denton (based on 2013 data).

- **Greenhouse Gases:** The A66 and A685 corridor crosses three local authority areas, Richmondshire, Durham and Eden. Whilst the highest total CO_2 emissions overall and the highest total emissions from the transport sector was in Durham (3292ktCO_2/ 925ktCO_2) , the greatest proportion of total emissions attributed to transport was in Richmondshire (c. 47%) based on 2013 data.
- **Cultural Heritage:** There are no World Heritage Sites within 2km of the Scheme corridor. There are 71 Scheduled Monuments within 2km of the scheme corridor and the A66/A685 carriageways cross seven Scheduled Monuments. There are three Grade II* Registered Parks and Gardens within 2km of the scheme corridor. There are 914 listed buildings within 2km of the scheme corridor, of which are 25 Grade I, 58 Grade II* and 831 Grade II. There are 17 Conservation Areas within 2km of the scheme corridor.
- **Landscape:** The North Pennines Area of Outstanding Natural Beauty is situated within 2km of the Scheme corridor between Bowes and Warcop. The A685 carriageway lies within the proposed extension to the Yorkshire Dales National Park which will include sections of the Scheme corridor between Brough and Penrith. The National Park extension was approved by the Secretary of State on 23rd October 2015 and comes into force on the 1st August 2016.
- **Nature Conservation / Biodiversity:** There are four Special Areas of Conservation (SAC) and one Special Protection Area (SPA) within 2km of the Scheme corridor. The River Eden SAC traverses the A66 corridor between Brough and Penrith at multiple locations and the North Pennines SPA and SAC covers the A66 carriageway between Bowes and Stainmore. There are 17 Sites of Special Scientific Interest within 2km of the Scheme corridor. There is one Local Nature Reserve within 2km of the Scheme corridor. There are no RSPB Reserves within 2km of the Scheme corridor. There are 42 sites of Ancient Woodland within 2km of the Scheme corridor.
- **Noise & Vibration:** There are 9 NIA's within 600m of the route and 6 along the A66 and A685 corridors. NIA's for roads are where the top 1% of the population that are affected by the highest noise levels are located according to the results of the Defra strategic noise mapping. The population at these locations is likely to be at the greatest risk of experiencing a significant adverse impact to health and quality of life as a result of their exposure to road traffic noise.
- **Road Drainage & Water Environment:** The majority of the Scheme corridor is located within the Flood Zone 1, which indicates a low risk of flooding. However, short sections of the A66 between Brough and Penrith are situated within a mixture of Flood Zones 2/3 indicating a medium/high risk of flooding. The Environment Agency's Risk of Flooding from Surface Water Map shows the majority of the Scheme corridor is at very low and low risk of flooding. However, there are isolated areas, where a medium to high risk of surface water flooding has been identified. The nearest significant watercourses to the Scheme are the River Tees and River Eden (and their associated tributaries), which are classified as Main River. There are also a number of ordinary watercourses which are within/immediately adjacent to the Scheme corridor. There are no Groundwater Source Protection Zones within 2km of the Scheme corridor along the majority of the A66. However, there is a short section of the A66 to the south of Penrith which is situated within Zone 3 of a Source Protection Zone.
- **Peoples & Communities:** There are a number of long distance footpaths and cycle routes within 1.5km of the Scheme corridor, in particular the Pennine National Trail, National Cycle Routes, 68, 70 and 71 and Sustrans Walney to Wear Cycleway Regional Route (20).
- **Geology, Soils & Materials:** There are 13 SSSIs designated for geological or mixed (biological and geological) reasons along the A66 and A685 corridor.

2.7.15 Where appropriate, existing designations have been presented on constraints plan in Appendix 4.

Summary Tables

2.7.16 A summary table outlining the key environmental constraints on a topic by topic basis with a Red/Amber/Green rating is provided in Table 2.55. The methodology and criteria are detailed in **Deliverable 4 – Appraisal Summary Report**.

Table 2-55: A66 Corridor

Technical Topic	Section					
	1 (A66 Scotch Corner to Greta Bridge)	2 (A66 Greta Bridge to Bowes)	3 (A66 Bowes to Brough)	4 (A66 Brough to Temple Sowerby)	5 (A66 Temple Sowerby to Penrith)	6 (A685 Brough to Tebay)
Air Quality						
Cultural Heritage						
Landscape						
Nature Conservation / Biodiversity						
Noise*						
Road Drainage & Water Environment						
Peoples & Communities **						
Geology, Soils & Materials ***						

Red **– avoidance or minimisation of impact is a key consideration in developing potential scheme options.**

Amber **– avoidance or minimisation of impact is an important consideration in developing potential scheme options and all options should be designed to facilitate mitigation where avoidance cannot be achieved.**

Green **– avoidance or minimisation of impact is desirable but is a lesser consideration in development of potential scheme options.**

* Note some NIAs relate to individual properties

** Refers to national trails and national and regional cycle routes

*** Geological SSSIs only.

2.7.17 A list of the 'red' criteria designations are provided in Appendix 4.

Opportunities

2.7.18 There a range of opportunities for environmental improvements and enhancements including:

- Improve existing connections across the trans-Pennine corridors to unlock economic development, provide greater connectivity between and greater access to the countryside.
- Reduce and mitigate noise and air quality pollution experienced at existing receptors both within and outside of the road corridors.
- Enhance and establish habitats to create coherent and resilient ecological networks and preserve, restore and re-create priority habitats to protect and facilitate the recovery of priority species.
- Should archaeological investigations be undertaken, these should involve the community through the provision of leaflets, information panels, public talks or potentially opportunities for involvement in elements of fieldwork. Any findings should be included as areas of open space with permanent displays of information.
- In the event that the land is found to be contaminated, development provides the opportunity to remediate the land.
- Opportunities to improve the existing drainage using modern techniques such as the implementation of Sustainable Drainage Systems (SuDS) and provide greater protection against flooding in extreme events.
- Replacement of existing structures with those more suited to the landscape character of the area and are more sympathetic to the natural and historic environment.
- Improve existing long distance footpaths and national and regional cycling routes through reducing 'disjunctures' and improving connectivity.

2.8 Conclusions Relating to the Current Situation

2.8.1 This section presents the conclusions on the current situation in the A66/A685 and A69 corridors. It considers:

- The strategic, regional and local functions of the corridors.
- The Local Economic Impact Area (LEIA) which the corridors run through.
- The current issues in each corridor.

2.8.2 Each issue is also referenced in Table 2-56 and Table 2-57 (C1, C2 etc) for summary purposes.

Functions of the A66/A685 and A69 Corridors

2.8.3 Both corridors serve two very different functions. On one level the A66/A685 and A69 are both part of the national Primary Route Network (PRN). The second function of the A66/A685 and A69 is that they provide a point of entry to the PRN for the local area. Such journeys could be either local journeys that do not use other parts of the PRN, or longer distance journeys with the ultimate origin/destination beyond the route sections that are the subject of this study. These functions, and the differences between each route, form the context to the understanding of current and future transport-related problems along their routes. In summary:

2.8.4 The **A66** corridor between its junctions with the A1 and M6:

- Acts as a national and regional strategic link for long distance journeys between the south and east of the UK and the north and west of the UK, providing the most direct east west crossing of the Pennines north of the M62.
- Acts as a strategic link for freight movements between the same areas of the UK and between east coast and west coast ports, with commercial vehicle flows greater than 20% of total flows on most sections of the route.

- Links local communities along its route, such as Bowes and Brough, and links these communities with destinations to the east and west of the route, such as Darlington and Penrith.
- Provides links to local and regional tourist destinations.

2.8.5 The **A685** between Tebay and Brough:

- Provides a link for journeys using the A66 and travelling to or from more south westerly destinations via the M6 corridor (although HGVs cannot use the route due to weight restrictions).
- Links local communities such as Kirby Stephen and Brough.

2.8.6 The **A69** corridor between its junctions with the A1 and M6:

- Acts as the major regional road link between Tyne and Wear and North Cumbria/South West Scotland.
- Provides a key link for freight movements between the same areas and between the Tyne ports and the east coast ports.
- Provides links between local communities along its route, such as Haltwhistle and Hexham, and links these communities to destinations to the east and west of the route, such as Newcastle and Carlisle.
- Provides links to local and regional tourist destinations.

Local Economic Impact Area

2.8.7 Analysis of the socio-demographic characteristics of the Local Economic Impact Area (LEIA) served by both routes and compared to national and regional averages, shows:

- Low population density across LEIA, but particularly along the A66 corridor.
- Higher than national average car access and high car mode share for journeys to work (JTW).
- Larger proportion of people within the 65+ years age range.
- Lower than national average unemployment.
- A skills mix similar to national average.

2.8.8 On the basis of most indices the LEIA therefore compares favourably with the surrounding areas and, in some cases, England and Wales as a whole. The one area where this is not the case is for the barriers to services domain within indices of multiple deprivation which measures barriers to key local services, such as a GP surgery, primary school, supermarket and Post Office. This domain shows that much of the LEIA, particularly large areas of the A66 corridor, is ranked in the top 5% most deprived in England. Although ultimately this high deprivation score is simply a reflection of the rural nature of the LEIA, it does show the reliance of the local population on highway links to services in both corridors.

2.8.9 So both routes play a fundamental role in linking local communities with destinations either end of the corridors, both in terms of access to services and employment opportunities. The A69, in particular between Hexham and Newcastle and Brampton and Carlisle, is a vital commuter link for local residents.

2.8.10 So common to both routes a key conclusion is that:

- People living in the Local Economic Impact Area (LEIA) are reliant on good transport links to a range of key services, such as GP surgery, schools, supermarket and Post Office, as these services are not always available locally, and access to employment opportunities **(C1)**.

Current Issues in the A66/A685 Corridor

2.8.11 Current issues in the A66/A685 corridor can be considered both in terms of issues applicable to the whole route and those related to specific sections of the route. These are described below and summarised in Table 2-55.

2.8.12 The A66 is a vital strategic route, providing the most direct link between the north-south corridors of the A1 and M6, north of the M62. Although it provides this function, through a direct connection between the A1 at Scotch Corner and the M6 at Penrith (with a section length of approximately 56 miles), it includes an inconsistent mix of single and dual carriageway sections of road. The A685 between A66 Brough and the M6 Tebay is almost entirely single carriageway.

2.8.13 This mix of dual and single carriageway standards on the A66 does not provide the standard of link required for a national and regional strategic route, and leads to a range of issues, particularly:

- The unreliability of journey times, due to the impact of slow-moving vehicles on single carriageway sections of the route (C2).
- Journey uncertainty, due to the impact of incidents on single carriageway sections making it more difficult to keep the route wholly open (C3).

2.8.14 Further general issues are that:

- There are frequent road closures on the A66, particularly between Scotch Corner and Great Bridge (Section 9) and between Brough and Bowes (Section 7). Many of these are due to planned road-works but there are still incidences of closures due to bad weather **(C4)**.
- Although the A66 is a particularly important strategic route for freight traffic, journey unreliability (C2/C3) does not meet the requirements of an efficient freight industry, causing poor service delivery, unproductivity and higher transport costs **(C5)**.
- The lack of real time journey information also exacerbates the journey uncertainty and unreliability issues and prevents better journey planning **(C6)**.
- In the event of incidents, diversionary routes are poor, particularly for HGVs. Generally closure of the A66 means northbound/westbound/eastbound trips need to use the A1 and the A69, involving much longer journeys over poorer standard routes, and southbound trips need to use the M62 **(C7)**.
- The public transport alternative to the road link is poor. There is no rail line to provide an alternative public transport route to the A66 between Darlington and Penrith and there is low bus service provision **(C8)**.
- There are also major environmental constraints in the corridor, including Special Areas of Conservation, SSSIs and 21 Noise Important Areas along the A66 and A685 corridors **(C9)**.

2.8.15 In addition to these general route issues the observed key issues related to specific sections of the A66/A685 corridor are:

- Section 5 (Penrith to Temple Sowerby) - a pinch point at the junction of the A66/A6 which can cause delays **(C10)**.
- Section 6 (Temple Sowerby to Brough)- unreliability of journey times with delays at the junction in Kirby Thore due to turning traffic and the community impact at Kirby Thore where the route runs through part of the village **(C11)**.
- Section 7 (Brough to Bowes) – highest point of the route where weather can have an impact and cause road closures **(C12)**.
- Section 8 (Bowes to Greta Bridge) – two sections of single carriageway and one section of dual in this section which is the second most unreliable section of the study corridors in terms of journey times **(C13)**.

- Section 9 (Greta Bridge to Scotch Corner) – collision rates on the single carriageway section which are higher than the national average **(C14)**.
- Section 10 (A685 Brough to Tebay) – weight and height restrictions on use of the route by HGVs **(C15)**.

2.8.16 Table 2-55 summarises these issues.

Table 2-56: Summary of Issues in the A66/A685 Corridor

Route Section	Route No.	Underlying Issues/Problems	Current Situation Issue
ALL A66/A685 SECTIONS	A66	Access to services for people living in the LEIA and commuter links Unreliability of journey times Journey uncertainty due to impact of incidents Frequency and impact of road closures Poor diversionary routes, particularly for HGVs Unreliable strategic route for freight traffic Lack of real time journey information Lack of rail line to provide alternative transport link to road Major environmental constraints	C1 C2 C3 C4 C5 C6 C7 C8 C9
Section 5 Penrith-Temple Sowerby	A66	Pinch point at A66/M6 junction at Penrith	C10
Section 6 Temple Sowerby-Brough	A66	Impact of junction at Kirby Thore on journey times (plus 40mph speed limit) Community impact at Kirby Thore	C11
Section 7 Brough-Bowes	A66	Impact of weather at highest point of the route	C12
Section 8 Bowes-Greta Bridge	A66	Mix of carriageway standards 2nd most unreliable section for traffic speeds/journey times	C13
Section 9 Greta Bridge-Scotch Corner	A66	Higher than national average for collisions in the single carriageway section	C14
Section 10 Tebay-Brough	A685	Restrictions on HGVs use	C15

Current Issues Specific to the A69 Corridor

2.8.17 The A69 corridor provides a direct connection between the A1 at Newcastle upon Tyne and the M6 at Carlisle (with a section length of approximately 52 miles). It is entirely dual carriageway for the

easternmost 19 mile section between Newcastle upon Tyne and Hexham. The westernmost 33 mile section between Hexham and Carlisle is single carriageway, with the exception of a short stretch of dual carriageway at the junction interface with B630 (Greenhead) and on the approach to the grade-separated roundabout junction with the M6.

2.8.18 This long section of single carriageway leads to issues similar to those experienced on the A66, particularly:

- The unreliability of journey times, particularly due to the impact of slow-moving vehicles on single carriageway sections of the route **(C2)**.
- Journey uncertainty, due to the impact of incidents on single carriageway sections making it more difficult to keep the route wholly open **(C3)**.

2.8.19 Further general issues are that:

- The lack of real time journey information also exacerbates the journey uncertainty and unreliability issues and prevents better journey planning **(C6)**.
- In the event of incidents, diversionary routes are poor, particularly for HGVs **(C7)**.
- Although there is an alternative rail service, current journey times are long and the service is infrequent **(C8).**
- Major environmental constraints in the corridor, including frontiers of the Hadrian's Wall World Heritage Site and the presence of the North Pennines Area of Outstanding Natural Beauty, Northumberland National Park and Northumberland Dark Sky Park all situated within 2km of the scheme corridor **(C9)**.

2.8.20 In addition to the common issues, the observed key issues specific to the A69 corridor are:

- Section 1 (Carlisle to Brampton) - comparatively low average traffic speeds; pinch point and community impact at Warwick Bridge; incident rates higher than the national average **(C16)**.
- Section 2 (Brampton to Haltwhistle) – pinch point at Low Row due to east-west incline and lack of overtaking opportunities **(C17)**.
- Section 3 (Haltwhistle to Hexham) – poor A69/A6351 junction where there is traffic turning right across both carriageways **(C18)**.
- Section 4 (Hexham to Newcastle) – although all dual carriageway this is the most unreliable section of both routes in terms of journey times but there are 2 roundabouts and the major A69/A1 junction in this section and it is a major commuter link in the peak periods **(C19)**.

2.8.21 Table 2-56 summarises these issues.

Table 2-57: Summary of Issues in the A69 Corridor

Route Section	Route No.	Underlying Issues/Problems	Current Situation Issue
ALL A69 SECTIONS	A69	Access to services for people living in the LEIA and commuter links Unreliability of journey times Impact of incidents/closures Poor diversionary routes Lack of real time journey information Slow rail journey times Major environmental constraints	C1 C2 C3 C6 C7 C8 C9
Section 1 Carlisle-Brampton	A69	Low average traffic speeds Pinch point and community impact at Warwick Bridge (30mph speed limit) Incident rate higher than the national average	C16
Section 2 Brampton-Haltwhistle	A69	Pinch point/incline at Low Row – lack of overtaking opportunities	C17
Section 3 Haltwhistle-Hexham	A69	Poor junction at A69/B6531	C18
Section 4 Hexham-Newcastle	A69	Most unreliable section in terms of journey times/speeds	C19

3 Future Situation

3.1 Chapter Objectives and Structure

3.1.1 This section of the NTPR study establishes the future situation with regards to the operation of the A69 and A66/A685 corridors and provides a detailed insight into:

- Socio-economic Context
- Transport Context

3.1.2 For the purpose of this study a future assessment year of 2030 has been adopted. This ensures that any recommendations made within the NTPR study are developed in the context of a 15 year design horizon, which is broadly consistent with the majority of current Local Authority and Local Enterprise Partnership growth aspirations (i.e. Local Plans, Local Development Frameworks, Core Strategies, Growth Deal frameworks, etc).

3.2 Socio-Economic Context

3.2.1 This section provides an insight into the future socio-economic context associated with operational conditions on the A69 and A66/A685 corridors.

