MOTT MACDONALD

A51 Tarvin-Chester Improvements Scheme

Outline Business Case

March 2018

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Contents

Executive Summary

This document presents the Outline Business Case for the A51 Tarvin-Chester Improvements Scheme. The scheme has been identified by the Cheshire and Warrington Local Enterprise Partnership (C&W LEP) as one of a number of strategically important infrastructure projects which will support regional economic growth.

The scheme seeks to address transport problems between the M53/A55/A51 junction and the Tarvin roundabout, which is prone to congestion and travel delay, through a series of highway capacity improvements at key points along the corridor. The location of the corridor is shown in the figure below.

Figure 1: Strategic Location of the A51 Corridor

Source: Bingmaps

The Outline Business Case is divided into 5 ‘cases’ presenting evidence and analysis to show why the scheme is needed, demonstrate its value for money and evidence that the scheme is commercially viable, financially affordable and achievable.

The Strategic Case

The purpose of the Strategic Case is to assess socio-economic trends in the study area and identify any current issues associated with transport and the economy, as well as highlighting how people travel across the borough, and how this has influenced the design and selection of the final preferred scheme.

Evidence presented in the Strategic Case demonstrates the importance of this scheme as the borough faces significant growth in housing, population and employment from developments such as Chester Northgate and the Chester Business Quarter. This presents a need for the highway network to remain resilient in order to support business growth in the area and offer reliable journey times for increasing freight movements as well as commuters residents and,

visitors using the A51 corridor. The A51 Tarvin corridor is a particular cause for concern in light of increasing traffic volumes as it already experiences severe congestion. The DfT's own data has shown that the route between the Tarvin roundabout and the A55 into Chester is the UK's 5th most congested in terms of average journey waiting time, outside London with a delay of 26.44 hours in 2014 (DfT traffic counts 2014).

The A51 is also a key route between major regional centres such as Crewe Hub, Chester Business Quarter, Ellesmere Port Enterprise Zone and the Atlantic Gateway. Therefore, ensuring congestion is reduced along this corridor will facilitate access to these developments and enhance their success as well as ensuring the area remains attractive to future investors.

As well as being a key route for the commuters and residents between key regional centres, the A51 serves as a key strategic corridor for freight traffic between Chester, North Wales, the West Midlands and beyond. Capacity improvements along the A51 will also ease congestion for road freight particularly on strategic connections from the M6 corridor through to the Atlantic Gateway.

Nitrogen Dioxide levels along the A51 are shown to be higher than the annual desired averages. Accident data has shown issues of road safety with clusters of accidents at junctions along the corridor, such as the A55/A51 Vicars Cross junction, and rear end shunting accidents resulting from stop start traffic. The A51 Tarvin-Chester Improvements Scheme can therefore improve the quality of life for residents within the borough by improving air quality through reduced congestion and increasing opportunities for pedestrians and cyclists with safer roads and improved infrastructure.

This evidence demonstrates the need for capacity improvements along the A51 corridor and have informed the development of scheme objectives which in turn guided scheme development. Scheme objectives have been grouped into 4 themes as follows:

- **Economic growth**- To achieve improved accessibility to facilitate economic growth and job creation;
- **Strategic connectivity**- To deliver transport network improvements which deliver enhanced connectivity between Chester and Tarvin, and key regional centres such as Crewe, Northwich, Winsford and Manchester Airport;
- **Local connectivity**- To reduce levels of highway congestion and secure enhanced local connectivity between Chester and Tarvin and encourage and facilitate sustainable transport use along the route. In addition, ensure provision for efficient access to, and movement between, current and future local housing sites, employment and mixed-use developments; and
- **Wider social impacts**- To ensure local residents enjoy a good quality of life and that the area between Tarvin and Chester remains an attractive place to live, work and play.

In line with these objectives the scope of the A51 Tarvin-Chester Improvements Scheme was set so that selected components would enhance local and strategic connectivity in order to support economic growth, and improve environmental and safety conditions for local residents. Increased capacity of the network and reduced congestion are key in addressing all 4 objectives and as such this scheme proposes to implement:

- An additional left turn lane at Tarvin roundabout from the A51 South to the A51 West;
- Signal and line marking changes at Stamford Bridge to provide 2 lanes straight ahead for eastbound traffic;
- Provision of an extra westbound lane through the Stamford Bridge junction, with a long merge for westbound traffic exiting the junction;
- Widening of the existing bridge over the River Gowy to accommodate the additional westbound traffic lane;

- Removal of some of the existing right turn movements at the Hare Lane/Littleton Lane junction;
- Modifications to the westbound approach and eastbound merge on the A51 at the A51/ A55 junction; and
- New crossing points and footpath provision for pedestrians, bus users and cyclists along the A51 corridor.

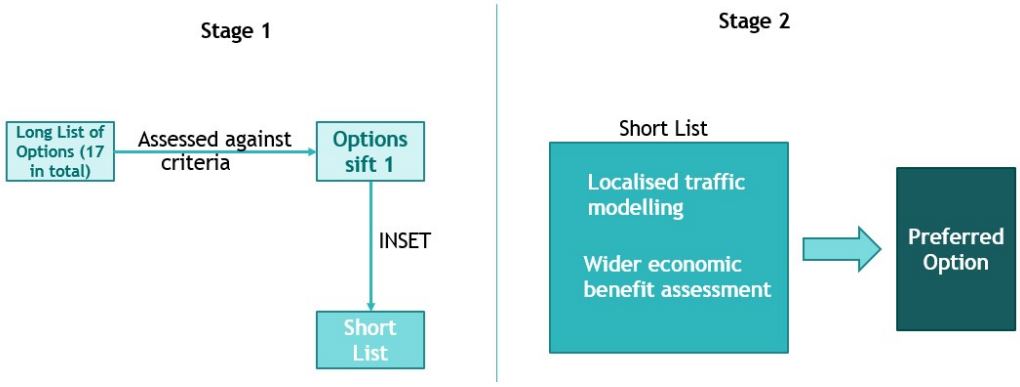
The strategic case also establishes how the scheme aligns with national, regional and local policy as it contributes towards a more resilient highway network. Enhanced transport infrastructure is vital in supporting economic growth and development by improving labour market access into and around Chester; a key priority for the C&W LEP.

Potential risks to the delivery of the scheme are also outlined and include changes to legislation or local administration which may result in the scheme becoming lower priority and funding risks which may directly impact budgets.

The Economic Case

The Economic Case demonstrates that the preferred scheme delivers considerable economic benefits for Cheshire West and Chester and the wider Cheshire and Warrington LEP area. A robust appraisal process was undertaken in order to develop the components of the preferred option summarised in the Figure below.

Figure 2: Options Assessment Framework Two Stage Approach



A robust process has been carried out to develop the components of this scheme and ensure maximum benefits. A long list of 17 options was developed in response to the scheme objectives and sifted using Mott MacDonald's in-house Investment Sifting and Evaluation Tool (INSET) to produce a short list of 4 potential schemes.

Junction modelling and assessment of the wider economic benefits found that capacity improvements at Stamford Bridge, Tarvin roundabout, and the A55/A51 junction as well as banning right turn movements at Hare Lane and Littleton Lane provided the maximum benefits in terms of reduction in journey times and benefits to the economy and this has been selected as the preferred option.

Transport benefits and wider economic benefits have been assessed for the preferred option showing strong support for the scheme. Economic appraisal has shown the scheme presents High Value for Money with an initial Benefit Cost Ratio (BCR) value of 3.1. When adjusted for the inclusion of journey time reliability benefits, this BCR increases to 3.2.

Detailed assessment of the wider economic benefits demonstrates how the scheme enhances local economy with the potential to provide 10 to 20 jobs and £433,800 to £864,500 GVA in

construction benefits. £171,840 to £343,680 worth of council tax can also be attributed to the proposed interventions within the scheme. There are no employment sites in proximity to the A51 corridor which will be directly influenced by this scheme. However, 200 houses are proposed in the Tarvin area with an additional 500 in Tarporley, Cuddington & Sandiway, as outlined within the Local Plan Part One, meaning improvements along the A51 may help to unlock jobs and development associated with housing growth. It should also be noted that this scheme is the first phase in a wider package of investments which could lead to further jobs and GVA uplift. Assessment of social and distributional impacts demonstrates that the scheme could be beneficial to journey quality as although there will be a temporary increase in route uncertainty during construction, once operational the scheme is likely to produce a reduction in user frustration and fear of accidents. Severance is also likely to be reduced once operational, creating an improved connection to community facilities in Tarvin and Chester and there will be no severance during construction.

From an environmental perspective, a number of constraints have been identified that will impact the scheme, however these are minor issues and it is expected that these can be appropriately avoided or mitigated as the scheme develops.

The Economic Case therefore provides strong support for the scheme demonstrating High Value for Money and generating significant economic benefits for the local area in terms of GVA uplift and council tax generation. On a qualitative basis it is likely the scheme can be delivered without any adverse environmental impacts and when complete will improve journey quality for users of the route and improve local connectivity within local communities as severance is reduced.

The Financial Case

The total cost of the scheme components based on detailed design with no risk allowance is £4,488,926. With quantified risk calculated as £633,183 (approximately 14%) and inflation at £222,730, the total cost of the scheme is £5,344,839.

An additional amount of 1% of total scheme construction and delivery costs, rounded up to the nearest thousand, of £54,000 has been allocated to enable robust monitoring and evaluation of the scheme, in accordance with the C&W LEP's Assurance Framework. This brings the **total funding ask to £5,398,839.**

The scheme will be funded by the Cheshire and Warrington LEP with Cheshire West and Chester Council providing £1,741,000 as match contribution, 32.2% of the overall cost of the scheme. This will be funded through the Council's own capital resources including Integrated Transport Block, Maintenance Block allocation, the Council's own capital reserves while seeking third party funding contributions towards the scheme from Community Infrastructure Levy (CIL) for the A51/A54 Tarvin roundabout, Barrow Lane. Section 106 contributions will also be sought to fund sustainable transport improvements at the Hare Lane/Littleton Lane junctions.

The Commercial Case

The commercial case demonstrates that the scheme is commercially viable and will be taken forward using a procurement strategy to engage the market to deliver the scheme. The A51 Tarvin-Chester Improvements Scheme meets a number of strategic objectives and outcomes within available funding and at low risk.

As this is an OJEU level scheme key procurement options are either:

- Open Tender,
- Restricted Tender or
- An approved Framework that CWaC can utilise.

Open Tender

Open Tenders for Highways schemes is the traditional method of procurement with the design done in house and contractor/ consultancy services procured through the CHEST North West Portal. Once the design is completed there is a normal 14-week timeline from Issuing the Open Tender and OJEU notice, through to tender award. If the detailed design is not being done in house, then CWaC will need to include the procurement process in the design commission. Another option on this theme is to package it as a design and build on an open tender basis, but that would be resource heavy with the detailed approvals needed.

Restricted Tender

A restricted tender using a Supplier Questionnaire tends to lengthen the procurement timeline and is also resource heavy and it is for these reasons that this option is not favoured.

Approved Frameworks

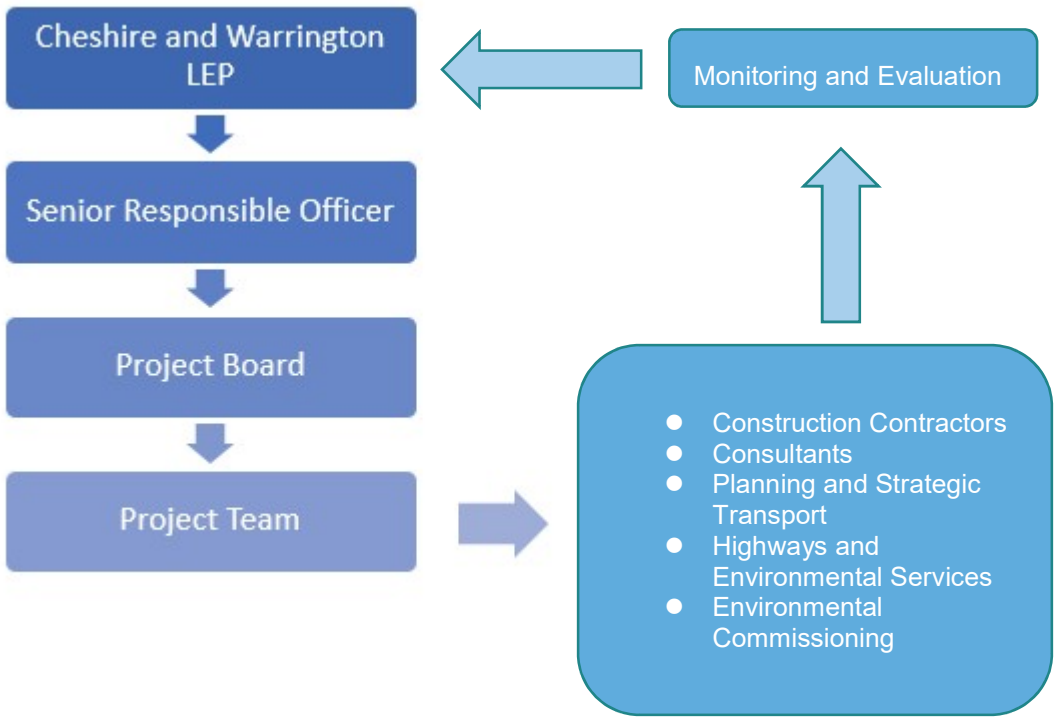
CWaC are undertaking further investigation into the SCAPE Civil Engineering & Infrastructure Construction Framework for construction. SCAPE has been used on previous LEP funded schemes such as Centre Park Link and Warrington East Phase 2, in order to understand the delivery benefits and value for money this procurement route can achieve. .

CWaC working in partnership with Warrington, Cheshire East and Halton Borough Councils are co-signatories to the Transportation and Public Realm Consultancy Services Framework to drawdown specialist transport consultancy support, of which five suppliers are party to: Mott MacDonald; AECOM; Atkins; Halcrow; and WSP.

The Management Case

CWaC are the scheme promoter and delivery agent for the A51 Tarvin-Chester Improvements Scheme. The strategic governance structure is shown in Figure 3.

Figure 3: Strategic Governance of theA51 Tavin Road Improvements Scheme



Source: Mott MacDonald

The C&W LEP hold the devolved funding from Central Government, however responsibility then falls to Cheshire West and Chester to make the relevant payments to the associated project partners to ensure scheme delivery.

The Project Team will manage the day to day delivery of the scheme with the Project Manager reporting to the Project Board. The Project Team consists of officers from the Council's Transport Planning and Highways Team who are responsible for providing advice on monthly spend/budget, funding and delivery agreements, land ownership issues and communication of the project with key stakeholders.

Delivery Milestones

The following table sets out the key milestones for delivery of the scheme and expected timescales which the Project Team will work to:

Table 1: Key Delivery Milestones

Key Milestone	Timescale (Financial years)
Funding Approvals	Q1 2018/2019
Start date (Date from which eligible expenditure will be incurred)	Q1 2018/2019
Consultation Engagement	Q2 2017/18 – Q2 2019/20
Land Acquisition	Q3 2017/18 – Q2 2019/20
Ecology Surveys	Q4 2017/2018 – Q1 2020/2021
Engineering Investigations (GI, Drainage, C3/ C4 Stats Searches)	Q4 2017/18 – Q2 2018/2019
Highway Design (Preliminary/ Detailed Design)	Q1 2018/2019 – Q2 2019/2020
Structural Design (Options/ Feasibility/ Detailed Design)	Q1 2018/2019 – Q2 2019/2020
Contract Procurement	Q1 2019/2020 – Q4 2019/2020
Construction Start	Q3 2019/2020
Construction End	Q4 2020/2021
Maintenance/ Defects Correction Period	Q4 2020/2021 – Q4 2021/2022
Final financial claim date	Q4 2020/2021
Proposed project completion date – date by which outputs will be achieved	Q4 2020/2021
Proposed activity end date – date by which all project activities described in the application will be completed (monitoring and evaluation of outcomes post scheme completion)	Q3 2025

Source: Mott MacDonald

Monitoring and Evaluation

The success of A51 Tarvin-Chester Improvements Scheme will be determined by a number of factors:

- Delivery to time, budget and specification;
- Reduction in congestion along the A51 corridor;
- Reduction in queue lengths at key junctions along the corridor;
- Improved journey times for east and westbound traffic travelling along the A51 corridor;
- Continued investment in developments within Chester and the wider region/ success of developments; and
- Helps improve local air quality.

Monitoring and evaluation activities need to be undertaken during scheme delivery to ensure the scheme is delivered on time, on budget and to specification (measuring inputs and outputs), and following scheme completion to evaluate to what extent outcomes and impacts have been

realised. The cost of these monitoring and evaluation activities undertaken during the scheme delivery is covered within the funding ask. Additional activities completed after scheme completion will be covered by CWaC.

Risk Management and Mitigation

A number of key risks have been identified which may occur as a result of implementing the scheme. These risks include strategic, environmental, infrastructure and financial risks and are summarised in the following table.

Table 2: Risk Management and Mitigation

Risk Type & (risk owner)	Risk Event	Likely timeframe for occurrence	Consequences	Mitigation
Strategic Risk				
Policy Risk (CWaC, Lisa Harris/ Charlie Seward)	Changes of national / local policy direction not involving legislation.	Throughout project delivery	Scheme components become redundant and / or additional measures are required to support local and national ambitions.	Funding for the scheme has been devolved from central government to the C&W LEP for locally based decision making as to whether the scheme should progress, so changes in national policy will have a lesser impact than changes in Local policy. Local policy is well established through the Cheshire West and Chester Local Plan Parts One and Two and the LTP3 which this scheme aligns with and have been developed within the last two years.
Construction Programme Risk (Contractor/ CWAC, Maria Byrne)	The construction of the physical assets is not completed on time and to specification.	During construction	Funding is clawed back because of failure to meet delivery targets established by the C&W LEP. Additional costs required to deliver completed scheme with no opportunity to secure additional external funding. The benefits of the scheme are delayed.	Due diligence during procurement process. Ongoing monitoring of progress against delivery milestones and stringent project management during delivery with clear procedures in place for reporting and addressing any slippage.
Stakeholder Risk (CWaC, Graham Pink, Carl Holloway)	Change in support from key stakeholders, Highways England and local parish councils.	Throughout project delivery	Scheme lacks support from the local community who were not consulted during scheme development, resulting in unfavourable public criticism of elected members	Consultation has been carried out with key stakeholders presenting the preferred option and three alternative options.
Planning Risk (CWaC, Lisa Harris)	Failure to progress to statutory process and achieve appropriate approvals (planning)	Prior to construction	Hinders scheme progression delaying overall delivery.	The planning and statutory process requirements have been identified at OBC stage and key parties remain engaged to ensure there is adequate allowance in the programme.
Funding Risk				
Cost Risk (Contractor/ CWaC, Mark Wynne)	Increase in scheme costs e.g. cost of materials and infrastructure.	During detailed design and construction	The level of funding available is insufficient to meet the proposed scheme delivery costs and scheme cannot be delivered in full, impacting the benefits and BCR upon which the scheme was awarded funding.	The Project Board will monitor cost and delivery throughout the project.

Risk Type & (risk owner)	Risk Event	Likely timeframe for occurrence	Consequences	Mitigation
Cost Estimate Risk (CWaC, Maria Byrne)	Inaccurate scheme cost estimate	During detailed design and construction	Delays to procurement and funding approvals	Progress scheme in sufficient detail to enable robust cost to be produced. Apply suitable risk allowances and contingencies to option development stage cost estimate.
Environmental Risk				
Flood Risk (CWaC, Maria Byrne)	Risk of flooding. The majority of the A51/B5132 junction site is within Flood Zone 3 and the land surrounding the river running North West to South East within 500m of the site boundary.	Throughout project delivery	Areas within site boundary may be damaged in the event of a flood which could cause further delays in traffic.	Early engagement has been undertaken with the Environment Agency. A Flood Risk Assessment will be undertaken to identify any issues and potential mitigation measures
Environmental Constraints (CWaC, Maria Byrne)	Unforeseen environmental constraints such as wildlife issues	During detailed Design, prior to construction	May cause delay and cost impact to the scheme as a result	Baseline environmental scoping and surveys undertaken and reviewed through detailed design process.
Infrastructure Risk				
External Interface Risk (CWaC, Maria Byrne)	Delays to programmed diversions to Statutory Undertakers apparatus.	Prior to construction	Delay to scheme delivery, impact on tourism. Complaints from Residents/ businesses.	Ensure works are programmed with least impact on the local and wider road network. Ongoing liaison with public and residents.
External Interface Risk (CWaC, Lisa Harris)	Delay to Third Party Land Acquisition.	Prior to construction	Increased costs and delay to the programme	Ensure land acquisition is completed in good time prior to works commencing.
Structural Constraints (CWaC, Maria Byrne/ Contractor)	Unforeseen structural constraints	During construction	Delay to the scheme design and overall delivery.	Undertake structural surveying / investigation works in support of the detailed design.
Engineering Risk (CWaC, Maria Byrne/ Contractor)	Unforeseen issues at locations of carriageway widening.	During construction	Time delays, with a potential resultant increase in scheme costs e.g. geotechnical issues.	Baseline reports completed and further detailed site surveys to identify any issues.

1 Introduction

1.1 Headline Description

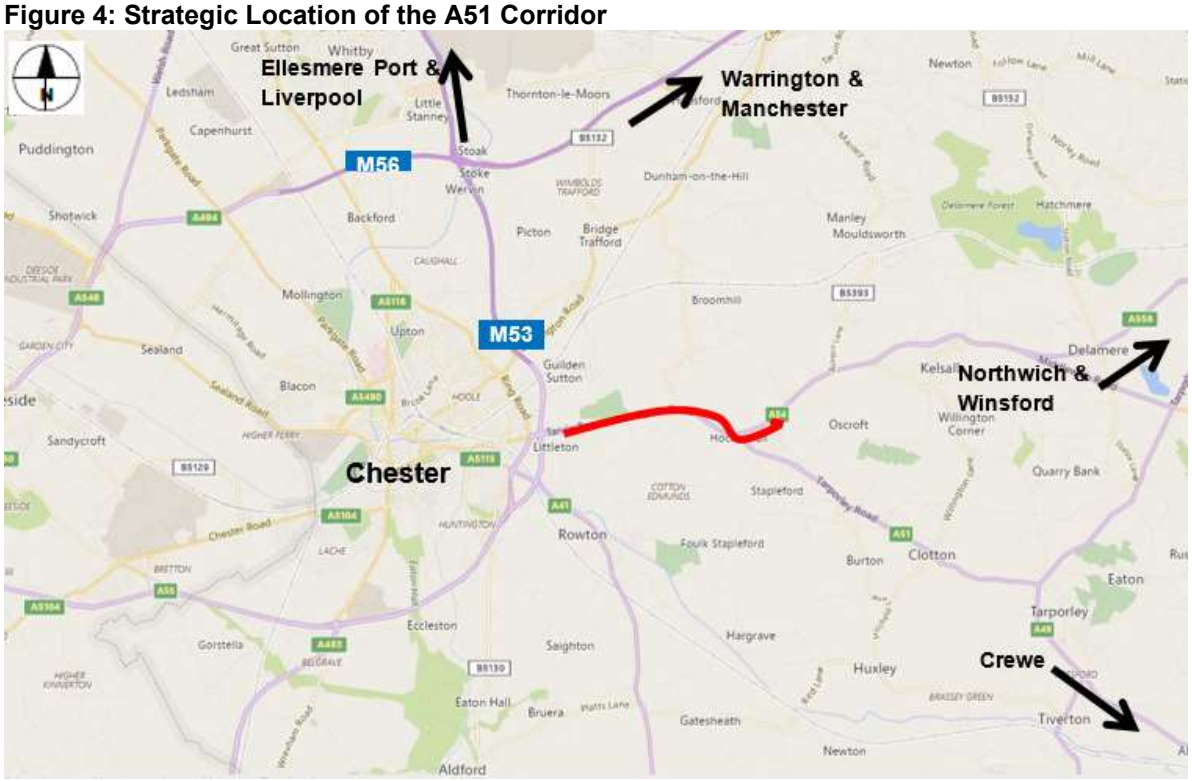
This document presents an Outline Business Case for the A51 Tarvin-Chester Improvements Scheme. The scheme has been identified by the Cheshire and Warrington Local Enterprise Partnership (C&W LEP) as one of a number of strategically important infrastructure projects which will support regional economic growth.

The scheme seeks to address transport, accessibility and community cohesion issues between the M53/A55/A51 junction and the Tarvin (A54/A51) roundabout; a corridor, illustrated in Figure 3, which is prone to congestion and travel delay. The proposed scheme aims to reduce network delay, improve journey time reliability and create a more resilient strategic highway network that will support economic growth in Chester and the wider Cheshire and Warrington area, emphasising the importance of this strategic corridor to the surrounding areas of Chester, Winsford, Northwich and Crewe.

1.2 Scheme Context

The A54 and A51 are key strategic roads running east and south-east respectively linking Chester to the M6. The A51 is a principle route for commuter and other traffic between Chester, Northwich and Winsford, Crewe, Staffordshire and the West Midlands as well as from local villages close to Chester such as Tarvin, Kelsall, Tarporley, Ashton and Barrow. The A51 is highlighted in red in Figure 4 and illustrates its importance as a strategic link to surrounding towns and the motorway network.

Figure 4: Strategic Location of the A51 Corridor

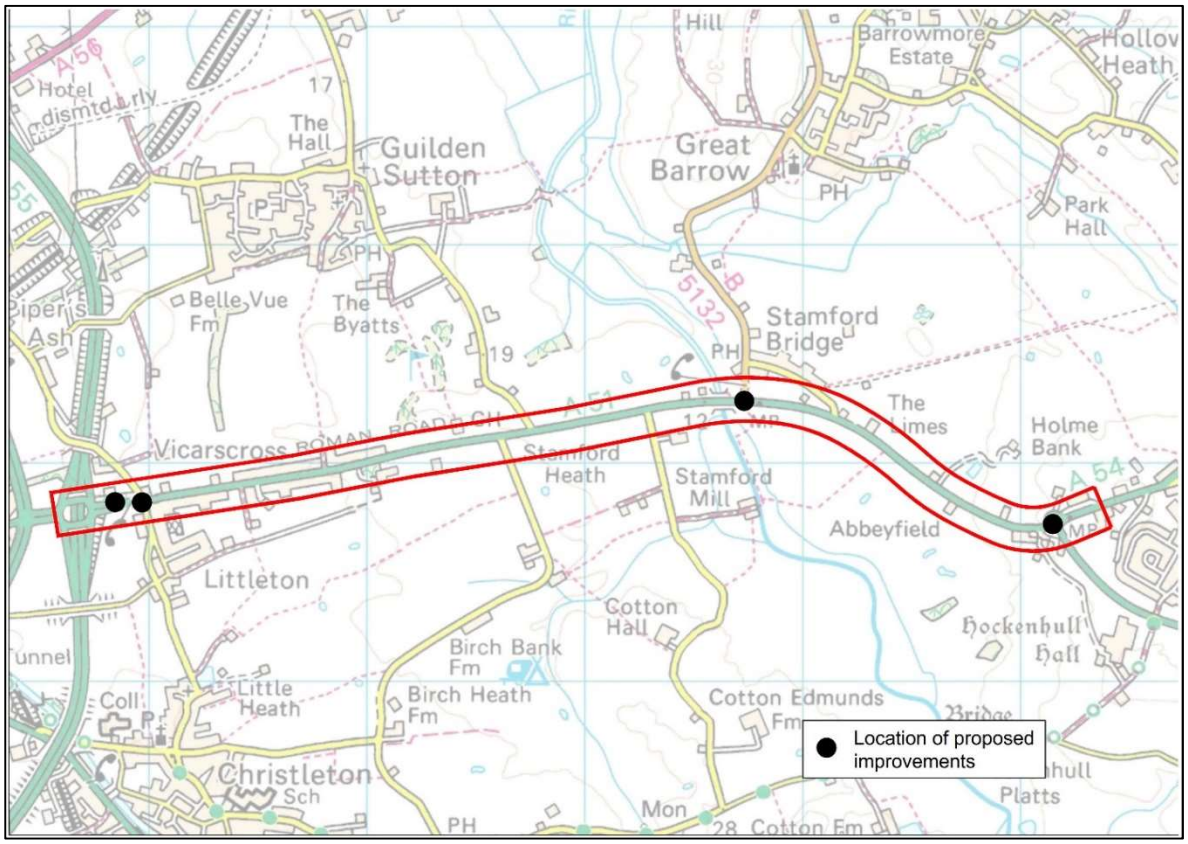


Source: Bingmaps

Within the identified corridor, Figure 5 illustrates the specific locations of the scheme interventions at a local level and these are:

- An additional left turn lane at Tarvin roundabout from the A51 South to the A51 West;
- Signal and line marking changes at Stamford Bridge to provide 2 lanes straight ahead for eastbound traffic;
- Provision of an extra westbound lane through the Stamford Bridge junction, with a long merge for westbound traffic exiting the junction;
- Removal of some of the existing right turn movements at the Hare Lane/Littleton Lane junction; and
- Modifications to the westbound approach and eastbound merge on the A51 at the A51/ A55 junction.

Figure 5: A51 Corridor - Study Area Boundary and Intervention Sites



Source: Mott MacDonald

1.3 Purpose and Structure of Report

This document is structured in accordance with the DfT's Guidance for Transport Business Cases, which was prepared in January 2013, capturing the 'Five Case' process approach. Following the introduction, the remainder of the document is structured as follows:

- **Section 2**: The Strategic Case- this section identifies the key issues and opportunities that the scheme is aiming to address in line with the core objectives of the scheme and wider strategic objectives outlined within policy.
- **Section 3**: Options Appraisal- this section briefly describes the options appraisal process undertaken to arrive at the preferred option.