Development Plans

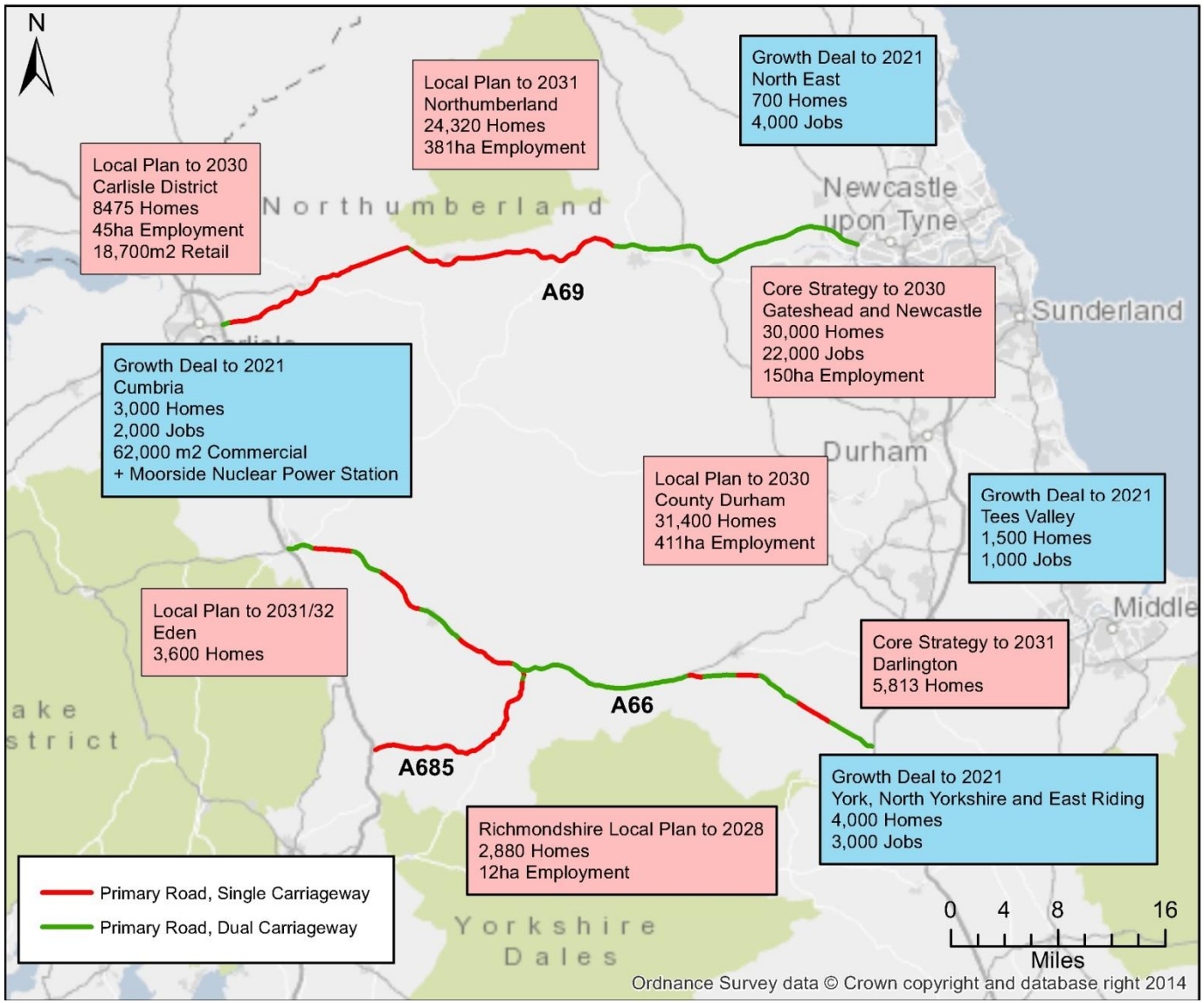
3.2.2 In order to understand the future socio-economic context with regards the proposed delivery of growth aspirations within the study area, a review of the various Local Enterprise Partnership (LEP) published Growth Deals and Local Plan documents has been conducted.

3.2.3 As discussed in Section 2 of this NTPR study the projected development forecasts between 2015/15-2031/32 from the following plans have been studied:

- Growth Deals
  - North East Growth Deal
  - Tees Valley Growth Deal
  - York, North Yorkshire and East Riding Growth Deal
  - Cumbria Growth Deal
- Local Plans
  - Northumberland Local Plan: Core Strategy Pre-Submission Draft
  - Core Strategy/Urban Core Plan for Gateshead and Newcastle upon Tyne 2010-2030
  - Durham Local Plan
  - Darlington Local Development Framework: Core Strategy
  - Proposed Carlisle District Local Plan 2015-2030
  - Eden Local Plan: Preferred Options Consultation 2014-2032

3.2.4 Figure 3-1 illustrates the volume of residential and commercial development which is anticipated to have been delivered across the study area prior to the future design year of 2030.

Figure 3-1: Growth Deal and Local Plan Development Forecasts to 2031/2032



3.2.5 Table 3-1 provides details of the anticipated number of new homes and jobs, which will be associated with growth aspirations in the study area prior to 2031/32.

Table 3-1: Growth Deal and Local Plan Development Forecasts to 2031/2032

Document	Homes	Jobs
North East Growth Deal	700	4,000
Tees Valley Growth Deal	1,500	1,000
York, North Yorkshire and East Riding Growth Deal	4,000	3,000
Cumbria Growth Deal	3,000	2,000
Northumberland Local Plan: Core Strategy Pre-Submission Draft	24,320	-
Core Strategy/Urban Core Plan for Gateshead and Newcastle upon Tyne	30,000	22,000
Durham Local Plan	31,400	22,000
Darlington Local Development Framework: Core Strategy	5,813	-
Proposed Carlisle District Local Plan	8,475	-
Eden Local Plan: Preferred Options Consultation	3,000	-
Total	**112,208**	**54,000**

3.2.6 The information presented above demonstrates that Local Authority forecasts have estimated that in excess of 112,000 new homes and 54,000 additional jobs will be required across the study area by 2030 in order to cater for regional demand. It is anticipated that this development will contribute to strain on the local and strategic highway network, in addition to that which will be experienced as a result of background traffic growth.

3.2.7 Based upon the information provided above, it is anticipated that the northeast of England will experience more intensified growth levels than the northwest, with regards housing and employment.

3.2.8 Major development plans for the Moorside Nuclear Power Station near Sellafield is anticipated to create a significant number of additional jobs in Cumbria, which could result in an increase in local trips associated with the A66 corridor (although it is likely to predominantly impact the network west of the M6).

Future Socio-Economic Context – Key Points
The Local Enterprise Partnership (LEP) Growth Deals and Local Plans produced by the Local Authorities estimate in excess of 112,000 new homes and 54,000 additional jobs will be produced by 2030 in order to cater for regional demand. **Very little of this growth will be within the Local Economic Impact Area (LEIA) although additional employment opportunities either end of the A66/A685 and A69 corridors is likely to increase traffic flows on the routes.**

3.3 Transport Context

3.3.1 This section provides an insight into the future transport context associated with operational conditions on the A69 and A66/A685 corridors. The specific details are presented in accordance with the following structure:

- Future Highway Schemes
- Forecast Traffic Demand
- Future Public Transport Schemes
- Future Port and Airport Schemes
- Future Freight Schemes
- Forecast Freight Demand

Future Highway Schemes

3.3.2 In order to establish the future situation with regards the transport context on the A69 and A66/A685 corridors, a strategic overview of future highway schemes on or adjacent to these routes has been prepared, which reviews:

- A66/A685 Improvement Schemes
- A69 Improvement Schemes
- Highways England – Road Investment Strategy
- The Northern Powerhouse: One Agenda, One Economy, One North
- Transport for the North – Road Studies

A66/A685 and A69 Improvement Schemes

3.3.3 In June 2015 a programme of works commenced on the A66 in order to provide drivers with smoother and safer journeys. The improvement scheme was scheduled to be conducted in phases (between June and December 2015) at a total cost of £5m and includes:

- Resurfacing of the carriageway pavement.
- Replacement of white lining.
- Replacement of road markings.
- Replacement of road studs.

3.3.4 The first phase of the improvement scheme (between June and September) began at the Cumbrian border and consists of white lining improvements on the whole length of the A66, with night closures required on certain sections of the corridor between 20:00-06:00 throughout the duration of the works.

3.3.5 The proposals also include improvements to the Melsonby crossroads junction and carrying out maintenance work which will also improve the road for motorists later in the scheme.

3.3.6 Although outside of the study area, a further programme of works commenced on the A66 between Penrith and Keswick to improve safety through the provision of various junction improvements. The scheme was scheduled to be conducted prior to December 2015 at a total cost of £815,000 and includes:

- Junction widening to provide right turn holding lanes at various priority junctions.
- Resurfacing of the carriageway pavement.
- Drainage improvements.

3.3.7 There has been no recent or currently committed highway improvement schemes associated with the A685 or the A69 corridors within the study area.

Highways England - Road Investment Strategy

3.3.8 In December 2014 the Department for Transport (DfT) published the Road Investment Strategy (RIS) which sets out a list of improvement schemes that will be developed by Highways England over the period 2015-2020 and restates a previous commitment to spend £6 billion to resurface around 80% of the network.

3.3.9 The requirement for an NTPR study was set out in the RIS, in addition to defining a long-term investment programme for the strategic road network (SRN), with a package of committed funding available to provide:

- A long-term vision for the strategic road network, outlining how Highways England will create smooth, smart and sustainable roads.
- A multi-year investment plan that will be used to improve the network and create better roads for users.
- High-level objectives for the first roads period 2015 to 2020.

3.3.10 Over the course of the following five years the RIS programme will:

- See £15.2 billion invested in over 100 major schemes to enhance, renew and improve the network.
- Help prevent over 2,500 deaths or serious injuries on the network.
- Build over 1,300 additional lane miles.
- Improve 200 sections of the network for cyclists.
- Benefit up to 250,000 people by reducing the noise impact of the strategic road network.

3.3.11 Possible solutions to schemes named in the RIS were identified through the route strategies process, led by Highways England, which collated evidence relating to SRN performance issues. The work-stream also engaged local stakeholders with regards to existing issues and the potential range of options or solutions available.

3.3.12 Within the RIS programme for Road Period 1 (between 2015 and 2020) no schemes have been nominated for implementation to the west (Area 13), however, twelve schemes have been developed for implementation to the east (Area 14). Further details of the committed schemes are set out at Table 3-2.

Table 3-2: Road Investment Strategy – Proposed Schemes for Area 14

Area	Scheme Name	Scheme Description	Expected Start Date
14	A1 Dishforth to Leeming	A1: Jn 49 (Dishforth) to Jn 51 (Leeming): upgrading to three lane motorway standard the strategic M1/A1(M) route between London and Newcastle	Completed
14	A1 Coal House to Metro Centre	A1: Jn 67 (Coal House) to Jn 71 (Metro Centre): increasing lane capacity from two to three lanes in each direction within the highway boundary; creating parallel link roads between the Lobley Hill and Gateshead Quay junctions	Current

Area	Scheme Name	Scheme Description	Expected Start Date
14	A1 Leeming to Barton	A1: Jn 51 (Leeming) to Jn 56 (Barton): upgrading to three lane motorway standard completing the remaining non motorway section on the strategic M1/A1(M) route between London and Newcastle	Current
14	A19 Coast Road	A19: (A1058 junction): upgrading the existing grade separated roundabout to a three level interchange to increase capacity and improve safety; together with the A19 Testos, raises the A19 to Expressway standard from Yorkshire to north of Newcastle	Early Road Period 1
14	A19 Testos	A19: junction with the A184: a grade separated junction providing free flowing access to the southern side of the Tyne Tunnel; together with the A19 Coast Road scheme this will raise the A19 to Expressway standard from Yorkshire to the north of Newcastle	Early Road Period 1
14	A19 Down Hill Lane junction improvement	A19: junction with the A1290: provision of a replacement junction at Downhill Lane to improve capacity and unlock development near the Nissan Factory, including the proposed International Advanced Manufacturing Park	Late Road Period 1
14	A19 Norton to Wynyard	A19: Norton to Wynyard: widening the Billingham bypass to dual three lanes; replacing the concrete surface with low-noise surfacing	Late Road Period 1
14	A1 & A19 Technology enhancements	A1(M) and A19: new technology at motorway standard; includes detection loops, CCTV cameras and Variable Message Signs to provide better information for drivers and active traffic management across Tyne and Wear	Late Road Period 1
14	A1 North of Ellingham	A1 North of Ellingham: measures to enhance the performance and safety of the A1 north of Ellingham to include: three sections of climbing lanes, five junctions with improved right turn refuges, and better crossing facilities for pedestrians and cyclists	Late Road Period 1
14	A1 Morpeth to Ellingham dualling	A1 Morpeth to Ellingham: upgrading to dual carriageway to provide continuous high quality dual carriageway from Newcastle to Alnwick	Late Road Period 1
14	A1 Scotswood to North Brunton	A1 Jn 74 (Scotshead) to Jn 79 (North Brunton): narrow lane widening to allow dual three lane through the junctions with dual four lane between some junctions	Late Road Period 1
14	A1 Birtley to Coal House widening	A1 Jn 65 (Birtley) to Jn 67 (Coalhouse): widening to provide dual three lanes, alongside the replacement of the Allerdene Bridge	Late Road Period 1

3.3.13 The two schemes to upgrade the A1 between Dishforth (J49) and Barton (J56) will ensure that the M1/A1(M) provides a continuous motorway standard strategic route between London and Newcastle. This will facilitate improved connections between north and south, in addition to enabling local development potential such as the new £25 million town centre at Catterick Garrison.

3.3.14 Of the schemes discussed previously, the A1 Dishforth to Leeming (completed between Spring 2009 and Summer 2012 at a budgeted cost of £318 million) and A1 Leeming to Barton (programmed for delivery between Spring 2014 and Summer 2017 at a budgeted cost of £380 million) are expected to have the largest impact upon the A66 corridor, although the majority of trips facilitated by these improvement measures will primarily affect the A1(M).

The Northern Powerhouse: One Agenda, One Economy, One North

3.3.15 The Northern Powerhouse: One Agenda, One Economy, One North – A Report on the Northern Transport Strategy was published in March 2015 by the Government, Northern City regions and Local Enterprise Partnerships (LEPs) working with Highways England, Network Rail and HS2 Ltd (as the Transport for the North Partnership Board).

3.3.16 The Strategy Report sets out various travel plans for rail, highways, freight and logistics, integrated and smart travel, airport and local connectivity. Each plan highlights a travel vision for the future and explains how it will be delivered.

3.3.17 With specific regard to its highways strategy, the report highlights how transport will aid changes in future patterns of land use and economic growth, with the following key deliverables:

- Enhance the performance of the North's Strategic Road Network (SRN) through delivery of the committed first phase of the Roads Investment Strategy.
- Further enhance the long-term performance of the Northern SRN through a clear vision and strategy that embraces transformational investment and technology.

3.3.18 The highways plan sets out a number of key issues such as:

- The number, capacity and reliability of east-west road connections is seen as a constraint on the Northern economy.
- There are areas of very high congestion on the road network, with high demand for freight from the Northern ports.
- The responsibility for roads is divided between different organisations at different geographical levels.

3.3.19 The plan vision is defined by the following aspirations:

- Develop a core free-flow network with 'mile a minute' journeys increasingly typical on expressways and motorways in the North of England.
- Improve the east-west major road links to ensure better and more reliable journey times between the major cities within the North.
- Expand the capacity on north-south major road links through the North to improve journey times and reliability.
- Ensure for effective road connections to the country's major ports in the North of England.
- Future-proof the Northern road network so that it can support the next generation of low emission vehicles.
- Future roads investment in enhancements, maintenance and renewals is better planned between the different organisations.

3.3.20 With specific regard to major road improvements to dramatically improve east-west connectivity (which could have transformative impacts on the Northern economy) the aims of the plan are to:

- Explore a major new road link under the Pennines between Sheffield and Manchester to take HGV and other traffic out of the Peak District National Park and protect natural heritage. This would complete a 'triangle' of major road links between Sheffield, Leeds and Manchester, creating a second major east-west expressway connection in the North of England to support the M62 and provide relief to the A628.

- Explore options to significantly upgrade the A66 from Scotch Corner to Penrith, connecting the M6 in the west to the A1 in the east, creating a third major east-west strategic connection in the North of England to support the M62.
- Exploring options to significantly upgrade the A69 from Newcastle to Carlisle, connecting the M6 in the west to the A1 in the east, creating a fourth major east-west strategic connection in the North of England to support the M62.

Transport for the North – Road Studies

3.3.21 Through The Northern Powerhouse: One Agenda, One Economy, One North report, Transport for the North established a strategic plan and aspirations to facilitate long-term transformational changes to connectivity between the city regions of Leeds, Liverpool, Manchester, Newcastle and Sheffield. It has subsequently identified a series of priorities for 2015/16 relating to rail, road, freight, integrated smart travel, strategy, city connectivity and governance.

3.3.22 With specific regard to its road strategy, Transport for the North has commissioned studies to investigate strategic road improvements including:

- Trans-Pennine Tunnel Study between Manchester and Sheffield.
- Northern Trans-Pennine Routes Strategic Study of the A69 and A66/A685 corridors.
- M60 North West Quadrant Study.
- Input into the development of the Road Investment Strategy 2 (RIS2) through Highways England's Joint Strategic Economic Growth Plan (2016) and Road Period 2 Route Strategy updates (2017).

Forecast Traffic Demand

3.3.23 In order to establish the future situation on the A69 and A66/A685 corridors, TEMPRO has been interrogated to establish the background traffic growth which has been forecast will occur in the north of England between 2014 and 2030. Average weekday growth factors have been established for rural trunk roads as per the data presented at Table 3-3.

Table 3-3: TEMPRO Growth Factors for the A66/A685 and A69 Corridors (2014-2030)

Route	Level	Area	Local Growth Factor	Percentage Increase
A66	Authority	Teesdale	1.1933	19.33%
A69	Authority	Tynedale	1.1498	14.98%
A69	Authority	Newcastle upon Tyne	1.2260	22.60%
A69	Authority	Carlisle	1.2450	24.50%
A66	Authority	Eden	1.2213	22.13%
A66	Authority	Richmondshire	1.3831	38.31%

3.3.24 The growth forecasts presented above have been applied to the traffic flow profiles presented in Section 2 of this NTPR study to present the future scenario with regards the operational performance of the Strategic Road Network within the study area.

3.3.25 Figure 3-2 and Figure 3-3 provide flow diagrams which detail the two-way total traffic flow forecast for 2030, during the AM and PM peak periods respectively, for the ten study area sections which were identified previously.

Figure 3-2: Average Traffic Flows on the A69 and A66/A685 Corridors - AM Peak Period (2030)

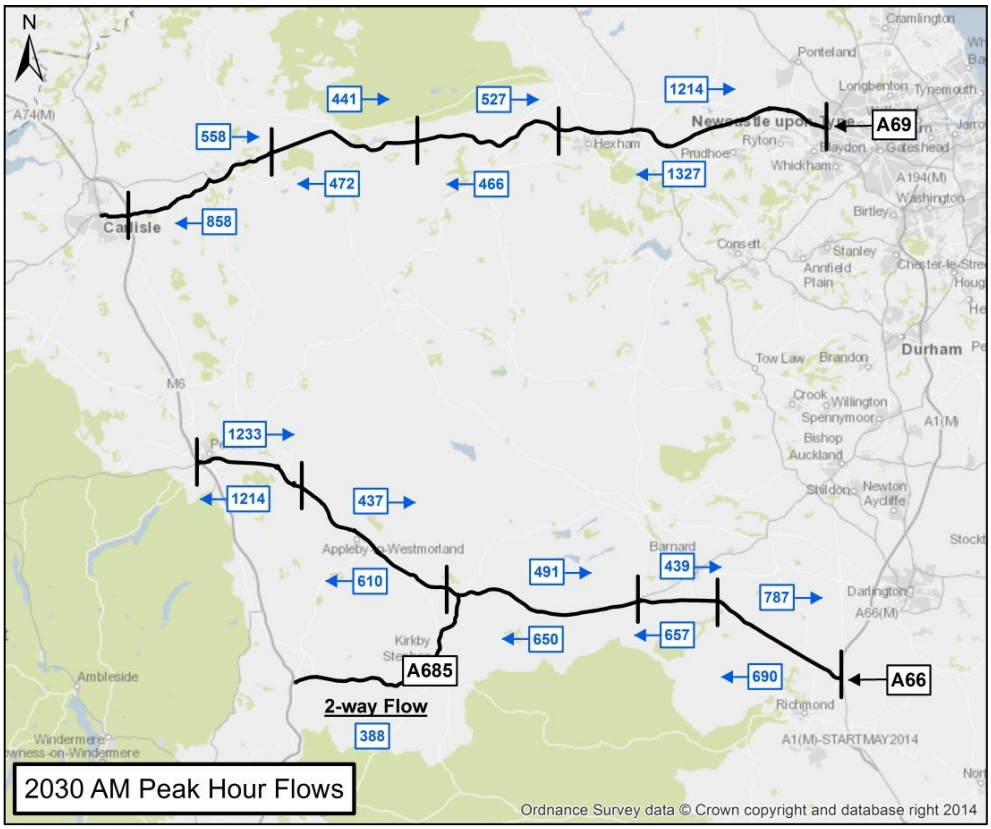
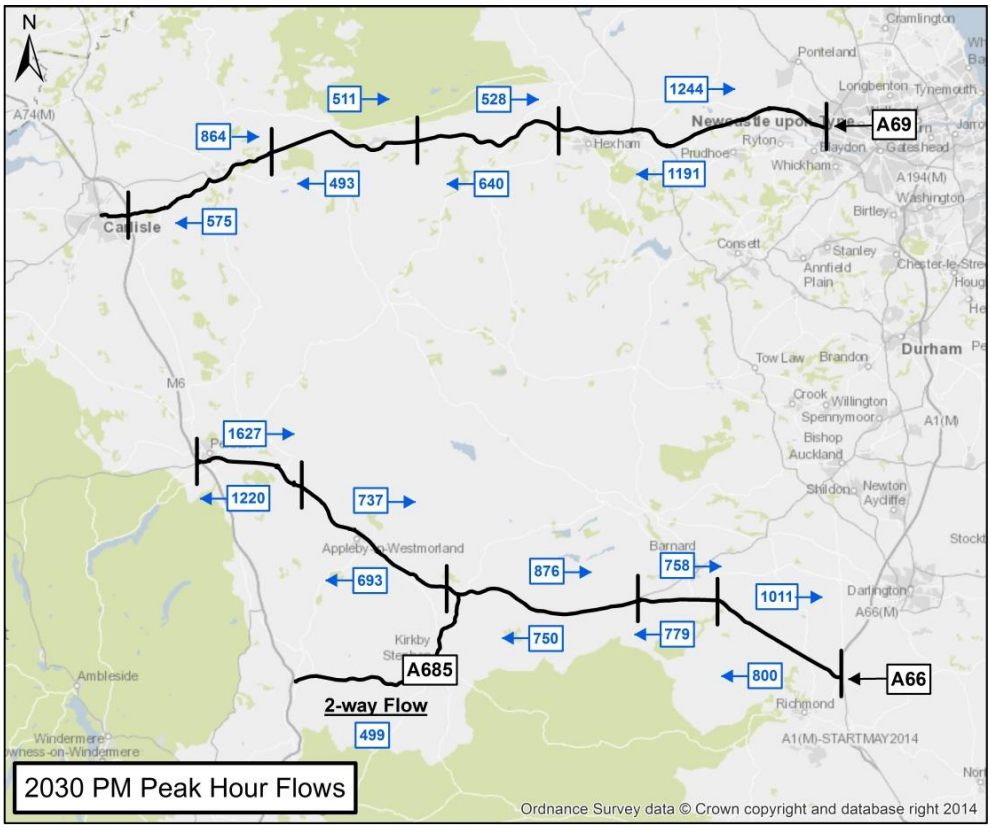


Figure 3-3: Average Traffic Flows on the A69 and A66/A685 Corridors - PM Peak Period (2030)



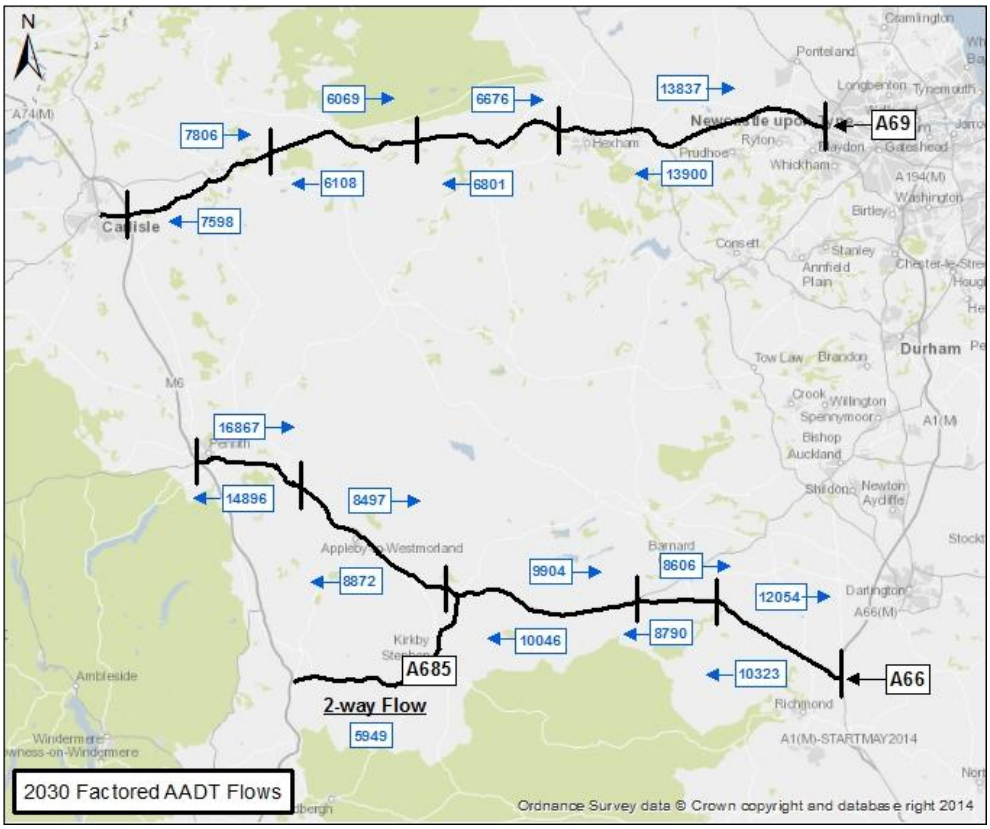
3.3.26 The information presented above demonstrates that the A69 corridor is forecast to experience two-way traffic flows in the region of 2,541 trips during the AM peak period and 2,435 trips during the PM peak period between the A1 at Newcastle upon Tyne and the A68 at Corbridge. To the west, two-way traffic flows between the A68 and M6 at Carlisle are anticipated to be between 913 - 1,416 during the AM peak period and 1,004 - 1,439 during the PM peak period.

3.3.27 The A66 corridor is forecast to experience two-way traffic flows in the region of 2,447 trips during the AM peak period and 2,847 trips during the PM peak period between the M6 and A6 adjacent to Penrith. To the east, two-way traffic flows between the A6 and the A1 at Scotch Corner are anticipated to be between 1,047 - 1,477 during the AM peak period and 1,430 - 1,811 during the PM peak period.

3.3.28 The A685 corridor is forecast to experience two-way traffic flows in the region of 388 trips during the AM peak period and in 499 trips during the PM peak period between the A66 at Brough and the M6 at Tebay.

3.3.29 In order to forecast the quantum of traffic which may use the A69 and A66/A685 corridors on a typical day in 2030, the growth factors have also been applied to the annual average daily traffic (AADT) presented previously. Figure 3-4 illustrates the total quantum of traffic anticipated to use these routes to travel from east to west during the study period.

Figure 3-4: Total Traffic Flow on the A69 and A66/A685 Corridors - AADT (2030)



3.3.30 The information presented above demonstrates that the A69 corridor will experience two-way traffic flows in the region of 27,737 trips per day between the A1 at Newcastle upon Tyne and the A68 at Corbridge. To the west, two-way traffic flows between the A68 and M6 at Carlisle will typically be around 12,177 - 15,404 per day.

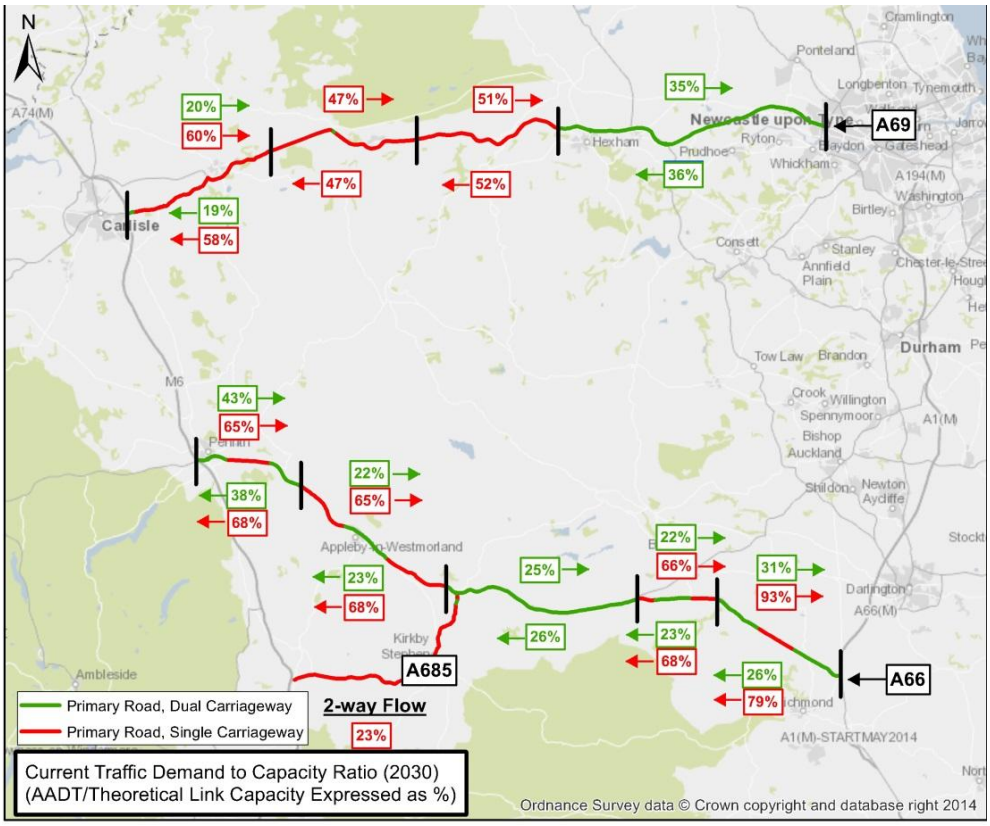
3.3.31 The A66 corridor will experience two-way traffic flows in the region of 31,763 trips per day between the M6 and A6 adjacent to Penrith. To the east, two-way traffic flows between the A6 and the A1 at Scotch Corner will typically be around 17,369 - 22,377 per day.

3.3.32 The A685 corridor is forecast to experience two-way traffic flows in the region of 5,949 trips per day between the A66 at Brough and the M6 at Tebay.

3.3.33 In order to demonstrate how the future traffic demand profile relates to the theoretical link capacity of the A69 and A66/A685 corridors, the recommended maximum flows associated with urban all-purpose roads (as presented in Section 2 of this report) have once again been studied.

3.3.34 Figure 3-5 illustrates how the future traffic demand forecast on each section of road within the study area, relates to the theoretical link capacity provided within the Design Manual for Roads and Bridges: Volume 1, Section 5, Part 3 – TA 46/97.

Figure 3-5: Traffic Demand (AADT) Expressed as a Percentage of the Theoretical Link Capacity (2030)



3.3.35 It is evident from the information presented above that the routes under consideration are forecast to continue operating within their theoretical link capacities, with the following data observed:

- A69 will operate at around 47-60% of the theoretical capacity of single carriageway sections and 19–36% of the theoretical capacity of dual carriageway sections of road.
- A66 will operate at around 65-93% of the theoretical capacity of single carriageway sections and 22-43% of the theoretical capacity of dual carriageway sections of road.
- A685 will operate at around 23% of the theoretical capacity of single carriageway sections of road.

3.3.36 It is evident from the figures presented above that the single carriageway sections of the A66 corridor are generally forecast to operate below 70% of the theoretical link capacity associated with urban all-purpose roads. The traffic flows associated with the single carriageway section of road between Greta

Bridge and Scotch Corner are, however, anticipated to operate at around 79-93% of the theoretical link capacity by 2030.

3.3.37 The single carriageway sections of the A685 and A69 corridors are generally forecast to operate below 23% and 60% (respectively) of their theoretical link capacities by 2030.

Future Socio-Economic Context – Key Points
Except for minor works there are no highway improvement schemes committed to the A66/A685 and A69 corridors.
Within the Road Investment Strategy (RIS) for Road Period 1 (2015 to 2020) there are 12 proposed major highway schemes to the east of the study area but none to the west.
The Northern Powerhouse: One Agenda, One Economy, One North sees the number, capacity and reliability of east-west road connections as a constraint on the growth of the North of England economy.
The completion of the upgrade of the A1 to 3 lanes carriageway standard between Leeming and Barton by 2017 will make the A1/A66 route even more attractive as a strategic route.
Forecast traffic flows show that, given current traffic forecasts, all links will still be operating within capacity by 2030.

Future Public Transport Schemes

3.3.38 In order to establish the future situation with regards the transport context on the A69 and A66/A685 corridors, a strategic overview of future public transport schemes within the study area has been prepared, which reviews:

- The Northern Powerhouse: One Agenda, One Economy, One North.
- Transport for the North – Rail Study.
- TransPennine Express Improvements

<u>The Northern Powerhouse: One Agenda, One Economy, One North</u>

3.3.39 Transport for the North's rail strategy highlights how transport will aid changes in future patterns of land use and economic growth, with the following key deliverables:

- Transform city to city rail connectivity east/west and north/south through both HS2 and a new TransNorth system, radically reducing travel times across this intercity network.
- Ensure there is the capacity that a resurgent North will need in rail commuter services.
- Deliver the full HS2 'Y' network as soon as possible, including consideration of accelerating construction of Leeds-Sheffield.
- Pursue better connections to Manchester Airport through TransNorth, whilst city regions consider connectivity to the North's other major airports.
- Develop integrated and smart ticket structures to support our vision of a single economy across the North.

3.3.40 The rail plan sets out a number of key issues such as:

- Many rail journeys in the North –particularly east-west – are too slow.
- There is unacceptable overcrowding on some rail services in the North of England.
- This is compounded by the infrequency of some services.
- The quality of some of the rolling stock in the north of England is very poor.

- The rail connections north and south to the rest of the country are too slow and increasingly crowded at peak times.

3.3.41 The plan vision is defined by the following aspirations:

- TransNorth is designed to radically improve journey times and frequencies between major cities to support a single economy through major investment in rail infrastructure.

3.3.42 With specific regard to this NTPR study the aims of the plan are to:

- To take forward HS2 and commit to developing options ahead of the rail Control Period 6 (2019-24) TransNorth improvements to rail services right across the North: Trans-Pennine links.
- In addition to the above, to explore the option to create a new rail route across the Pennines from Manchester, linking into HS2 between Sheffield and Leeds and so providing a new high speed alignment linking all three cities. Also to be explored as part of the existing Highways England study on a trans Pennine road tunnel, the option and synergies of creating a new rail alignment between Manchester and Sheffield along a similar route.
- It will be critical to ensure the HS2 and TransNorth plans have a clear vision for how to deliver a properly integrated network and to develop rail stations and the areas around them.

Transport for the North – Rail Studies

3.3.43 With specific regard to its rail strategy, Transport for the North has commissioned studies to investigate potential new TransNorth routes including:

- Consideration of new 'central' routes to connect Manchester with Leeds/Sheffield.
- New routes on the Liverpool-Manchester/Manchester Airport, Manchester-Leeds and Manchester-Sheffield corridors.
- New routes for the Leeds/Sheffield-Hull and Leeds-ECML/Newcastle corridors.
- Input into the rail industry capital plan (CP6: 2019-2024) through the Initial Industry Plan (September 2016) and HLOS (July 2017).
- Examine the TfN/HS2 'touch points' to input into the Higgins HS2 Route and Station Interim Report and the Secretary of State's Formal Route Decision.

TransPennine Express Improvements

3.3.44 From April 2016 a new TransPennine Express franchise will begin, which is provisionally programmed to run for seven years (with the possibility of a two year extension). This franchise will see the introduction of:

- An additional 9,000 seats (66% extra peak period capacity) on services into major cities by 2019.
- Additional services during the week and on weekends.
- Over 500 new-build carriages including 125mph intercity bi-mode (electric/diesel) trains operating on the route.
- Local SMART ticketing schemes.
- Real-time passenger information screens on all trains by 2020.
- Station improvements, with over £30 million of investment throughout the region.
- A new Northern Connect service.
- Increased support and funding for Community Rail.

Future Public Transport Context – Key Points
The new TransPennine rail franchise (2016) includes improvements to service capacity, journey times and frequency on the Newcastle to Carlisle line.
The Northern Powerhouse Agenda sees rail as a key contributor to city to city connectivity, although there are currently no specific plans for improved rail links which directly impact on the study area.

Future Freight Schemes

The Northern Powerhouse: One Agenda, One Economy, One North

3.3.45 Transport for the North's freight strategy highlights how transport will aid changes in future patterns of land use and economic growth, with the following key deliverables:

- Set out a clearly prioritised multimodal freight strategy for the North to support trade and freight movement within the North and to national/international markets.

3.3.46 The freight and logistics plan sets out a number of key issues such as:

- There has never been a single plan for freight and logistics across the North, meaning that there has been a lack of cohesion in developing approaches across modes and the whole network.
- The rise of port-centric warehousing and the increasing proportion of all freight traffic arriving in Northern ports means that the centre of gravity of the UK's freight and logistics industry is in the North, according to analysis of official data undertaken for Transport for the North. Responding to and facilitating this requires investment in the North's transport networks now.
- As the North grows, so must its distribution networks. Current capacity will not meet future demand for effective freight movement.

3.3.47 The plan vision is defined by the following aspirations:

- A single plan for the needs of freight and logistics in the future.
- Deliver a transport network that supports the growth of the Northern economy.
- Recognise Northern ports investment to ensure the delivery of port infrastructure that meets the future needs of the shipping industry.

3.3.48 With specific regard to this NTPR study the aims of the plan are to:

- Take action now to ensure the North's road network supports the effective movement of freight. Study options to dual the A66 or the A69 in the Northern Pennines. These routes would provide vital additional east-west road capacity and would significantly enhance the resilience of the network by providing a reasonable diversionary route for the M62.
- Take action now to ensure the rail network supports the effective distribution of freight, north-south and east-west. Transport for the North to work with Northern Ports to ensure that their expansion plans are accounted for when developing the wider distribution network.
- Produce a Northern multi-modal freight and logistics strategy to inform future development of transport investment plans.

Transport for the North – Freight and Logistics Studies

3.3.49 With specific regard to its freight strategy, Transport for the North has commissioned a Freight and Logistics Study across the north to:

- Establish the baseline position with regards freight movements by all modes of travel, including road, rail, air and water.
- Identify and model potential infrastructure requirements for the network, including complementary rail and road work-streams as appropriate.

- Inform the development of national freight and logistics policy, strategy, etc.

Forecast Freight Demand

3.3.50 As discussed in Section 2 of this NTPR study, MDS Transmodal has been commissioned to prepare a Freight and Logistics Study, which analyses the likely impact of delivering a Trans-Pennine tunnel in terms of HGV routing, with provision of an estimate of potential benefits which may be offered to users.

3.3.51 The study has forecast that by 2033 there will be an estimated 3,394,664 commercial trips per year, which would be likely to use a Trans-Pennine tunnel in order to travel from east to west. It has been assumed that this level of usage will be driven by cost savings, with the forecast estimating that the tunnel will result in reductions of around £10 per HGV per year (i.e. approximately £34 million in total).