- **Section 4**: The Economic Case- this section demonstrates the value for money for the scheme including the impact on the economy, environment and society, based on an appraisal framework consistent with the DfT business case guidance.
- **Section 5**: The Financial Case- presenting an assessment of affordability, overall scheme costs and funding certainty. It outlines how the costs and the scheme are to be funded/financed, including the structuring of any borrowing and the position of the relevant parties.
- **Section 6**: The Commercial Case- a summary of the procurement strategy, pricing and payment mechanisms and risk allocations.
- **Section 7**: The Management Case- sets out clear proposals for governance, project planning, risk management, stakeholder management and evaluation.
- **Section 8**: Summary and conclusions of the key issues and benefits of the scheme.

2 The Strategic Case

Section Summary

The purpose of the Strategic Case is to assess socio-economic trends in the study area and identify any current issues associated with transport and the economy, as well as highlighting how people travel across the borough, and how this has influenced the design and selection of the final preferred scheme.

As well as identifying the key issues within the area this section highlights how the A51 Tarvin-Chester Improvements Scheme can provide opportunities to reduce congestion, support economic growth and improve socio-economic conditions. In order to assess these trends, this section reviews sources from the Office of National Statistics (ONS), Department for Transport (DfT), official labour market statistics, OS mapping, traffic counts, annual average daily flows and the English Indices of Deprivation. The identification of these problems and opportunities has been used to inform the development of the objectives for the A51 Tarvin-Chester Improvements Scheme to ensure that the scheme outputs have the capability to address local and regional issues.

- Evidence presented in this section demonstrates the importance of this scheme as the borough faces significant growth in housing, population and employment from developments such as Northgate and the Chester Business Quarter. This presents a need for the highway network to remain resilient and offer reliable journey times for increasing numbers residents, visitors, shoppers and commuters. The A51 Tarvin corridor is a particular cause for concern in light of increasing traffic volumes as it already experiences severe congestion. TrafficMaster journey times show that from the A55 Vicars Cross Roundabout to Tarvin roundabout, which is the section of the A51 where the interventions will take place, the journey in both directions in the off-peak takes around four minutes, whereas in the AM peak (08:00-09:00) the times increase to 7.5 minutes eastbound and 10 minutes westbound.

The A51 provides a key route between major regional centres such as Crewe Hub, Chester Business Quarter, Ellesmere Port Enterprise Zone and the Atlantic Gateway. Therefore, ensuring congestion is reduced along this corridor will facilitate access to these developments and enhance their success as well as ensuring the area remains attractive to future investors.

Nitrogen Dioxide levels along the A51 are shown to be higher than the annual desired averages. Accident data has also shown issues of road safety with clusters of accidents at junctions along the corridor, such as the A55/A51 Vicars Cross junction, and rear end shunting accidents resulting from stop start traffic. The A51 Tarvin-Chester Improvements Scheme can therefore also improve the quality of life for residents within the borough by improving air quality through reduced congestion and increasing opportunities for pedestrians and cyclists with safer roads and improved infrastructure.

The key issues and evidence identified in this section demonstrate the need for capacity improvements along the A51 corridor in order to facilitate upcoming developments, mitigate current and future issues of congestion, support economic growth and ensure residents experience a good quality of life through improved air quality and road safety.

2.1 Scheme Background

2.1.1 Strategic context

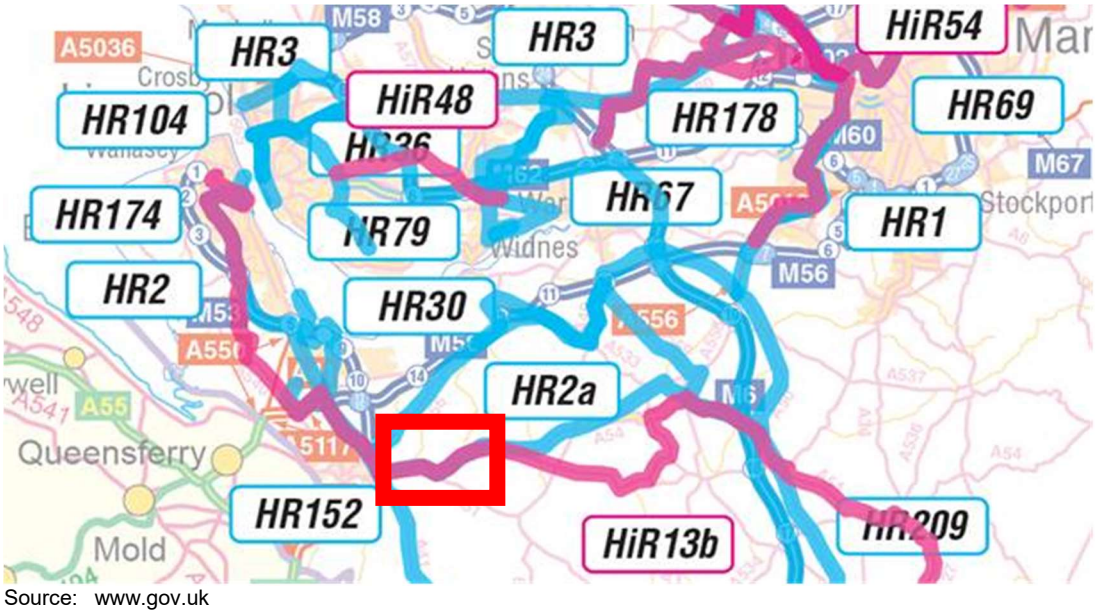
The A51 between Chester and Crewe is a key highway corridor in the north of England. The route has been identified by the Department for Transport as one of the five most congested highway corridors in England outside of London (DfT traffic counts 2014) and is recognised as a significant constraint on the long-term growth and development of Chester. Historically, Chester as the county town of Cheshire has relied on good highway connectivity to provide accessibility to the wider historic county which stretches as far as Stoke on Trent, east Manchester and the Peak District. As the first part of the journey to these areas, the A51 has performed a key role in enabling efficient west – east movement from Chester.

The A51 is also central to the Transport for North (TfN) West and Wales corridor where significant economic and population growth is forecast increasing demand and pressures on transport infrastructure. Capacity improvements along the A51 will enhance connectivity across the wider TfN strategic corridor to support the growth of Manchester Airport, Liverpool John Lennon Airport, the Cheshire Science Corridor Enterprise Zones, Atlantic Gateway, North Wales Arc, Port of Liverpool and Crewe HS2 Hub.

The A51 also provides a strategic link through mid-Cheshire between North Wales, Chester, Crewe and the Northwich/Winsford area. Whilst Chester as a whole is a relatively prosperous city, a number of locations in Cheshire West and Chester and parts of Cheshire East and Warrington are relatively deprived. The A51 forms a vital connection for residents in towns such as Winsford who wish to access employment or opportunities in Chester, Chester Business Park and Deeside. Growth in congestion and network delay therefore threatens the ability of the wider community of Cheshire to access these opportunities as the A51 offers unreliable and inefficient journey times.

As a key strategic link between North Wales, Chester, Crewe, Northwich and Winsford, the A51 also serves as an important network for freight services and is a critical route for both high and heavy loads as shown in the red box in Figure 6.

Figure 6: High and Heavy Loads Grid Map



Source: www.gov.uk

This network needs to remain resilient in order to ensure that extra freight traffic resulting from developments such as the Atlantic Gateway enables efficient transport of goods in and around the Local Authority. In addition to its role in connecting people to employment opportunities, the A51 Tarvin to Chester corridor is a vital link for traffic moving between the freight hubs of the Port of Holyhead, Liverpool2, Mersey Dee area and key distribution sites in the Midlands. Significant volumes of freight traffic are therefore using the route to travel between these locations and onwards to the channel ports. The A51's east- west routing also provides vital connectivity to Manchester and Liverpool John Lennon Airports through onward links to the M56 particularly from the surrounding areas of North Wales and Chester.

2.1.2 Local Context

Whilst the route performs a key role as a strategic corridor providing access to employment sites, economic 'drivers' and centres of population it also forms a key part of the local transport network.

Local communities such as Tarvin, Tarporley, Kelsall and Ashton all rely on the A51 to provide access to Chester which is the principal urban services centre for west Cheshire. As congestion has increased and the performance of the network continues to deteriorate, these communities experience increasing severance from key amenities such as retail, leisure and employment.

The current performance of the A51 also causes problems for local school children travelling to schools such as Guilden Sutton C of E Primary School and Christleton High School on, a daily basis. A lack of suitable crossing points, high vehicle speeds and congestion at peak hours all contribute to a highway environment which restricts opportunities for children to walk to school further increasing congestion. Children travelling by bus are also often required to use a service which is routed via a variety of local side roads in an attempt to bypass congestion on the A51 and ensure more reliable journey times.

2.1.3 Development Pressure

A significant number of housing developments are located within a range of small villages and communities in Cheshire West and Chester and Cheshire East (see Section 2.9 for details on housing and upcoming developments). Due to its central location between these areas the A51 plays a key role in providing access to these housing sites and access between them and key urban employment centres. It is therefore vital that the strategic highway network, including the A51, provides sufficient capacity and network resilience to meet the needs of new residents in these areas both now and in the future.

The Cheshire and Warrington LEP has ambitious aspirations for growth and key housing sites play a role in enabling the achievement of those aspirations (outlined in Section 2.9.3). However, without adequate network capacity and scope to manage growth, the area's strategic objectives are unlikely to be realised.

2.1.3.1 Land Acquisition Implications

Proposed improvements at Tarvin Roundabout and Stamford Bridge will result in the requirement for third party land. This is unavoidable if sufficient capacity improvements are to be introduced. With regard to Tarvin Roundabout, land negotiations are expected to be positive with dialogue with the land owner already underway. With regard to Stamford Bridge, CWaC may need to engage in a CPO process should negotiations stall, and this has a potential cost implication of between £50,000 and £100,000, depending on the level of potential objections. As the business case is progressed CWAC will seek to avoid a CPO if possible and mitigate any objections that may arise following consultation. As the engagement in a CPO process has been identified in the work programme (set out in Appendix N) this can be accommodated for

within the delivery timescales. Therefore, acquiring third party land will not affect the overall delivery of the scheme.

With regard to Statutory Undertakers apparatus, as part of the OBC development, C2 records have been obtained and potential diversions highlighted to accommodate proposed diversion works. Estimates for such works have been made from previous similar sized schemes. As part of the Full Business Case development, C3 and C4 enquiries will be made as designs are developed to a higher level of detail. This will confirm what diversionary works are required along with the production of more detailed budget estimates.

2.1.4 Previous scheme options

Although the above problems on the A51 are well understood, local partners have been restricted in their ability to actively address these problems and the community's concerns until recently.

Prior to the development of this scheme changes have been made to individual junctions along the A51 to address network performance and capacity constraints. Previous work undertaken by Highways England saw the introduction of signal controls on the A55 / M53 / A51 junction elevated roundabout in an attempt to address queuing issues on the M53 northbound sliproad. To the east of the route, Cheshire County Council introduced a left turn only lane at the Stamford Bridge junction for traffic approaching eastbound in an attempt to improve access to Barrow and enhance the performance of the junction. Line marking changes were also made along the corridor to make the best available use of road space in order to manage traffic flow. However, despite Cheshire West and Chester's robust maintenance programme, constraints on available funding have reduced the ability of the local authority to further enhance the quality of the highway surface, road markings and signage.

The cumulative impact of these previous changes has led to short term improvements which have temporarily addressed local concerns. However, the absence of a long-term strategic approach to the improvement of the corridor has meant that as traffic growth has continued and new areas of housing and employment have developed, pressure on the A51 has increased.

This now presents a need for a strategic, 'whole corridor' review of the A51 Chester to Crewe corridor to examine its role in supporting the future growth and strategic connectivity aspirations of the Cheshire and Warrington LEP, and the continuing needs of the local community and residents who are adversely affected by high traffic levels, growing congestion, poor local air quality and continuing concerns about road safety. The need for this review of the corridor becomes even more apparent in light of the planned HS2 depot at Wimboldsey which will stretch over 4kms on land to the south of Winsford. The creation of jobs as a result, and likely increase in freight movements will place even greater demand on the A51.As a first stage in this longer-term plan, Cheshire West and Chester Council are now examining the management and development of the A51 between Chester and Tarvin as part of a phased package of improvements.

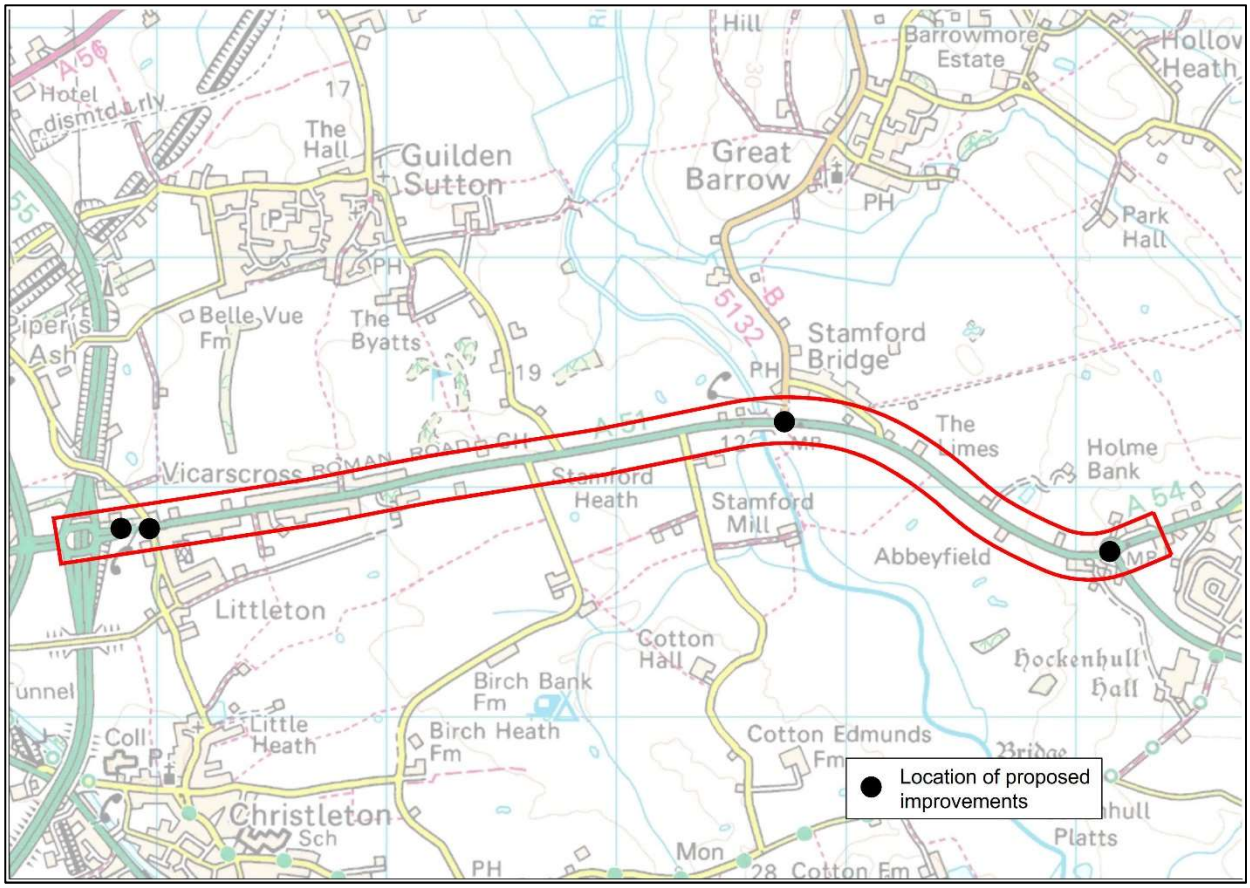
2.1.5 A Phased Approach

Cheshire West and Chester Council secured programme entry for a proportionate package of local highway improvements to the A51 Tarvin to Chester Corridor through the submission of a Strategic Outline Case to the Local Enterprise Partnership. This has provisionally allocated £5.4m of investment in the A51 corridor, £3.6m from the Local Growth Fund and £1.8m local contribution from Cheshire West and Chester.

This Outline Business Case now provides an opportunity to examine the wider performance and management of the A51 corridor. A package of investment options to extract maximum value from the above funding allocation are identified as the first phase in a potentially longer-term

programme of investment for the A51. This scheme covers a series of capacity improvements along the A51 Tarvin to Chester Corridor between the M53/A55/A51 Vicars Cross junction and Tarvin roundabout junction with the A51 and A54. The corridor for this investment is outlined in the figure below together with the location of the specific sites identified for Phase 1 improvements.

Figure 7: A51 Corridor – Phase 1 Study Area Boundary and Intervention Sites



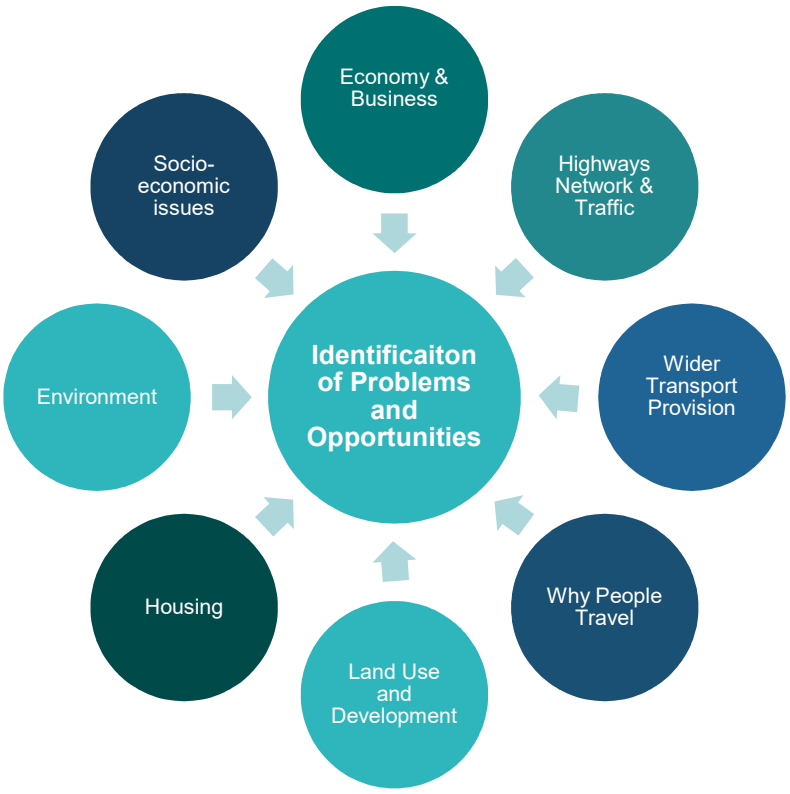
Source: Mott MacDonald

This opportunity to secure funding is therefore potentially just the start of a programme of investment in the wider corridor. To that end, this business case has evaluated a wider range of options in the context of this longer-term programme, selecting investment options which will interface and support further improvements to the highway network and A51 corridor over a longer period of time. This package of schemes (shown as black circles in Figure 5) should be seen as the first step in Cheshire West and Chester Council's long-term aspirations for highway network resilience and reliability.

2.2 Establishing the Problems and Opportunities

The background to the scheme set out above highlights the significance of the A51 in the local and wider area and the importance of reducing congestion along the corridor in order to maintain local and strategic connectivity and support growth. In contrast to previous work addressing short term issues of congestion at key junctions along the A51, this scheme aims to address issues for the whole corridor to provide a longer-term solution. In order to capture the key problems and opportunities evident along the A51 corridor eight themes have been identified for assessment; these are outlined in the diagram below:

Figure 8: Identification of Problems and Opportunities



Source: Mott MacDonald

In the following sub sections, each theme is investigated with key information sources and the themes relevance to the A51 Tarvin-Chester Improvements Scheme specified. Each section is set out according to the following structure:

1. Identification and explanation of the issue(s)
2. A summary of the key problems and opportunities
3. A 'So what does this mean for the A51 Tarvin-Chester Improvements Scheme?' section

These are summarised at the end of the overall Problems and Opportunities section to demonstrate how the scheme objectives were defined.

2.3 Strategic Socio-Economic Overview

The assesment of socio-economic trends across Cheshire West and Chester helps identify any problems and opportunities concerning population, employment, unemployment and education in the region of the A51 and the wider area of the borough and how these trends may be impacted by issues of congestion along the A51 corridor.

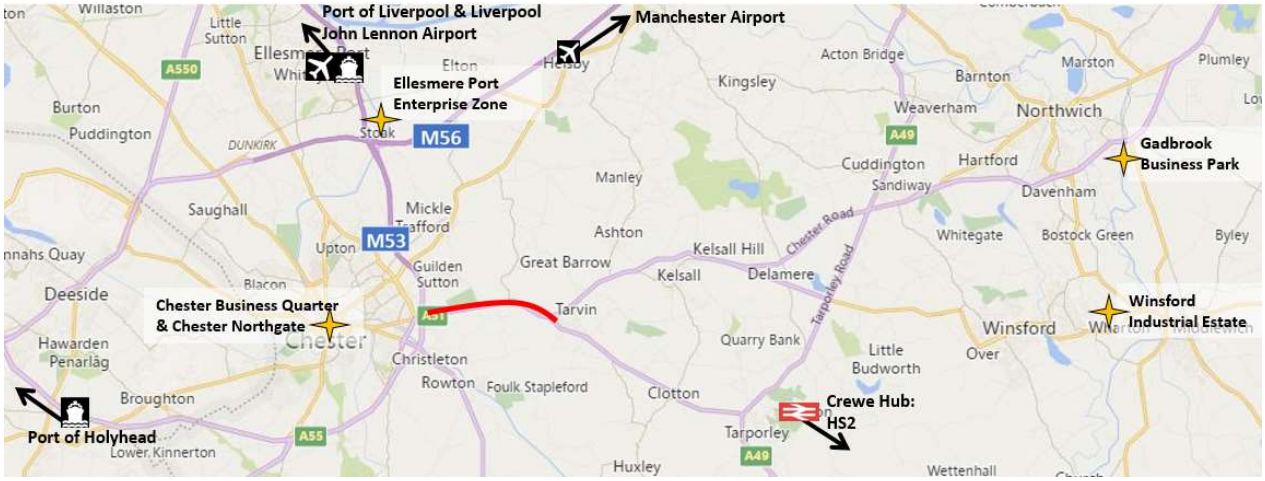
2.3.1 Location

The A51 Tarvin to Chester Corridor lies within the borough of Cheshire West and Chester which covers a 900sqkm area in the North-West of England. It forms a key route into the city centre of Chester from towns to the east of the borough. It also offers connectivity to the south east of Liverpool via the M53 and to Warrington, Manchester and the wider North-West region via the M56 (Figure 9).

This key link to the strategic highway network enables Chester and surrounding communities to prosper from good connections to surrounding northern conurbations and key employment

centres such as Gadbrook Park, Winsford Industrial Estate and, in the future, to the HS2 depot in Crewe. Figure 9 highlights the location of the A51 Tarvin to Chester Corridor (shown in red) in relation to the motorway network as well as Chester and key towns in the wider region.

Figure 9: The Strategic Location of Chester



Source: Goggle Maps

2.3.2 Population

The A51 Tarvin to Chester Corridor lies at the heart of Cheshire West and Chester, with the most recent population count for the Borough standing at 333,900 people, around 25% of which live in the city of Chester. The total population of Cheshire West and Chester is forecast to increase by 10% to around 355,700 in 2035[1]. Table 33 illustrates the mid-year population estimates for Chester, the administrative area of Cheshire West and Chester, the North-West of England and Great Britain as a whole.

Table 3: Mid-year Population Estimates

Area	Population Growth				
	2001	2011	2015	2025	2035
Chester	77,040	79,645	81,470	83, 800	84, 600
Cheshire West and Chester	321,971	329,608	333,900	355,300	366, 700

Source: ONS/CWaC Population forecasts report June 2017

Cheshire West and Chester's population has a slightly lower proportion of working age adults (61%) compared with the national average (63.1%). Cheshire West and Chester also has a slightly higher proportion of elderly residents (21%) compared with the national average (18.1%). The proportion of people over 65 is expected to grow to account for 28% of the forecasted 365,500 population by 2032, as illustrated in Figure 10.

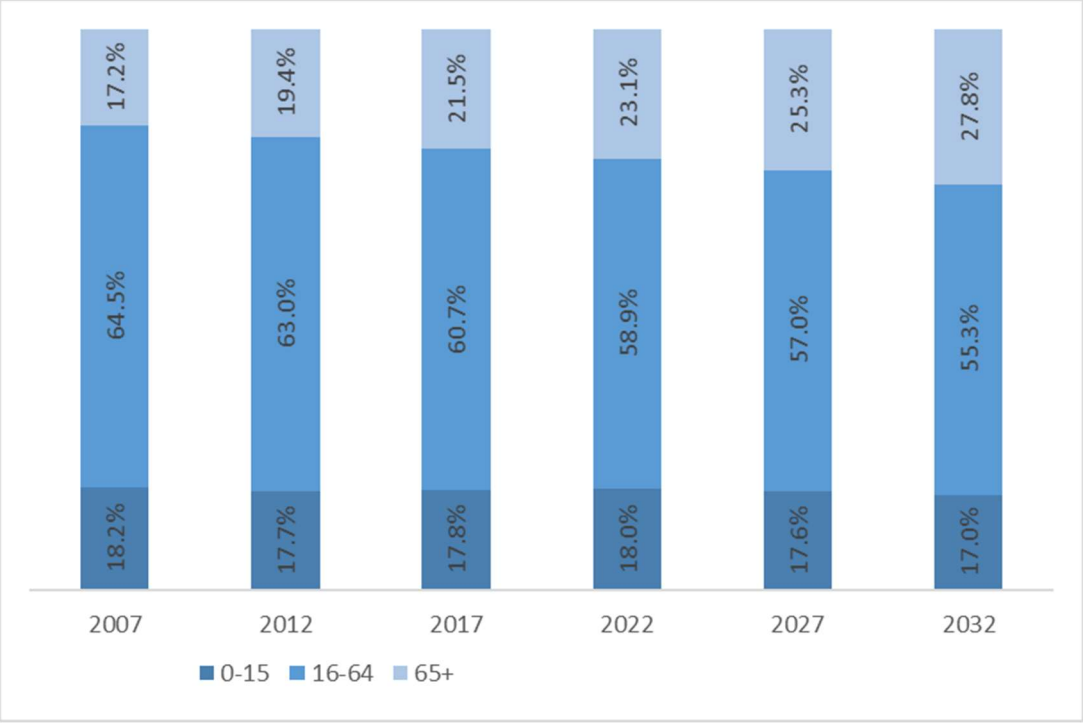
Table 4: Cheshire West and Chester Age Profile, 2016

	No. of Children	Children (%)	No. of Working age	Working Age (%)	No. of Older People	Older People (%)
Cheshire West and Chester	59,200	18%	206,000	61%	70,300	21%
North West	1,367,200	18.9%	4,530,400	62.8%	1,322,000	18.3%
Great Britain	12,002,100	18.8%	40,267,500	63.1%	11,515,300	18.1%

Source: ONS

The growth in the level of working age adults and elderly people projected in future years will increasingly contribute to the challenges the borough faces when addressing future transport issues. Congestion and poor journey reliability on the A51 currently hinder the reliability and availability of bus services between Chester and the east of the borough, which are particularly depended upon on by some older and mobility impaired residents to access facilities and services. An increase in the elderly population will therefore require reliable public transport services (and a highway network which supports bus services) across the borough to offer mobility to all ages.

Figure 10: Cheshire West and Chester Projected Age Structure (2007-2032)



Source: Health and Wellbeing Statistics Compendium, Cheshire West and Chester, 2015

2.3.2.1 Key Issues and Opportunities

Table 5 highlights the key issues and opportunities in relation to Chester's population.

Table 5: Key Issues and Opportunities Presented by Population Growth

Issues	Opportunities
• The population of Cheshire West and Chester has grown over the past 15 years and is projected to continuing growing through to 2035 and beyond. A larger number of residents will generate an increased number of trips along the A51 Corridor as it forms a major route between key towns, cities and development areas within the borough such as Chester, Winsford and Northwich. It also provides connectivity to key employment sites such as, Gadbrook Park, Winsford Industrial Estate and the planned HS2 depot in Crewe. • There will be greater demand to travel in and around Chester which could exacerbate problems at existing pinch points and congestion hotspots along the A51 corridor. • Without intervention, this could generate further delays and increase vehicular based pollution. • The population of the borough is ageing, with the over 65 age group forecast to account for 28% of the population by 2032. This will create an increased demand for public transport.	• A greater number of people living in Chester will create greater demand to access and utilise the wide-ranging local services in the area as well as employment opportunities which will require an efficient and reliable transport network. • A greater number of people living and working within the borough will increase the job pool and create prosperity for all residents. • Network resilience will be necessary to support the growth in demand for jobs, particularly at key employment sites of Crewe HS2, the Atlantic Gateway and Ellesmere Port Enterprise Zone as well as more local connections to Northgate Retail. Such sites could flourish with improvements to the strategic network. • Design improvements to the A51 corridor will be necessary to support enhanced public transport services.

So, what does this mean for the A51 Chester to Tarvin Corridor?

Cheshire West and Chester's population is set to continue growing, adding to the risk that the highways network within the borough will become overloaded and congestion will be exacerbated as movement and the demand for travel place increasing strain on the A51 as it forms a major route through the borough.

The scheme presents an opportunity to support Cheshire West and Chester's growing population and travel demand by improving a key strategic route into the city centre. A reduction in journey time and travel delays would facilitate faster access to jobs and local services, ultimately creating more prosperity across the borough and facilitating an uplift in GVA.

The enhancements would facilitate improvements from which all parts of the community could benefit, including public transport that is currently hindered by delays along the A51 corridor. By improving the capacity of the A51, both local and strategic movements will become much easier.

2.3.3 Employment

Table 66 presents a summary of employment levels in Cheshire West and Chester, the North-West and Great Britain as a whole. Cheshire West and Chester has a greater number of economically active persons (76.4%) than the North-West (75.7%) as well as a greater proportion of people in employment (73.5%), compared with the North-West figure of 71.8%. These figures are slightly lower than that of Great Britain, with 78% economically active and 74.2% in employment.

Cheshire West and Chester has a significantly better rate of unemployment (4%) than the North-West and Great Britain as a whole (5.1% and 4.7% respectively). It is important to maintain these levels of employment by ensuring that an efficient transport network within the borough offers reliable access to jobs and opportunities.

Table 6: Employment and Unemployment (April 2016- Mar 2017) Chester and Great Britain

	Cheshire West and Chester (numbers)	Cheshire West and Chester (%)	North West (%)	Great Britain (%)
All people				
Economically active	162,000	76.4	75.7	78.0
In employment	156,300	73.5	71.8	74.2
Employees	138,400	65.4	62.3	63.2
Self-employed	17,500	7.9	9.2	10.6
Unemployed (model-based)	6,500	4.0	5.1	4.7

Source: ONS 2016

Ensuring an efficient, reliable, uncongested transport network is also a priority of the LEP as a means to access jobs and enable logistics movements, both now and to support future growth. The region contains the major growth areas of Ellesmere Port Enterprise Zone (earmarked for major housing and employment growth, with £8m LGF awarded in February 2016) and the Atlantic Gateway, and is a net importer of labour with the A51 Chester to Tarvin corridor forming a key route to these sites from areas in east Cheshire. Improving connectivity within, and to, the borough will be central to unlocking employment opportunities.

Capacity improvements along the A51 will also ensure efficient access to education, training and employment. An increase in opportunities will encourage graduates to remain in the area after university leading to a general upskilling in the workforce around Cheshire West and Chester.

The A51 Chester to Tarvin corridor is also a major pinch point for local commuter traffic between the major growth areas of Chester, Crewe and Nantwich, and mid-Cheshire (Northwich and Winsford). It is also a pinch point for strategic travel and traffic between the M6 and the Atlantic Gateway and Ellesmere Port Enterprise Zone areas beyond Chester, and to north Wales. The A51 also provides vital access to jobs along the Cheshire Science Corridor, at Deeside Industrial Park, and to future employment opportunities at key development sites proposed by Constellation Partnership, as well as the future HS2 depot in Crewe. The Cheshire & Warrington LEP area relies on growing its employment market to support and grow its strong, specialised and high-performing economy and therefore requires a highway network which offers reliable journey times and minimal congestion to ensure commuter journeys can be supported and the area remains an attractive place for a skilled workforce to live.

2.3.3.1 Key Issues and Opportunities

Table 7 highlights the key issues and opportunities in relation to employment in Chester.

Table 7: Key Issues and Opportunities Presented by Employment in Chester

Issues	Opportunities
• Cheshire West and Chester has ambitious growth plans with many future employment opportunities planned at, the HS2 depot in Crewe, the Atlantic Gateway and Ellesmere Port Enterprise Zone, Cheshire Science Corridor, Deeside Industrial Park and key sites within the Constellation Partnership. There will be greater demand to reach these employment growth sites. • There will be greater commuter flows along the A51 corridor as a result of economic growth and a resultant need for increased network capacity. • Without intervention, there is risk that the highways network will become subject to critical 'network stress' and will cease to function effectively.	• Economic development within the borough and on the periphery of Chester city centre will enable job opportunities for people in the region across a wide range of sectors. • New employment centres will in turn rely upon an effective and efficient strategic transport network.

So, what does this mean for the A51 Chester to Tarvin Corridor?

Transportation can act as a catalyst for economic development and prosperity. The scheme presents an opportunity to better connect residents around Chester, Tarporley, Northwich and Winsford to employment sites and introduce journey time savings for people commuting to or from the east of the borough.

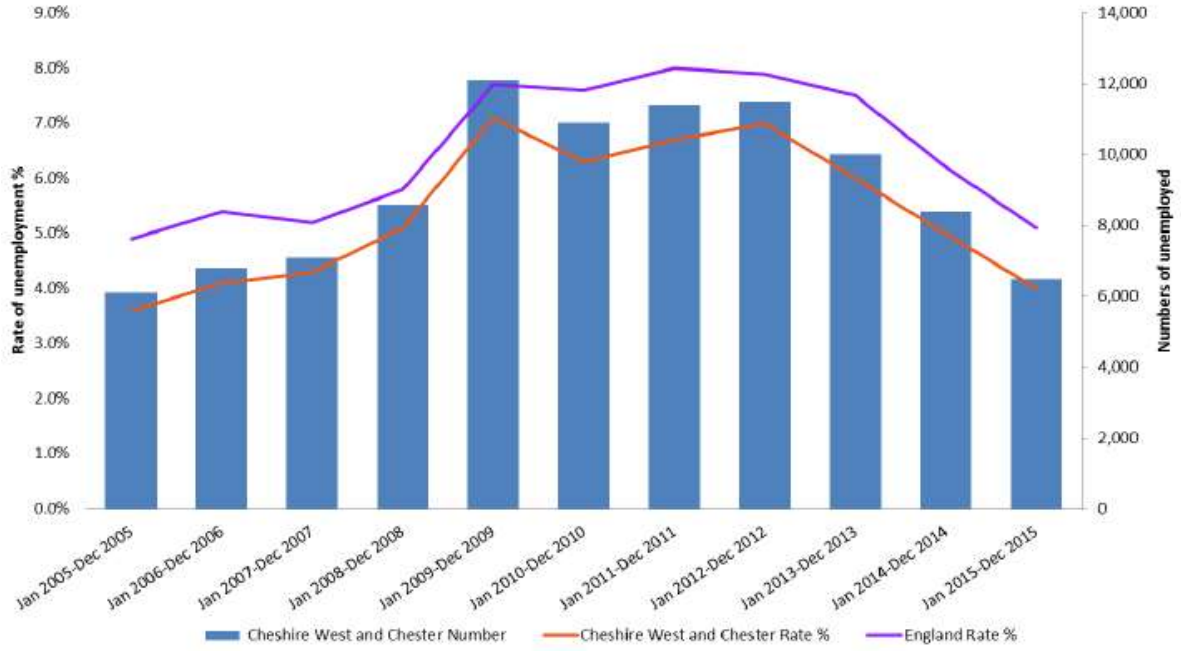
The A51 should ensure reliable and direct connections between residential areas and key employment industries such as administrative services, science and professional services, and transportation and storage. Consideration should also be given to better connecting the regions new and strategic employment sites such as: the Atlantic Gateway, Ellesmere Port Enterprise Zone and the HS2 Hub in Crewe.

A faster and more reliable route to the east of Chester also has the potential to ease the congestion caused by freight traffic from the M6 corridor through to sites such as the Atlantic Gateway. In turn, this will create localised journey time benefits as well as the strategic improvements for freight movements.

2.3.4 Unemployment and Deprivation

The latest figure for unemployment in Cheshire West and Chester stood at 4%, below the rate for both the North-West (5.1%) and Great Britain as a whole (4.7%). Figure 11 illustrates the unemployment rate in Cheshire West and Chester from the period 2005 to 2015. Comparable with the rest of the UK, Cheshire West and Chester experienced a spike in unemployment during the recession period, with a high of 7.75% taking place in 2009. A gradual decline was then observed from 2012 through to 2015.

Figure 121: Model-based Unemployment Rates Over Time



Source: NOMIS 2016

The A51 corridor provides connectivity to a number of significant employment areas such as the Chester Business Quarter, Northgate retail development and Ellesmere Port Enterprise Zone. Therefore, the network needs to remain resilient in order to meet the requirement to enable economic growth through effective connectivity.

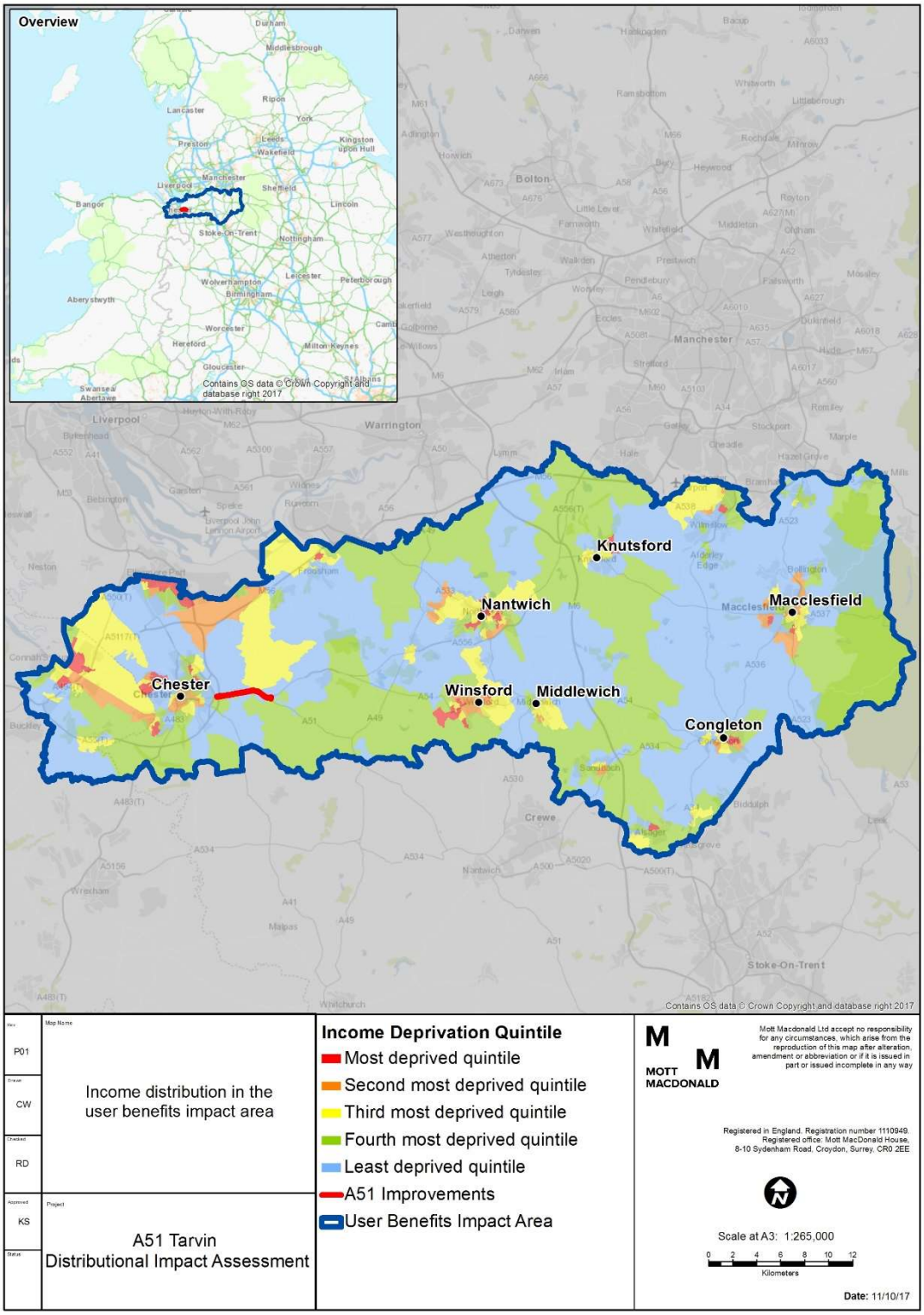
2.3.4.1 Deprivation

To aid understanding of deprivation and economic disadvantage, Indices of Multiple Deprivation (IMD) were mapped to acquire a spatial understanding of the socio-economic problems in the study area. The Index of Multiple Deprivation is the official measure of deprivation and combines information from the following domains:

- Employment Deprivation;
- Education, Skills and Training Deprivation;
- Health Deprivation and Disability;
- Crime;
- Barriers to Housing and Services; and
- Living Environment Deprivation.

As can be seen in Figure 12, Chester and areas directly surrounding the A51 Chester to Tarvin Corridor experience relatively low levels of deprivation.

Figure 12: Deprivation in Key Towns and Cities Surrounding the A51 and its Onward Links



Source: IMD, 2015

However, deprivation is a key issue for other key towns in the wider study area of interest. Winsford is situated around 12 miles to the east of the corridor and is connected to Chester via the A51. Winsford features as the one Lower Layer Super Output Area (LSOA) in the top 3%

most deprived in England. Two LSOAs in Winsford also fall into the top 10% most deprived areas in England. Northwich is another Mid-Cheshire town which is also served by the A51 Chester to Tarvin Corridor and which experiences moderate deprivation when compared to national averages, with some pockets of deprivation around the town centre.

Reliable journey times along the A51 Chester to Tarvin Corridor will enable residents in deprived towns such as Winsford to access employment opportunities within Chester, Chester Business Quarter and Deeside.

2.3.4.2 Key Issues and Opportunities

The table below highlights the key issues and opportunities in relation to unemployment and deprivation in Chester.

Table 8: Key Issues and Opportunities Presented by Unemployment and Deprivation

Issues	Opportunities
• The unemployment rate in the borough stands at 4%. • Several deprived areas are located in Chester city centre. • Winsford has one LSOA in the top 3% most deprived in England.	• Over the past five years, the unemployment rate and percentage of people claiming job seekers allowance has slowly been declining in Chester. • The borough has an opportunity to continue increasing the number of people in employment by ensuring easy and affordable access to jobs, education and training.

So, what does this mean for the A51 Chester to Tarvin Corridor?

Ensuring access to employment and opportunity is central to maintaining low levels of unemployment and deprivation which currently exist within the borough.

The A51 Chester to Tarvin Corridor is a key route between regional employment centres such as Chester Business Quarter, Crewe Hub, the Atlantic Gateway and key towns across the borough such as Winsford and Northwich and the city centre of Chester. Therefore, enabling efficient and reliable journeys along this route will be a key factor in supporting access to jobs for many people across the borough and ensuring that living and working in the area remains attractive.

2.3.5 Education

2.3.5.1 Educational Establishments Along the Corridor

There are a number of schools located in close proximity to the study area in Guilden Sutton, Christleton and Littleton. A large number of school children, and parents assisting with school pick up and drop off, use the A51 for access to school by car, public transport, bicycle or on foot. Traffic modelling has shown that congestion along the A51 Tarvin to Chester Corridor is peaks in the AM peak and early PM peak increasing journey times for students and school children when travelling to and from their place of education.

The A51 also offers connectivity to towns to the east of the corridor such as Winsford and Northwich which have a dense network of educational establishments including Sir John Deane's College, a leading sixth form college with a large catchment area attracting many students from the Chester area. Winsford is also served by a large range of schools including the Mid-Cheshire college for tertiary education that offers a wide variety of courses. Enabling efficient reliable journeys along the A51 is therefore required to help those wishing to access these educational opportunities.

Although the Chester region out performs the whole of the North-West in terms of NVQ 1-3 qualifications, rates of education deprivation in Northwich are of concern with 20% of the population living in LSOAs where educational deprivation is in the highest 20% in the country. Supporting access to education is therefore important to ensure a wide range of educational facilities are available to all residents within the borough and further afield.

2.3.5.2 Higher Education

The University of Chester has high ambitions set out in its Corporate Plan: Vision 2020, with aims to be a Top 50 University within the UK by 2020, and in the top 10% for student and staff satisfaction. Among its other priorities are to increase the undergraduate intake by 25% between 2013/14 and 2020, and to have over 650 postgraduate students.

However, Chester's One City Plan indicates that retention of graduates from the university within the city is low. The university has the scope to be a driver of innovation and economic growth in the city with its focus on sectors such as biosciences and food technology which can bring many opportunities for new employment in the city and surrounding area.

For the increase in students to be accommodated within the city, more student residential developments may be required. The ambitious plans of the University of Chester will require the transport network to be resilient and supportive to facilitate the increasing number of students living in or commuting to the area. The University seeks to support those wishing to learn and continue their education from a wide catchment area; the A51 corridor will play a key role in connecting prospective students in Cheshire to the opportunities provided at the University.

2.3.6 Key Issues and Opportunities

Table **9**9 highlights the key issues and opportunities in relation to education and skills in Chester.

Table 9: Key Issues and Opportunities Presented by Education and Skills

Issue	Opportunities
• Chester has a successful university with high growth targets and increasing attendance figures. • The University of Chester has a low graduate retention rate with a small of number of students choosing to stay in Chester for postgraduate study. This reduces opportunities for a highly skilled workforce in the borough. • Rates of education deprivation in Northwich are moderate – 20% of the population live in LSOAs where educational deprivation is in the highest 20% in the country.	• Chester must seek to improve residents' access to education and training, whilst ensuring education services are accessible for those in deprived areas further afield. • Improved access to employment opportunities in the area may lead to higher graduate retention levels. • Residents in the borough have high qualification levels, with educational attainment higher than the regional and national average. Chester should look to support the retention of this skills base by improving access to the city centre and employment hubs such as Crewe and the Atlantic Gateway. • Improvements to the A51 corridor could attract local residents to attend and continue education at the University of Chester through improved local journey times. • Improvements could also encourage graduates to remain in the city on completion of their degree through a greater number of jobs being available due to developments being unlocked along the A51 corridor.

So, what does this mean for the A51 Chester to Tarvin Corridor?

Poor access or a lack of transport choice can act as a key barrier to education. Effective investment in transport can support those with fewer qualifications to access educational services across the borough and support residents with access to adult education facilities. The scheme presents opportunities to enhance not only car user access to educational services, but also improve connectivity to education for public transport users through reducing congestion and improving the journey time reliability of bus services.

Many opportunities lie in extracting value from the services provided by the University of Chester, both in delivering higher education to the population of Cheshire West and Chester and also providing a highly skilled workforce. Developments taking place on the A51 corridor and in the wider Cheshire West and Chester area will support the provision of high quality jobs, resulting in higher rates of graduate retention and an uplift in GVA for the borough.

2.4 Economy and Business

Cheshire West and Chester aims to be 'a desirable and attractive place to live, work, learn and visit with vibrant towns and rural villages.'[2] It has set a number of aspirations for growth in housing and jobs to be achieved across the borough, as summarised in Table 10.

Table 10: Cheshire West and Chester Growth Aspirations

Growth Aspiration	2010-2030
Housing Growth	22,000 houses
Jobs Growth	14, 000

Source: Cheshire West and Chester Adopted Local Plan (Part One) Strategic Policies, 2015

These growth aspirations for Cheshire West and Chester will boost the economy of the Cheshire and Warrington Local Enterprise Partnership area to £26.6bn by 2021, and £35bn by 2030, as set out in the LEP Strategic Economic Plan (2014). In addition, the LEP aims to increase its GVA to 110% of UK average by 2021 and to 115% by 2030[3].

In order to achieve these objectives, Cheshire West and Chester's Local Transport Plan 2011-2026 identifies the borough's six key priorities for transport. These are:

- To provide and develop reliable and efficient transport networks which support sustainable economic growth in West Cheshire and the surrounding area;
- To reduce carbon emissions from transport and take steps to adapt our transport networks to the effects of climate change;
- To manage a well-maintained transport network;
- To contribute to safer and secure transport in West Cheshire and to promote types of transport which are beneficial to health;
- To improve accessibility to jobs and key services which help support greater equality of opportunity; and

- To ensure that transport helps improve quality of life and enhances the local environment in West Cheshire.

Within these six objectives are a series of sub-objectives. Sub-objectives relevant to this proposed scheme include:

- Improve connectivity between West Cheshire and surrounding areas, particularly to Merseyside, Greater Manchester, North East Wales and to local airports and the Port of Liverpool;
- Improve and encourage the use of sustainable (low carbon) transport; and
- Ensure that new development takes place in accessible locations which minimise the need for travel.

Many housing and employment sites in the borough are constrained by a lack of infrastructure and road access[4] causing local congestion on available routes inhibiting new investment at key locations. A transport network that is unable to cope with the increased amounts of traffic resulting from new developments is a threat to achieving these ambitions. This will in turn discourage private sector investment in the area. Therefore, it will be essential to ensure local highway networks remain resilient to increasing volumes of traffic.

In addition to increasing capacity to support growth in housing and enable access to employment, improvements along the A51 could also support the economy through enabling freight movements towards the Port of Holyhead, Mersey Dee area and key distribution sites in the Midlands from the east of Chester. This could help address key growth aspirations for Cheshire West and Chester which aim to improve connectivity between Cheshire and the surrounding area, particularly to Merseyside, Greater Manchester and North Wales.

2.4.1 Gross Weekly Pay

Gross weekly pay, as a measure of the average wages paid to employees in Cheshire West and Chester is higher than regional and national levels. Data on average gross weekly pay from 2015 shows:

- Gross weekly pay for full time workers in Cheshire West and Chester is £547
- This is significantly higher than gross weekly pay across the North-West (£502.1)
- Gross weekly pay in Cheshire West and Chester is also higher than the average across Great Britain (£541.0)
- The local living wage in Cheshire West and Chester in 2017 is £8.45[5] per hour for employees aged 18 or over, this is slightly below the UK Living wage which is set at £8.75 for 2017.

This data indicates a higher proportion of higher paid, and likely high value, employees within the region relative to the comparator areas.

2.4.2 Gross Value Added (GVA) per Head

At £24,949, GVA per head in Cheshire West and Chester is significantly below that of neighbouring authorities Cheshire East (£29,984) and Warrington (£30,945), but higher than

Merseyside (£18,621) (2015). GVA per head in Cheshire West and Chester is also well above the figure for the North-West as a whole (£21,011).

2.4.3 Gross Value Added (GVA) per Filled Job

GVA per filled job data sets out the total GVA of Chester and its comparator areas, divided by the number of jobs that are currently taken in the area. This data shows:

- Cheshire West and Chester has £49,695 of GVA per filled job. This is higher than the North-West average of £47,494, but lower than the England average of £54,783; and
- Within the Cheshire and Warrington LEP area, Cheshire West and Chester has the lowest GVA per filled job of all three unitary authorities and Cheshire East the highest:
  - Cheshire West and Chester; £49,695
  - Cheshire East: £60,748.
  - Warrington: £50,733.

This suggests the need for Cheshire West and Chester to improve its GVA per filled job to remain competitive in the region. Encouraging the growth of higher value businesses through effective and efficient transportation services and highway networks in the borough will support this.

2.4.4 Key Issues and Opportunities

Table 11 highlights the key issues and opportunities in relation to the economy and businesses in Cheshire West and Chester.

Table 11: Key Issues and Opportunities Presented by Economy and Business

Issues	Opportunities
• GVA per head in the borough of Cheshire West and Chester is below that of the neighbouring authorities of Cheshire East and Warrington. • GVA per filled job in Cheshire West and Chester is lower than the national average and could potentially be improved by attracting higher value jobs to Cheshire West and Chester and building housing of a sufficient quality to attract higher paid, higher skilled workers to the town.	• Attracting businesses to the borough, in part through effective transport networks, could help address the relatively low level of GVA per head in Cheshire West and Chester • Cheshire West and Chester has higher gross weekly pay than the regional and national averages, as well as a higher proportion of its businesses surviving beyond four years offering potential for a strong and competitive future economy. • This forms an excellent environment for businesses to set up and thrive.

So, what does this mean for the A51 Chester to Tarvin Corridor?

This section has demonstrated that Cheshire West and Chester is performing well economically with key indicators suggesting that the borough is performing, in some cases, better than neighbouring authorities and in others better than the North-West and England as a whole.

This positive outlook suggests that improvements to the A51 would support continued economic growth by unlocking jobs and business opportunities both along the A51 corridor and locations further afield.

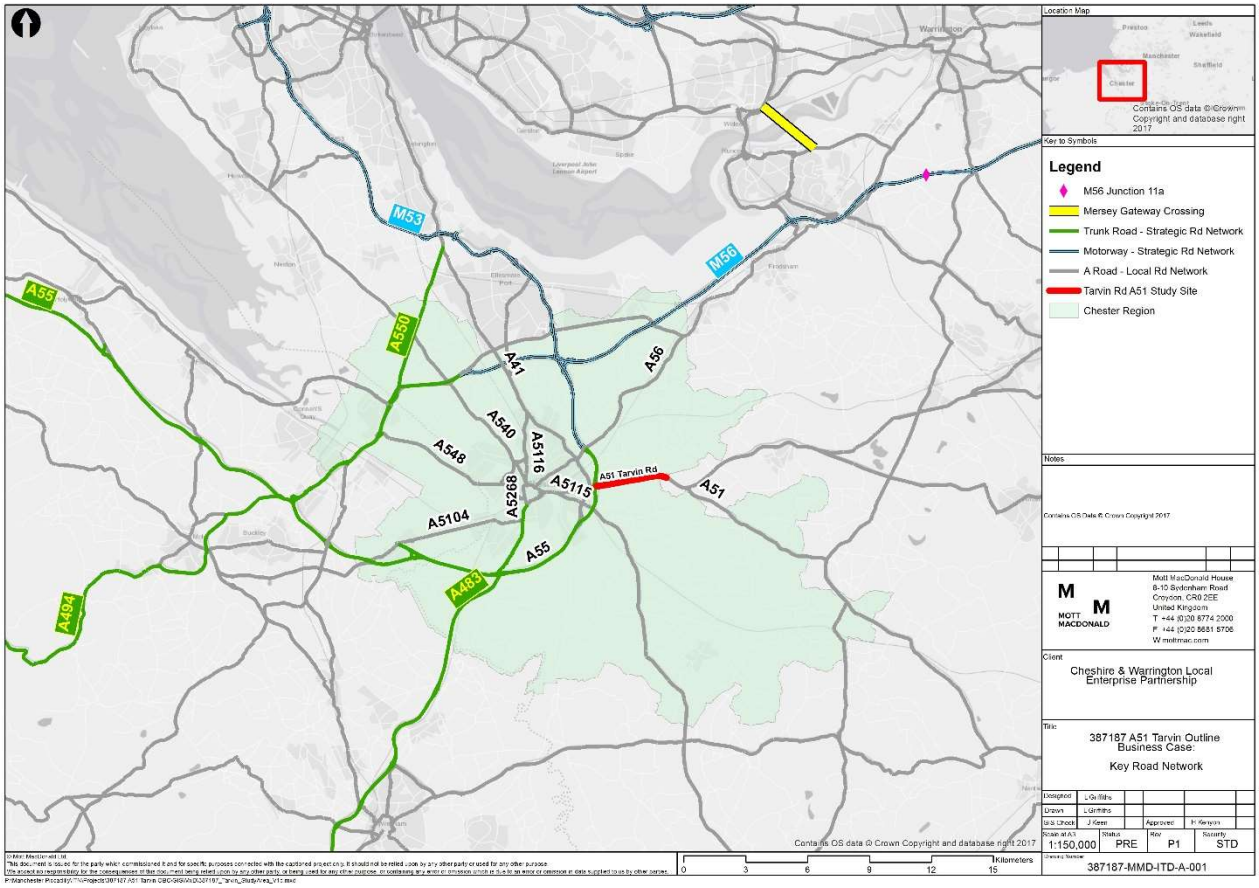
2.5 Transport Highways Network and Traffic

This section discusses existing traffic conditions and characteristics of the local highway network. It considers the key travel problems found along the A51 corridor.

2.5.1 Strategic Road Network

The figure below shows the wider area around the A51 and surrounding strategic road network. The Chester region, highlighted light green is served by a dense network of key routes with the A51 at its centre. The strategic routes highlighted in this figure include both local and Highways England roads.

Figure 13: Map identifying the location of the A51 Chester to Tarvin Corridor in Relation to the Wider Strategic Network



Source: Mott MacDonald

The A51 is a key route offering connectivity to Chester from areas to the east of the borough and further afield. The A51 Chester to Tarvin corridor provides a key strategic route for residents in the east of the borough to access employment opportunities in areas such as Chester, Chester Business Quarter and Ellesmere Port Enterprise Zone. In addition to serving commuter traffic and providing access to employment opportunity, the A51 also has a key role in the sub-national movement of freight traffic between North Wales, Cheshire and the Channel Ports. The position of the A51 provides an alternative route to the M56 for west/east freight movements, further increasing the need for a more resilient network in order to support economic activity. A faster and more reliable route to the east of Chester also has the potential to ease congestion caused by freight traffic from the M6 corridor through to sites such as the

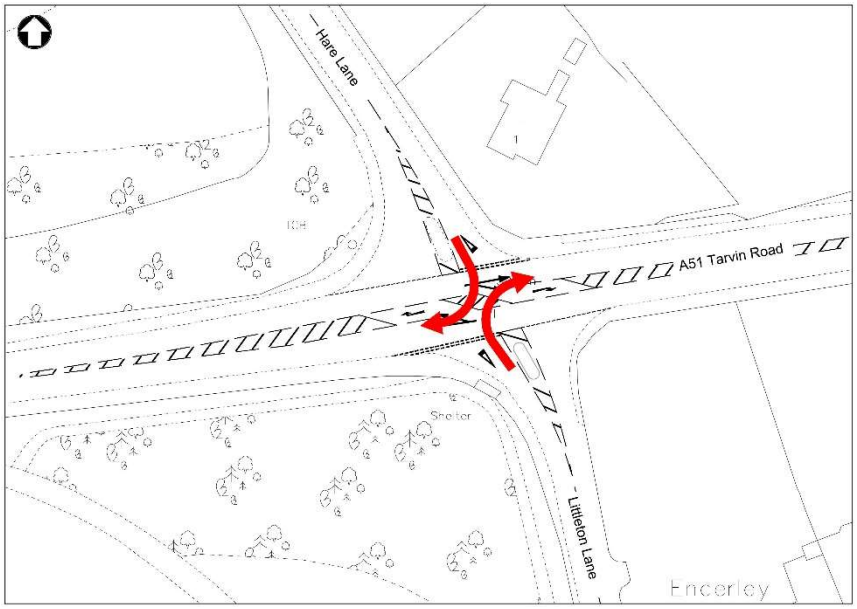
Atlantic Gateway. In turn, this will create localised journey time benefits as well as strategic improvements for freight.