3.3.52 The report forecasts that reduced haulage costs as a result of constructing a new Trans-Pennine tunnel, could have the net impact of inducing economic development and thus increasing the number of HGV trips using the network. It advises that areas such as South Yorkshire could potentially become more attractive locations for haulage firms to base distribution centres.

3.3.53 The study estimates that following completion of a Trans-Pennine tunnel there may also be additional benefits to the operation of the strategic road network, which would be realised in terms of a net reduction in road traffic and thus congestion on various parallel routes currently used by Trans-Pennine freight traffic such as the M6/M62 (a forecast reduction of 26%), A50 (a forecast reduction of 17%) and A628 (a forecast reduction of 63%). There is, however, potential for increases to be observed on feeder routes which will serve the proposed Trans-Pennine tunnel, such as the M1/A1, M18, M27 and M60.

Future Port and Airport Schemes

3.3.54 In order to establish the future situation with regards the transport context on the A66/A685 and A69 corridors, a strategic overview of future port and airport improvement schemes within the study area has been prepared, which reviews:

- The Northern Powerhouse: One Agenda, One Economy, One North.
- National Infrastructure Plan 2014 – Port Development Proposals to 2021.
- Newcastle International Airport Development Plan.
- Durham Tees Valley Airport Development Plan.
- Carlisle Lake District Airport Development Plan.

<u>The Northern Powerhouse: One Agenda, One Economy, One North</u>

3.3.55 Transport for the North's port and airport strategy highlights how transport will aid changes in future patterns of land use and economic growth, with the following key deliverables:

- Set out a clearly prioritised multimodal freight strategy for the North to support trade and freight movement within the North and to national/international markets.
- Pursue better connections to Manchester Airport through TransNorth, whilst city regions consider connectivity to the North's other major airports.

3.3.56 The ports and airports plan sets out a number of key issues such as:

- The North has an excellent network of regional airports, in particular the extensive scheduled intercontinental services from Manchester and Newcastle, as well as the key role of other regional airports in short-haul travel. But we need to ensure the wider transport network is developed to support an expanding Northern economy.

3.3.57 The plan vision is defined by the following aspirations:

- More destinations served by the existing quality network including Liverpool John Lennon, Manchester, Leeds-Bradford, Newcastle, Durham-Tees Valley, Doncaster-Sheffield and Humberside, carrying over 30 million passengers a year, providing direct links for businesses and the public to a range of destinations.
- High quality surface access to airports across the North.
- Better rail connectivity to Manchester Airport to allow quick and easy access, continued success of Newcastle airport which serves a particular function in the North in providing for business and leisure flights.

3.3.58 With specific regard to this NTPR study the aims of the plan are to:

- Individual city regions will work with Northern airports to develop plans for improved connectivity.
- Government will launch a review for regional airports affected by the recent devolution of Air Passenger Duty, to be published by summer 2015.

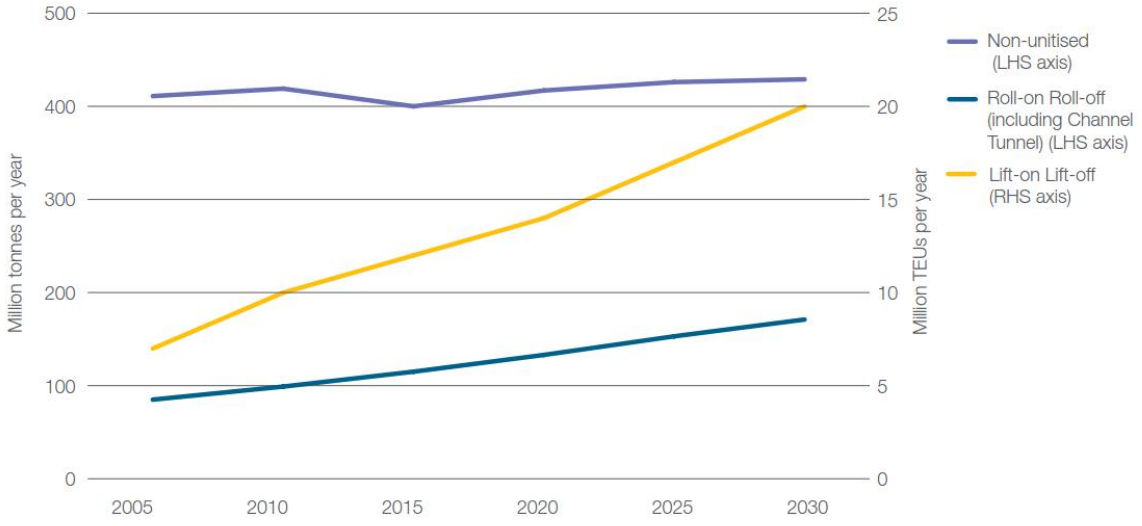
National Infrastructure Plan 2014 – Port Development Proposals to 2021

3.3.59 The National Infrastructure Plan 2014 seeks to ensure sustainable port development that will cater for long-term forecast growth in volumes of imports and exports by sea, with the provision of a sufficient port capacity remaining an essential element in ensuring sustainable growth in the UK economy.

3.3.60 There are approximately 120 commercial ports in the UK, which collectively handle the largest amount of freight throughout Europe in terms of tonnage. Ports in England and Wales handle around 95% of all goods in and out of the UK by volume. Freight traffic through UK ports has increased by three-quarters in the last 40 years and estimates suggest that the ports sector contributed approximately £7.9 billion to UK GDP in 2011.

3.3.61 Future need for port infrastructure depends on overall demand for port capacity. In 2007 the Department for Transport published demand forecasts up to 2030 as shown at Figure 3-6.

Figure 3-6: Department for Transport Port Demand Forecast (2030)



Source: MDS Transmodal Ltd., Update of UK Port Demand Forecasts to 2030 & Economic Value of Transhipment Study, July 2007
TEUs stands for Twenty-foot Equivalent Unit – a standard measure for container handling capacity

3.3.62 The plan identifies key actions to 2020, with £1.2 billion of planned investment in major ports projects, from renewals to expansions between now and the end of the decade. The government will continue

to support the development of international gateways by improving connectivity through measures on surface access. These include the A5036 development to improve access to the Port of Liverpool, the A63 (Castle-Street) at Hull, the A14 serving Felixstowe, and various rail gauge clearance and path improvements.

3.3.63 Furthermore, Infrastructure UK is working with Atlantic Gateway to facilitate the delivery of critical infrastructure projects in the North West. By 2030, there is the potential for some 250,000 new jobs to be created in the Atlantic Gateway area and around 140,000 of these jobs will be associated with Atlantic Gateway priority projects, involving £14 billion of new investment.

Newcastle International Airport Master Plan 2030

3.3.64 The Newcastle International Airport Master Plan sets out development aspirations for the interchange to 2030 and proposes infrastructure improvements as set out below:

- Realignment of existing internal roadways to increase capacity and circulation.
- Additional long-stay car parks and a possible multi-storey short stay car park.
- Additional apron to create extra aircraft parking stands.
- Construction of a Southside development.
- Measures to improve capacity of the runways, such as taxiways and turning points.
- Extensions to the terminal and possible pier and/or satellite pier development.
- Road junction and infrastructure improvements.

3.3.65 The Master Plan forecasts that through the implementation of the infrastructure improvements detailed above, that the following levels of growth are anticipated:

- Passenger levels to increase from 4,516,739 to 8,500,000 per year by 2030.
- Services to increase from 59,114 to 87,500 per year by 2030.

3.3.66 With regards surface access to the airport, the Master Plan states that Newcastle International Airport anticipates that:

- Vehicular trips to/from the airport will increase from 9,000 per day to 16,250 per day by 2030.
- Sustainable travel to/from the airport will account for at least 30% of total trips by 2030.
- Car parking spaces will increase from 7,500 to 16,000 by 2030.
- The Metro reinvigoration programme will result in additional bus services to/from the airport by 2030.

Durham Tees Valley Airport Master Plan 2020

3.3.67 The Durham Tees Valley Airport Master Plan sets out similar development aspirations for the interchange to 2020 and proposes infrastructure improvements as set out below:

- Consolidation of aviation activity and associated employment uses within the airfield.
- Diversification of the employment offer within the Northside development.
- Creation of a new link road between the Northside and Southside developments.
- Phased delivery of an aviation related and general employment cluster in the Southside development.
- Creation of a vibrant neighbourhood incorporating high quality new homes and improved local services/community facilities.

3.3.68 The Master Plan forecasts that through the implementation of the infrastructure improvements detailed above, that the following levels of growth are anticipated:

- Passenger levels to increase from 142,379 to 200,000 per year by 2020.
- Services to increase from 17,940 to 28,000 per year by 2020.

3.3.69 With regards surface access to the airport, the Master Plan states that Durham Tees Valley Airport anticipates that:

- Vehicular trips to/from the airport will increase to a maximum of 1,100 per hour by 2020.
- Car parking spaces will increase by an undefined amount to accommodate additional demand by 2020.

Carlisle Lake District Airport Development Plans

3.3.70 Carlisle Lake District Airport does not have an official Master Plan, however, the purchase of this facility in 2009 by the Stobart Group has resulted in a committed £13.0 million development plan to 2018 and proposes infrastructure improvements as set out below:

- Construction of a £12.0 million Stobart Air Freight Distribution Centre by 2015.
- Planned reintroduction of passenger flights to Belfast, Dublin and London by 2016.
- Construction of a £1.5 million anaerobic digester renewable energy plant by 2018.

Future Freight, Ports and Airports Context – Key Points
Transport for the North has commissioned a Freight and Logistics study which is establishing a baseline position with regards to current and future freight movements and identifying potential infrastructure requirements.
The Northern Powerhouse Agenda identifies the need for the northern road network to support the effective movement of freight and, in particular, identifies options to improve the A66 and A69 as vital for enhancing the capacity and resilience of the network and providing a reasonable diversionary route for the M62.
The Northern Powerhouse Agenda also considers that there will be an increasing demand for the North's ports and airports, and this is supported by the aspirations of the ports and air-ports in the region.

3.4 Conclusions Relating to the Future Situation

3.4.1 This section summarises the main points relating to the future situation in the A66/A685 and A69 corridors. Each issue is also referenced in Table 2-54 and Table 2-55 (F1, F2 etc) for summary purposes.

Existing Development Plans and Planned Transport Improvements

3.4.2 Existing development plans for the area are only likely to have a relatively modest impact on the future use of the A66/A685 and A69. The Growth Deal and Local Development Plan Forecasts for the period up to 2030 show aspirations for housing growth (all areas) and growth in jobs (principally in Newcastle, Gateshead and Durham), although these will be located either side of (rather than within) the study area. It is anticipated that these plans will maintain or slightly increase the need for local access to employment opportunities from within the LEIA **(F1)**.

3.4.3 Growth plans for Newcastle International Airport and Carlisle Lake District Airport are the focus for existing planned development within the LEIA. These will have some impact on traffic patterns or flows, and the plans themselves will depend on good road access to the sites, principally (in terms of this study area) via the A69 **(F2)**.

3.4.4 Planned transport improvements which directly affect the area are relatively modest as well. Highway schemes planned within RIS1 are focused on improving north-south links either side of the study area. There are no major committed highway intervention schemes planned for the A66/A685 or A69 and the future public transport improvement schemes relate to the provision of more frequent and faster journeys on the Newcastle to Carlisle rail line.

3.4.5 However, there are current highway improvement schemes which could have an impact on demand for the A66 and increase its value as a national strategic route. The current work on the upgrade of the A1 to three lane carriageway standard up to the junction with the A66 (the final stage of A1 Leeming to Barton is underway) by 2017 will make the A1/A66 route even more attractive as a strategic route, assuming that issues with the A66 can also be addressed. Coupled with increased congestion on the M62 this could increase the demand for the A1/A66 route between south and north UK.

Northern Powerhouse Agenda

3.4.6 Although current development plans and schemes are only likely to have a relatively modest impact, the ambition for the North of England to be a dynamic area of economic growth which complements the London and South East economy and helps to rebalance and grow the national economy will have a greater potential impact on the use of the A66/A685 and A69.

3.4.7 The Northern Powerhouse: One Agenda, One Economy, One North – A Report on the Northern Transport Strategy, published in March 2015, identifies that the number, capacity and reliability of east-west road connections is seen as a constraint on the North of England economy. The highways vision plan contains a number of aims and aspirations which are of direct relevance to this study, particularly:

- Improve the east-west major road links to ensure better and more reliable journey times between the major cities within the North.
- Ensure for effective road connections to the country's major ports in the North of England.
- Future roads investment in enhancements, maintenance and renewals is better planned between the different organisations.

3.4.8 Given the importance of both routes, but particularly the A66, as strategic east-west routes it is this function which will need to be enhanced to ensure that the current links do not constrain the economic growth associated with the Northern Powerhouse agenda.

3.4.9 The key issue, therefore, is whether the failure to address current issues, particularly those which have a strategic impact, will have a detrimental impact on Transport for the North's development and infrastructure aspirations for the North of England (**F3**), in particular:

- The multimodal freight strategy for the North to support trade and freight movement within the North and to national/international markets.
- Better connectivity to the region's Airports, including Newcastle Airport.
- Improved connectivity between different parts of the region, bringing city regions closer together.
- Enhancements to the capacity of ports in the North of England.

3.4.10 These, together, with the increasing attractiveness of the A66 all add to the case for interventions which enhance the function of the A66 as a national and regional strategic link.

4 Need for Intervention

4.1 Introduction

4.1.1 This section of the 'Northern Trans-Pennine Routes Strategic Study' establishes the case for intervention with regards to the operation of the A66/A685 and A69 corridors, based on an understanding of the current and future transport-related problems identified in Chapters 2 and 3.

4.1.2 Following a consideration of the overall case for intervention in Section 4.2, the case for intervention is considered separately for the A66/A685 and A69 corridors as, although there are some similar issues, the current and potential functions of the routes, given the Northern Powerhouse agenda, are substantially different.

4.2 Strategic Case for Intervention

4.2.1 Chapters 2 and 3, and the following sections of this Chapter, show that there are problems and issues which affect the performance of both the A66/A685 and A69 corridors and which, in themselves, merit further investigation of potential interventions. However, the analysis of current and traffic flows on both corridors shows that traffic congestion, except on a very localized basis, is not and will not be a significant impediment to route performance. So given current regional development plans, therefore, you would not expect there to be a strong case for substantial investment in interventions in either of the corridors.

4.2.2 However, the ambition for the North of England to be a dynamic area of economic growth which complements the London and South East economy and helps to rebalance and grow the national economy, encapsulated by the Northern Powerhouse Agenda, will have a greater potential impact on the use of the A66/A685 and A69.

4.2.3 The Northern Powerhouse: One Agenda, One Economy, One North – A Report on the Northern Transport Strategy, published in March 2015, identifies that the number, capacity and reliability of east-west road connections is seen as a constraint on the North of England economy. The highways vision plan contains a number of aims and aspirations which are of direct relevance to this study, particularly:

- Improve the east-west major road links to ensure better and more reliable journey times between the major cities within the North.
- Ensure for effective road connections to the country's major ports in the North of England.
- Future roads investment in enhancements, maintenance and renewals is better planned between the different organisations.

4.2.4 It is therefore the importance of both routes, but particularly the A66, as strategic east-west routes which make the strategic case for intervention, ensuring that the links do not constrain the future economic growth associated with the Northern Powerhouse agenda.

4.2.5 The following sections summarise the need for intervention on each of the corridors, in the context of the Northern Powerhouse Agenda as well as problems associated with the current performance of the routes.

4.3 A66/A685 Corridors

4.3.1 The A66 currently serves as a strategic road link for the North of England and as an important national link for north south journeys. It is the most direct route between the Tees Valley, North Yorkshire, South Yorkshire, parts of West Yorkshire, the East Midlands, Eastern England and North Cumbria, Glasgow, much of the central belt of Scotland and Stranraer (for access to Northern Ireland and the Republic of Ireland).

4.3.2 For some journeys the A66 can serve as an alternative and more direct east-west crossing to the M62. For example, from Ferrybridge (A1/M62 junction) to Penrith (M6/A66 junction) the route is approximately 42 miles and 29 minutes shorter via the A1 and A66 than the alternative route via the M62, M61 and M6.

4.3.3 The A66 has a high freight flow, with commercial vehicles over 20% of total vehicles on most sections of the route between Scotch Corner and Penrith. The expectation is that freight traffic generated in the North of England and Scotland will continue to grow, and that Northern Powerhouse aspirations for the Ports and the economy as a whole will only accelerate this growth. Time savings, shorter distances and more reliable journeys are critical for freight operators and have a direct impact on operating costs and the real economy.

4.3.4 The existing evidence shows that the A66 is under-utilised given the comparative travel distances and journey times, particularly by freight traffic. The analysis undertaken using the 'GB Freight Model' for the Northern Freight Strategy Study, for example, estimates (based on travel distances and journey times) that use of the A66 for Trans-Pennine movements by commercial vehicles should be double that of current flows, with those journeys using the M62 instead. Consultation with stakeholders confirms that the A66 is used less by freight traffic than it should be, due to the actual and perceived unreliability of the route compared with north-south routes and the M62.

4.3.5 It is likely that the completion of the upgrade of the A1 to three lane carriageway standard up to the junction with the A66 (the final stage of A1 Leeming to Barton is underway) by 2017 will make the A1/A66 route even more attractive as a strategic route, assuming that issues with the A66 can also be addressed.

4.3.6 Other studies of the A66 east of the A1 between Scotch Corner and Tees Valley and west of the M6 between Penrith and Workington are also being undertaken within a similar timescale to this study, recognising the future importance of a strategic link between the Tees Valley area and ports and Northern Cumbria and west coast ports such as Workington.

4.3.7 Although there is no evidence to show that current journey times on the A66 are generally affected by traffic congestion, except on an occasional or localised basis, the current mix of road standards affects the attractiveness of the route. The evidence shows that:

- There are regular closures along the route, due to planned road works and maintenance; incidents and weather impacts (high winds, flooding and snow).
- There are sections of the route where there is a higher number of incidents and accidents than the national average, particularly between Greta Bridge and Scotch Corner.
- The diversionary routes are either poor or involve long detours, particularly for HGVs due to the weight and height restrictions on the A685.

4.3.8 The single carriageway sections of the route make it far more difficult to keep the A66 open if incidents occur and, given the quality of the diversionary routes, makes it an unreliable highway link both in actual and perceived terms. This is particularly the case for freight operators for whom route reliability is a key criteria in decisions such as route choice.

4.3.9 In addition to its strategic function the A66 is an important access link to local and regional services for communities along the route, particularly as there is no alternative public transport provision. It is also a link to popular local and regional tourism destinations, such as the North Pennines and Lake District.

4.3.10 Generally communities along the route have been by-passed by previous interventions, but this is not the case at Kirby Thore where the route runs directly through part of the village, and there is a negative community impact at this point.

4.3.11 So the current performance of the A66, together with the Northern Powerhouse Agenda aspirations and other highway improvements, all make a strong case for investigating interventions which could improve the performance of the A66 as a strategic route and an essential link for local communities.

Case for Intervention on the A66/A685
The A66 is a key national and regional strategic link for a range of south north and east west movements, particularly for freight.
Its importance will only increase with the economic growth of the Northern Powerhouse agenda, and other strategic road link improvements.
The current standard of the route, principally its unreliability, is constraining use of the route and inhibiting strategic connectivity and economic growth.
These problems will worsen as economic development and traffic growth takes place.
Interventions will therefore have a positive impact on travel reliability, network resilience and future national and regional connectivity and economic growth.