2.5.2 Local Road Network

The A51 is the primary route into Chester for residents of local towns and villages such as Tarvin, Tarporley, Kelsall and Ashton. Residents rely on the local road network for access to jobs, services and leisure and retail facilities. The current performance of the A51 is poor causing substantial delays to local journeys within the borough (DfT traffic counts, 2014). While congestion is evident along the whole corridor in both directions, the corridor between the Tarvin roundabout and Stamford Bridge is severely congested during the PM peak period particularly for westbound traffic (Google traffic data, 2017). The A51 Tarvin-Chester Improvements Scheme therefore aims to address capacity issues at key junctions along the corridor to improve the overall flow of traffic and reduce journey times.

The current right turn movements onto the A51 Tarvin Corridor from Hare Lane and Littleton Lane, shown in Figure 14, are also adding to issues of congestion.

Figure 14: Right Turn Movements from Hare Lane and Littleton Lane



Source: Mott MacDonald

The existing layout at this junction provides minimal space for vehicles to turn right into Littleton Lane and right into Hare Lane from the A51 causing traffic to build up on approach to the M53/A55/A51 Vicars Cross junction. Delays also occur on Littleton Lane due to the narrow width of the junction onto the A51. Right turn movements onto the A51 from this junction block vehicles wishing to turn left towards the Vicars Cross junction causing traffic to back up down Littleton Lane. Removal of selected right turning movements at these junctions would provide an opportunity to increase capacity and reduce network delay. Removing these right turn movements would also create safer environments for pedestrians and cyclists offering capacity for wider and safer crossings encouraging sustainable and active modes of travel.

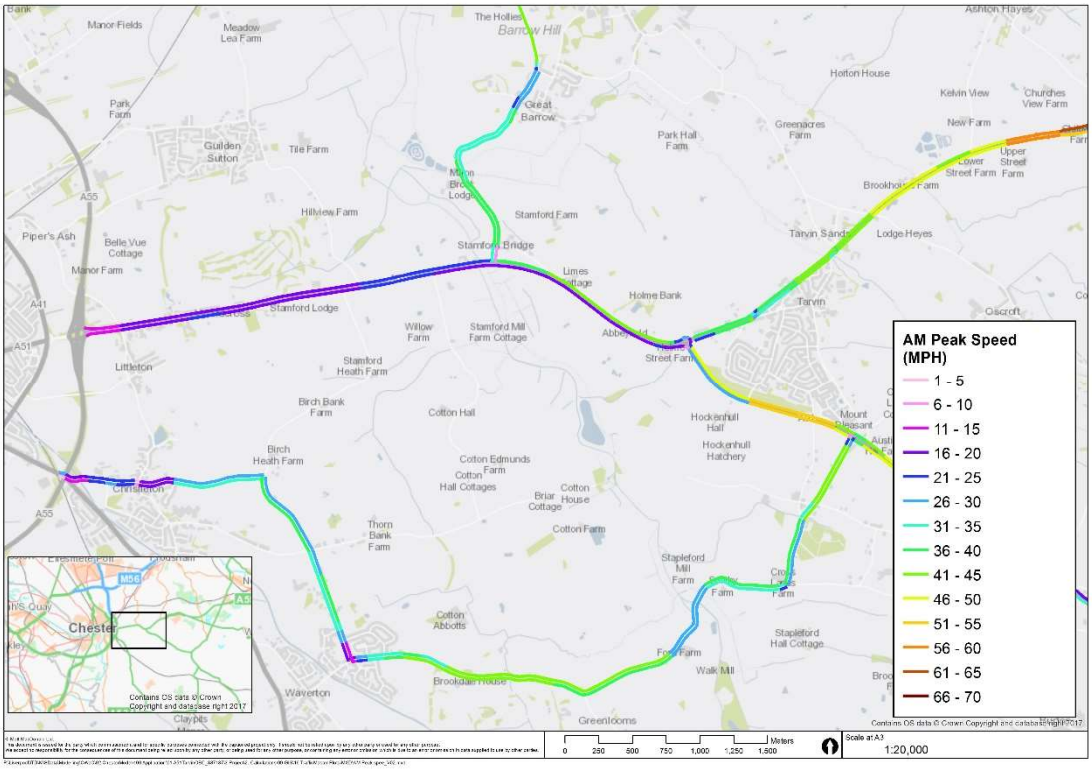
2.5.2.1 Current A51 Congestion

Current levels of congestion along the A51 are a serious cause for concern with journey times between Tarvin and Chester taking up to 40 minutes in the AM peak period for a short 5-7mile journey, considerably longer than the desired journey period. TrafficMaster journey times have

also been calculated from A55 Vicars Cross Roundabout to Tarvin roundabout, which is the section of the A51 where the interventions will take place; in the off-peak it takes around four minutes to travel the route in each direction. In the AM peak (08:00-09:00) the times increase to 7.5 minutes eastbound and 10 minutes westbound.

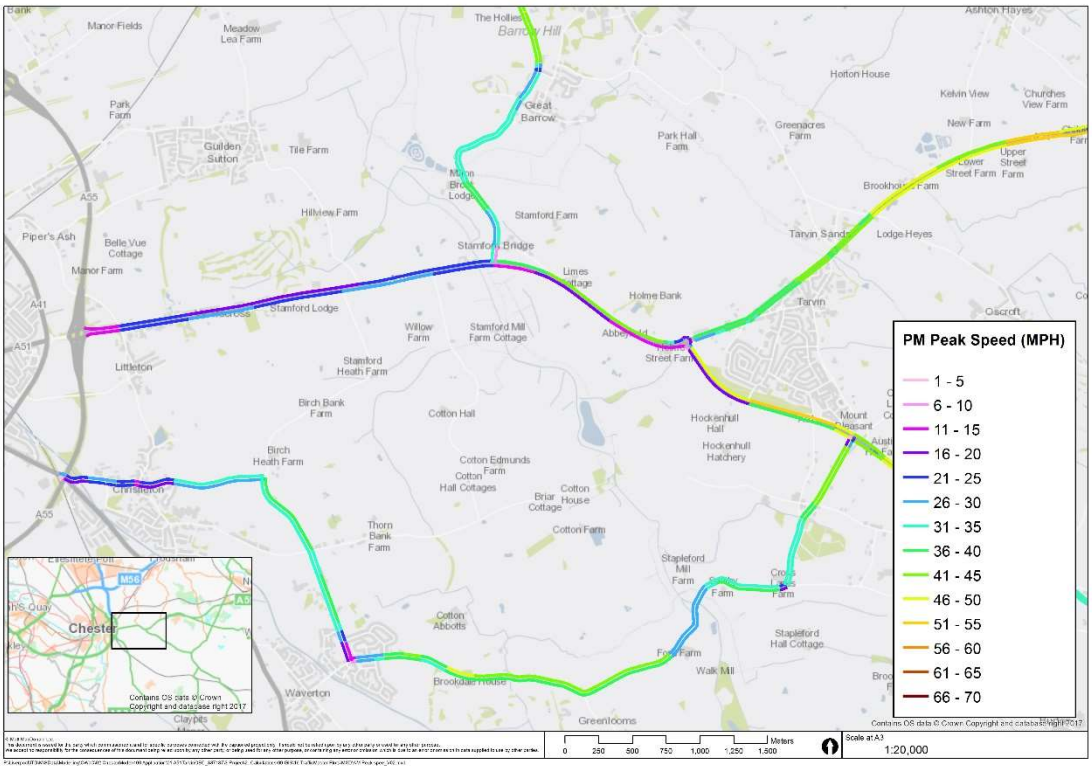
Figure 15 and Figure 16 show AM and PM peak hour average travel speeds, focused on the section of the A51 between Tarvin roundabout and the A55/A51 junction, where the scheme interventions are proposed.

Figure 15: AM Peak Average Speeds



Source: Mott MacDonald

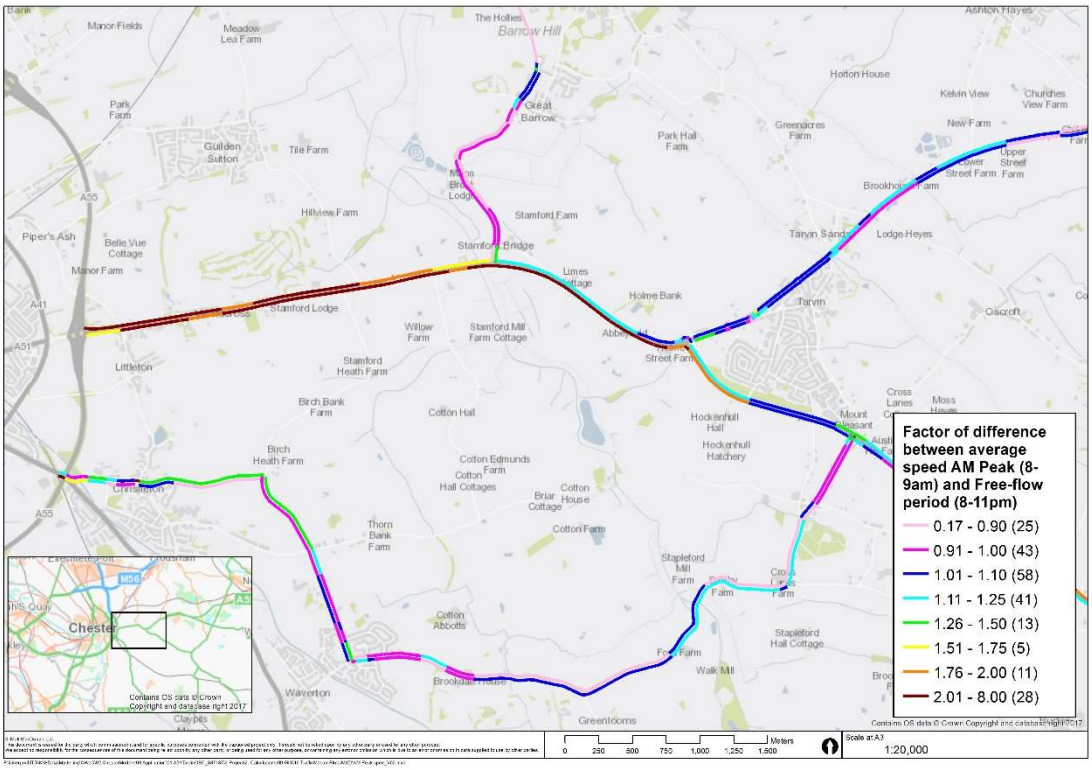
Figure 16: PM Peak Average Speeds



Source: Mott MacDonald

Using the AM peak as an example, Figure 17 shows the difference in speed between average AM peak speeds and average speeds when traffic is free flowing. It can be seen that most of the A51 corridor between the A55/A51 and Tarvin roundabout experience the greatest differential in speeds, (yellow, orange and burgundy colours), between the AM peak and hours of free flow traffic. Speeds in free flow traffic, depending on the section of the corridor are between 1.51 and 8 times faster in free flow than in the AM peak.

Figure 17: Factor of difference between average AM peak speed and free flow traffic



Source: Mott MacDonald

2.5.2.2 Future A51 Congestion

Key junctions along the network have been modelled to identify issues with future capacity in 2030 if no changes are made to the network[6]. The results of this modelling show that:

- By 2030, the Tarvin roundabout will operate significantly over capacity. It will experience a maximum delay per Passenger Car Unit (PCU) of approximately 119.9 seconds during the AM peak and 116.6 seconds during the PM peak on the A51 southern approach to the roundabout. The results also demonstrated that the maximum queue on the roundabout would be significantly reduced by implementing the capacity improvements identified within this scheme.
- By 2030, each arm of the Tarvin Road / Barrow Lane junction at Stamford Bridge has a Degree of Saturation (DoS) approaching the recognised threshold level of 90% for a signal controlled junction with a maximum of 78.4% at the A51 westbound approach.

This demonstrates how increasing traffic volumes will continue to slow journey times and increase delays at key junctions along the network and why there is a need to improve the current and future conditions along the corridor. This issue of congestion is also likely to be exacerbated as a result of future growth in and around Chester which may hinder the success of economic development projects as congestion causes the area to become increasingly unattractive and inaccessible to prospective developers and investors.

Therefore, it is clear that intervention along this corridor is needed to reduce issues of congestion and ensure the network is able to operate effectively in anticipation of future growth and facilitate economic development.

2.5.3 Key Issues and Opportunities

Table 12 highlights the key issues and opportunities in relation to the highways network and traffic in Chester.

Table 12: Key Issues and Opportunities Presented by the Highways Network

Issues	Opportunities
• High levels of congestion along the A51 Tarvin to Chester Corridor is affecting journey times in and out of Chester from the east of the borough. • This congestion is likely to be exacerbated by predicted growth in the region. Congestion may hinder the success of future development. • The Department for Transport's (DfT) data has shown that the route between the Tarvin roundabout and the A55 into Chester is the UK's 5th most congested in terms of average journey waiting time, outside London (with a delay of 26.44 hours in 2014). • The A51 provides an alternative route for freight traffic which requires an efficient transport network to support the movements of goods and enable economic.	• There are strong road links from Chester to the strategic highway network which provide connectivity to local and regional hubs. This provides an opportunity to support economic growth. • Capacity improvements along the A51 corridor could ease congestion for road freight particularly on strategic connections from the M6 Growth Corridor through to the Atlantic Gateway enhancing the transportation of goods and services around the borough and wider region. • Reduction in congestion will also improve the efficiency and reliability of journey times for commuters and residents travelling between Chester and Cheshire towns to the east of the corridor such as Crewe, Winsford and Northwich. • More efficient routes would also assist in a reduction in carbon emissions generated by vehicles, thus improving air quality conditions.

So, what does this mean for the A51 Chester to Tarvin Corridor?

This section clearly demonstrates that the A51 is a key route within both the local and strategic highway network providing connectivity to regional centres and city centres of Chester and Liverpool for both commuter and freight movements.

However, data collected and modelling along this network provide evidence of heavy congestion which could produce significant delays in the future hindering developments and access to opportunities. Capacity improvements are therefore required to mitigate current issues of congestion and prevent severe delays for future traffic.

2.5.4 Road Safety

Road safety and security is an important issue for Cheshire West and Chester. This is reflected by the development of the 'Road Safety Plan' in 2016/2017. The plan proposes a range of measures to reduce the risk of road traffic collisions and casualties, including:

- Improving safety for all road users but especially vulnerable users;
- Directing traffic to use the most appropriate roads;
- Managing the speed of traffic;
- Behavioural change through Road Safety Education, Training and Publicity programmes; and
- Delivering targeted engineering measures to reduce collisions through the annual Local Safety Scheme Programme.

Overall, road safety trends in Cheshire West and Chester are broadly stable with a decrease in the number of people Killed or Seriously Injured (KSI) on roads within Cheshire West and Chester between 2012 and 2015. The number of casualties (slight, serious and fatal) has fluctuated over the 4-year study period as shown in Table 13. Of the 1026 casualties in 2014, 841 were slight casualties, 170 were serious, and 9 were fatal.

Table 13: Killed or Seriously Injured in Road Traffic Collision 2012 to 2015

Type	2012	2013	2014	2015
Adult	205	126	179	67*
Children	13	14	9	5*

Source: Cheshire West and Chester Road Safety 2015 / 2016

**Data only up until June 2015*

Table 14 shows how these casualties were distributed among different modes of transport. As can be seen in the table below, the majority of casualties were car occupants. However, over 200 casualties in each year have been pedestrians and cyclists. Reducing congestion and enhancing the performance of junctions could therefore improve safety along the corridor creating better environments for cyclists and pedestrians.

Table 14: Seriousness of Collision Sorted by Mode Type 2012 to 2014

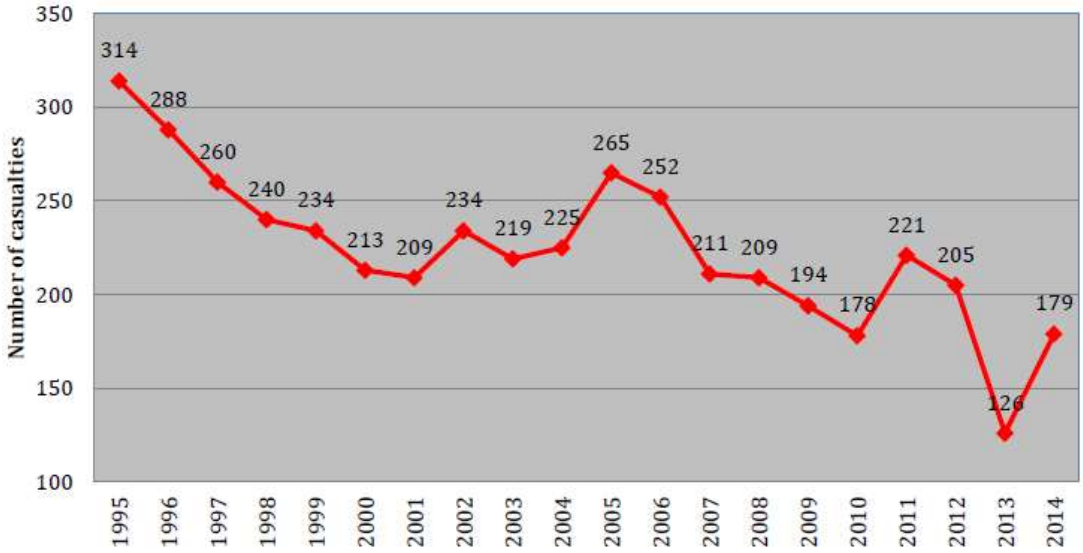
	2012					2013					2014				
Casualty Group	Fatal	Serious	Slight	Total	%	Fatal	Serious	Slight	Total	%	Fatal	Serious	Slight	Total	%
All casualties	11	194	917	1122	-	7	119	763	889	-	9	170	841	1026	-
Pedestrians	2	29	79	110	10	3	24	79	106	12	1	26	80	107	11
Pedal cyclists	0	24	76	100	9	1	22	82	105	12	0	27	97	124	12
Motor cyclists	4	58	67	129	11	2	21	90	113	13	1	59	75	135	13
Car occupants	3	75	646	724	65	1	46	477	524	59	7	54	551	612	60
PSV occupants	0	4	20	24	2	0	4	10	14	2	0	1	6	7	1
Other	2	4	29	35	3	0	2	25	27	3	0	3	32	35	3
KSI Total				205					126					179	

Source: Cheshire West and Chester Road Safety 2015 / 2016

The graph displayed in Figure **18** 18 shows the number of Killed or Seriously Injured (KSI) individuals on Cheshire's highway network since 1995.

There has been a decrease in the number of recorded collisions between 1995 and 2014 with the exception of an increase between 2013 and 2014 of 53 accidents. Further data is required to know whether this is an anomaly or an emerging pattern.

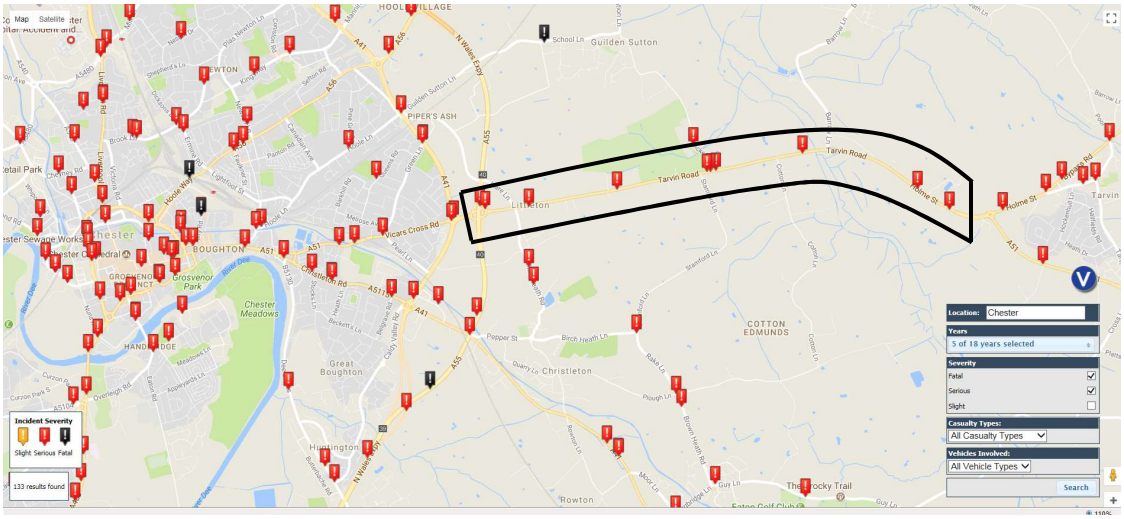
Figure 18: Killed or Seriously Injured Road Traffic Collisions on Cheshire West and Chester local roads 1995-2014



Source: Cheshire West and Chester Road Safety 2015 / 2016

The location of collisions that occurred between 2011 and 2015 can be seen in Figure 19 which displays the location of both serious and fatal accidents, black markers representing fatal and red markers representing serious collisions. As expected, there is clustering around the two junctions along the A51 Chester to Tarvin Corridor. There have been no recorded fatalities during the study period along the A51; however, two have been recorded in Chester city centre and on the A56 / A55.

Figure 19: 5-Year Serious / Fatal Accidents in the Chester Region (2011-2015)



Source: www.Crashmap.co.uk 2017

2.5.5 Key Issues and Opportunities

Table 15 highlights the key issues and opportunities in relation to road safety in Chester.

Table 15: Key Issues and Opportunities Presented by Road Safety

Issues	Opportunities
• Latest figures from 2014 suggest that the number of KSIs has increased in Cheshire West and Chester.	• The current level of road safety in the Chester region could be improved if the amount of stop start traffic Is

Issues	Opportunities
• Continued analysis of accidents is required to help reduce accidents to a similar level observed between 1995 - 2013. • Rear end shunting accidents are common at key junctions along the corridor such as the A51/A55 Vicars Cross roundabout.	reduced. Junctions along the A51 Tarvin Corridor such as the A51/A55 Vicars Cross junction and the A51/Stamford Lane junction currently experience a higher than acceptable number of collisions of this type. The occurrence of rear end shunting accidents could be reduced if traffic is free flowing at junctions.

So, what does this mean for the A51 Chester to Tarvin Corridor?

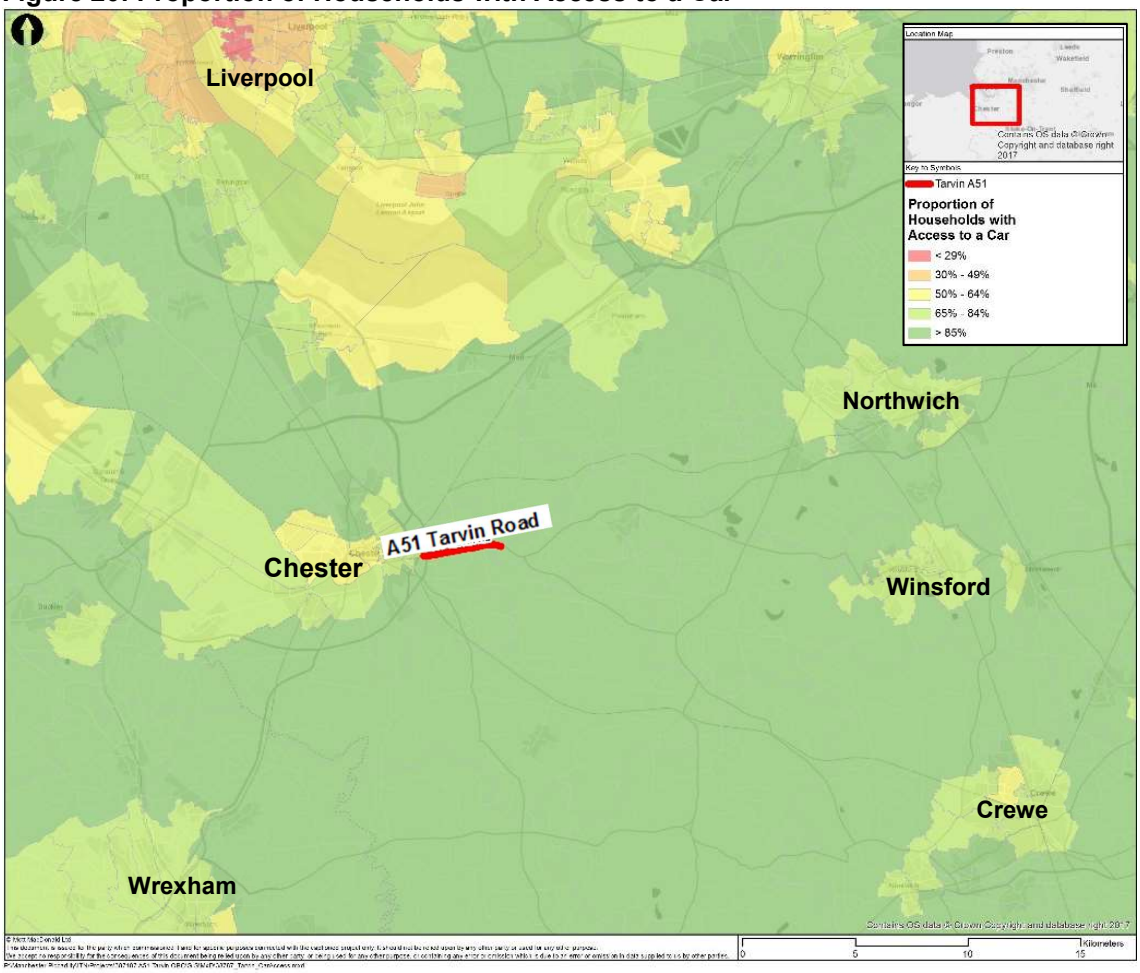
Accident data for the study area shows a number of serious and slight accidents occurring at key junctions along the corridor such as the Vicars Cross roundabout, Stamford Bridge Junction, Wicker Lane junction and the eastern and western approaches to the Tarvin roundabout.

Increasing capacity along the A51 and a series of improvements at key junctions such as Vicars Cross roundabout, Stamford Bridge and the Tarvin roundabout could enhance road safety for vehicles by improving the flow of traffic along the network and on approach to key junctions.

2.5.6 Car Ownership

Figure **20** below presents a review of car ownership in the Chester region and analysis of 2011 ONS Census data forms the basis of this sub section.

Figure 20: Proportion of Households with Access to a Car



Source: ONS 2011

As can be seen in Figure **20**20 above, there is a relatively high proportion of the population (85% of households) surrounding Chester that have access to a car. In Chester, parts of Ellesmere Port and Elton levels of access to a private car decreases to 50-64%. Further north, across the River Mersey the proportion of households with access to a car dramatically decreases, in some areas to less than 29%. It should also be noted that there is a direct correlation between areas of low car ownership and the most deprived parts of the wider study area (See Figure 1212).

2.5.7 Key Issues and Opportunities

Table 16 highlights the key issues and opportunities in relation to car ownership in Chester.

Table 16: Car Ownership Issues and Opportunities in Chester

Issues	Opportunities
• A high proportion of the population (85% of households) surrounding Chester have access to a car. • Whilst this can be viewed as a positive indicator of wealth and prosperity in the study area, this also implies that car travel is embedded as a dominant mode of travel in Chester West and Chester.	• Within the urban centre fewer members of the population have access to a car. • There is an opportunity to increase travel by sustainable modes and increase resident access to employment and services.

So, what does this mean for the A51 Chester to Tarvin Corridor?

High levels of car ownership are evident across the borough particularly in areas surrounding the A51 corridor which contributes to increasing levels of congestion along the A51. Therefore, the highway needs to remain resilient to high and increasing levels of car ownership and offer a network which supports sustainable modes of transport to reduce the number of trips made by car.

In order to create a resilient network and improve opportunities for sustainable travel, capacity of the network needs to be increased in order to reduce congestion and improve the reliability of bus services.