4.4 A69 Corridor

4.4.1 The A69 serves a predominantly regional and sub-regional function. It is the most direct route for journeys between Tyne and Wear, Durham and North Cumbria, Glasgow, much of the central belt of Scotland and Stranraer (for access to Northern Ireland and Republic of Ireland). It also provides a link for freight traffic between the Tyne ports and South West Scotland.

4.4.2 There are a number of communities along the route that have substantial commuting flows into regions either end of the route, for example between Hexham and Newcastle and between Brampton and Carlisle. These destinations also offer health, education, professional services and retail opportunities which are not available in the communities along the route and access to these is integral to their future vitality.

4.4.3 Although there is a public transport alternative, the Carlisle to Newcastle rail line, which is attractive to some people along the route, and improvements are planned for this line, communities along the route generally have a high car dependency and are reliant on road access. The A69 is therefore economically very important for these communities, especially given the poor standard of alternative road links.

4.4.4 The A69 is also important for access to tourism facilities, with frontiers of the Hadrian's Wall World Heritage Site and the presence of the North Pennines Area of Outstanding Natural Beauty, Northumberland National Park and Northumberland Dark Sky Park all situated within 2km of the route corridor.

4.4.5 Although on average journey speeds are not adversely affected by traffic congestion, the road standards and quality do affect journey speeds and reliability. Specific pinch points such as Warwick Bridge (speed limit of 30mph) and the lack of overtaking opportunities, for example the incline at Low Row, have an impact on journey times and reliability.

4.4.6 Analysis of collision rate data shows that the section between Carlisle and Brampton has a collision rate higher than the national average for the type of road. The data also shows that the A69 overall has a higher than national average of collisions involving HGVs. There is no evidence to identify a consistent explanation for these findings although anecdotally it is felt that the single carriageway sections, particularly where there is a pinch point such as Warwick Bridge, and lack of overtaking opportunities create frustration and risky driving behaviour.

4.4.7 As with the A66, and noted above, the A69 is a vital transport link for communities along its route. Again many communities, such as Brampton and Haydon Bridge have been bypassed by previous interventions but the current route has an adverse impact on Warwick Bridge, where the route runs directly through a large village.

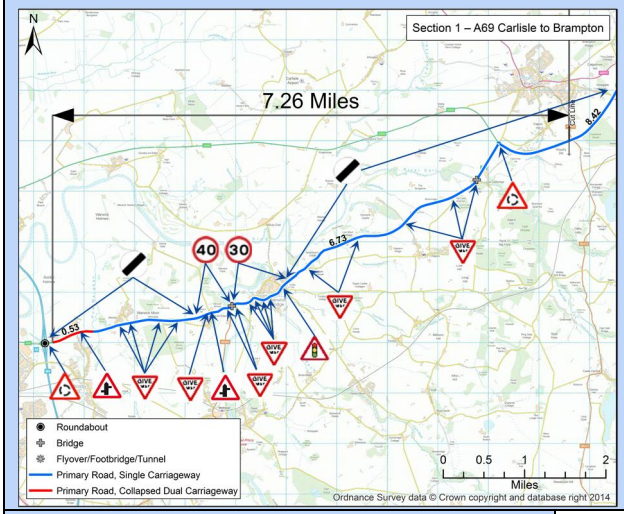
4.4.8 All of these issues affect how the A69 can support the economic future of the communities along the route, as well as the economy of the wider North East and northern North West.

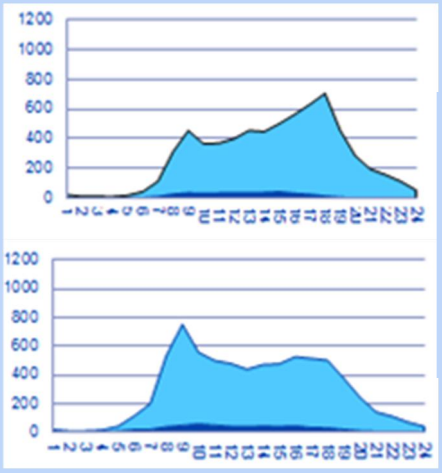
Case for Intervention on the A69
The A69 performs a key function in integrating communities along the route into the wider North East/North West economy.
The route also supports access to key tourist destinations and some inter-regional freight.
There are some specific issues along the route which will constrain the future economic development of the communities and development growth areas, such as Carlisle and Newcastle airports.
Interventions will therefore have a positive impact on the economic vitality of local communities; the attractiveness of specific development areas; network resilience and future regional connectivity and economic growth.

APPENDICES

Appendix 1 – Study Section Summaries

Link: A69: Section 1 – Carlisle to Brampton





Link Distance & Speed limit:	7.26 miles			30,40, 60, 70mph			
Lanes:	Single: 0.53 miles			Dual: 6.73 miles			
Feeder routes:	M6, A689						
Junctions:	Traffic Signals: 1		Priority: 16		Roundabout: 2		Central Reserve Openings: 3
Resilience: Road Closures (2015):	Emergency Works: N/A		Event: N/A		Incident: N/A		Planned Works: N/A
Environmental Appraisal Summary:	Air Quality & Green-house Gases	Cultural Heritage	Land-scape	Nature Conser-vation / Biodiver-sity	Noise & Vibration	Road Drainage & Water	Peoples & Com-munities	Geology, Soils & Materials
Other transport mode provision:	Bus Services: 85, 95, 685		Bus Stops: 25		Nat Cycle Route: 72		Ped Crossings: 2	
Annual Freight Demand:	367,536 HGV's two-way							

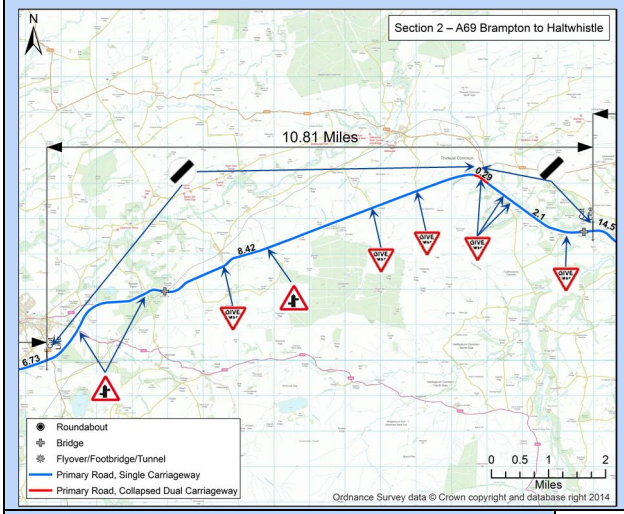
Accidents

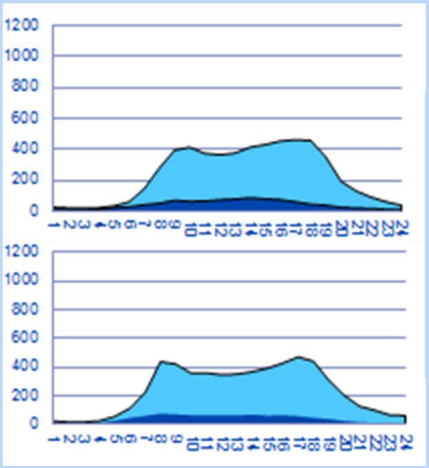
Collisions:	Fatal: 0	Serious: 2	Slight: 34
Collisions/bvkm:	Single C/way: 221	Dual C/way: 534	UK Average: 175
Percentage of HGV's involved in Collisions:	10.29%		

Traffic Data		Flow	%HGV	Average Speed	Journey Time	Link Capacity	Reliability
AADT	e/bound	6,380	6.9%			S: 49% D: 16%	97.8%
AM Peak (worst hour)	e/bound	403		33mph	15:59m		
PM Peak (worst hour	e/bound	683		33mph	12:11m		
AADT	w/bound	6,210	8.0%			S: 48% D: 16%	
AM Peak (worst hour)	w/bound	633		47mph	13:11m		
PM Peak (worst hour)	w/bound	463		49mph	12:41m		

Priorities for Intervention	*Low traffic speeds eastbound peak. Pinch point at Warwick Bridge High collision rates.*

Link: A69: Section 2 – Brampton to Haltwhistle





Link Distance & Speed limit:	10.81 miles		60, 70mph	
Lanes:	Single: 10.52 miles		Dual: 0.29 miles	
Feeder routes:	A6071, B630, B6322			
Junctions:	Traffic Signals: 0	Priority: 9	Roundabout: 0	Central Reserve Openings: 0
Resilience: Road Closures (2015):	Emergency Works: N/A	Event: N/A	Incident: N/A	Planned Works: N/A

Environmental Appraisal Summary:	Air Quality & Green-house Gases	Cultural Heritage	Land-scape	Nature Conser-vation / Biodiver-sity	Noise & Vibration	Road Drainage & Water	Peoples & Com-munities	Geology, Soils & Materials

Other transport mode provision:	Bus Services: 85, 685	Bus Stops: 18	Nat Cycle Route: 72	Ped Crossings: 0
Annual Freight Demand:	367,536 HGV's two-way			

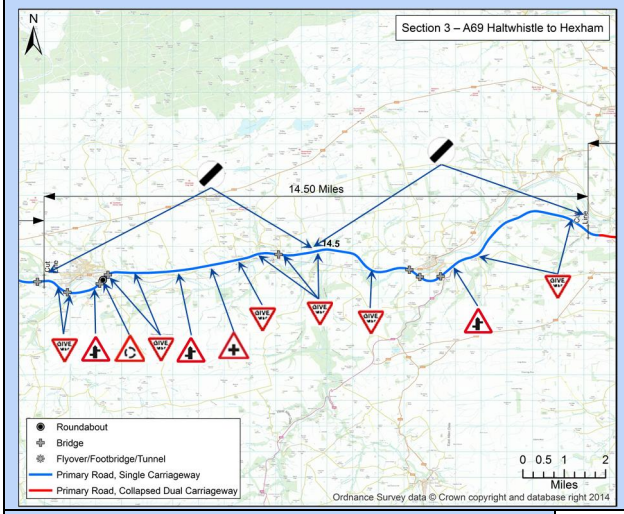
Accidents

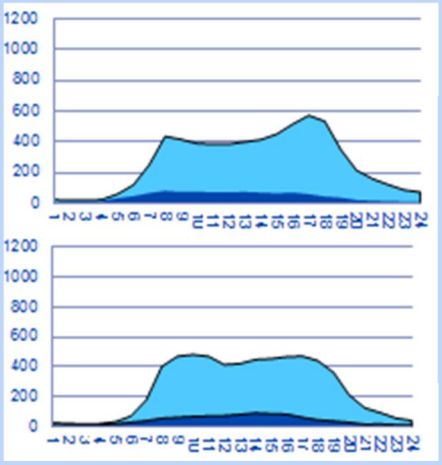
Collisions:	Fatal: 2	Serious: 9	Slight: 23
Collisions/bvkm:	Single C/way: 159	Dual C/way: -	UK Average: 175
Percentage of HGV's involved in Collisions:	25.35%		

Traffic Data		Flow	%HGV	Average Speed	Journey Time	Link Capacity	Reliability
AADT	e/bound	5,424	15.6%			D: 42%	80.4%
AM Peak (worst hour)	e/bound	354		47mph	13:24m		
PM Peak (worst hour	e/bound	438		47mph	12:21m		
AADT	w/bound	5,458	15.7%			D: 42%	
AM Peak (worst hour)	w/bound	392		50mph	12:48m		
PM Peak (worst hour)	w/bound	421		49mph	12:57m		

Priorities for Intervention	*Unreliable journey times/variable traffic speeds. Pinch point at Low Row. High number of fatal/serious accidents.*

Link: A69: Section 3 – Haltwhistle to Hexham





Link Distance & Speed limit:	14.50 miles				60mph		
Lanes:	Single: 14.50 miles				Dual: 0.00 miles		
Feeder routes:	A686, B6322, B6319						
Junctions:	Traffic Signals: 0		Priority: 15		Roundabout: 1		Central Reserve Openings: 0
Resilience: Road Closures (2015):	Emergency Works: N/A		Event: N/A		Incident: N/A		Planned Works: N/A
Environmental Appraisal Summary:	Air Quality & Green-house Gases	Cultural Heritage	Land-scape	Nature Conser-vation / Biodiver-sity	Noise & Vibration	Road Drainage & Water	Peoples & Com-munities	Geology, Soils & Materials
Other transport mode provision:	Bus Services: 85, 685		Bus Stops: 2		Nat Cycle Route: 68, 72		Ped Crossings: 0	
Annual Freight Demand:	367,536 HGV's two-way							

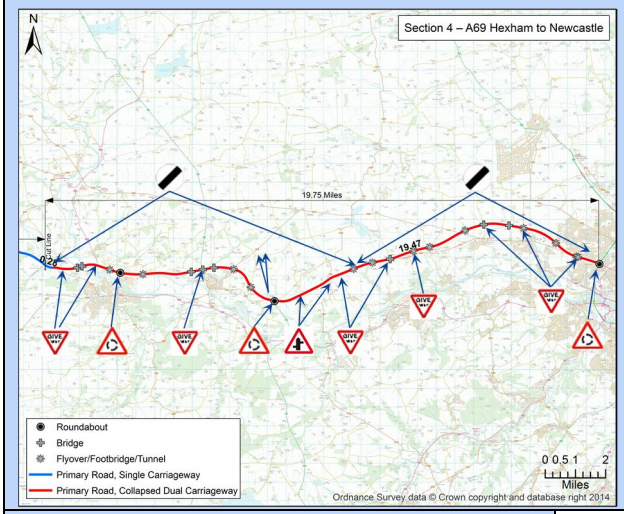
Accidents

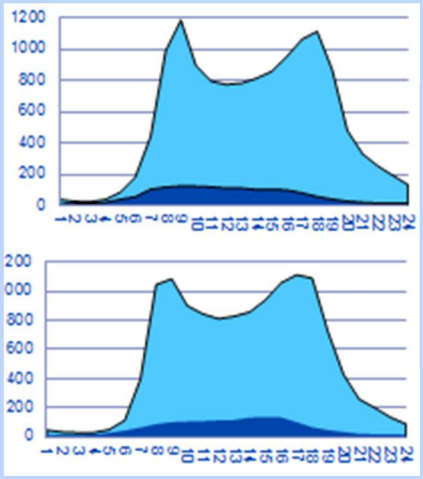
Collisions:	Fatal: 3	Serious: 3	Slight: 17
Collisions/bvkm:	Single C/way: 72	Dual C/way: 22	UK Average: 175
Percentage of HGV's involved in Collisions:	32.14%		

Traffic Data		Flow	%HGV	Average Speed	Journey Time	Link Capacity	Reliability
AADT	e/bound	5,966	14.7%			S: 46%	82.9%
AM Peak (worst hour)	e/bound	448		47mph	17:29m		
PM Peak (worst hour	e/bound	435		46mph	17:27m		
AADT	w/bound	6,078	14.7%			S: 46%	
AM Peak (worst hour)	w/bound	339		48mph	16:59m		
PM Peak (worst hour)	w/bound	526		47mph	17:02m		

Priorities for Intervention	*Unreliable journey times/variable traffic speeds. Poor junction at A69/B6531. High number of fatal/serious accidents.*

Link: A69: Section 4 – Hexham to Newcastle





Link Distance & Speed limit:	19.75 miles		60mph	
Lanes:	Single: 0.28 miles		Dual: 19.47 miles	
Feeder routes:	A1, A6079, A68, B6323, B6351, B6309, B6528, B6530			
	Traffic Signals: 0	Priority:11	Roundabout: 3	Central Reserve Openings:
Resilience: Road Closures (2015):	Emergency Works: N/A	Event: N/A	Incident: N/A	Planned Works: N/A

Environmental Appraisal Summary:	Air Quality & Green-house Gases	Cultural Heritage	Land-scape	Nature Conser-vation / Biodiver-sity	Noise & Vibration	Road Drainage & Water	Peoples & Com-munities	Geology, Soils & Materials

Other transport mode provision:	Bus Services: 85, 685, X84, X85	Bus Stops: 12	Nat Cycle Route: 72	Ped Crossings: 0
Annual Freight Demand:	367,536 HGV's two-way			

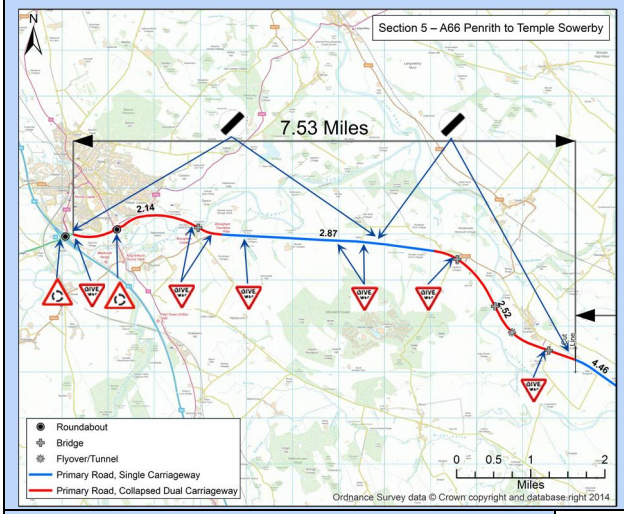
Accidents

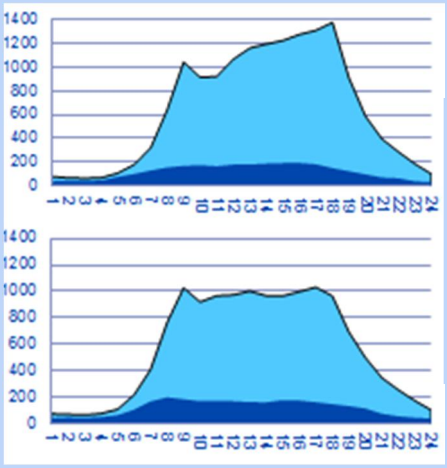
Collisions:	Fatal: 2	Serious: 12	Slight: 53
Collisions/bvkm:	Single C/way: -	Dual C/way: 70	UK Average: 175
Percentage of HGV's involved in Collisions:	17.21%		

Traffic Data		Flow	%HGV	Average Speed	Journey Time	Link Capacity	Reliability
AADT	e/bound	12,365	10.1%			D: 32%	77.6%
AM Peak (worst hour)	e/bound	1,014		46mph	23:50m		
PM Peak (worst hour	e/bound	1,106		49mph	21:04m		
AADT	w/bound	12,422	10.1%			D: 32%	
AM Peak (worst hour)	w/bound	1,165		47mph	21:47m		
PM Peak (worst hour)	w/bound	1,132		49mph	20:47m		

Priorities for Intervention	*Unreliable journey times/variable traffic speeds. High number of fatal accidents. High collision rates.*

Link: A66: Section 5 – Penrith to Temple Sowerby





Link Distance & Speed limit:	7.53 miles			60, 70mph			
Lanes:	Single: 2.87 miles			Dual: 4.66 miles			
Feeder routes:	M6, A6, A686, B6412						
Junctions:	Traffic Signals: 0		Priority: 8		Roundabout: 2		Central Reserve Openings:
Resilience: Road Closures (2015):	Emergency Works: 0		Event: 1		Incident: 0		Planned Works: 1
Environmental Appraisal Summary:	Air Quality & Green-house Gases	Cultural Heritage	Land-scape	Nature Conser-vation / Biodiver-sity	Noise & Vibration	Road Drainage & Water	Peoples & Com-munities	Geology, Soils & Materials
Other transport mode provision:	Bus Services: 563		Bus Stops: 6		Nat Cycle Route: 71		Ped Crossings: 0	
Annual Freight Demand:	1,804,820 HGV's two-way							

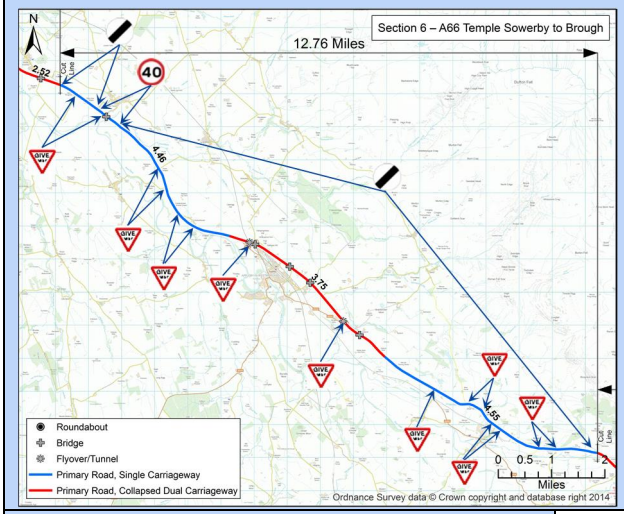
Accidents

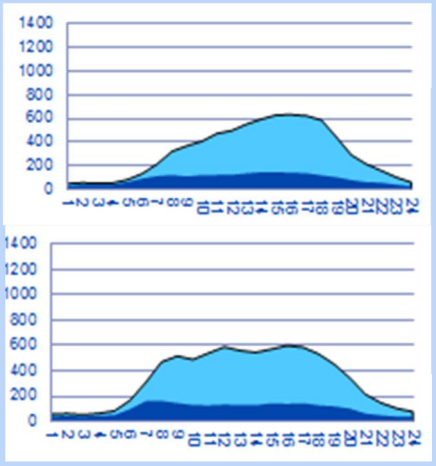
Collisions:	Fatal: 0	Serious: 5	Slight: 16
Collisions/bvkm:	Single C/way: 86	Dual C/way: 57	UK Average: 175
Percentage of HGV's involved in Collisions:	21.15%		

Traffic Data		Flow	%HGV	Average Speed	Journey Time	Link Capacity	Reliability
AADT	e/bound	14,266	16.5%			S: 55% D: 37%	83.9%
AM Peak (worst hour)	e/bound	1,064		47mph	09:14m		
PM Peak (worst hour	e/bound	1,324		47mph	09:38m		
AADT	w/bound	12,599	18.8%			S: 58% D: 37%	
AM Peak (worst hour)	w/bound	1,057		47mph	09:57m		
PM Peak (worst hour)	w/bound	945		46mph	10:16m		

Priorities for Intervention	*Low/moderate traffic speeds. Unreliable journey times/variable traffic speeds. Pinch point at A66/M6 junction at Penrith.* High collision rates.

Link: A66: Section 6 – Temple Sowerby to Brough





Link Distance & Speed limit:	12.76 miles				40, 60, 70mph		
Lanes:	Single: 9.01 miles				Dual: 3.75 miles		
Feeder routes:	A685, B6276, B6259, B6542						
Junctions:	Traffic Signals: 0		Priority: 15		Roundabout: 0		Central Reserve Openings:
Resilience: Road Closures (2015):	Emergency Works: 0		Event: 0		Incident: 3		Planned Works: 0
Environmental Appraisal Summary:	Air Quality & Green-house Gases	Cultural Heritage	Land-scape	Nature Conser-vation / Biodiver-sity	Noise & Vibration	Road Drainage & Water	Peoples & Com-munities	Geology, Soils & Materials
Other transport mode provision:	Bus Services: 563		Bus Stops: 8		Nat Cycle Route: -		Ped Crossings: 0	
Annual Freight Demand:	1,804,820 HGV's two-way							

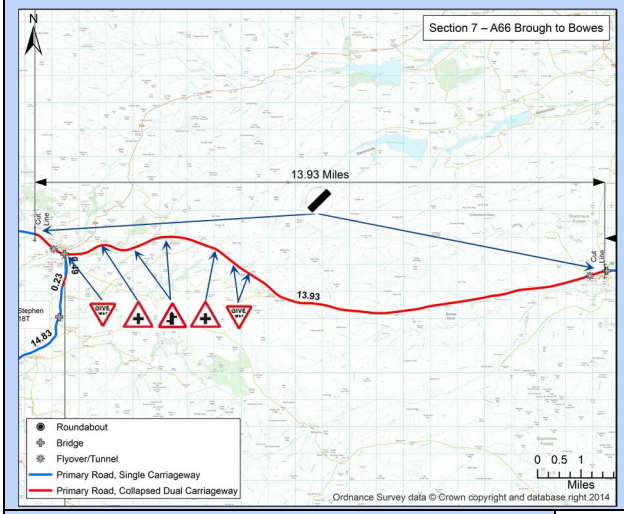
Accidents

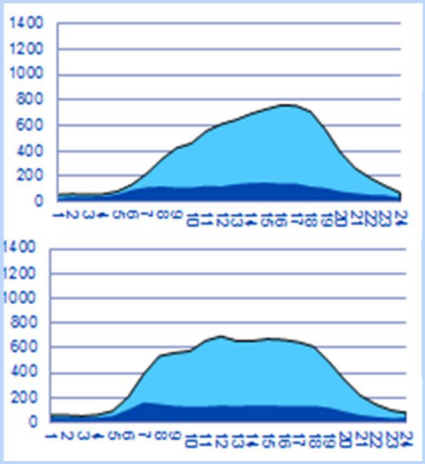
Collisions:	Fatal: 0	Serious: 10	Slight: 35
Collisions/bvkm:	Single C/way: 137	Dual C/way: 65	UK Average: 175
Percentage of HGV's involved in Collisions:	22.86%		

Traffic Data		Flow	%HGV	Average Speed	Journey Time	Link Capacity	Reliability
AADT	e/bound	7,187	26.4%			S: 55% D: 18%	91.3%
AM Peak (worst hour)	e/bound	376		50mph	15:20m		
PM Peak (worst hour	e/bound	547		48mph	16:11m		
AADT	w/bound	7,504	26.7%			S: 58% D: 18%	
AM Peak (worst hour)	w/bound	492		50mph	15:18m		
PM Peak (worst hour)	w/bound	525		49mph	15:26m		

Priorities for Intervention	*High collision rates. Pinch point at Kirby Thore.*

Link: A66: Section 7 – Brough to Bowes





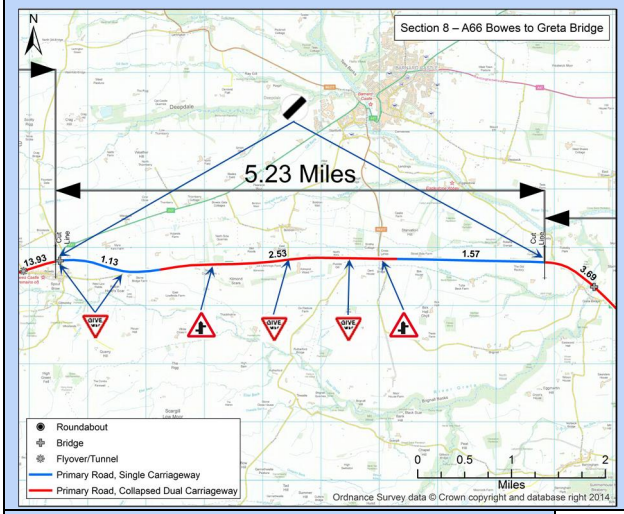
Link Distance & Speed limit:	13.93 miles				60mph		
Lanes:	Single: 0.00 miles				Dual: 13.93 miles		
Feeder routes:	A67, A685, B6276						
Junctions:	Traffic Signals: 0		Priority: 7		Roundabout: 0		Central Reserve Openings: 17
Resilience: Road Closures (2015):	Emergency Works: 8		Event: 1		Incident: 0		Planned Works: 18
Environmental Appraisal Summary:	Air Quality & Green-house Gases	Cultural Heritage	Land-scape	Nature Conser-vation / Biodiver-sity	Noise & Vibration	Road Drainage & Water	Peoples & Com-munities	Geology, Soils & Materials
Other transport mode provision:	Bus Services: -		Bus Stops: 7		Nat Cycle Route: -		Ped Crossings: 0	
Annual Freight Demand:	1,804,820 HGV's two-way							

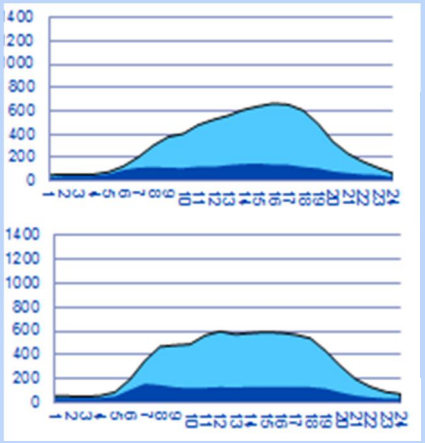
Accidents

Collisions:	Fatal: 1	Serious: 2	Slight: 22
Collisions/bvkm:	Single C/way: -	Dual C/way: 55	UK Average: 175
Percentage of HGV's involved in Collisions:	30.77%		

Traffic Data		Flow	%HGV	Average Speed	Journey Time	Link Capacity	Reliability
AADT	e/bound	8,557	22.3%				87.2%
AM Peak (worst hour)	e/bound	431		57mph	14:10m	S: 22%	
PM Peak (worst hour	e/bound	645		57mph	12:21m		
AADT	w/bound	8,680	23.0%			S: 22%	
AM Peak (worst hour)	w/bound	534		55mph	14:12m		
PM Peak (worst hour)	w/bound	580		54mph	14:44m		
Priorities for Intervention	*Frequency and impact of road closures.*						

Link: A66: Section 8 – Bowes to Greta Bridge





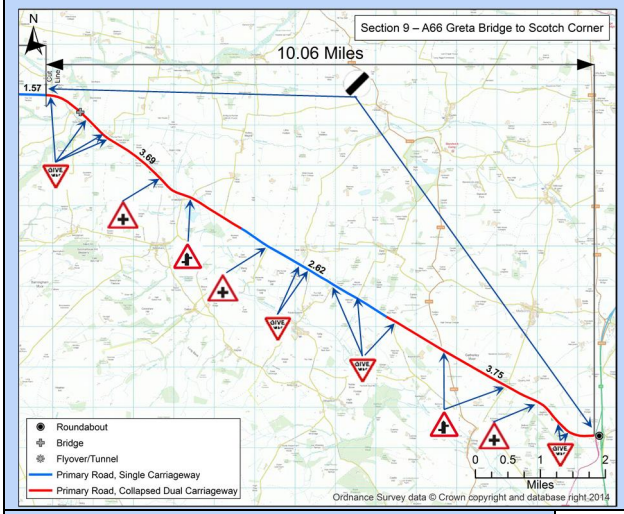
Link Distance & Speed limit:	5.23 miles			60, 70mph			
Lanes:	Single: 2.70 miles			Dual: 2.53 miles			
Feeder routes:	A67, B6277						
Junctions:	Traffic Signals: 0		Priority: 6		Roundabout: 0		Central Reserve Openings: 10
Resilience: Road Closures (2015):	Emergency Works: 1		Event: 1		Incident: 1		Planned Works: 3
Environmental Appraisal Summary:	Air Quality & Green-house Gases	Cultural Heritage	Land-scape	Nature Conser-vation / Biodiver-sity	Noise & Vibration	Road Drainage & Water	Peoples & Com-munities	Geology, Soils & Materials
Other transport mode provision:	Bus Services: -		Bus Stops: 4		Nat Cycle Route: -		Ped Crossings: 0	
Annual Freight Demand:	1,804,820 HGV's two-way							

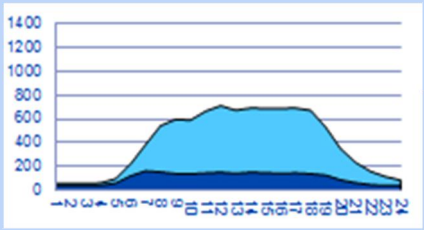
Accidents

Collisions:	Fatal: 0	Serious: 0	Slight: 5
Collisions/bvkm:	Single C/way: 35	Dual C/way: 31	UK Average: 175
Percentage of HGV's involved in Collisions:	27.27%		

Traffic Data		Flow	%HGV	Average Speed	Journey Time	Link Capacity	Reliability
AADT	e/bound	7,436	25.2%				79.6%
AM Peak (worst hour)	e/bound	378		55mph	05:28m	S: 57% D: 19%	
PM Peak (worst hour	e/bound	552		56mph	05:37m		
AADT	w/bound	7,595	25.8%				
AM Peak (worst hour)	w/bound	467		53mph	05:55m	S: 58% D: 19%	
PM Peak (worst hour)	w/bound	516		52mph	06:05m		
Priorities for Intervention	*Unreliable traffic speeds/variable journey times.*						

Link: A66: Section 9 – Greta Bridge to Scotch Corner





Eastbound

Link Distance & Speed limit:	10.06 miles		60, 70mph	
Lanes:	Single: 2.62 miles		Dual: 7.44 miles	
Feeder routes:	M1, B6274			
Junctions:	Traffic Signals: 0	Priority: 17	Roundabout: 0	Central Reserve Openings: 16
Resilience: Road Closures (2015):	Emergency Works: 6	Event: 3	Incident: 0	Planned Works: 24

Environmental Appraisal Summary:	Air Quality & Green-house Gases	Cultural Heritage	Land-scape	Nature Conser-vation / Biodiver-sity	Noise & Vibration	Road Drainage & Water	Peoples & Com-munities	Geology, Soils & Materials

Other transport mode provision:	Bus Services: -	Bus Stops: 0	Nat Cycle Route: -	Ped Crossings: 0
Annual Freight Demand:	1,804,820 HGV's two-way			

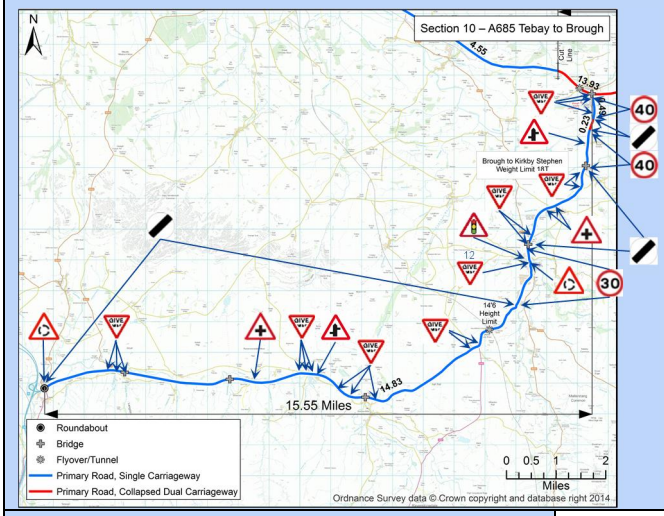
Accidents

Collisions:	Fatal: 0	Serious: 16	Slight: 32
Collisions/bvkm:	Single C/way: 393	Dual C/way: 93	UK Average: 175
Percentage of HGV's involved in Collisions:	25.47%		

Traffic Data		Flow	%HGV	Average Speed	Journey Time	Link Capacity	Reliability
AADT	e/bound	8,840	25.4%			S: 68% D: 23%	88.4%
AM Peak (worst hour)	e/bound	570		49mph	11:51m		
PM Peak (worst hour	e/bound	661		49mph	12:08m		
AADT	w/bound	8,919	25.8%			S: 69% D: 23%	
AM Peak (worst hour)	w/bound	602		46mph	14:36m		
PM Peak (worst hour)	w/bound	633		46mph	15:07m		

Priorities for Intervention	*Moderate average traffic speeds. Frequency and impact of road closures. High incidence of severe accidents. High collision rates.*

Link: A685: Section 10 – Tebay to Brough



Link Distance & Speed limit:	15.55 miles		30, 40, 60, 70mph	
Lanes:	Single: 15.32 miles		Dual: 0.23 miles	
Feeder routes:	M6, A683, B6260, B6261, B6259			
Junctions:	Traffic Signals: 1	Priority: 34	Roundabout: 2	Central Reserve Openings: 0
Resilience: Road Closures (2015):	Emergency Works: N/A	Event: N/A	Incident: N/A	Planned Works: N/A

Environmental Appraisal Summary:	Air Quality & Green-house Gases	Cultural Heritage	Land-scape	Nature Conser-vation / Biodiver-sity	Noise & Vibration	Road Drainage & Water	Peoples & Com-munities	Geology, Soils & Materials

Other transport mode provision:	Bus Services:	Bus Stops: 16	Nat Cycle Route: 68	Ped Crossings: 1
Annual Freight Demand:	N/A			

Accidents

Collisions:	Fatal: 1	Serious: 3	Slight: 9
Collisions/bvkm:	Single C/way: 55	Dual C/way: -	UK Average: 175
Percentage of HGV's involved in Collisions:	17.39%		

Traffic Data		Flow	%HGV	Average Speed	Journey Time	Link Capacity	Reliability
AADT	e/bound	2,500	19.8%			S: 19%	85.3%
AM Peak (worst hour)	e/bound	170		38mph	21:18m		
PM Peak (worst hour	e/bound	200		38mph	21:25m		
AADT	w/bound	2,500	19.8%			S: 19%	
AM Peak (worst hour)	w/bound	170		39mph	20:48m		
PM Peak (worst hour)	w/bound	200		38mph	20:58m		