2.6 Wider Transport Network Provision

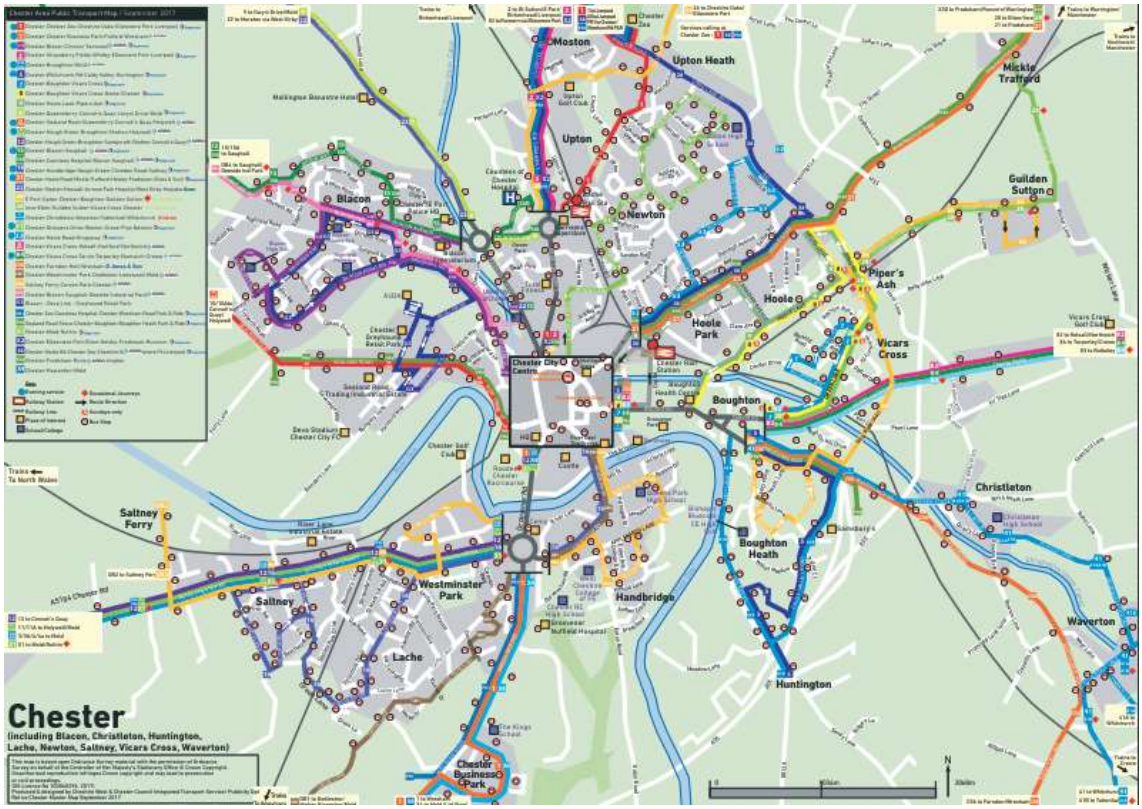
It is important to examine the use of the corridor by other forms of transport and 'active mode' users. This section examines wider transport provision in Cheshire West and Chester, examining accessibility on a mode by mode basis. Accessibility covers movement within the borough as well as to key centres to the east of Chester.

2.6.1 Public Transport

2.6.1.1 Bus

Buses are a sustainable and effective mode of transport that can efficiently utilise highways space. An overview of Chester's bus network is displayed in Figure **13**. There are currently three bus services that run along the A51 Tarvin to Chester Corridor. These are the 82, 83 and 84 bus services which link Chester with Crewe, Northwich, Winsford and Tarporley.

Figure 13: Chester Bus Network Map



Source: Cheshire West and Chester Council 2017

The importance of the A51 Chester to Tarvin corridor for buses travelling to and from Chester is demonstrated by the high number of services which stop along the route. On a weekly basis, 186 buses stop at the bus stop on the A51 Tarvin Road near Cotton Lane travelling towards Chester, and 176 stop at the bus stop on the opposite side of the A51, travelling from Chester.

Effective public transport is a key factor in creating more sustainable communities. However, bus services which utilise the A51 Chester to Tarvin corridor often experience congestion and delay leading to poor journey reliability with some services being discontinued as a result. Bus travel can become more attractive if journey times are fast and reliable which can be achieved through reducing congestion on the highway network.

High levels of car ownership in the study area (85%) could be indicative of a level of car dependency, reinforced by a perception that public transport offers a poor level of service. Improving conditions for travel along the A51 will increase opportunities for sustainable travel modes to connect Chester to wider surrounding areas, which in turn could further reduce congestion and lead to a positive change in carbon emissions.

Data from the DfT Public Service Vehicles (PSV) survey, which uses figures from bus operators within each local authority for years 2010-2016, has shown the number of passenger journeys on local bus services have fluctuated around 11 million with a decrease occurring around 2011/12. Declining trends in bus passengers across the UK and no significant increase in patronage in Cheshire West and Chester since 2009/2010 demonstrate the need for change to enable services to become more efficient and attractive as a main mode of travel. As a percentage of the total bus passenger journeys undertaken in Chester, 30% are undertaken by passengers eligible for concessionary travel. Therefore, ensuring bus services are available and efficient is important to ensure all ages of the population have access to opportunities and facilities.

2.6.1.2 Rail

Rail plays a crucial role in the transport of people and goods in Cheshire and across north Wales and northern England. Chester railway station, currently operated by Arriva Trains Wales, is the main rail hub for the region with services on the North Wales Coast Line, the Wirral Line and the Mid-Cheshire Line. Figure **14** shows the location of the Chester rail network and how it is connected to Liverpool in the west, Manchester in the north and Crewe in the east.

Table 17 shows annual rail passenger levels at Chester railway station between 2011/12 to 2015/16. There has been an increase year on year by over 1.5 million passengers during the study period.

Table 17: Annual Rail Passengers at Chester Railway Station

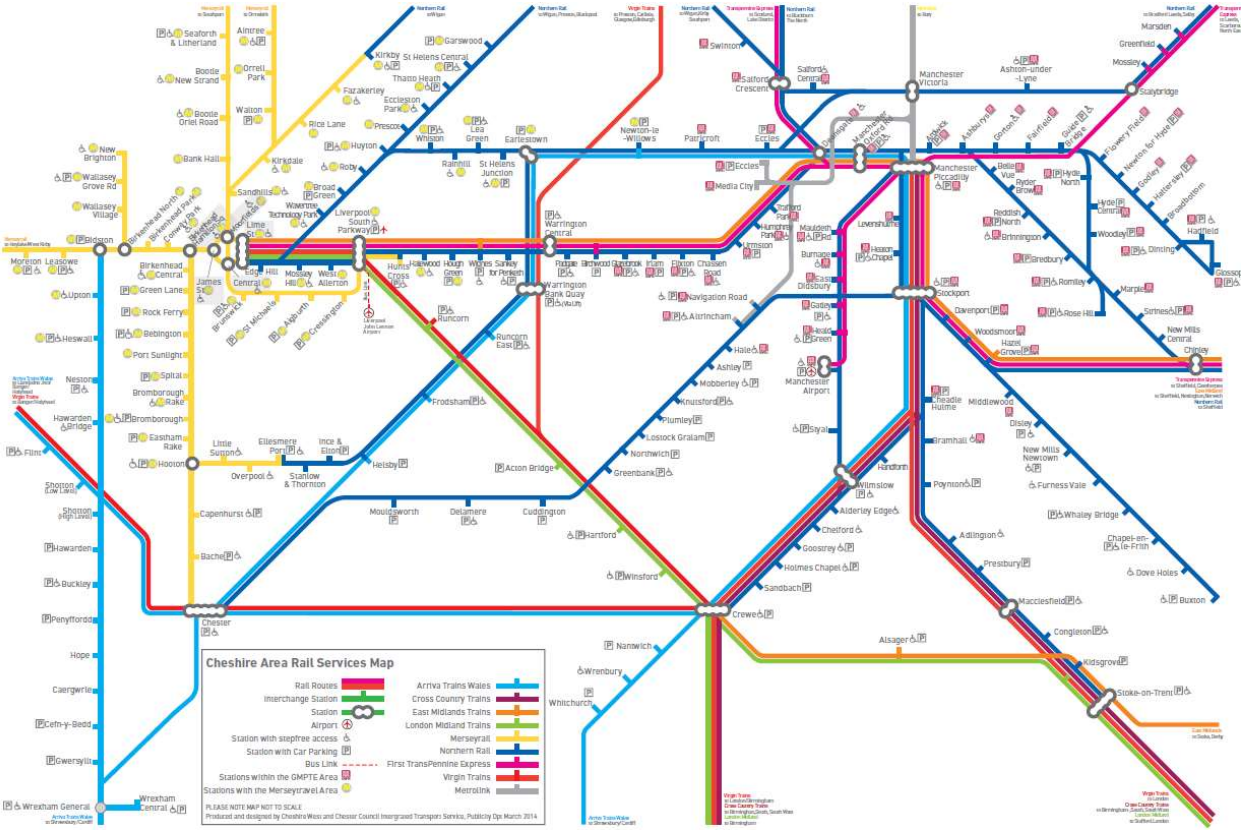
Year	Annual rail passenger usage (Millions)
2011/2012	2.957
2012/2013	3.011
2013/2014	4.256
2014/2015	4.523
2015/2016	4.620

Source: ORR

Increasing passenger numbers are reflective of the attractiveness of rail as a mode of transport for commuters and visitors travelling between Chester, the wider region and further afield. Potentially this could reduce the number of vehicles on the local highway network as people use the train for regional journeys, however it could also see an increase in traffic as people drive, or are driven to the station from the local environs to embark upon longer distance train journeys.

In order to support multi modal journeys and encourage use of public transport an efficient local highways network is needed to encourage people living in the vicinity of the A51 to either drive (or be driven) to the station to make onward longer distance journeys, or to take the bus to the station. Highway improvements along the A51 therefore have the potential to support an increase in public transport use.

Figure 14: Chester Rail Network Map



Source: Cheshire West & Chester Council 2017

2.6.2 Key Issues and Opportunities

Table 18 highlights the key issues and opportunities in relation to bus and rail use and services.

Table 18: Key Issues and Opportunities Presented by the Public Transport Network in Chester

Issues	Opportunities
• The Department for Transport forecast that Rail patronage may rise from 2010 to 2020 by 8-10%, 2026 by 16-20% and 2030 by 19-24%. • Congestion along the A51 corridor is causing significant delays to bus journey times, decreasing the reliability of services and attractiveness as a mode of transport. • The number of bus passengers on local bus services in Chester has shown no sign of significant increase between 2009/10 and 2015/16.	• In the future, Chester has the ability to capitalise on HS2 and Northern Powerhouse Rail. Chester residents will be able to quickly access both growth sites and attract more residents who wish to connect to the high-speed rail service as long as they can access Chester station efficiently. At present this is a challenge for residents driving to the station using the A51. • Reduced congestion on the A51 Tarvin to Chester Corridor will help to improve bus journey times between Crewe and Chester. This can help promote a mode share increase towards public transport.

So, what does this mean for the A51 Chester to Tarvin Corridor?

Chester rail station is well positioned to provide an opportunity to increase the use of sustainable modes of travel for long-distance trips for residents within Cheshire West and Chester. By investing in the local highway network, residents will be able to access Chester station more effectively to undertake onward travel by HS2, Northern Powerhouse Rail and the West Coast Main Line to London.

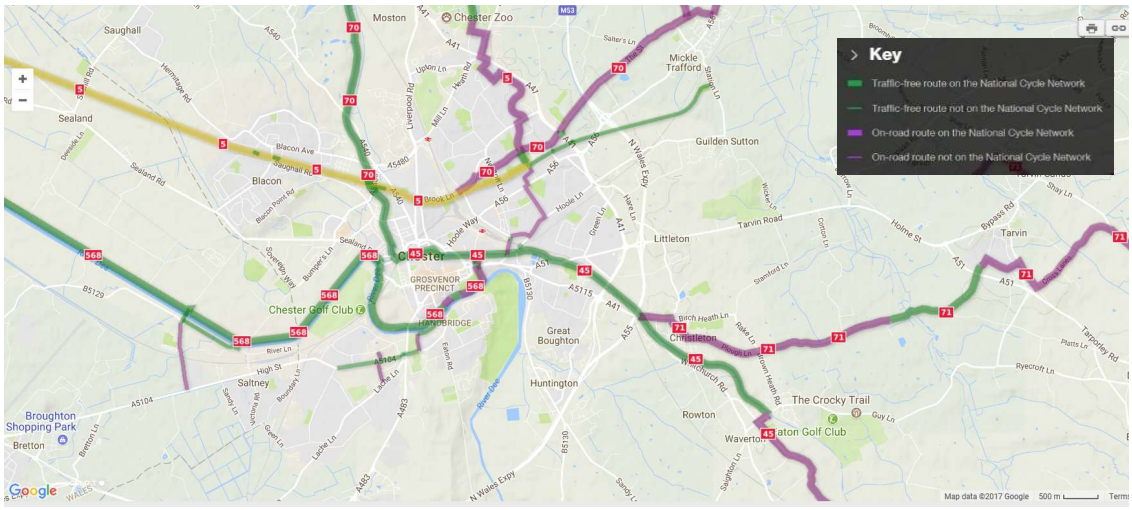
For local travel, investing in the A51 Corridor will facilitate improved journeys by bus through more efficient and reliable journeys. Furthermore, investment on the A51 corridor will complement the aims of the Chester City Gateway programme which aims to enhance access into Chester station via the A56 corridor.

2.6.3 Active Travel

2.6.3.1 Cycling

There are a number of cycle routes in and out of Chester city centre from the north, south, east and west with a traffic free cycle route. National Cycle Route 45, located along the A51 Tarvin to Chester corridor connects with the on-road National Cycle Route 71 which runs parallel to Tarvin A51 connecting Chester with Winsford as shown in Figure **15**. However, this cycle lane is narrow, poorly maintained and therefore unattractive to many cyclists.

Figure 15: Sustran's Chester Region Cycling Map



Source: Sustrans

Capacity and infrastructure improvements along the A51 highway corridor could improve conditions for cyclists between Chester. The proposed improvements to active travel routes as an integral part of this scheme include;

- Widening of the A51 between Tarvin and Chester to a 3m shared facility, where feasible;
- New tactile paving; and
- New signage.

In addition, at Hare Lane, the scheme will see the installation of larger islands at the junction to block right turn movements and at the same time reduce crossing distances for pedestrians and cyclists.

At the Stamford Bridge junction, west of the garage, the scheme will also encompass the installation of a new pedestrian refuge island to serve an existing bus stop on the northern side of the A51.

Increasing the capacity and utility of the cycle and highway network in the A51 Chester to Tarvin Corridor of the network will support a move away from private car use and assist in modal shift..

2.6.3.2 Walking

Walking is the simplest and easiest form of transport and it offers a quick and effective way to travel for shorter distances with benefits for both the user and the environment. For this reason, walking trips often form at least one leg of multi-modal journeys.

Walking as a main mode of transport along the A51 corridor offers limited connectivity to key towns and facilities which are not located within walking distance. However, walking to public transport stops, local shops, schools and leisure amenities could be supported for people living in close proximity to the A51 Tarvin to Chester corridor. There are a number of residential properties along the corridor and within Littleton which are within walking distance of six bus stops offering connectivity to Winsford, Northwich, Crewe and Tarporley. Residential areas around Littleton Lane are also located a 30-40 minute walk away from Chester railway station offering opportunities for walking as part of a longer distance journey reducing the need for vehicle use at the western end of the corridor.

The current congestion and lack of pedestrian crossings along the A51 present a road safety issue restricting walking opportunities for school children in the villages of Tarvin, Guilden Sutton, Christleton and Littleton. This adds to network pressures during school pick up and drop off times. Managing the flow of traffic and vehicle speeds and increasing safety at junctions along the A51 can create safer environments for pedestrians to help increase levels of walking amongst school age children.

2.6.3.3 Key Issues and Opportunities

Table 19 highlights the key issues and opportunities in relation to active travel in Chester.

Table 19: Key Issues and Opportunities Presented by Active Travel in Chester

Issues	Opportunities
• Existing cycle lanes along the A51 Tarvin Corridor are narrow reducing the attractiveness of the route for cyclists. • The majority (> 85%) of the population have access to a car which is likely to decrease the levels of walking and reduce opportunities for sustainable travel.	• During the last 3 years, a general increase has been noted in the level of walking trips in Chester. Enhanced pedestrian provision along the A51 corridor could encourage walking to public transport stops along Tarvin Road for people in the local area, offering sustainable modes of travel between Chester and Northwich. • Chester has several designated strategic cycle routes. These connect residential areas such as Christleton to the east. However, cycling along the A51 corridor is restricted with narrow cycle lanes and a heavily trafficked road network making the route unattractive. • Widening of footways can create more space for cyclists and pedestrians to travel between Chester and the east of the borough.

So, what does this mean for the A51 Chester to Tarvin?

Opportunities for active travel along the A51 corridor are predominantly associated with providing connectivity to public transport stops / stations with cycling offering sustainable connectivity for slightly longer journeys between the A51 and Chester. However, the currently congested network and narrow cycle lanes alongside the A51 lead to an intimidating environment for pedestrian and cyclists.

Capacity improvements along the A51 aim to improve road safety and reduce congestion which will in turn create environments which better promote walking and cycling.

2.7 How People Travel

In addition to understanding the highway and wider transport network it is important to understand where people are travelling to and from, to gain an idea of movements along the A51 corridor and how capacity improvements can facilitate more efficient movement. This section examines how people travel within Cheshire West and Chester. It explores the travel behaviour of both those living and/or working within Cheshire West and Chester and the way in which they travel.

2.7.1 Travel to Work

Origin and destination data supplied by the ONS from the 2011 census provides an insight into the movement of people from their usual residence to their place of work. The data provides the usual place of residence for those working within Chester and the place of work for those who live in Chester disaggregated by modal share. This information shows the flow of commuters between Chester and the surrounding Local Authorities.

Table 20: Inbound and Outbound Commuter Flows for Chester City for all modes

Local Authority District	Chester Outbound Flows		Chester Inbound Flows	
	Total	Percent	Total	Percent
Cheshire West and Chester	31,527	59%	38,643	49%
Flintshire	9,019	17%	19,428	24%
Wirral	1,658	3%	5,607	7%
Wrexham	1,789	3%	4,780	6%
Liverpool	1,237	2%	967	1%
Manchester	748	1%	320	0.4%
Cheshire East	1,139	2%	1,467	2%
Halton	348	2%	793	1%
Denbighshire	429	1%	1,417	2%
Warrington	1,041	2%	853	1%
Other	4,681	1%	5,286	1%
Total	53,616	100%	79,581	100%

Source: ONS 2011

A summary of Chester's commuter flows, based on travel to work census data from 2011 is given below:

- In total, just under 131,197 commuter movements take place in and out of the Chester region each day; with 53,616 outward flows compared to 79,581 inward flows. Therefore, Chester can be considered as a net importer of commuters.
- 53,616 outward flows leave Chester. The largest proportion of outbound flows are to the wider Cheshire West and Chester area (59%), then Flintshire (17%) and then Wirral (3%).

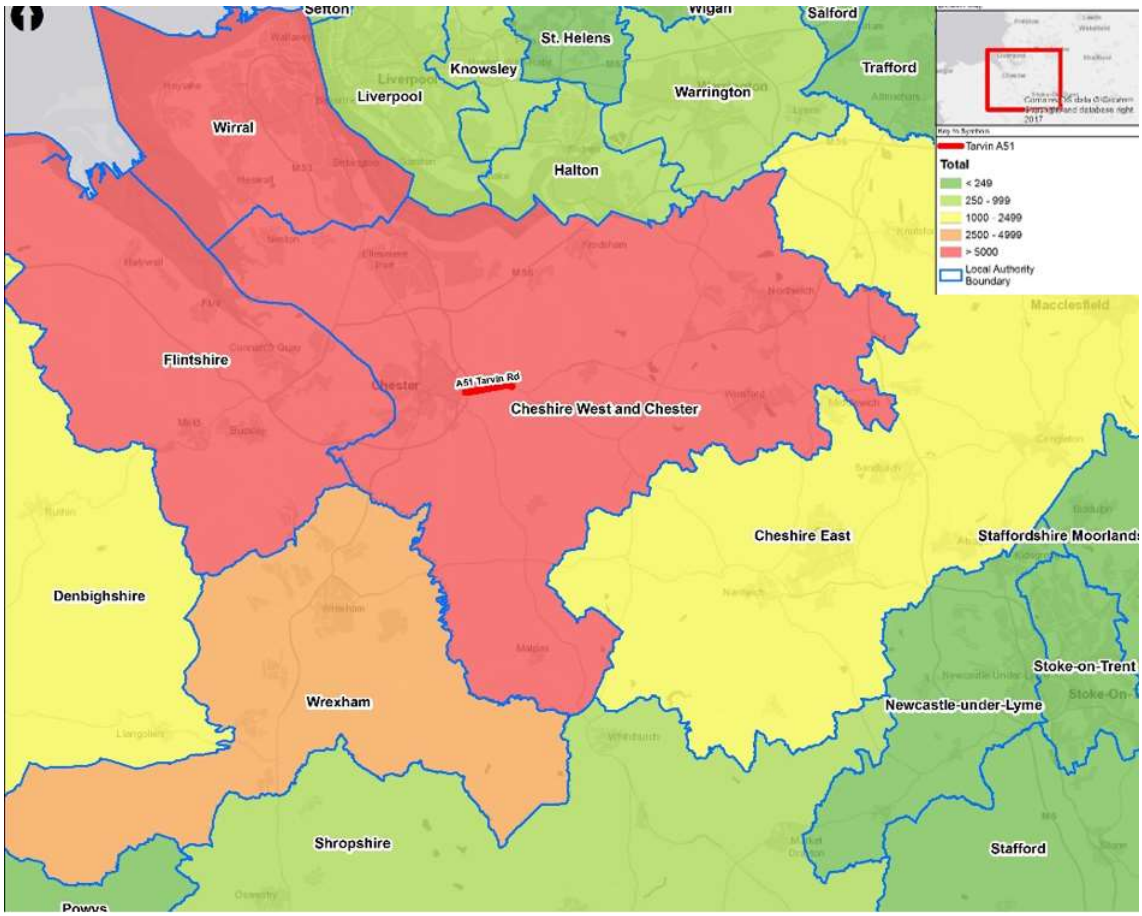
- There are typically 79,581 commuter movements into Chester each day. The three places of origin where inward flows are highest are from the wider Cheshire West and Chester area (49%), Flintshire (24%) and Wirral (7%). The largest volumes of inward commuter journeys originate from the east and north of Chester.
- Consequently, the A51 Chester to Tarvin corridor carries a greater level of commuter traffic compared to corridors to the south and west of Chester.

2.7.1.1 Where Chester's Workforce Resides

The place of residence for people who work in Chester has been mapped in Figure **16**.

The map shows that a high proportion of the workforce in Chester live within the wider Cheshire West and Chester area and neighbouring counties. Consequently, the area is potentially subject to a variety of cross county movements as resident's commute to work. Cheshire East and Denbighshire are the third most popular places to live for those who work in Chester, with 2,500 - 4,999 of inbound Chester commuters living in these areas. Therefore, traffic flows approaching from the east (along the A51 corridor) and west in the AM and PM peaks have the potential to be high.

Figure 16: Chester's Workforce Usual Place of Residence (2011)



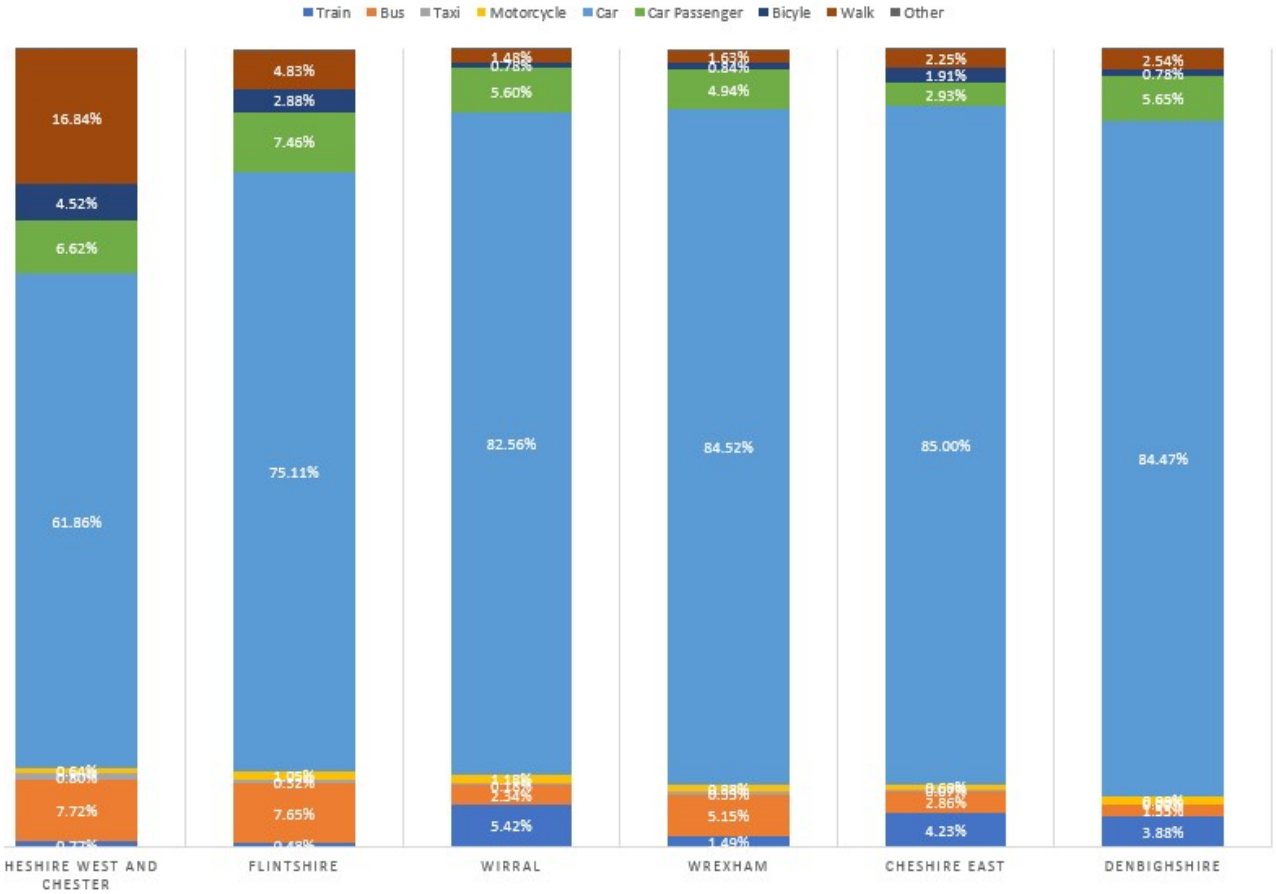
Source: ONS / MM

The modal share for inbound flows can be seen in Figure 25. There is a high reliance on car transport. Car travel makes up at least 75% of all travel outside Cheshire West and Chester. Inside the wider borough, 62% use the car to get to Chester for work.

Rail use is relatively low (< 3% of total mode share in Cheshire West and Chester) with the exception of the Wirral, Cheshire East and Denbighshire where it accounts for 3-6%. Bus travel is highest from Cheshire West and Chester and Flintshire making up 8% of the total mode share for inbound commuter trips into Chester.

With a heavy reliance on the car as a main mode of transport for commuters to Chester and around 79,851 people travelling into the city each day it is clear why congestion on key routes into the area is an issue; this is likely to be exacerbated as a result of proposed developments within the Northgate area and Chester Business Quarter increasing available employment opportunities. The A51 is a key route into the city centre from communities to the east of the city and commuters into Chester from other areas within Cheshire West and Chester make up the majority of inbound flows (59%) increasing the importance of the A51 as the key route between Chester and areas within the east of the borough.

Figure 17: Inbound Flows to Chester Modal Share (2011)

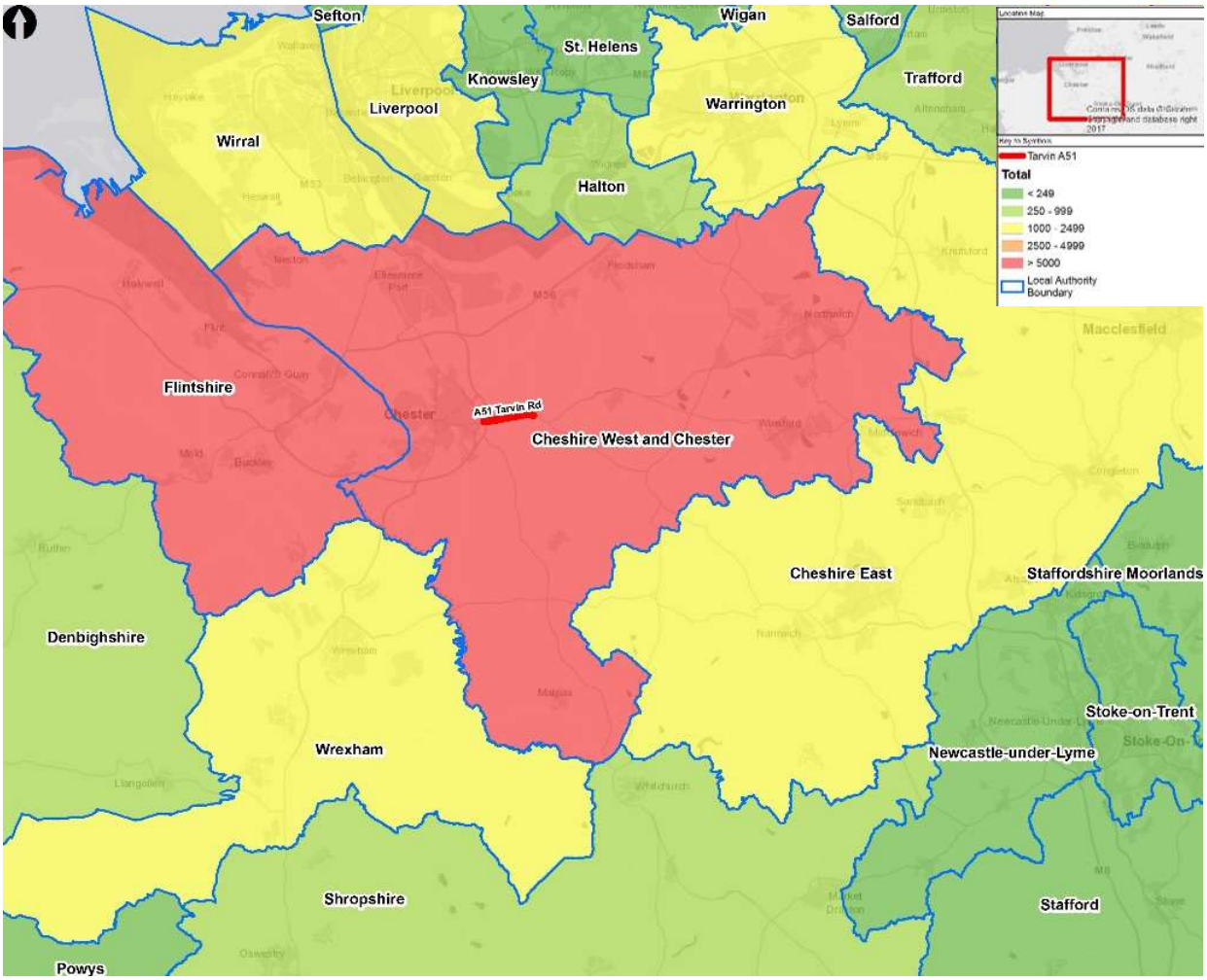


Source: ONS 2011

2.7.1.2 Where Chester's Residents Travel to Work

Chester residents usual place of work was mapped and can be found in Figure 26. The most popular place to work for Chester residents is within Cheshire West and Chester and Flintshire with over 5,000 movements per day.