Priorities for Intervention	*Restrictions on HGVs.*

Appendix 2 – Stakeholder Reference Group Information

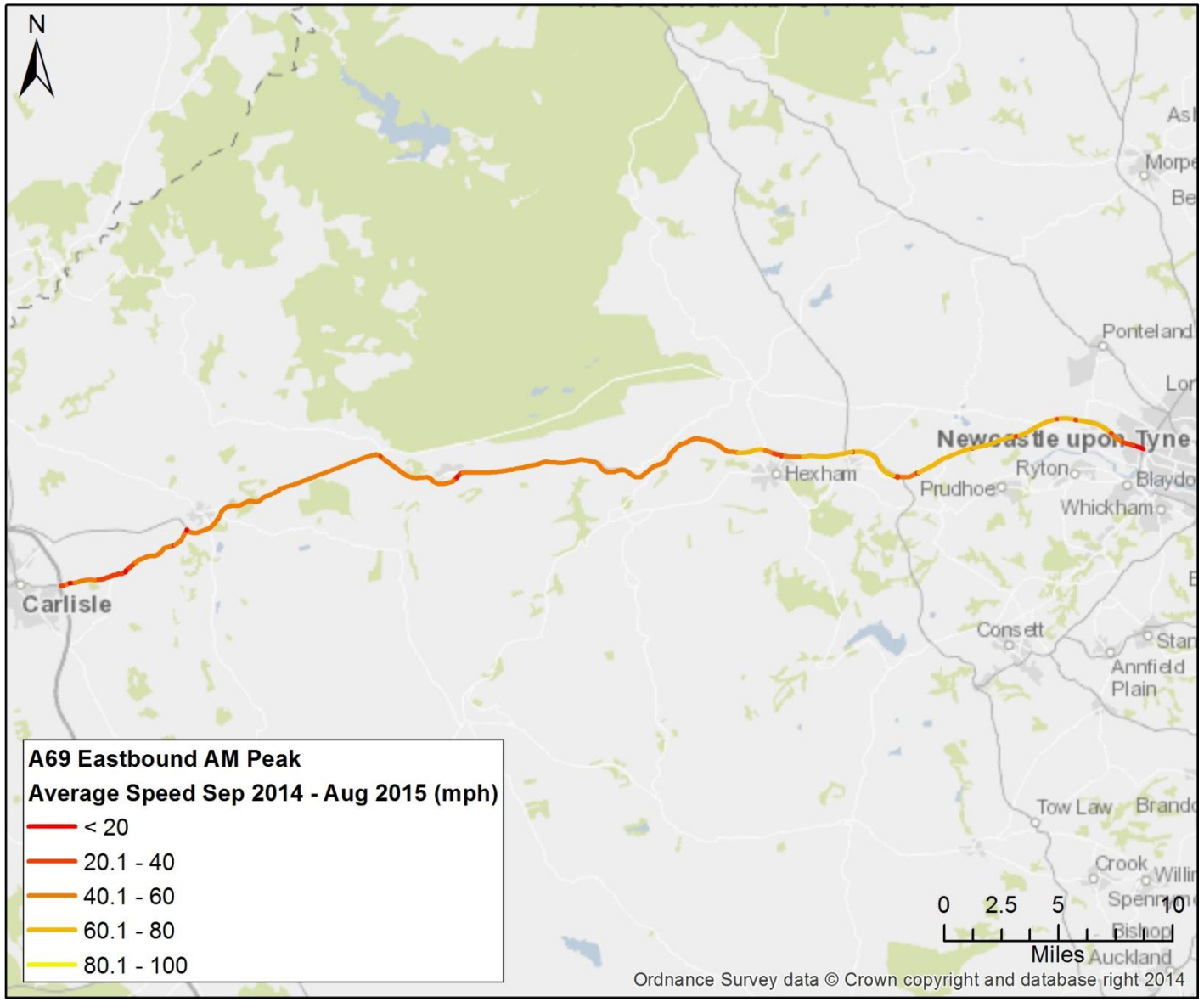
Northern Trans-Pennine Route Strategic Study - Stakeholder Reference Group List	
Category	**Organisation**
Port	Associated British Ports (Port of Barrow)
LA Transport Directors	Association of North East Councils
Vulnerable Road Users	BHS County Access and Bridleways Officer
Environmental / Heritage Group	Campaign to Protect Rural England (CPRE)
LA Transport Directors	Carlisle
Business Group	CBI North East
Business Group	CBI North West
Police	Cleveland Police
TOC	Confederation of Passenger Transport
Vulnerable Road Users	CTC - The National Cycling Charity - NE
LEP	Cumbria Chamber of Commerce and Industry
LA Transport Directors	Cumbria County Council
LEP	Cumbria LEP
LEP	Cumbria LEP
Police	Cumbria Police
Environmental / Heritage Group	Cumbria Tourism
LA Transport Directors	Darlington
DfT	DfT Regional Engagement Team
LA Transport Directors	Durham Council
Police	Durham Police
Environmental / Heritage Group	Environment Agency
Business Group	Federation of Small Business (North East)
Business Group	Federation of Small Business (North West)
Business Group	Freight Transport Association (FTA)
Environmental / Heritage Group	Friends of the Earth
Environmental / Heritage Group	Friends of the Lake District
LA Transport Directors	Gateshead Council
LA Transport Directors	Hartlepool Council
Environmental / Heritage Group	Historic England (English Heritage)
Environmental / Heritage Group	Lake District National Parks Authority
LA Transport Directors	Lancashire Council

Northern Trans-Pennine Route Strategic Study - Stakeholder Reference Group List	
Category	**Organisation**
LEP	Lancashire LEP
LA Transport Directors	Middlesbrough
Business Group	National Farmers Union
Environmental / Heritage Group	National Trust
Environmental / Heritage Group	Natural England
Infrastructure	Network Rail
LA Transport Directors	Newcastle Upon Tyne Council
Passenger Transport Executive	Nexus
Business Group	North East Chamber of Commerce
LA Transport Directors	North East Combined Authority / NE LEP (Chairman)
LEP	North East LEP
LA Transport Directors	North Tyneside Council
LEP	North Yorks LEP
LA Transport Directors	North Yorkshire Authority
Police	North Yorkshire Police
TOC	Northern Rail
LA Transport Directors	Northumberland County Council
Environmental / Heritage Group	Northumberland Tourism
EMPS	Northumbria Police
Port	Peel Ports – Dublin, Glasgow, Liverpool, Heysham, Manchester and Sheerness
Port	Port of Blyth
Port	Port of Sunderland
Port	Port of Tyne
Port	Port of Workington
Environmental / Heritage Group	Ramblers Association
LA Transport Directors	Redcar & Cleveland Council
Business Group	Road Haulage Association
LA Transport Directors	South Tyneside Council
LA Transport Directors	Stockton on Tees Council
LA Transport Directors	Sunderland Council

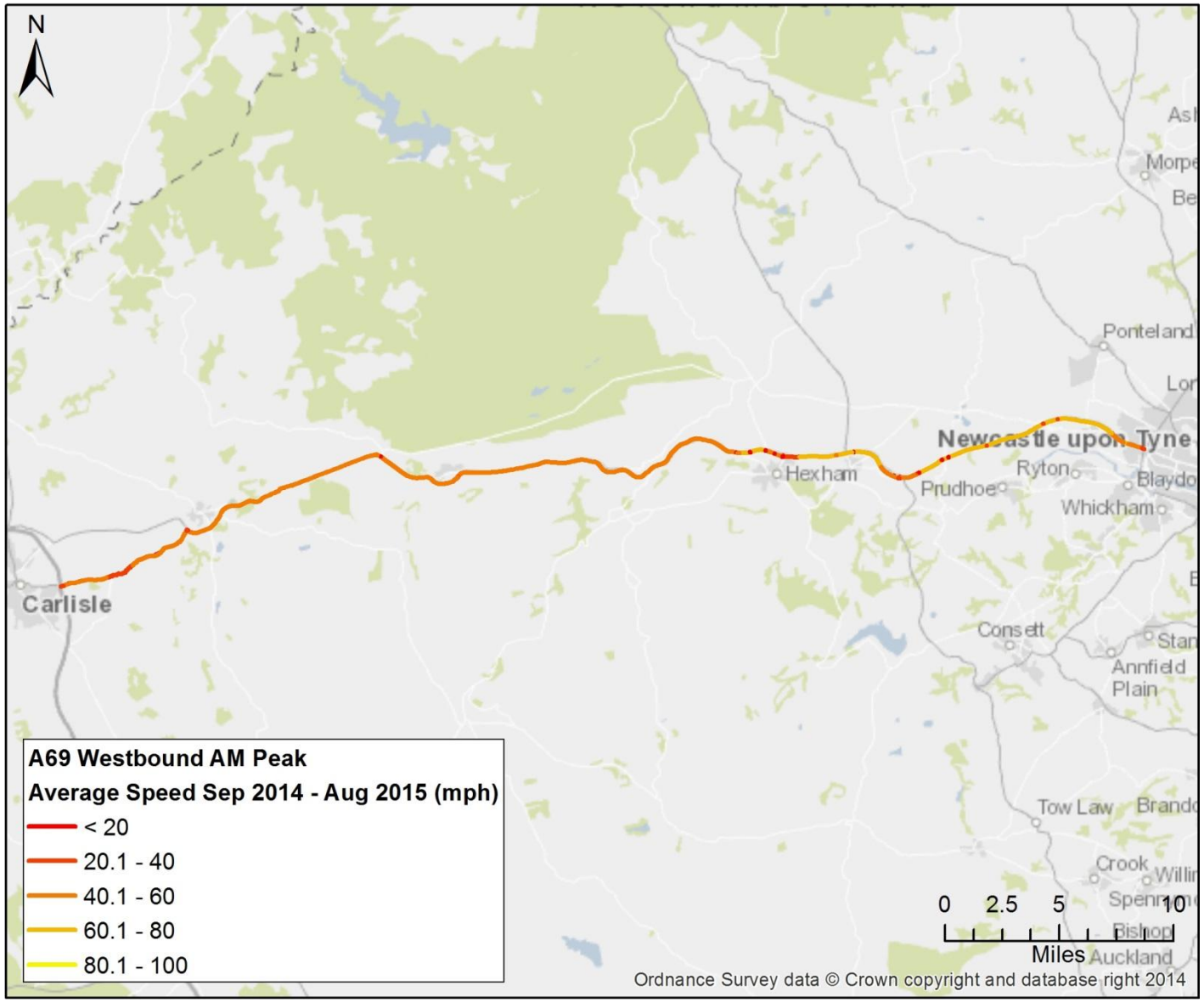
Northern Trans-Pennine Route Strategic Study - Stakeholder Reference Group List	
Category	**Organisation**
LEP	Tees Valley LEP
TfN	Transport for the North
Devolved Nations	Transport Scotland
Environmental / Heritage Group	Wildlife Trusts
LEP	York, North Yorkshire & East Riding LEP

Appendix 3 – Average Vehicular Speeds

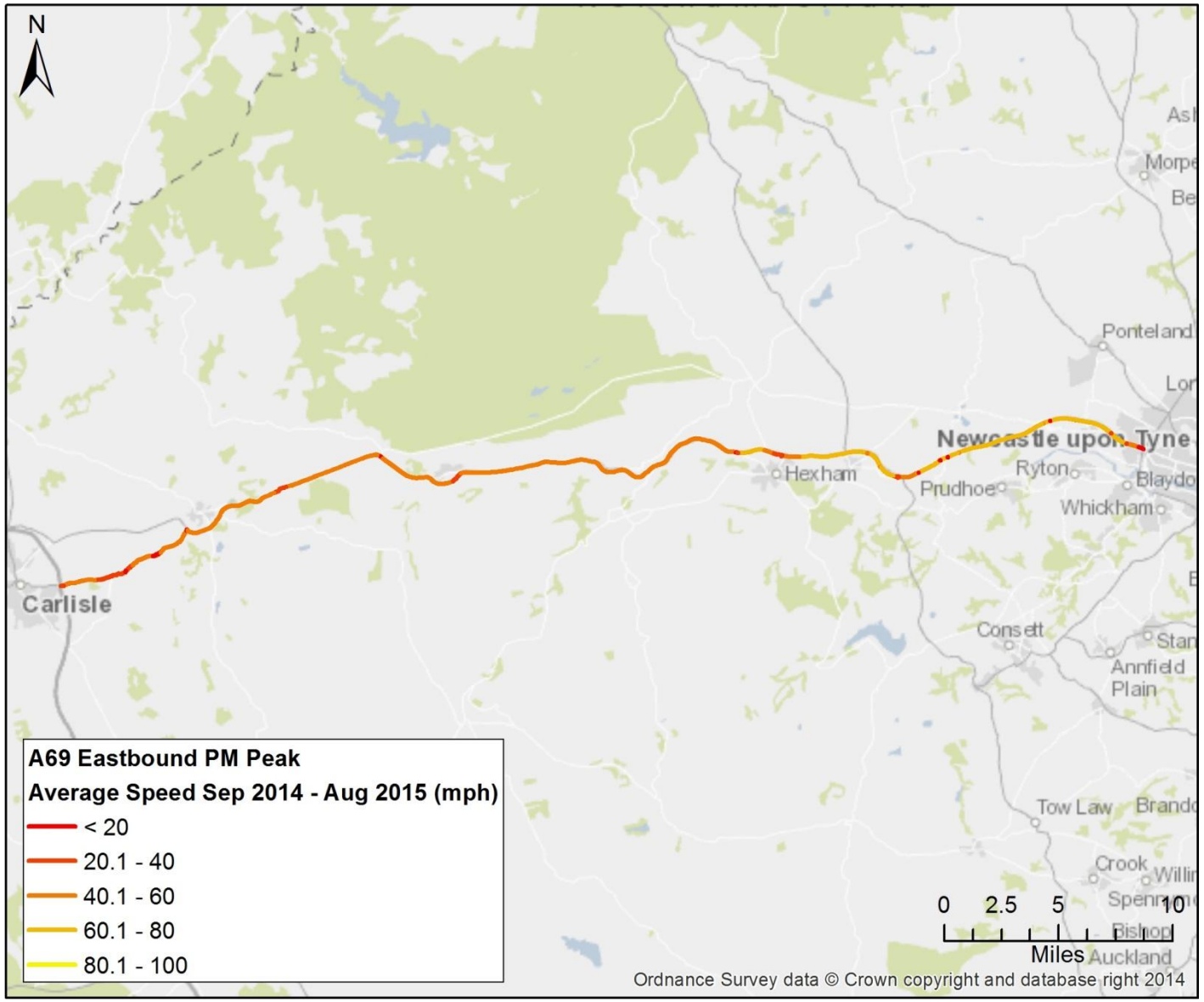
Average Speeds on the A69 Corridor – September 2014 - August 2015 Eastbound Traffic (AM Peak)



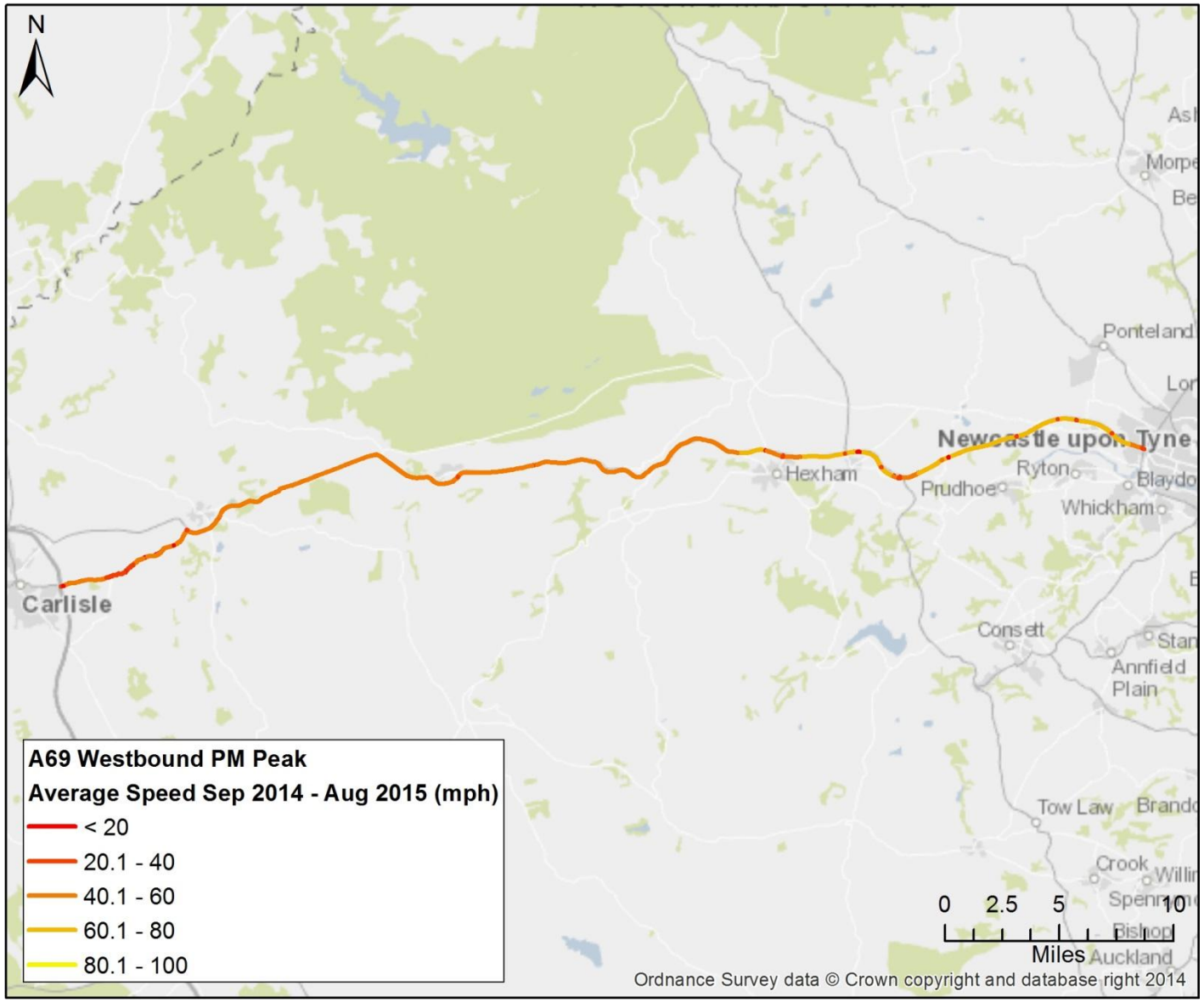
Average Speeds on the A69 Corridor – September 2014 - August 2015 Westbound Traffic (AM Peak)



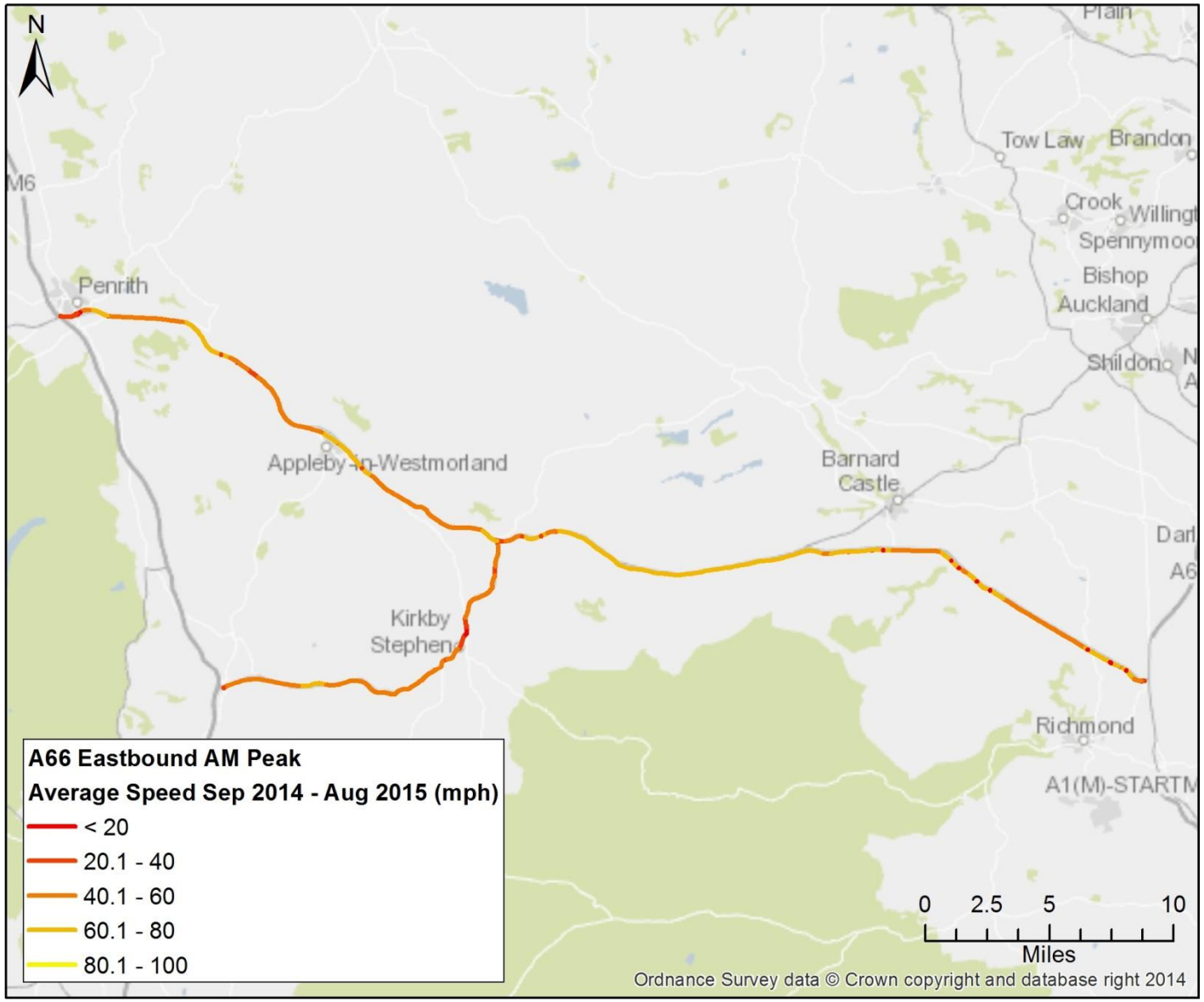
Average Speeds on the A69 Corridor – September 2014 - August 2015 Eastbound Traffic (PM Peak)