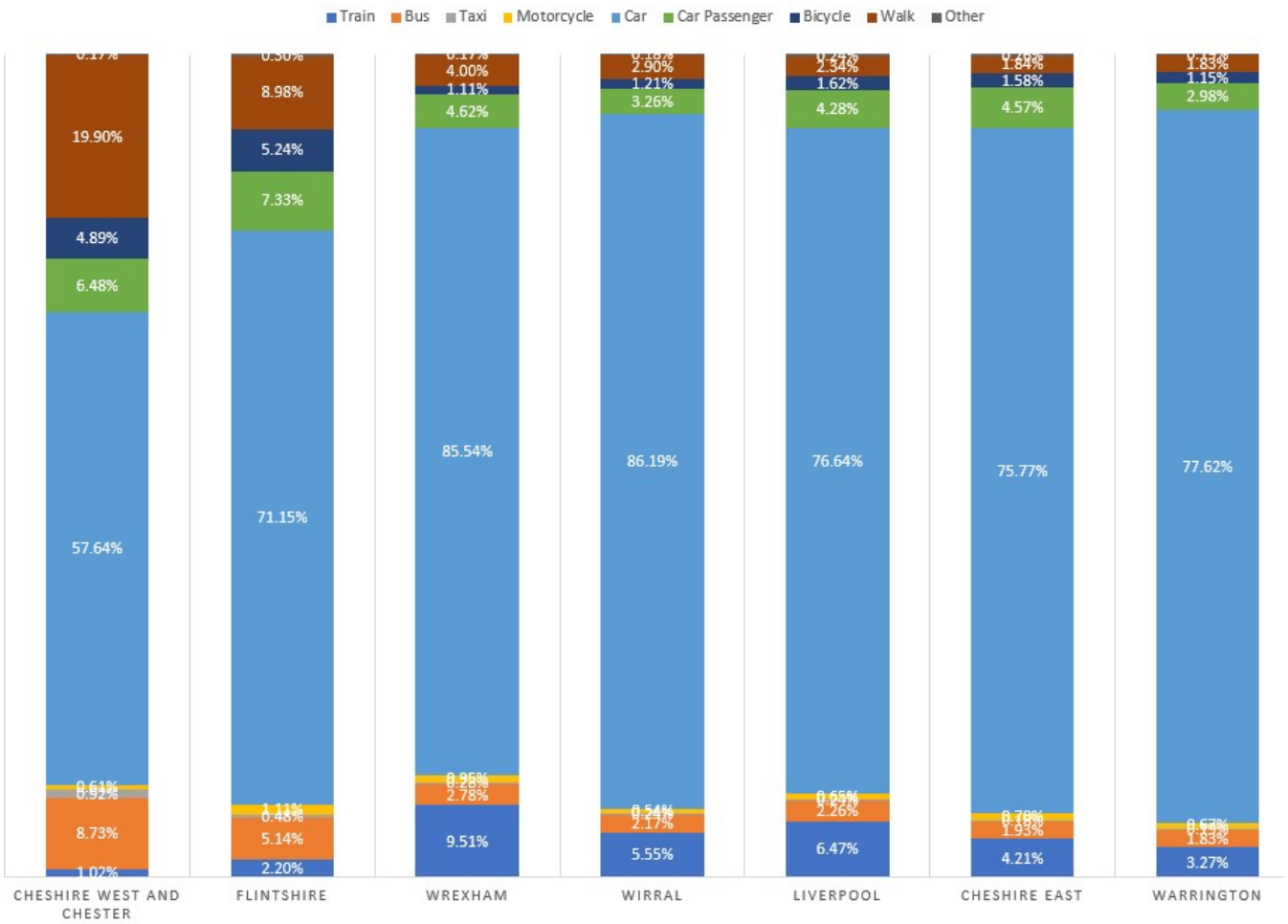
Figure 26: Chester Residents Place of Work (2011)



Source: MM / ONS

The modal share for these outbound flows can be seen in Figure **27** which demonstrates that the majority of trips out of Chester for work are made by car. Within Cheshire West and Chester, car travel makes up 58% of commuter trips from Chester. Similar to the inbound flows, rail travel is greatest to Wrexham with 10% of trips made using this mode. For areas within Cheshire East and Warrington, rail accounts for less than 5% of commuter trips from Chester. Cheshire East is the second most popular destination to work for people that live in Chester. Therefore, the significance of the A51 corridor is clear as it is a key link between Chester and Cheshire East for which car travel makes up around 75% of trips. Public transport use is also low (around 6%) for commuter trips from Chester to Cheshire East increasing the importance of highway connectivity between these areas.

Figure 27: Outbound Flows to Chester Modal Share (2011)



Source: ONS 2011

2.7.1.3 Key Issues and Opportunities

Table 21 highlights the key issues and opportunities in relation to how people travel to work to and from Chester.

Table 21: Key Issues and Opportunities Presented by How People Travel to Work to and from Chester

Issues	Opportunities
• Chester is a net importer of commuters with 53,616 outward flows compared to 79,581 inward flows for all modes of transport each day. • The majority of commuter trips in and out of Chester are made by car, making up between 65% to 90% of journeys with less than 3% of people using public transport. • Commutes into Chester from other areas within Cheshire West and Chester make up the majority of inward flows (59%) increasing the importance of the A51 as the key route between Chester and areas to the east of the borough. • Analysis of outbound commuter flows for people that live in Chester also shows a heavy reliance on the car. The A51 corridor forms a key route between Chester and Cheshire East which is the	• The A51 is a key route for a significant number of commuters travelling between Chester on a regular basis. Therefore, it is important to ensure reliable journey times. • The A51 corridor to the east and the highways network to the north of Chester are potentially exposed to greater levels of traffic than those to the south or west of the region highlighting opportunities for investment into capacity improvements in these areas. • Buses only account for a small proportion of commuter trips within Cheshire West and Chester (9%). Bus services that serve the A51 corridor such as the 82 between Chester and Northwich could be better utilised to increase the use of sustainable

Issues	Opportunities
second most popular destination for Chester residents to work therefore highlighting the significance of the A51. • Pressures on the A51 are further increased by commuters travelling from Chester to Cheshire East as public transport accounts for just 6% of these journeys.	transport modes if congestion along the A51 was reduced. • 25% of commuter trips within Cheshire West and Chester are made by cycling or walking. Where distances are appropriate in length and suitable infrastructure is present, active travel should be encouraged to embed active travel as a regular commuter mode within Chester. • Walking and cycling along the A51 corridor would become more attractive after improvements at key junctions such as the A55/A51 Vicars Cross junction improve the safety of environments for cyclists and pedestrians.

So, what does this mean for the A51 Chester to Tarvin Corridor?

This section shows how the A51 corridor provides a major route for a significant number of commuter trips between Chester and the east of the borough. It is therefore essential to ensure journey times are reliable and connections are efficient to ensure people can access jobs and contribute to the overall growth of the economy.

2.8 Land Use and Development

Following analysis of the current issues on the transport network and the A51 corridor, it is also useful to identify key upcoming developments in the study area to assess how traffic movements along the A51 corridor may change in the future. There are a number of significant developments planned and currently taking place around Chester, increasing the importance of strategic routes in and out of the city centre such as the A51 corridor. STRAT 3 of the Cheshire West and Chester Local Plan sets out the specific proposals for Chester which includes around 5,200 new dwellings.

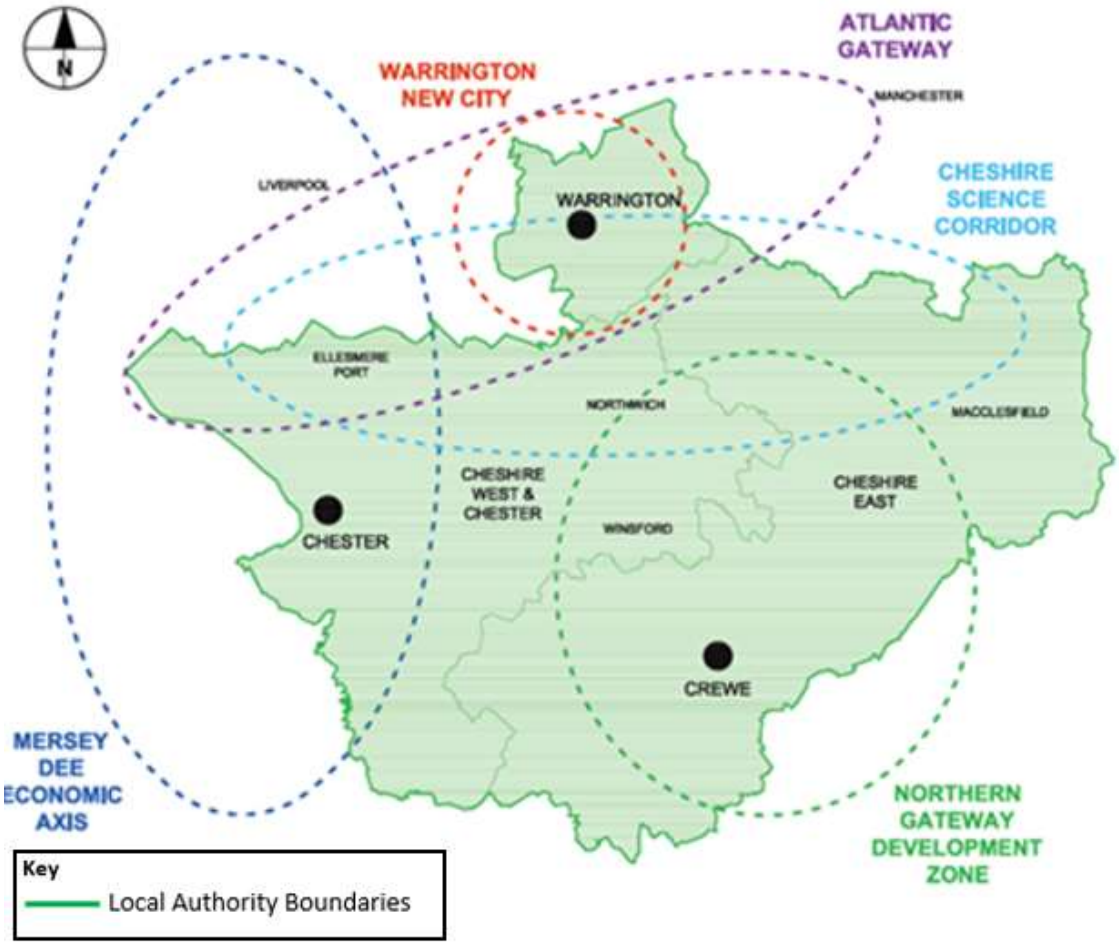
In addition, a key retail programme at Northgate is in development including a new theatre and proposals for Business Quarter consisting of 44,000 m2 of office floor space is creating many opportunities for the city. The A51 through Tarvin is an important strategic route which will be key to providing connectivity to these areas of development in Chester and so effective transport links will be essential.

2.8.1 The M6 Growth Corridor

The Cheshire & Warrington LEP proposals for a new HS2 hub at Crewe and a growth zone at Crewe / Stoke / North Staffordshire reinforces the importance of the M6 Growth Corridor. The aspirations for growth along the West Coast Main Line and HS2 corridor are set out in the sub-regional economic strategy ‘Cheshire Matters’, which formed the basis of a Growth Deal with Government in 2015. The ambition of ‘Cheshire Matters’ is to, by 2040:

- Grow the Cheshire and Warrington economy by £27bn to £50bn;
- Create 112,000 jobs;
- Build 115,000 new homes; and
- Increase GVA per head to 120% of the national average.

Figure 28: Key Development Growth Areas



Source: Mott MacDonald

Chester lies at the heart of the M6 Growth Corridor and forms one of the key cities within the Constellation Partnership, the Cheshire Science Corridor, the Atlantic Gateway and Mersey Dee Economic Axis. The A51 provides a key connection between these locations and the wider area. Reducing issues of congestion along this network will help facilitate these developments and ensure connections are efficient and reliable.

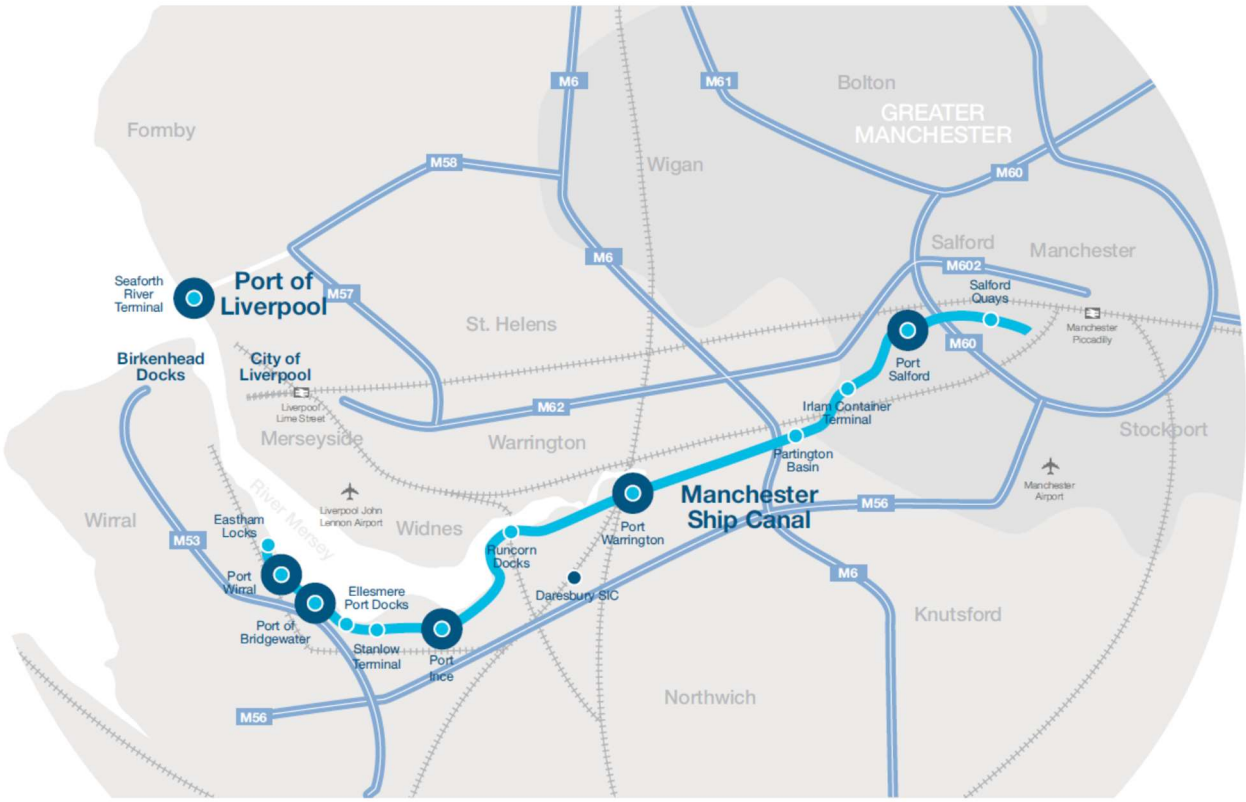
2.8.2 The Atlantic Gateway

The Atlantic Gateway is an emerging hub for world trade, logistics, business and innovation in the corridor stretching from Deeside and Merseyside through Cheshire and Warrington to Manchester and is shown in Figure **29**. The Gateway region is a leader in innovation and advanced manufacturing and delivers a GVA of £17 billion per annum.

The area represents a key intervention priority for the Cheshire & Warrington LEP, Liverpool City Region LEP and Greater Manchester LEP, offering significant prospects for the long-term economic prosperity of the region.

By 2030, there is the potential for 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 (Atlantic Gateway Business Plan, 2012).

Figure 29: Chester's Close Proximity to the Atlantic Gateway Initiative, Supported by the Cheshire & Warrington LEP, Liverpool City Region LEP and Greater Manchester LEP



Source: Atlantic Gateway Business Plan (2012)

The A51 provides a significant key connection to key strategic connectivity 'hubs' in the Gateway area. This scheme will support development of the Atlantic Gateway by enhancing connectivity from the east of Chester providing opportunities for efficient connections.

2.8.3 Chester Northgate Retail Development

A £300 million investment into a retail-led, mixed-use development in the Northgate area of the city centre is set to deliver around 500,000 sqft of new retail, restaurant and leisure facilities over two phases of construction. The Chester Northgate project will transform the northwest quarter of Chester City Centre with new shopping, leisure and residential development. Key features of the Northgate development are:

- A department store along with a mix of large and small shops;
- A multi-screen cinema;
- Cafés, bars and restaurants;
- A new, reinvigorated market hall;
- A new hotel with conference facilities;
- Parking for around 800 cars; and

Anticipated to create more than 1000 jobs, the open, single-level scheme has been designed with three main east-west shopping streets and two north-south streets to integrate seamlessly with the existing city centre. The creation of this strong shopping offer, anchored by the new department store, will extend and complete a city centre shopping circuit. Chester Northgate is

set to generate a ‘step change’ for the city and propel Chester into again being one of the nation’s Top 50 shopping destinations.

Figure 30: Artistic Impressions of Northgate Development Area

Source: Cheshire Growth Partnership

The council has already taken major steps to facilitate this scheme by relocating the bus station and developing the cultural centre ‘Storyhouse’, however implications on the highway need to be considered to ensure any potential issues associated with increasing levels of traffic from visitors are mitigated. Chester is likely to experience a rise in the number of visitors creating additional pressures on the A51 as a major route into the centre of Chester.

2.8.4 Chester Business Quarter

In addition to the Northgate development, increased commuter traffic generated as a result of Chester’s Central Business Quarter (CBQ) will also create additional pressure on the A51

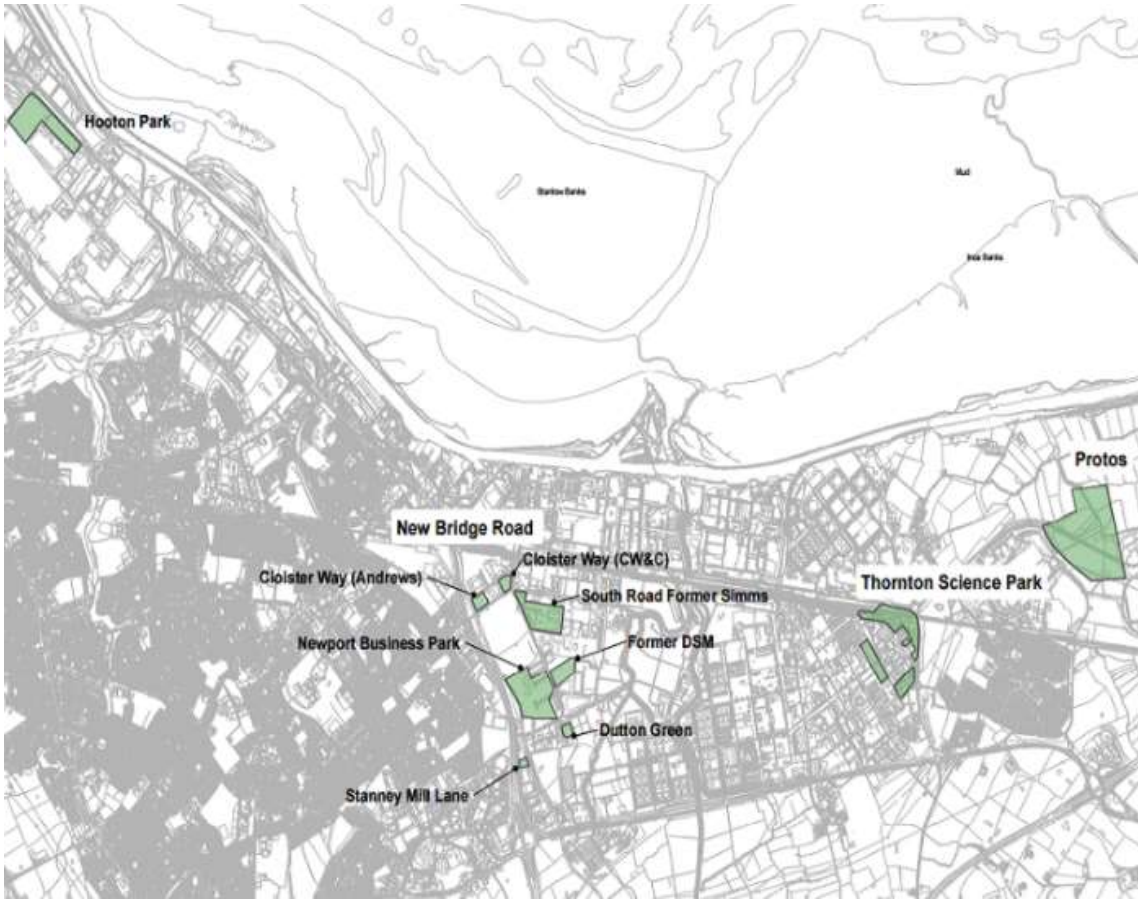
By 2028, it is planned that Chester’s Central Business Quarter will offer up to 500,000 sq ft of office space creating around 3,500 jobs. One City Place, a six-storey, 70,000 sq ft office development, was completed in February 2016 and as a new sizeable employment destination is likely to have already attracted additional traffic on the A51.

2.8.5 Ellesmere Port Enterprise Zone

Ellesmere Port Enterprise Zone forms a substantial part of the Cheshire Science Corridor compromising nine sites across the area including Hooton Park, Dutton Green, Cloister Way and Newport Business Park. The Cheshire Science Corridor is a crescent that crosses the northern part of the Cheshire & Warrington sub-region linking together nationally and internationally significant research facilities and established science based businesses.

Overall the science corridor would accelerate the significant growth potential of the sub region’s cluster of science and innovation industries and create 15,200 new jobs by 2030 with 390 businesses attracted to Cheshire and Warrington. The substantial new enterprise zone initiative in the Ellesmere Port area has the potential to create around 4,000 jobs in and around the town.

Figure 31: Ellesmere Port Sites in the Cheshire Science Corridor



Source: cheshiresciencecorridorez.com

Enterprise zone status is internationally recognised and therefore provides opportunities to boost the marketing of the sites in Ellesmere Port and across the science corridor as a whole attracting future investors and tenants.

The A51 forms a key route for traffic travelling to and from the Ellesmere Port Enterprise Zone from the surrounding areas to the east of Chester such as Northwich, Winsford and Crewe. Enhancing connectivity to Crewe from this site will also improve connectivity to longer distance destinations provided at Crewe Hub. Ensuring this network provides an efficient link to the sites at Ellesmere Port from the surrounding areas will therefore be essential in enabling the success and economic potential of the developments.

2.8.6 Key Issues and Opportunities

Table 22 highlights the key issues and opportunities in relation to economy, business and trade in an around Chester.

Table 22: Key Issues and Opportunities Presented by Economy, Business and Trade

Issues	Opportunities
• Development sites towards Ellesmere Port and the Atlantic Gateway are currently relatively inaccessible from locations to the east of Chester due to high levels of congestion. • Increasing journey times will decrease attractiveness of the sites to future investors and tenants slowing economic growth in Cheshire West and Chester and the wider region. • Current issues of congestion along the corridor will further increase due to the significant number of people that will be commuting to these sites on a regular basis and the increasing number of visitors attracted by new retail and leisure facilities.	• The A51 Tarvin to Chester Corridor provides a key connection between the Constellation Partnership, the Cheshire Science Corridor, the Atlantic Gateway, Mersey Dee Economic Axis and the wider areas of the borough. • A reduction in congestion would improve journey efficiency and reduce journey times along the A51 which acts as a key route from the M6 corridor through to the Atlantic Gateway. • Reducing issues of congestion along this network will therefore help facilitate developments such as the Atlantic Gateway and ensure connections are efficient and reliable.

What this means for the A51 Chester to Tarvin Corridor?

The A51 has significant potential to support several key developments in the region. The sites identified in this section are widely recognised as crucial factors in future economic and employment growth across Cheshire West and Chester. Therefore, capacity improvements along the A51 corridor are required to reduce congestion and provide efficient and reliable journeys to key developments to the east, west and within Chester supporting and accelerating growth in the wider region.

2.9 Housing

This section expands on the above information, considering housing need across Cheshire West and Chester. Housing and employment land are inextricably linked and since the majority of Chester's workforce live within Cheshire West and Chester, there will be a requirement to provide a wide range of housing types to accommodate the current and future demands of residents and support the projected growth of employment across the borough. Improvements on the A51 corridor may also be required to facilitate and provide access directly to housing sites as around 1,200 new dwellings are proposed throughout green belt release.

2.9.1 Housing in Chester

Chester has the largest population in the borough with over 81,000 people (25 percent of the total population of the borough). Given the potential of Chester to drive economic growth and the need to meet the city's housing requirements 5,200 dwellings are proposed for development during the period of the Local Plan (Part One) (up to 2030).

2.9.2 Local Housing Issues

The local housing market compares strongly against regional and national comparators. The key features of the Cheshire West and Chester housing market, based on the 2011 Census are:

- 147,746 households across Cheshire West and Chester;
- 34.7% of these homes are owned outright by the occupiers, this is higher than the figures for the North-West (31%) and England and Wales as a whole (30.8%);
- 36% of homes in Cheshire West and Chester are owned with a mortgage, around 3% higher than both comparator areas; and

- A lower proportion of Cheshire West and Chester's residents live in social rented houses than across the North-West and England (14.7% in Cheshire West and Chester compared to 18.3% across the North-West and 17.6% in England[7]).

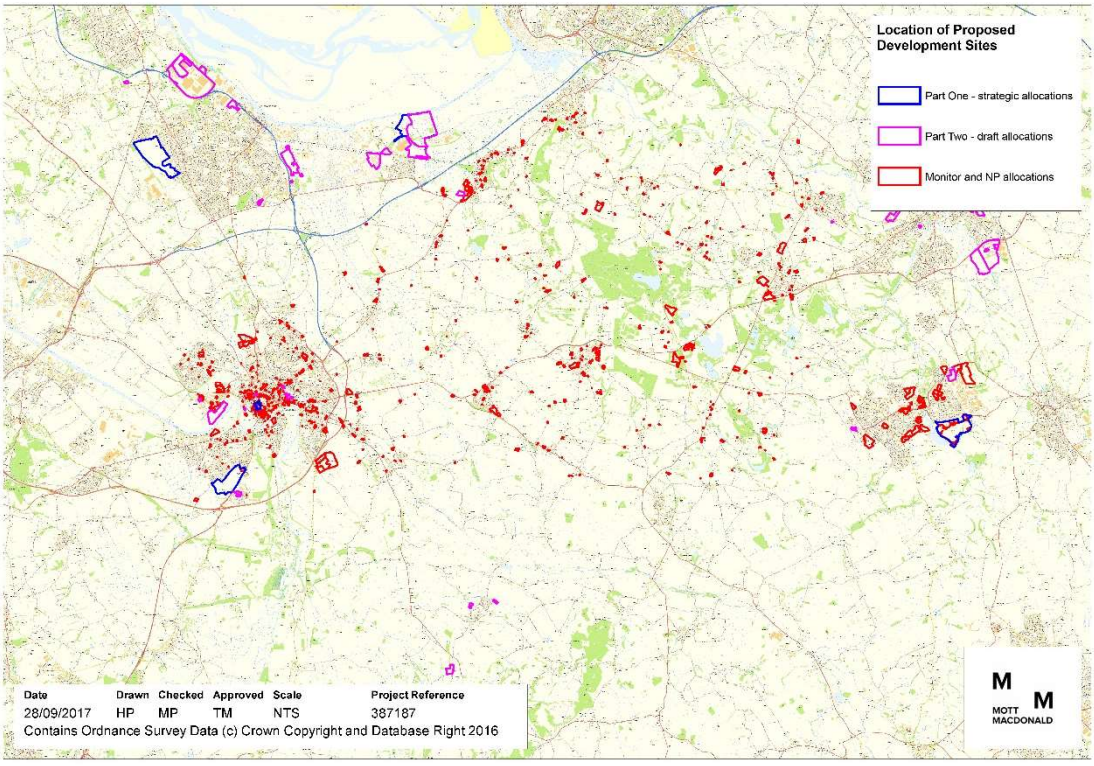
Affordable homes will be required within all new residential development, including those that form part of mixed use developments on sites that:

- In the urban areas, have a capacity for ten or more dwellings or comprise an area of 0.3 hectares or more; and
- In rural areas, have a capacity of three or more dwellings or comprise an area of 0.1 hectares or more.

2.9.3 Local Plan

Key elements of the Council's strategy are to deliver around 22,000 new homes across the district to support an additional 14,000 people in employment through to 2030. The Preferred Policy Directions (PPD) outline the Council's preferred option for growth which aims to deliver 1100 new homes per annum (22,000 over the Plan period). The city of Chester and towns of Ellesmere Port, Northwich and Winsford are the main focus for development to allow for the best integration of homes jobs, services and facilities in the most accessible locations. Figure 32 shows the location of these developments across the wider area.

Figure 32: Location of proposed development sites



Source: Mott MacDonald, based on data form Cheshire West and Chester Council

However, in relation to the study area for the A51 Tarvin-Chester Improvements Scheme, a number of settlements are listed as key service centres that could provide a good range of facilities for development in rural areas. Within the rural area, provision will be made for at least 4,200 new dwellings and 10ha of additional land for employment development. The identified settlements relevant to this scheme are listed in STRAT 8 of the Local Plan (Part One) and are noted below:

- Tarvin- 200 dwellings
- Tarporley- 300 dwellings
- Cuddington and Sandiway- 200 dwellings

Such increases in the number of dwellings in the rural areas of Cheshire West and Chester are likely to align and support the development of employment sites within and around the borough such as the Northgate Retail Development. Tarvin, Tarporley, Cuddington and Sandiway are all located to the east of the study area. Therefore, residents in these areas will rely on the A51 corridor for connectivity to Chester city centre and developments further afield such as the Ellesmere Port enterprise zone and the HS2 Crewe Hub increasing the need for capacity improvements along this corridor.

2.9.4 Key Housing Issues and Opportunities

Table 23 identifies the key issues and opportunities in relation to Chester's hosing offer.

Table 23: Key Issues and Opportunities Presented by Housing in Chester

Issues	Opportunities
• Between 2010 and 2030 it is expected that at least 22,000 new dwellings and 365 hectares of land for employment development will be created in the borough. Traffic congestion along the A51 corridor will therefore increase as the borough attracts more residents and employers. • Housing growth in communities along the A51 corridor has been significantly higher than in other key service centres seeing the completion of between 60 and 100 dwellings in each of these settlements during 2016. Heavy congestion on the local highway network could potentially slow housing growth if the area becomes an unattractive place to live and work. • Development on green belt land to the south-west of Chester will add pressure to the A51 as a local route for residents and a strategic route for traffic.	• As Cheshire West and Chester delivers targets for housing each year, the demand to travel in the borough will increase. The A51 will continue to be a strategically vital route and must be improved in order to accommodate more movements. • Increased numbers of new homes will also result in a greater demand for jobs in the area. To live and work in the borough workers must be attracted by efficient access to Chester City Centre as well as the developing employment centres of Crewe HS2 Hub and rolling stock depot, the Atlantic Gateway and the Northgate Retail Development. This would support the continued economic growth of Chester.

So, what does this mean for the A51 Chester to Tarvin Corridor?

The demand for housing in Cheshire West and Chester is high and is likely to be increased by anticipated future economic growth. Therefore, future provision for housing must create enough homes to meet demand and provide a suitable mix of housing styles to accommodate a range of needs. The transport network must respond to this growth in housing numbers.

A number of rural areas around the A51 corridor have been identified as suitable areas for housing and employment sites. The A51 Tarvin-Chester Improvements Scheme can support these developments by unlocking significant amounts of land suitable to build homes required to meet demand driven by the employment growth across Cheshire West and Chester. Improvements will also ensure the highway network remains resilient in response to future growth in levels of traffic.

2.10 Air Quality

Poor air quality is often associated with areas in proximity to heavily congested road networks due to high levels of carbon dioxide from vehicles. This is particularly an issue in the study area where traffic master data shows high levels of congestion, especially during peak hours. Residents are negatively impacted by both traffic delay and associated air pollution. The level of carbon emissions present around the highway network reduces air quality, quality of life and the overall attractiveness of the area to new residents and investors.

Air quality can be assessed by measuring the level of Nitrogen Dioxide (NO_2) present in the atmosphere. Annual measurements of NO_2 have been recorded at three different roadside locations along Tarvin Road over the last four years. Boughton Air Quality Management Area (AQMA) covers the Boughton gyratory west of Chester city centre and is situated where the A51 Tarvin Road and the A5115 Christleton Road meet. It is estimated that 280 residents live in the AQMA within 115 residential properties close to the road. The air quality monitoring data for diffusion tube sites along Tarvin Road are shown in Table 24 below.

Table 24: Levels of NO_2 along Tarvin Road in /micrograms per cubic metre

Location	2013	2014	2015	2016
A	58.4	53.0	49.1	48.7
B	32.1	30.6	-	-
C	48.0	46.1	41.5	42.8

Source: www.cheshirewestandchester.gov.uk

The majority of these measurements taken across a 4-year period show that NO_2 levels along A51 Tarvin Road are higher than the national annual objective for nitrogen dioxide (NO_2) which is 40 micrograms per cubic metre (Defra[8]). Therefore, this suggests poor air quality in the immediate surrounding area of the A51.

Air quality in the area surrounding the A51 will continue to decline as congestion levels increase which will also reduce the attractiveness of the area for new residents. Stationary, slow moving and stop-start traffic have considerably more adverse air pollution effects than free-flowing traffic reinforcing the need for investment to address congestion on the A51.

2.10.1 Key Issues and Opportunities

The key air quality issues and opportunities are summarised in Table 25.

Table 25: Air Quality Issues and Opportunities

Issues	Opportunities
• Cheshire West and Chester s recent rapid housing and employment growth has brought increased traffic pressures, and in turn, higher emissions from vehicles. • Current levels of Nitrogen Dioxide are above annual targets creating unattractive areas for potential future investment into the greenbelt in proximity to the A51 corridor.	• The scheme presents an opportunity to reduce levels of Nitrogen Oxide in proximity to the carriageway by implementing a scheme which reduces congestion along the corridor.

[8] https://uk-air.defra.gov.uk/assets/documents/reports/aqeg/nd-summary.pdf

So, what does this mean for the A51 Chester to Tarvin Corridor?

Data collection along the A51 corridor shows poor air quality with higher levels of Nitrogen Dioxide than national targets. This can be directly reduced through enabling free flowing traffic along the A51.

Ensuring environmental impacts are mitigated also maintains the attractiveness of the area as a place to live.

2.11 Review of Problems and Opportunities

The Strategic Case provides an in-depth analysis of the key issues and opportunities across Cheshire West and Chester, how these are linked to issues of congestion along the A51 corridor and how capacity improvements in the area provide significant opportunities for the borough and the wider region. A summary of the problems and opportunities are provided in Table 26, which also highlights the objectives emerging in response to the identified issues and opportunities to ensure the scheme outputs address key problems.

Table 26: Problems and Opportunities / Emerging Objectives Summary

Issues	Opportunities	Emerging Objectives
Strategic Socio-Economic Overview		
• Population growth in Cheshire West and Chester is expected to continue generating more traffic on the highway network further increasing congestion and delay. Further strain will be placed on the A51 corridor as key route through the centre of the borough. • Cheshire West and Chester has ambitious plans for economic growth. Without intervention, the network will become severely constrained hindering the efficient transport of goods and people in Chester.	• Network resilience will be key to supporting population growth and demand for jobs. • New employment developments require a resilient transport network in the borough. • Effective and affordable access to jobs, education and training could attract people to attend the University of Chester through improved local journey times.	• Provide a more resilient transport network able to deal with future increases in traffic growth.
Economy and Business		
• Attracting larger businesses to Chester and Cheshire West and Chester would support an uplift in GVA and enable further job creation. • GVA per filled job is lower than the national average.	• Unlocking access to development sites along the A51 corridor could attract larger businesses to the area.	• Support activity to 'unlock' the Chester Northgate - retail and leisure area through improved and more efficient and reliable highway access. • Support job creation by reducing congestion to ensure that development sites along the A51 corridor remain attractive to investors. • Ensure the A51 Tarvin to Chester Corridor has sufficient capacity to enable reliable and efficient journey times to the Chester Business Quarter supporting city centre business development.
Transport Highways Network and Traffic		
• High levels of congestion along the A51 Tarvin Corridor is affecting journey times in and out of Chester. This will worsen as a result of predicted traffic growth in the region. • Increase in the number of serious road accidents since 2014.	• Chester is well positioned in terms of the strategic road network. The A51 has the opportunity to provide strong links to local and regional hubs if congestion is relieved. • Improvements at key junctions can address current concerns regarding traffic accidents and collisions.	• Secure congestion relief at key pinch point areas along A51 the corridor. • Provide faster more reliable journey times for shoppers, visitors and those commuting to Chester city centre using the A51 corridor by private car or public transport. • Reduce the number of rear-ending accidents occurring at junctions along the A51 corridor between Chester and Tarvin, by increasing capacity and improving junction operation.

Issues	Opportunities	Emerging Objectives
Wider Transport Network Provision		
• Rail patronage for 2020 is expected to rise. However adequate rolling stock needs to become available to improve travel choice and the passenger experience. • Congestion along the corridor is increasing bus journey times and decreasing the reliability of services leading to some bus services to the wider area being discontinued.	• Improvements to rail services provide opportunity to support the capacity improvements along the A51 corridor by reducing the number of vehicles on the network. • Reducing congestion along the A51 could improve journey times and increase the reliability of services providing more opportunities for sustainable modes of travel.	• Provide faster more reliable journey times for shoppers, visitors and those commuting to Chester city centre using the A51 corridor by private car or public transport. • Introduce improvements which enhance levels of safety for cyclists and pedestrians.
How People Travel		
• The majority of commuter trips into and out of Chester are made by car. • A large number of inbound and outbound commuter trips to Chester occur to and from areas within Cheshire West and Chester.	• Increasing opportunities for sustainable travel through reduced congestion may decrease the number of commuter trips made by car.	• Enable efficient and reliable movement between north-Wales, Chester, Northwich and Winsford.
Land Use Development		
• Chester is central to many major development sites such as the Atlantic Gateway and Ellesmere Port Enterprise Zone which are relatively inaccessible at present, particularly from areas to the east of Chester due to levels of congestion of the A51. • Increasing journey times will decrease attractiveness of these sites to future investors and tenants slowing economic growth. • Without intervention, current issues of congestion along the corridor will further increase due to the significant number of people that will be commuting to these sites on a regular basis and the increasing number of visitors attracted by new retail and leisure facilities.	• Chester must address issues of congestion along the A51 Tarvin to Chester Corridor to facilitate economic development in the surrounding area and unlock upcoming significant development sites. • A resilient highway network connecting developments to wider areas will help support and accelerate economic growth and provide a significant number of jobs.	• Enable access to the High Speed Two (HS2) hub at Crewe from Chester and Cheshire West through improvements which enable faster and more reliable journey times. • Provide enhanced, reliable freight and private car connectivity to the Ellesmere Port Enterprise Zone and the Atlantic Gateway from Chester and Cheshire West.
Housing		
• High demand and expected growth for housing in Chester to support economic growth and meet demand. • Development on green belt land to the east of Chester will increase pressure on the A51 as a local route for residents and a strategic route for traffic.	• As Cheshire West and Chester delivers targets for housing each year, the demand to travel in the borough will increase. The A51 will continue to be a strategically vital route and must be improved in order to accommodate more movements.	• Provide a more resilient transport network able to deal with future increases in traffic growth.
Environment		
• Air quality levels are higher than national targets in areas along the corridor. • High levels of NO_2 create unattractive areas for potential future investment into the greenbelt.	• Cheshire West and Chester have the opportunity to reduce levels of Nitrogen Oxide in proximity to the carriageway by implementing a scheme which reduces congestion along the network.	• Improve air quality through a reduction in emissions from vehicles by optimising junction layouts and merger lanes to reduce idling and promote free flow speeds.

2.12 Scheme Objectives

The objectives emerging in response to the key issues identified have been categorised into 4 themes to create a comprehensive list of scheme objectives that aim to guide the development of scheme components. The four strategic objectives that this scheme aims to address are Economic Growth, Strategic Connectivity, Local Connectivity and Wider Social Impacts. The full list of scheme objectives is outlined in the diagram below.

Figure 33: Scheme Objectives

2.13 Policy Review

In addition to addressing the identified problems associated with connectivity, development, safety and environmental concerns it is important to ensure that the proposed scheme aligns with local, regional and national policy. This section summarises the local, regional and national policy documents relevant to the region of the A51 Chester to Tarvin Corridor and how the A51 Tarvin to Chester Improvements Scheme can contribute towards achieving the identified objectives.

2.13.1 National Policy and Strategy

2.13.1.1 National Planning Policy Framework (NPPF) - March 2012

The National Planning Policy Framework (NPPF) sets out the UK Governments planning policies for England. The document sets out requirements of the planning system and how policy should be adhered to and delivered in local plan development and planning decisions.

The NPPF promotes sustainable development and sets out three roles that planned development should fulfil: -

- **An economic role** – contributing to building a strong, responsive and competitive economy, by ensuring that sufficient land of the right type is available in the right places and at the right time to support growth and innovation; and by identifying and coordinating development requirements, including the provision of infrastructure;
- **A social role** - supporting strong, vibrant and healthy communities, by providing the supply of housing required to meet the needs of present and future generations; and by creating a high quality built environment, with accessible local services that reflect the community's needs and support its health, social and cultural well-being; and
- **An environmental role** – contributing to protecting and enhancing our natural, built and historic environment; and, as part of this, helping to improve biodiversity, use natural resources prudently, minimise waste and pollution, and mitigate and adapt to climate change including moving to a low carbon economy.

So, what does this mean for the A51 Chester to Tarvin Corridor?

The A51 Tarvin-Chester Improvements Scheme aligns with the NPPF by ensuring that the highway network supports current and future housing and development sites in order to make contribution towards a strong competitive economy.

This scheme is also designed to ensure that residents enjoy a good quality of life reducing carbon emissions and environmental impacts around the A51 supporting healthy communities and enhancing the natural and built environment.

2.13.1.2 National Policy Statement for National Networks

This document was prepared by Government in December 2014 to provide guidance for promoters of nationally significant infrastructure projects, such as national road and rail networks that meet the country's long-term needs; supporting a prosperous and competitive economy and improving the overall quality of life, as part of a wider transport system. This means developing:

- Networks with the capacity, connectivity and resilience to support national and local economic activity, facilitate growth and create jobs;
- Networks which support and improve journey quality, reliability and safety;
- Networks which support the delivery of environmental goals and the move to a low carbon economy; and
- Networks which join up our communities and link effectively to each other.

So, what does this mean for the A51 Chester to Tarvin Corridor?

The improvements along the A51 corridor will deliver journey benefits to highways users in and around Tarvin. Increasing capacity of the highway network will result in a more resilient network that offers more reliable journey times particularly for shoppers and workers commuting to Chester during the AM and PM peak hours.

2.13.1.3 Single Departmental Plan 2015-2020 (2016)

The Department for Transport has published an overarching strategy for transport in the UK, with a vision of:

"*Investing to make journeys better: simple, faster and more reliable. Our plan will support jobs, enable business growth and bring our country closer together.*"

This will be achieved through investing in transport infrastructure projects and programmes; as of July 2015, 59 were under construction. This vision has been broken down in to four key objectives:

- Boosting economic growth and opportunity;
- Building a One Nation Britain;
- Improving journeys; and
- Safe, secure, and sustainable transport.

So, what does this mean for the A51 Chester to Tarvin Corridor?

The objectives of this scheme directly align with the core vision of this policy as the aim of the highway capacity improvements is to ensure reliable and efficient journey times to facilitate economic growth and job creation in and around the city centre enabling it to remain an attractive area for investors and local residents.

2.13.1.4 DfT's Transport Investment Strategy (July 2017)

This document outlines a plan for the UK to build a stronger, fairer country, with an economy that works for everyone, in which wealth and opportunity are spread across the country and we are set up to succeed in the long term. The four key objectives identified in the strategy to deliver this plan are:

- Create a more reliable, less congested, and better connected transport network that works for the users who rely on it;
- Build a stronger, more balanced economy by enhancing productivity and responding to local growth priorities;

- Enhance our global competitiveness by making Britain a more attractive place to trade and invest; and
- Support the creation of new housing.

So, what does this mean for the A51 Chester to Tarvin Corridor?

This scheme directly supports the objectives of the DfT's Transport Investment Strategy by implementing improvements to increase the capacity of the network and reduce congestion. This will create a more reliable network, supporting acres to jobs to build a stronger economy and improving the efficiency of freight movements to ensure the area remains an attractive place to trade and invest. Reducing congestion and enhancing connectivity along he A51 Chester to Tarvin corridor will also ensure the area remains an attractive place to reside supporting future housing growth.

2.13.1.5 Major Road Network Consultation (DfT December 2017)

As part of the DfT's Transport Investment Strategy the Government committed to creating a Major Road Network (MRN) across England. This consultation outlined the Government's proposals for this network seeking views on its core principles, the definition of the network, investment planning, and eligibility and investment assessment. The creation of a Major Road Network (MRN) across England is a key step in the delivery of the strategy and will help to:

- Reduce congestion;
- Support economic growth and rebalancing;
- Support housing delivery;
- Support all road users; and
- Support the Strategic Road Network.

So, what does this mean for the A51 Chester to Tarvin Corridor?

The A51 is identified on the proposed major Road Network highlighting its importance as a strategic route on a national scale. Not only does this emphasize the significance of the scheme, it also provides opportunities for further investment along the corridor in the future. The A51 is also included in the MRN Investment Plan which provides a potential funding route for the higher cost interventions on the corridor that are currently unfunded.

2.13.1.6 Highways England Road Investment Strategy (2015-2020)

The first 'Road Investment Strategy' (RIS 1) outlines a long-term programme for Highways England motorways and major roads with the stable funding needed to plan ahead. This includes a long-term vision for England's motorways and major roads and a multi-year investment plan that will be used to improve the network and create better roads for users.

Between 2015 and 2020 the RIS will:

- See £15.2 billion invested in over 100 major schemes to enhance, renew and improve the network;
- Help prevent over 2500 deaths or serious injuries on the network;
- Build over 1300 additional lane miles;
- Improve 200 sections of the network for cyclists; and

- Benefit up to 250,000 people by reducing the noise impact of England's motorways and major roads.

So, what does this mean for the A51 Chester to Tarvin Corridor?

It is important to ensure that proposals in this scheme align with the Highways England Road Investment Strategy as the A55, managed by Highways England, is in close proximity to the proposed interventions. This scheme aims to increase capacity along the A51 Chester to Tarvin corridor to improve the network and create better roads for users. This will therefore, support any improvements on the A55 as the junction to the west of the corridor.

2.13.2 Sub-regional Policy and Strategy

2.13.2.1 Strategic Transport Plan (TfN)

Transport for the North (TfN) was established in 2014 to bring together local representatives from across northern England with the aim of fostering better transport links in order to accelerate economic growth through influencing financial and transport decisions. The overarching objective is to develop a 'Northern Powerhouse' of economic growth which will redress some of the imbalance in the UK's economic geography. Transport is a key part of delivering the Northern Powerhouse because it creates better connections between economic centres. This can support business development and clusters, trade and business interaction. It also enables better commuting opportunities therefore providing businesses with access to a wider pool of skill. One of the key aims is to enhance the performance of the North's strategic road network.

TfN's Strategic Transport Plan for the North sets out the case for strategic transport infrastructure investment through to 2050. The West and Wales corridor is identified within the strategy to improve connectivity, for people and goods, to, from and through the important economic centres and assets of Cheshire, Liverpool City Region and Greater Manchester, with strategic connectivity in to North Wales and the Midlands.

Improvements in this corridor will also strengthen the North's cross border connections with North Wales and the Midlands. The A51 is located to the centre of this corridor which will see significant economic and population growth, increasing pressure on transport infrastructure. Connectivity improvements can support the growth of Manchester Airport, Liverpool John Lennon Airport, Cheshire Science Corridor Enterprise Zones, Atlantic Gateway, North Wales Arc, Port of Liverpool and Crewe HS2 Hub.

So, what does this mean for the A51 Chester to Tarvin Corridor?

The A51 corridor forms a key strategic route connecting Chester to Stoke-on-Trent. Therefore, the components identified in this scheme that aim to improve the performance of this network, directly align with one of the core aims of the Northern Transport Strategy. The A51 also lies within the West and Wales corridor which requires improved connectivity in order to support sub-regional economic growth.

2.13.2.2 Cheshire and Warrington Strategic Economic Plan and Growth Plan

The Strategic Economic Plan is part of the County's decade long strategy to support growth and economic development, it focuses on the three-year period between 2014-2017. The strategy sets out investment proposals for the local Growth fund and how this fund will be deployed.

An ambitious growth plan has been produced for Cheshire and Warrington. During the 3-year period, the plan pursues the delivery of 3,125 additional homes and 12,743 additional jobs for LGF investment of £124.8m. This feeds into the county's vision where:

- By 2021 Cheshire and Warrington will be an economy of £26.6bn with GVA per head 110% of the UK average;
- By 2030 Cheshire and Warrington will be an economy of £35bn with GVA per head 115% of the UK average, and home to an additional 100,000 residents, 75,000 new jobs and 70,000 new homes.

Connectivity through the Cheshire and Warrington LEP area will be improved which is a key enabling strategic policy in the Strategic Economic Plan (SEP). In addition, this scheme contributes to the following strategic imperatives in the LEP's Strategic Economic Plan (SEP):

- 1. SI2: Attracting and retaining talent – In that our transport network needs to support a diverse and specialised range of employment sectors, and ensure that transport problems do not prevent workers from accessing job opportunities.
- 2. SI4: Maximising our growth assets: property and place – In that improving through flow and efficiency on this important transport route helps create the conditions for economic growth.
- 3. SI6: Internationally connected and engaged – In that this road is a key desire line of traffic travelling between the Atlantic Gateway/Ellesmere Port Enterprise Zone – key strategic growth sites – and the M6 to the south.

The LEP has identified and developed three Intervention Priorities outlined in the Strategic Economic Plan these priorities are:

- **The Atlantic Gateway in Cheshire & Warrington** - reinforcing and grasping the opportunities of what Lord Heseltine and Sir Terry Leahy termed 'Britain's Second Engine of Growth' – the world trade, logistics, business and innovation corridor stretching from Deeside and Merseyside through the northern part of Cheshire and Warrington to Manchester. Warrington, one of the UK's most important locations for investment and business growth, coupled with Chester and Ellesmere Port form integral components of this growth corridor.
- **The Cheshire Science Corridor** - connecting into the Cities of Manchester and Liverpool, there are a string of interconnected centres of excellence located in Cheshire which are or have the potential of contributing significantly to national innovation in science – Capenhurst, Thornton Science Park, SciTech Daresbury, Birchwood Park, Jodrell Bank and Alderley Park.
- **Crewe High Growth City** - the major development hub centred on Crewe with accelerate growth potential for both business and new homes. HS2 now places Crewe at the heart of a 'Superhub', central to the countries' major infrastructure network – a national hub for transport connectivity. The access to HS2 services at Crewe is the key stimulus for development of the High Growth City.

So, what does this mean for the A51 Chester to Tarvin Corridor?

Chester is identified within this document as a key location for growth with a strong financial and professional service sector which plays a major role in the sub-regional economy. Plans for a new business district in Chester will complement investment in transport and other investments, building on a strong leisure, tourism and higher education offer to support new investment in key service sectors. This scheme will also aim to support major growth areas in Crewe, the Atlantic Getaway and Cheshire Science Corridor by improving connectivity and making strategic journeys more reliable.

2.13.2.3 Cheshire and Warrington Local Transport Body (CWLTB)

The Cheshire and Warrington Local Transport Body (CWLTB) is a strategic partnership that has been established with a primary goal to ensure that the sub-region's transport investments support and enable economic growth and regeneration.

The LTB brings together the three local authorities (Cheshire East Council, Cheshire West and Chester Council and Warrington Borough Council) along with the Cheshire and Warrington Enterprise Partnership, and key stakeholders, such as the Highways Agency, DfT and Network Rail in an advisory role. Its single strategic objective is to improve transport infrastructure to secure significant connectivity gains in the support of economic growth and prosperity. As well as supporting economic growth, it is recognised that transport investment must also contribute towards wider social and environmental objectives.

The CWLTB proposes to fulfil a number of roles and functions over and above making decisions on devolved local authority major funds and support the Cheshire and Warrington growth agenda.

So, what does this mean for the A51 Chester to Tarvin Corridor?

This transport investment will support economic growth and make contribution to wider social and environmental objectives through reducing congestion enabling Chester to remain attractive to new employers, businesses and potential development. An improvement to journey times also provides a better quality of life for people who live on or around the A51 corridor.

2.13.2.4 Chester and Warrington Transport Strategy (Draft)

This aims to support the Strategic Economic Plan (SEP) produced by the Cheshire and Warrington Local Enterprise Partnership (CWLEP). The strategy identifies the transport investment priorities needed to accommodate sub-regional growth and increasing demand from housing and employment. Transport and connectivity objectives outlined in the SEP include:

1. Improve connections to support development of priority employment sites including those within the Cheshire Science Corridor.
2. Improve connections to neighbouring sub regions, including international gateways to ensure that business has connectivity to global markets and to facilitate the economic benefits of both out and in commuting that takes place daily.
3. Resolve pinch points and congestion in the transport network, both road and rail, which act as barriers to growth if left unaddressed. Delays and unpredictable journey times affect

business activity directly (e.g. the supply of components to the automotive sector) and indirectly, and influences commuting flows.

4. Address network resilience issues to deliver predictable and efficient journey times to support business productivity.
5. Make best use of the existing road (e.g. smart motorways) and rail network (e.g. electrification) to capitalise on existing infrastructure, offering efficient mechanisms for improvement and helping deliver best value for money from investment.
6. Ensure that the maximum benefit is gained in economic and connectivity terms from the development of the HS2 Hub Station at Crewe.

So, what does this mean for the A51 Chester to Tarvin Corridor?

The objectives of this scheme are directly aligned with those identified in the SEP and Chester and Warrington Transport Strategy and the scheme has been developed to support growth and increase access to key areas such as Mersey Dee Economic Axis, Cheshire Science Corridor Enterprise Zone and the Constellation Partnership.

2.13.3 Local Policy and Strategy

2.13.3.1 Chester Transport Strategy

The Chester Transport Strategy sets out how the borough can work towards the vision of ensuring that the city can cope with likely future trends and opportunities to support economic growth. Seven key goals were identified which the transport strategy intended to help to achieve:

- Supporting city centre development and the aspirations of the One City Plan;
- Enhancing transport connectivity to and from the rural hinterland, and across local, regional and national borders;
- Improving Chester's sustainable accessibility and alternative transport offer;
- Responding to changes in residential and other land use patterns;
- Increasing the reliability, safety and efficiency of core transport networks for the city;
- Safeguarding quality of life within Chester by securing the long-term future of its development; and
- Responding to strategic transport changes.

In order to achieve these goals, ten recommended work packages were developed as a result of the public consultation and other research which included congestion relief and access to employment. This package aims to tackle key congestion and queuing at pinch points on the local highway network, which in some cases may be triggered by future housing growth and development. The likely focus of this package includes:

- Liverpool Road/Moston Road (A41)/Liverpool Road (A5116);
- **Vicars Cross Road/Tarvin Road (A51); Hoole Road (A56);**
- **Vicars Cross/Tarvin Road (A51)/A55/Ring Road (A41) junctions**;
- Whitchurch Road (A41/A5115)/Ring Road (A55)/Caldy Valley Road;
- Boughton/Tarvin Road (A51)/Christleton Road (A5115) – Existing
- Air Quality Management Area (AQMA); and
- Sealand Road/New Crane Street (A548).

So, what does this mean for the A51 Chester to Tarvin Corridor?

This scheme therefore aims to make significant contribution to one of the core packages outlined within the Chester Transport Strategy in order to enhance transport connectivity and support city centre development through relieving congestion and increasing access to employment opportunities.

2.13.3.2 Cheshire West and Chester Local Plan

The Cheshire West and Chester Local Plan (Part One) Strategic Policies document was adopted on the 29th January 2015 and forms part of the statutory development plan for the borough. The Local Plan will be developed in two parts, Part One Strategic Policies and Part Two Land Allocations and Detailed Policies. The Cheshire West and Chester Local Plan (Part One) is the first local development document to be produced by Cheshire West and Chester. The purpose of this Plan is to provide the overall vision, strategic objectives, spatial strategy and strategic planning policies for the borough to 2030.

STRAT3 sets out the specific proposals for the Chester area which can be summarised as:

- Around 5,200 new dwellings of which in the region of 1,300 dwellings will be provided through Green Belt release;
- Key retail development at Northgate and proposals for a new theatre in the city centre will enhance the city's role as a sub-regional shopping and leisure destination and support its role as an international tourism destination and.
- Proposals at the Chester Business Quarter which include 44,000 m2 of high quality office floor space adjacent to Chester Railway Station.

So, what does this mean for the A51 Chester to Tarvin Corridor?

The Cheshire West and Chester Local Plan (Part One) identifies a considerable amount of development in and around the centre of Chester which could intensify the existing levels of congestion on the local highway network and have a detrimental impact on the growth of the economy. This scheme will ensure the highway network is able to remain resilient in light of housing and business growth increasing the number of people and vehicles accessing Chester via the A51 corridor.

The Local Plan (Part Two) Land Allocations and Detailed Policies document is currently being developed and a preferred approach was subject to public consultation between August and September 2016). This more detailed document will follow on from the strategic framework set out in the Part One Strategic Policies, and will include land allocations and detailed policies required to deliver the development requirements and the overall strategy set out in the Local Plan (Part One).

A range of documents and supporting evidence is being consulted on in the compilation of the Local Plan (Part Two) Land Allocations and Detailed Policies including the former district and county local plans, housing supply reports, Chester Transport Strategy Phase One and Phase Two.

2.13.3.3 Cheshire West and Chester Local Transport Plan (LTP 3)

Cheshire's third LTP sets out transport plans and priorities for the 15-year period of 2011/12 to 2025/26. The following core goals were identified in the Local Transport Plan:

- To provide and develop reliable and efficient transport networks, which support sustainable economic growth in West Cheshire and the surrounding area;
- To reduce carbon emissions from transport and take steps to adapt our transport networks to the effects of climate change;
- To manage a well-maintained transport network;
- To contribute to safer and secure transport in West Cheshire and to promote types of transport which are beneficial to health;
- To improve accessibility to jobs and key services which help support greater equality of opportunity; and
- To ensure that transport helps improve quality of life and enhances the local environment West Cheshire.