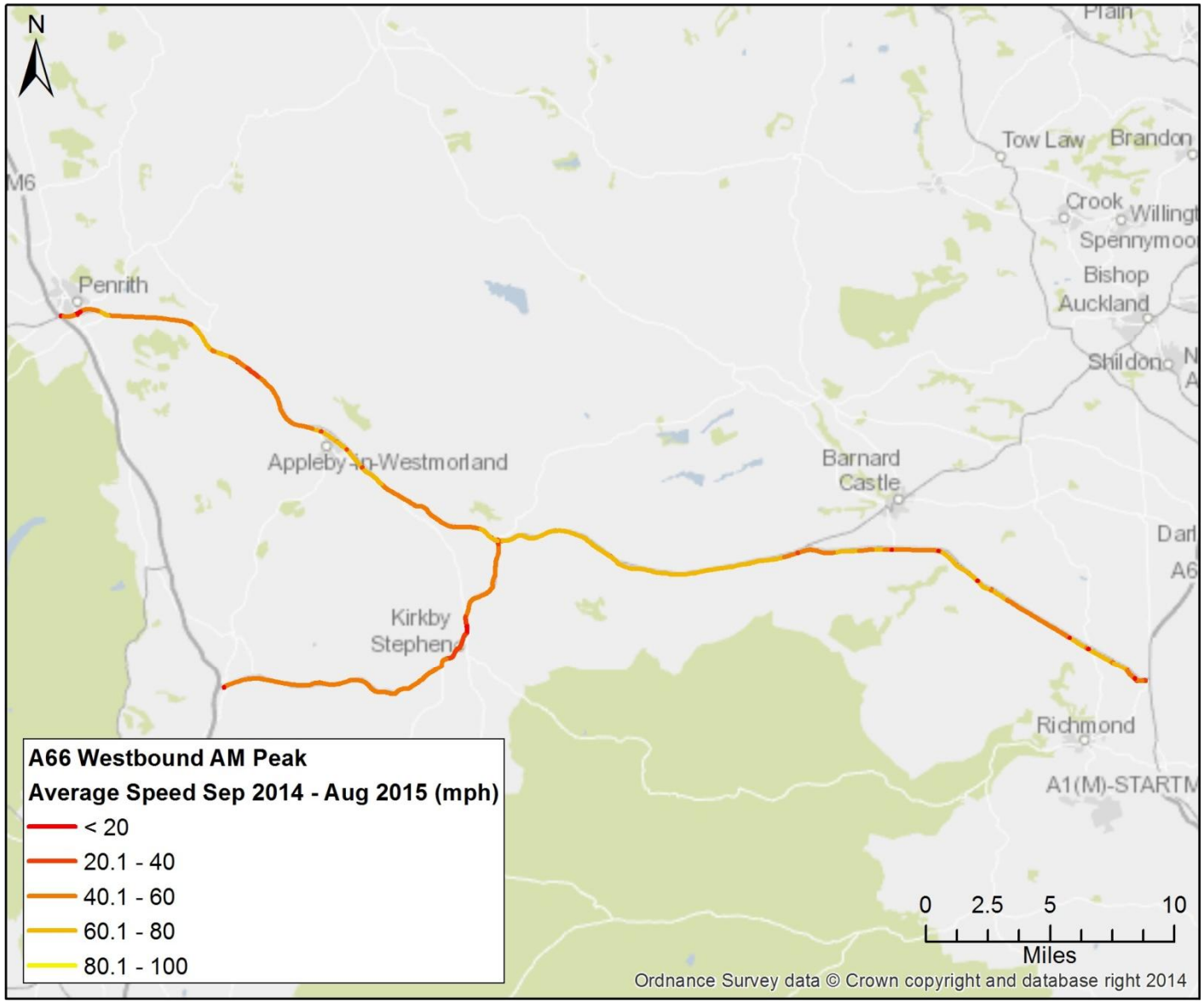
Average Speeds on the A69 Corridor – September 2014 - August 2015 Westbound Traffic (PM Peak)



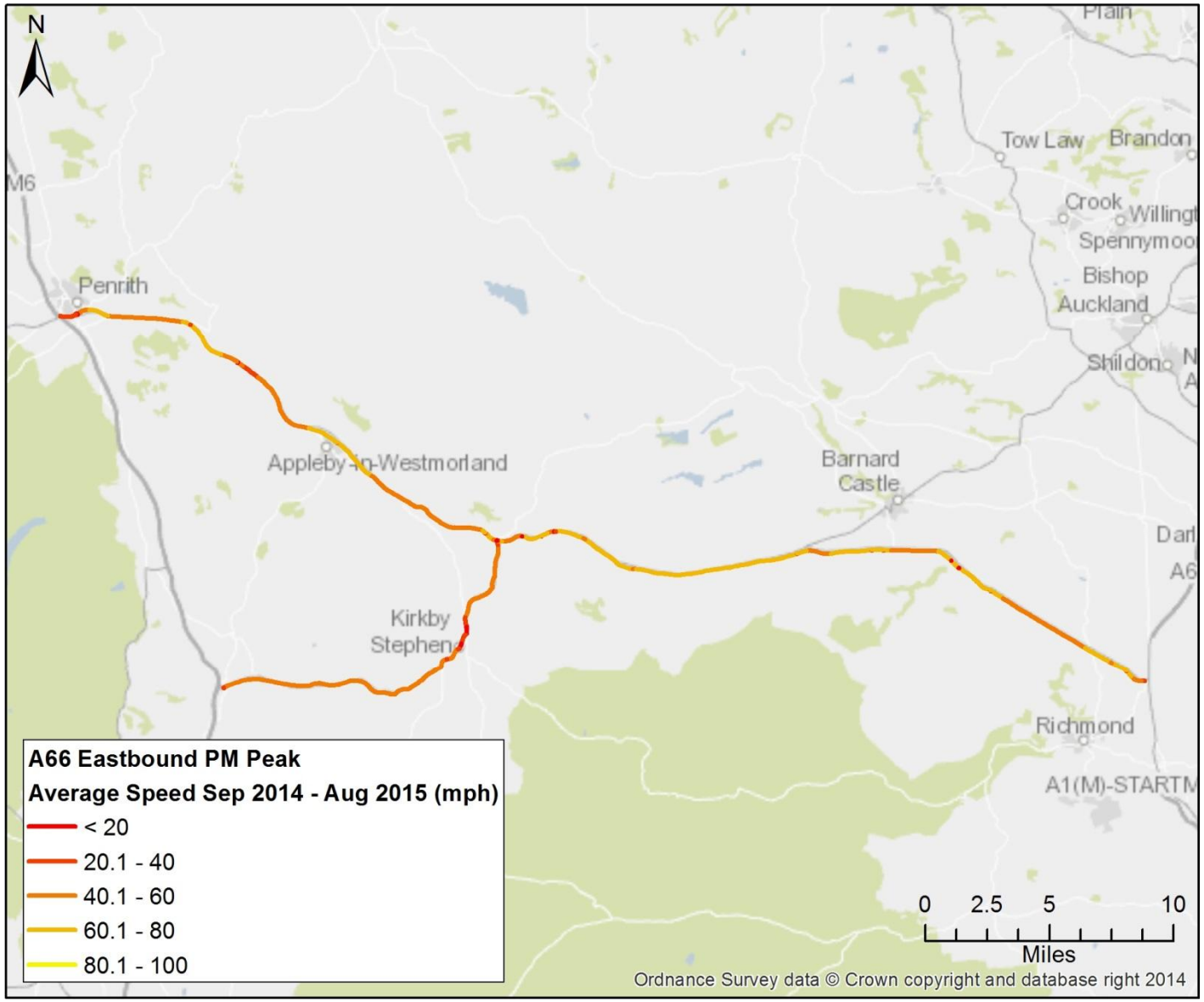
Average Speeds on the A66/A685 Corridor – September 2014 - August 2015 Eastbound Traffic (AM Peak)



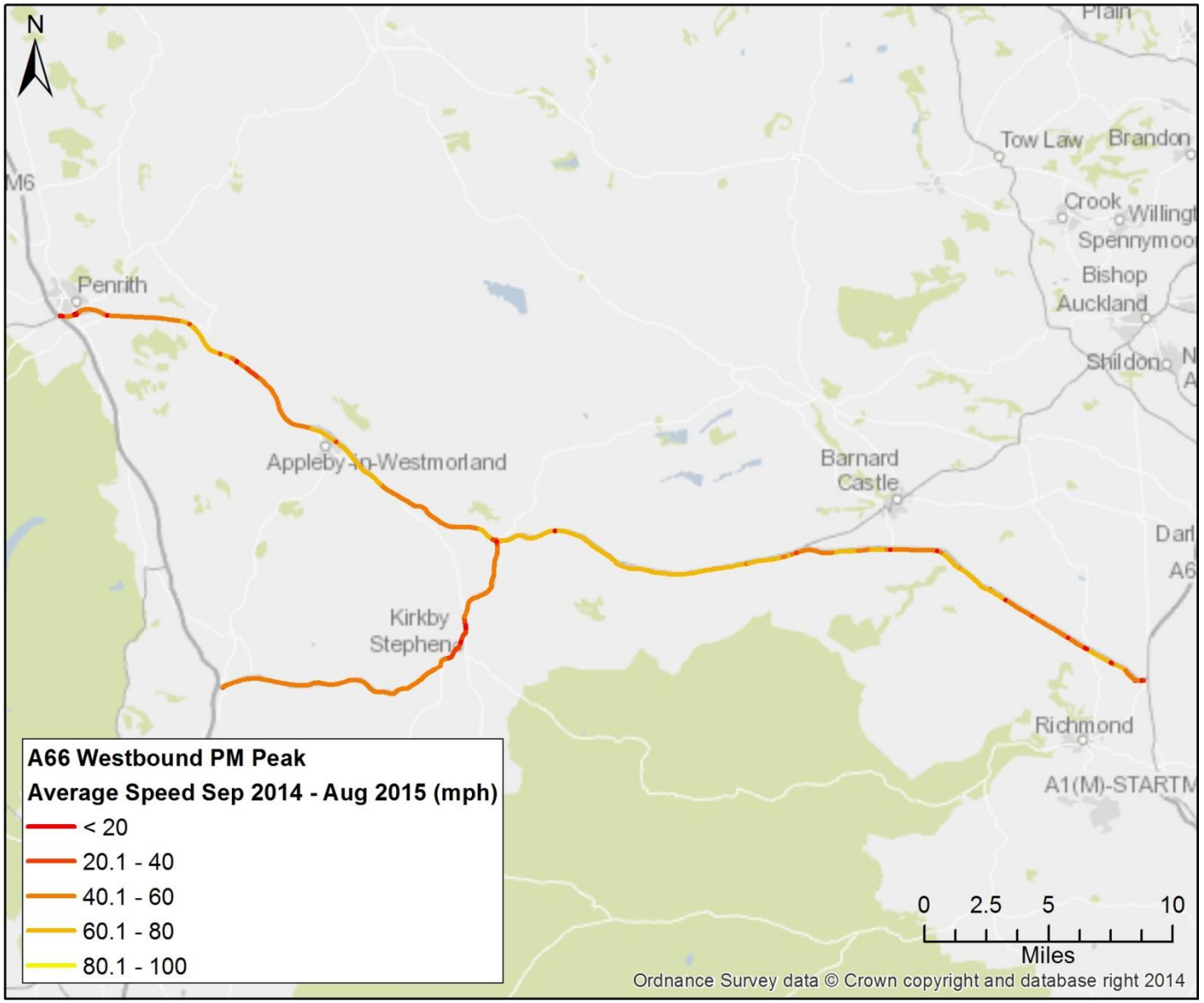
Average Speeds on the A66/A685 Corridor – September 2014 - August 2015 Westbound Traffic (AM Peak)



Average Speeds on the A66/A685 Corridor – September 2014 - August 2015 Eastbound Traffic (PM Peak)



Average Speeds on the A66/A685 Corridor – September 2014 - August 2015 Westbound Traffic (PM Peak)



Appendix 4 – Environmental Criteria Designations

A69 Corridor

Technical Topic	Section			
	1 (A69 Newcastle to Hexham)	2 (A69 Hexham to Haltwhistle)	3 (A69 Haltwhistle to Brampton)	4 (A69 Brampton to Carlisle)
Air Quality & Greenhouse Gases	PCM link in excess of 40 µg m^{-3}	N/A	N/A	N/A
Cultural Heritage	Frontiers of the Roman Empire World Heritage Site within A69 corridor; Scheduled Monuments within 1km. Grade I and Grade II* Listed Buildings.	Frontiers of the Roman Empire World Heritage Site within 1km; Scheduled Monuments within 1km. Grade I and Grade II* Listed Buildings.	Frontiers of the Roman Empire World Heritage Site within A69 corridor; Scheduled Monuments within 1km. Grade I and Grade II* Listed Buildings.	Frontiers of the Roman Empire World Heritage Site within 1km/immediately adjacent to A69 corridor. Scheduled Monuments within 1km. Grade II* Listed Buildings.
Landscape	N/A	Within 2km of North Pennines Area of Outstanding Natural Beauty.	Within 2km of Northumberland National Park and Northumberland Dark Sky Park.	N/A
Nature Conservation / Biodiversity	Hallow Hill SSSI 1.5km to the south; East Denton Ancient Woodland adjacent to A69 carriageway.	North Pennines SPA/SAC within 2km; A69 crosses Tynewatersmeet SSSI.	River Eden SAC/SSI within 2km.	A69 carriageway crosses River Eden SAC/SSI.
Noise & Vibration*	Sections of carriageway within/adjacent to Noise Important Areas	Sections of carriageway within/adjacent to Noise Important Areas	Sections of carriageway within/adjacent to Noise Important Areas	Sections of carriageway within/adjacent to Noise Important Areas
Road Drainage & Water Environment	Sections of carriageway within Flood Risk Zone 3a/b	Sections of carriageway within Flood Risk Zone 3a/b	Sections of carriageway within Flood Risk Zone 3a/b	Sections of carriageway within Flood Risk Zone 3a/b
Peoples & Communities**	Hadrian's Cycleway crosses the A69 carriageway Pennine Way National Trail crosses the A69 carriageway	Hadrian's Cycleway crosses the A69 carriageway	Hadrian's Cycleway crosses the A69 carriageway Pennine Way National Trail crosses the A69 carriageway	Hadrian's Cycleway crosses the A69 carriageway

Technical Topic	Section			
	1 (A69 Newcastle to Hexham)	2 (A69 Hexham to Haltwhistle)	3 (A69 Haltwhistle to Brampton)	4 (A69 Brampton to Carlisle)
Geology, Soils & Materials***	Corbridge Limestone Quarry SSSI	Fallowfield Mine SSSI, Roman Wall Escarpments SSSI and Burnfoot River Shingle and Wydon Nabb SSSI.	River Eden and Tributaries SSSI (designated for geological & biological) & Tipault Burn SSSI	River Eden and Tributaries SSSI (designated for geological & biological)

A66/A685 Corridor

Technical Topic	Section					
	1 (A66 Scotch Corner to Greta Bridge)	2 (A66 Greta Bridge to Bowes)	3 (A66 Bowes to Brough)	4 (A66 Brough to Temple Sowerby)	5 (A66 Temple Sowerby to Penrith)	6 (A685 Brough to Tebay)
Air Quality & Greenhouse Gases	N/A	N/A	N/A	N/A	Within 200m of a PCM link with over 40 µg m^{-3}	N/A
Cultural Heritage	Scheduled Monuments within 1km.	Scheduled Monuments within 1km. Grade I Listed Buildings.	Scheduled Monuments within 1km. Grade I and Grade II* Listed Buildings.	Scheduled Monuments within 1km. Grade I and Grade II* Listed Buildings.	Scheduled Monuments within 1km. Grade I and Grade II* Listed Buildings.	Scheduled Monuments within 1km. Grade I and Grade II* Listed Buildings.
Landscape	N/A	Within 2km of North Pennines Area of Outstanding Natural Beauty.	North Pennines Area of Outstanding Natural Beauty crosses A69 carriageway	North Pennines Area of Outstanding Natural Beauty crosses A69 carriageway	N/A	Situated within proposed extension of Yorkshire Dales National Park
Nature Conservation / Biodiversity	Kilmond Scar SSSI within 200m	A66 corridor crosses North Pennines Moors SAC/SPA	A66 corridor crosses North Pennines Moors SAC/SPA	A685 carriageway crosses River Eden SAC/SSSI. Within 2km of North Pennines Moors SAC/SPA	A66 carriageway crosses River Eden SAC/SSSI.	A685 carriageway crosses River Eden SAC/SSSI.
Noise & Vibration	Sections of carriageway within/adjacent to Noise Important Areas	No sections of carriageway within/adjacent to Noise Important Areas	Sections of carriageway within/adjacent to Noise Important Areas	Sections of carriageway within/adjacent to Noise Important Areas	No sections of carriageway within/adjacent to Noise Important Areas	No sections of carriageway within/adjacent to Noise Important Areas

Technical Topic	Section					
	1 (A66 Scotch Corner to Greta Bridge)	2 (A66 Greta Bridge to Bowes)	3 (A66 Bowes to Brough)	4 (A66 Brough to Temple Sowerby)	5 (A66 Temple Sowerby to Penrith)	6 (A685 Brough to Tebay)
Road Drainage & Water Environment	No sections of carriageway within Flood Risk Zone 3a/b	No sections of carriageway within Flood Risk Zone 3a/b	No sections of carriageway within Flood Risk Zone 3a/b	Sections of carriageway within Flood Risk Zone 3a/b	Sections of carriageway within Flood Risk Zone 3a/b	Sections of carriageway within Flood Risk Zone 3a/b
Peoples & Communities	N/A	Within 1.5km of Walney to Whitby Regional Cycle Route	A66 crosses Pennine Way National Trail Within 1.5km of Walney to Wear Regional Cycle Route	Eden Valley National Cycle Route crosses A66 carriageway	Eden Valley National Cycle Route crosses A66 carriageway	Walney to Whitby Regional Cycle Route crosses A685 carriageway
Geology, Soils & Materials	Black Scar Quarry SSSI within 2km	N/A	God's Bridge SSSI within 2km	River Eden and Tributaries SSSI (designated for geological & biological) crosses A66 carriageway	River Eden and Tributaries SSSI (designated for geological & biological) crosses A66 carriageway	River Eden and Tributaries SSSI (designated for geological & biological) crosses A685 carriageway

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