To help achieve these goals, Cheshire West and Chester has developed a number of objectives under each of the goals. These form the basis of the actions identified in the accompanying Implementation Plan, which sets out the strategy for the first four years of the plan. An update of this plan is currently being developed.

So, what does this mean for the A51 Chester to Tarvin Corridor?

The development of this scheme will contribute towards a more efficient reliable transport network where lower levels of congestion result in reduced carbon emissions and improved accessibility to jobs and key services improving quality of life and enhancing the local environment of West Cheshire.

2.13.3.4 Cheshire West and Chester Council Highways Asset Management Strategy

This highway asset management strategy sets out how the Council will best manage highway assets, taking into consideration customer needs, local priorities, asset condition and best use of available resources. It addresses the highways asset as a whole, as well as articulating specific strategies for our major asset groups: carriageways, footways, bridges, structures, street lighting and traffic signals. These strategies are set out to inform the development of forward works programmes, in line with best practice lifecycle planning practice. This strategy identifies the following key objectives:

- **Creating a highways infrastructure asset that enables growth and development-** By identifying and focusing our investment where it receives the greatest return, our highways asset will be performing to the most effective level so as to encourage and enable further economic and community development.
- **Improve the condition of our unclassified network-**In order to optimize our investment funding for highways management, we are committed to improving, or minimising the deterioration, of the condition of our highways asset located within our unclassified network. This typically includes smaller, less-trafficked rural roads, and neighbourhood streets which provide crucial links and shorter length journeys for our residents.
- **Shifting the focus to more preventive maintenance vs reactive maintenance-** Continuing the work from previous years, Cheshire West and Chester Council will further expand our level of preventive maintenance works where appropriate, in order to ensure we extend the life of our critical assets. This will typically include undertaking preventive maintenance treatments on our carriageways and footways for surface dressing, micro asphalting works, and other similar treatments. This preventive approach will be delivered hand-in-hand with ongoing renewal and improvement works to our highways asset.

This scheme is directly aligned with the first objective of the Highways Asset Management Strategy. Highway improvements along the A51 corridor will support the growth of housing and facilitate the development of businesses by creating faster and more reliable journeys to Chester city centre and ensuring the wider residential areas remain attractive by improving connectivity and reducing congestion.

2.13.3.5 Chester Growth Partnership

Chester Growth Partnership along with key partners will deliver a programme of improvements in Chester as part of the One City Plan, the 15-year strategy which guides the future economic regeneration of Chester. The plan defines the overarching vision and direction of travel for the city, under which all projects should sit. Importantly, it is driven by prioritisation, implementation and delivery. The plan informed the Cheshire West & Chester Local Development Framework, the statutory planning document for the city.

The Chester One City Plan outlines many significant areas for growth such as the Business Quarter and major development projects such as the Northgate development scheme, the Cathedral and Castle Quarters.

So, what does this mean for the A51 Chester to Tarvin Corridor?

This 15-year strategy will transform and accelerate economic growth in Chester increasing the important of the city being easily accessible from the local and strategic areas. Ensuring the surrounding highway network is efficient and free from severe congestion will ensure proposed developments within the One City Plan will remain successful and the area will remain attractive to future investment further increasing opportunities for development.

2.13.4 Summary

This section has demonstrated a clear alignment of this scheme with national, regional and local policies and strategies through ensuring the highway network supports economic growth and remains resilient with regard to local development.

2.14 Risks, Constraints and Dependencies

In order to ensure the successful delivery of the A51 Tarvin-Chester Improvements Scheme it is important to consider the potential risks associated with the scheme in order to identify potential mitigation measures where appropriate. This section identifies the key strategic, funding and infrastructure risks as well as a number of environmental constraints arising from the development of the scheme. This sub-section also identifies how success of the scheme can be measured and the key stakeholders that will be involved throughout the development of the project.

2.14.1 Risks

2.14.1.1 Strategic Risk

A number of strategic risks have been identified with regard to the A51 Tarvin-Chester Improvements Scheme predominantly associated with how the scheme is governed and managed. Changes to legislation or local administration present political risks to the scheme which may result in the scheme becoming lower priority to newly elected members or directly impact the capital and revenue budgets of the scheme jeopardising some components of the scheme and reducing its benefits. These risks will be mitigated by establishing the scheme

through a full three stage business case approach and ensuring the scheme is developed in full consultation with the Cheshire & Warrington LEP. It will also be important to maintain an awareness of Government policy to keep track of any potential changes in legislation.

Several risks associated with management of the scheme also pose a threat to the overall successful delivery. Changes in the team or team structure responsible for delivery, and delays in appointing new members, could cause delay to the overall delivery of the scheme with associated cost implications. In order to mitigate this risk, it will be important to maintain team continuity. However, a project board and project management team have already been set up under a new major development team initiative, therefore further imminent change is unlikely. The failure to complete construction of physical assets on time and to specification can also delay delivery and presents a risk of funding being clawed back as a result of failing to meet delivery targets.

2.14.1.2 Funding Risk

Changes in inflation rates also pose a threat to delivery as additional costs will be required to deliver the completed scheme if actual inflation rates differ from the assumed inflation rates. Forecasts will be kept under review in order to mitigate this risk and rates will be adjusted to account for any predicted rate of change. There is also a risk that the cost of the scheme may increase if, for example, the cost of materials or infrastructure increases. This could lead to the level of available funding becoming insufficient to meet the proposed scheme. The project board will therefore be responsible for monitoring the cost and delivery throughout the project.

2.14.1.3 Infrastructure Risk

Infrastructure risks that may occur during the delivery of this scheme include engineering risks associated with unforeseen issues at locations of carriageway widening causing time delay with a potential resultant increase in scheme costs. This risk can be mitigated by conducting detailed site surveys to identify any issues. Unforeseen structural constraints relating to the bridge over the River Gowy also present a risk to the scheme which may delay the scheme design and overall delivery. However, structural surveying / investigation works in support of the detailed design can be used to reduce he impacts of this risk.

Various strategic, funding and infrastructure risks have been considered above in relation to the implementation of this proposed scheme. A full risk register and associated Quantified Risk Assessment (QRA) is provided in Appendix K. The Environmental Constraints Report, also included as part of this submission, as Appendix G, examines the specifics of environmental risk and mitigation in detail; however, some of the key issues and constraints are summarised below.

2.14.2 Environmental Constraints

A number of constraints have been identified to be present within the boundary of the site and within 500m of this boundary. A key constraint present within the site boundary is that the majority of the A51/B5132 junction lies within Flood Zone 3. This is defined as “Land having a 1 in 100 or greater annual probability of river flooding; or Land having a 1 in 200 or greater annual probability of sea flooding.” (Environment Agency, 2017). This is sourced from the River Gowy that flows South to North underneath the A51, approximately 100m East of the junction with the B5132. As the scheme progresses the design development will need to consider these high-risk constraints to minimise the potential for adverse environmental impacts occurring. The land surrounding the river running North-West to South-East also sits within Flood Zone 3 presenting further constraints within 500m of the site boundary.

There are also two Grade II listed buildings within 500m of the site boundaries; Holme Street Hall which is an early 17th Century farmhouse, and Holme Bank which is an 18th Century house. Both are within Tarvin Parish. However, construction or operational impacts on these features are unlikely due to its distance from the proposed works.

A number of environmental planning constraints also exist for the area within 500m of the site boundary including 3 sections of the Cheshire Noise Action Planning Important Area and a Local Wildlife Site where Otters have been sighted in the River Gowy in recent years and may still be present. This should therefore be considered when carrying out any woks around Stamford Bridge.

Land acquisition also remains a key constraint as it will be required for the proposed improvements at Tarvin Roundabout and Stamford Bridge. Implications of this on the delivery of the scheme are set out in Section 2.1.3.1.

Whilst these constraints pose an increased risk to the scheme, and should be avoided where possible, they do not prevent the scheme from going forward. Further consideration to these constraints will be required as the scheme progresses, and any potential risk minimised using appropriate mitigation measures. Further details of these constraints can be found in the appended Environmental Constraints report.

2.14.3 Dependencies

The development of the A51 Tarvin Road Capacity Improvements scheme is not dependent on any other transport or regeneration schemes. Following consultation with key stakeholders such as Highways England and local Parish Councils, there are also no dependencies or influences were identified and all were supportive of the improvements identified within this scheme.

2.14.4 Key Success Factors

The A51 Tarvin-Chester Improvements Scheme has identified a number of expected outcomes in terms of GVA uplift and employment opportunities, reducing congestion, increasing the capacity at junctions, improving air quality. Key success factors therefore include journey times and queue lengths at junctions along the A51 Tarvin to Chester corridor and reduced levels of Nitrogen Dioxide along the corridor. A ‘Benefit Realisation Plan’ and ‘Monitoring and Evaluation Plan’ has been set out to recognise and measure the attainment of these outcomes following construction of the proposed scheme interventions. Details of both the ‘Benefit Realisation Plan’ and ‘Monitoring and Evaluation Plan’ can be found in Appendix J attached as part of this submission.

2.14.5 Stakeholder Involvement

Engagement of key stakeholders, residents and members of the public is an obligation of the local authority during the planning and delivery of major highway projects. In relation to the A51 Chester-Tarvin Corridor Improvements Scheme, a managed approach to stakeholder engagement has been adopted to ensure the focus is the customer. The key objectives of stakeholder engagement have been defined as:

- To raise awareness and understanding of the scheme, promoting awareness, positive attitudes and behaviours; and
- To enable the public and stakeholders to discuss the scheme with a member of the project team through a variety of communication mediums.

Prior to the development of this scheme a number of key stakeholders were engaged as part of the Chester Transport Strategy consultation process which took place in 2014. This consultation highlighted a number of pinch points on the road network in Chester to be included within the strategy which was adopted by Cabinet in 2014. Further work was undertaken on the pinch points in February 2016[9] which later led to the development of this scheme. Therefore, the need for this scheme has been agreed with stakeholders through the Chester Transport Strategy consultation process.

No public consultation has been undertaken at this stage, however, this will be developed as the business case is progressed through to and including at Full Business Case.

This will include Informative scheme material and answers to Frequently Asked Questions made available online via a dedicated website and at drop-in session. Further sessions are planned with exhibition boards in Chester Littleton/Christleton, Tarvin, Barrow Parishes. The Council's communication team are working on the media management and communication plan for 2018/19, the A51 is integral within the plan and will be utilised to publicise and facilitate these events utilising tactical plan to allocate resources.

Table 27 outlines the key stakeholders that have been engaged with at this stage and their expected key roles within the scheme delivery from this point forward. No potential conflicts between these Stakeholder have been identified.

Table 27: Overview of Stakeholder Involvement

Key Stakeholder Group	Project Input/Roles Responsibilities
Highways England	Consultee, joint responsibility for network reliance along the A51, A55, A41 road corridors
Christleton Parish Council	Consultee, representing local resident's views
Littleton Parish Council	Consultee, representing local resident's views
Guilden Sutton Parish Council	Consultee, representing local resident's views
Tarvin Parish Council	Consultee, representing local resident's views
Cheshire and Warrington LEP	Consultee, review and approval of preferred scheme and joint funding partner thorough grant agreement
Gowy Ward Member	Consultee, representing local resident's views
Tarvin Ward Member	Consultee, representing local resident's views
Chester Villages Ward Member	Consultee, representing local resident's views
Bus Operators – Stagecoach, Arriva North West, Arriva Cymru and Network Warrington Buses, Aintree Coachline	Consultee through the Council bus liaison group meeting
Landowners	Joint party to signed legal agreements for land acquisition required to deliver the scheme

Source: Mott MacDonald

At this stage of the process selected stakeholders have been consulted to present details of the preferred option and provide an opportunity to give feedback. Key stakeholders identified and engaged with at this stage included:

- Highways England;
- Christleton Parish Council;
- Littleton Parish Council;
- Guilden Sutton Parish Council and

[9] https://www.cheshirewestandchester.gov.uk/documents/parking-roads-and-travel/public-transport/transport-strategies/phase-two-reports/chester-transport-strategy-phase-two-congestion-relief-pinch-points-report-0216.pdf.

- Tarvin Parish council.

The following meetings have been held with the Parishes where scheme plans and progress so far have been shared. The key outcomes of these meetings are summarised in the following section.

Table 28: Details of Stakeholder Engagement Meetings

Date	Location	Representing
11 October 2017	Cheshire West and Chester HQ building	Gowy Ward Member also representing Barrow Parish Council
12 October 2017	Cheshire West and Chester HQ building	Littleton Parish Council and Chester Villages Ward Councillor
23 October 2017	Clotton and District War Memorial hall	Clotton Hoofield Parish Council Littleton Parish Council Tarvin Parish Council Christleton Parish Council Waverton Parish Council Tarporley Parish Council Duddon Parish Council Tilston and Fernall Parish Council Calveley Parish Council
6 December 2017	Guilden Sutton Village Hall	Guilden Sutton Parish Council

Source: Mott MacDonald

2.14.5.1 Key Outcomes from Stakeholder Consultation

Highways England have stated that they are supportive of the scheme proposals and the anticipated benefit of reducing the queuing on the A55 southbound exit slip at the junction with the A51.

A number of key points were raised during the other stakeholder consultation events which are noted below. None of these posed a barrier to the scheme and were deemed as helpful in fine tuning the designs. The table below summarises the key issues and how these have been addressed within the development of the scheme.

Table 29: Key Outcomes of Stakeholder Consultation

Issue	How the Scheme Addresses the Issue
Improved pedestrian crossing facilities at the Stamford Bridge junction.	Scheme updated to show additional dropped crossings with tactile paving.
Westbound approach to the left turn lane at A55 junction to be extended.	Additional widening on the northern side and re-application of road markings to allow more efficient access to approach lanes to the roundabout. Entry radius to be amended to improve left turn movement to the A55 (S).
Relocated layby opposite garage to the west of the Stamford Bridge junction to include existing field access.	Scheme to be updated to include relocated field access.
Additional pedestrian refuge and footway to the south of the A51 at the Cotton Lane junction required to serve existing bus stops.	Scheme to be updated to include a new refuge island and footway at the Cotton Lane junction.
Can right turning movements be banned from the garage onto the A51 west of the Stamford Bridge junction to improve road safety?	This would be difficult to achieve physically and also difficult to enforce.
Could additional movements be banned at the Hare Lane/ Littleton Lane junction such as the straight	This movement could not be stopped without effectively making Hare Lane entry only or blocking entry to Littleton Lane. Banning right turn movements

Issue	How the Scheme Addresses the Issue
across movement from Hare Lane to Littleton Lane, a popular 'rat run'.	from Hare Lane is not worthwhile due to the relatively low numbers undertaking this movement and long detour involved should it stopped.
Can the junction with the A55 be included in the scheme to address major delays?	This junction is within the trunk road network and under the control of Highways England and therefore outside the remit of this scheme. However, Highways England will be advised of the scheme proposals and the future benefits it will have on both the local and strategic network in the area.
Can yellow box markings be introduced at the A55 roundabout junction?	As stated above, this junction is under the control of Highways England and outside the remit of this scheme. However, should the scheme progress, measures to improve junction operation would be discussed with Highways England.
The A55 junction worked better before traffic signals were introduced.	As stated above, this junction is under the control of Highways England and outside the remit of this scheme. However, should the scheme progress, measures to improve junction operation would be discussed with Highways England.

Source: Mott MacDonald

2.14.5.2 Next Steps for Consultation

Following the consultation with stakeholders carried out at this stage, further engagement will be required as the scheme progresses to FBC. Table 30 summarises the next steps for stakeholder engagement full details of which can be found in Appendix P (Stakeholder Engagement Strategy).

Table 30: Next Steps for Stakeholder Engagement

Key Stakeholder Group	Project Input/Roles Responsibilities
Chester Growth Partnership	Consultee representing local Chester Businesses views
North Wales Local Authorities	Consultee
Cheshire East Council	Consultee
Local Cyclist Groups	Consultee
Sustrans	Consultee
Statutory Undertakers	Suppliers for relocating services within the scheme area, at cost to the project.
Emergency Services	Consultee
Local Residents	Consultee
LEP and CWAC Senior Management. Project Board.	Delivery Team
CWAC Project Team and other internal Council departments.	Delivery Team
Design Consultant(s)	Delivery Team
Contractor(s)	Delivery Team
Emergency Services	Consultee
MPs/Local Cllr/Parish Councils	Consultee
Environment Agency	Consultee
Natural/Historic England	Consultee
Freight Transport Associations	Consultee
Local businesses	Consultee
Local residents	Consultee
Adjoining Authorities	Consultee
Travelling Public	Consultee

Source: Mott MacDonald

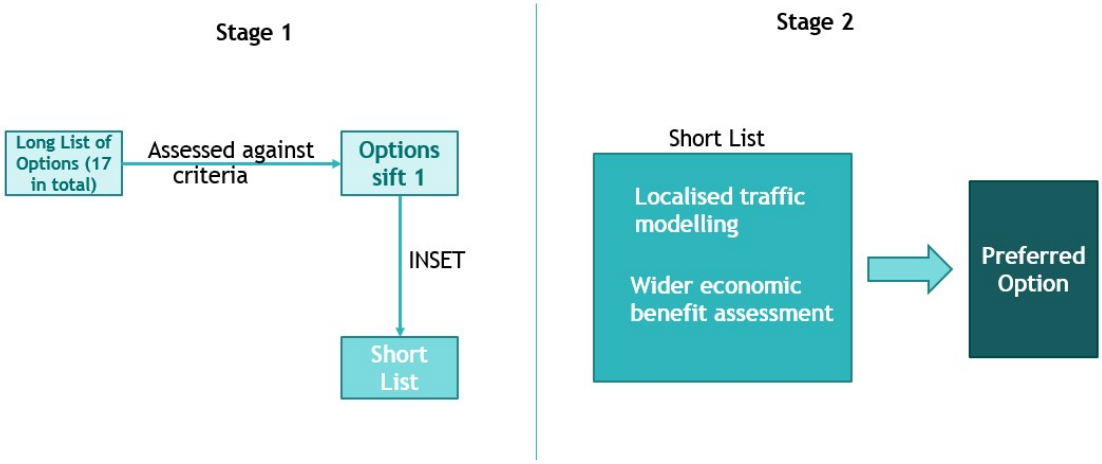
3 Options Appraisal and Preferred Option

Following identification of the key issues and scheme objectives a number of potential scheme options were developed to meet these objectives and mitigate current and future issues. This section sets out the options appraisal process carried out demonstrating how the preferred scheme was selected.

3.1 Options Appraised

The options appraisal process for the A51 Tarvin-Chester Improvements Scheme has been structured to align with DfT's transport appraisal model. As part of the options assessment process, options pass through several stages of appraisal and refinement. The process of options appraisal used in this scheme is illustrated in Figure 34 and summarised below. Full details of options appraisal can be found in Appendix A - Options Appraisal Report.

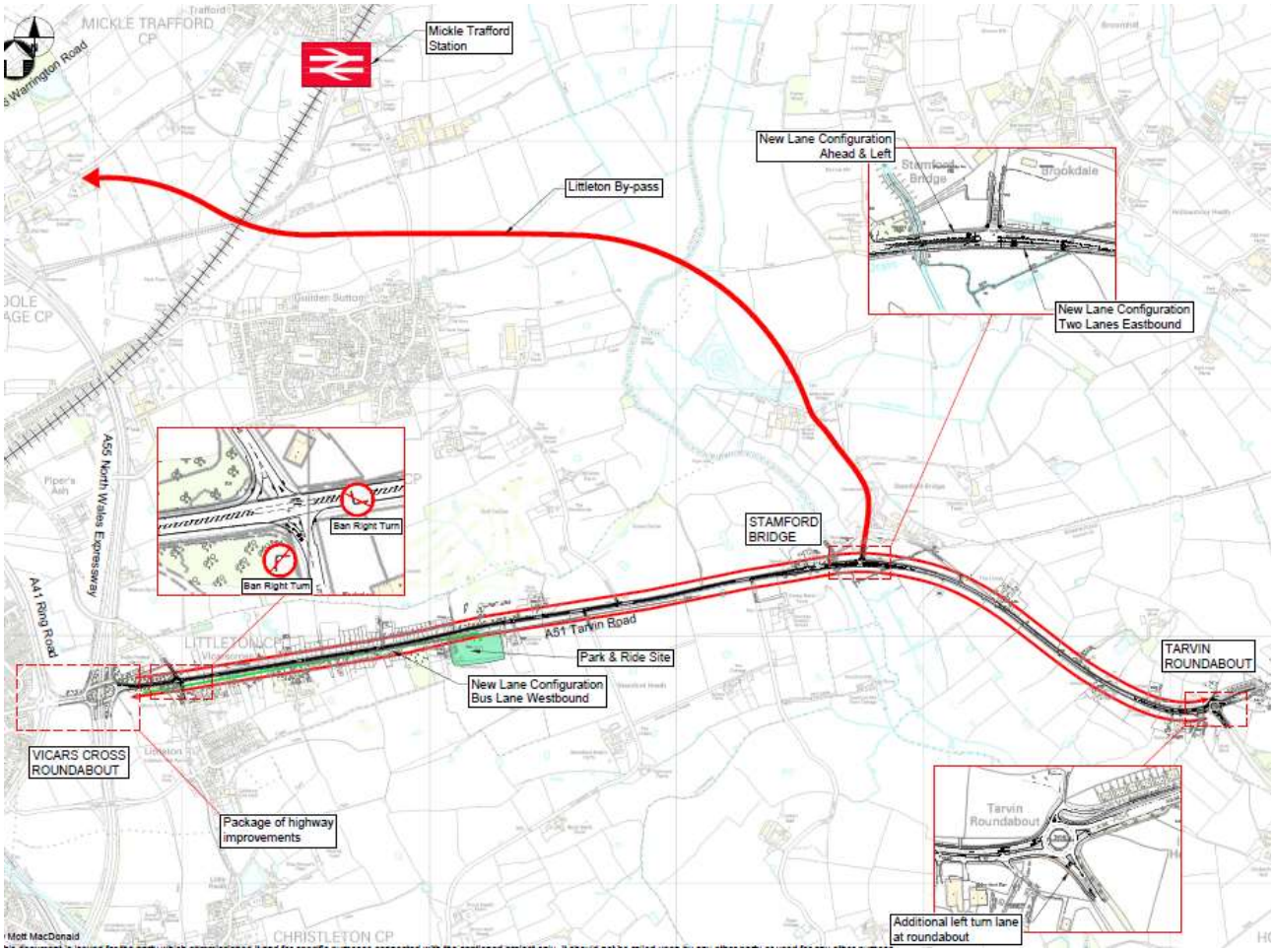
Figure 34: Options Assessment Framework Two Stage Approach



Source: Mott MacDonald

The long list of options was developed in response to the key issues identified along the corridor. Do Minimum Options were included for comparison, to provide evidence of the need for intervention and to demonstrate the benefits that could be achieved through delivery of the preferred option. A number of high-cost options were also included within the long list to consider potential longer-term benefits. Although these are not currently deliverable due to funding constraints, from a strategic viewpoint it was important to recognise that any current interventions should be considered as part of a longer term strategic approach in support of economic growth through area wide improvements to capacity and connectivity along the A51 corridor. As a result, the final long list consisted of 17 options. Details of the long list of options appraised can be found within Section 5.2 of the OAR, but they are illustrated here in Figure 35.

Figure 35: Overview of Long list of Options



Source: Mott MacDonald

This approach of identifying and assessing options along the whole A51 corridor, clearly demonstrates Cheshire West and Chester's holistic approach to addressing the issues and opportunities for the entire area. Although at this point in time it is recognised that available funding can only support selected interventions at key pinch pints within the corridor, if further funding becomes available, delivery of this scheme can be presented as evidence of the initial phase of a much broader highway improvement strategy to support economic growth.

3.1.1 Appraisal Criteria

Following the development of the long list of options an initial sift was then undertaken using a set of themed criteria based on:

- Theme 1: Alignment with both strategic and enabling objectives and
- Theme 2: Deliverability.

The assessment of the 17 options at Stage 1 was undertaken using Mott MacDonald's in-house Investment Sifting and Evaluation Tool (INSET), which applies weighted scoring to each option based on how well an option meets identified criteria, and where relevant sub criteria under each theme.

The process and rationale for the selection of criteria and assignment of weightings is covered in detail in the OAR but the following two tables provide an overview of the criteria and associated weightings under each of the two themes.

Table 31: Assessment Criteria and Weighting under Theme 1, Alignment with Objectives

Assessment Criteria	Sub-criteria	Weight
• Economic Growth	Unlock Chester Northgate retail and leisure area	3
	Supports development sites along the length of the A51 corridor	3
	Supports reliable and efficient journeys to Chester Business Quarter	3
	Job Creation	3
	GVA Uplift	3
• Strategic Connectivity	Enables reliable, faster access to HS2 hub, Crewe	3
	Reliable, faster connectivity for cars and freight traffic to Ellesmere Port Enterprise Zone	3
	Enhanced connectivity to Atlantic Gateway	3
	Enable reliable faster journeys between north Wales, Chester, Northwich & Winsford	3
• Local Connectivity	Congestion relief at key pinch points	2
	Enable reliable faster journeys along the A51 corridor from Tarvin to Chester by private car or public transport	2
	Improved network resilience	2
• Social Impacts	Enhanced pedestrian and cycle safety	1
	Reduce rear-ending /shunting accidents at junctions along the A51	1
	Improved local air quality by optimising junction layouts and merger lanes to reduce idling.	1

Source: Mott MacDonald

No Deliverability sub-criteria that could meaningfully be measured at the time of the long list appraisal was identified, so a brief description of the criteria is provided instead.

Table 32: Assessment Criteria and Weighting under Theme 2, Deliverability

Assessment Criteria	Weight	Description
Land ownership acquisition issues	1	The extent to which land is available to construct the highways intervention.
Physical barriers	1	The extent to which physical barriers may affect scheme delivery
Relative cost	5	The extent to which the scheme can be delivered within the funding constraints of the scheme.
Public Support	1	The extent to which there is support from the public for the delivery of the option.
Stakeholder Support	1	The extent to which there is support from stakeholders for the delivery of the option.
Total	9	

Source: Mott MacDonald

This assessment, using a weighted scoring system narrowed the list of options down to a shortlist of four (as per the scope of our proposal); these were the three highest scoring options plus a Do Minimum option for comparison. Table 33 shows that based on INSET scores alone the Do Something 3 is the preferred option, however INSET was applied sift out poorly performing options that either did not meet scheme objectives, or would prove to be complex to deliver; it did not consider actual performance at the junctions. For this reason a second round of assessment was undertaken for the four shortlisted options.

Table 33: INSET Scores

No.	Option Name	Theme 1: Alignment with Objectives	Theme2: Deliverability score	Total Quantitative Score	Rank based on total score only
1	Do Nothing	-2.06	1.67	-0.40	16
2	Do Minimum 1	-1.14	2.11	0.97	8
3	Do Minimum 2	-1.07	1.00	-0.07	15
4	Do Something 1	0.28	0.89	1.17	6
5	Do Something 2	0.61	0.78	1.38	2
6	Do Something 3	0.73	0.78	1.50	1
7	Do Something 4	0.67	0.11	0.78	11
8	Do Something 5	1.10	0.11	1.21	4
9	Do Something 6	0.69	0.33	1.03	7
10	Do Something 7	0.96	0.33	1.29	3
11	Do Something 8	1.79	-0.89	0.90	9
12	Do Something 9	0.86	0.00	0.86	10
13	Non-Highway 1	0.19	0.22	0.41	14
14	Non-Highway 2	-0.06	-1.67	-1.73	17
15	High Cost 1	2.08	-1.33	0.75	12
16	High Cost 2	1.66	-1.11	0.55	13
17	High Cost 3	2.64	-1.44	1.20	5

Source: Mott MacDonald

Table 34: Shortlist of Schemes summarises the specific interventions within each of the shortlisted options.

Table 34: Shortlist of Schemes

	Capacity Improvement						
Option	Stamford Bridge Road Markings	Tarvin roundabout- Left turn lane	Stamford Bridge Long Merge (Westbound)	Stamford Bridge Short Merge (Westbound)	Right turn bans at the Hare Lane/ Littleton Lane	Extension of eastbound merge from the A55/ A51 junction	2 Lanes westbound from Tarvin roundabout to the Stamford Bridge junction
Do Minimum 1	✓						
Do Something 2	✓	✓	✓				

	Capacity Improvement							
Do Something 3	✓	✓		✓	✓	✓		
Do Something 7	✓	✓	✓					✓

Source: Mott MacDonald

Junction modelling in LinSIG and ARCADY was undertaken to test the effects of junction designs on traffic flows and journey times for the four shortlisted options whilst a SATURN model was used to assess impacts on the wider network. A high level strategic assessment of economic impacts was also carried out using the Mott MacDonald proprietary Transparent Economic Assessment Model (TEAM) to assess impacts on GVA and determine indirect and induced effects of jobs created directly by the scheme. A benefit cost ratio (BCR) was then calculated for the preferred option in order to illustrate the value for money. Full details of the options assessed and the appraisal process can be found in the supporting Options Appraisal Report.

3.2 Preferred Option Selection

As outlined within the methodology the preferred option was to be selected based on the options which produced the greatest Wider Economic Benefits (WEBS) and results of the junction modelling. As there was no difference in the results of the WEBs assessment for each of the shortlisted options it was assumed that the option with the greatest transport benefits would produce the greatest wider economic benefits.

Therefore, the selection of the preferred option was based on assessments of traffic modelling Results of these assessments can be found in detail within the Options Appraisal Repot submitted as part of this OBC as Appendix A, however an overview of the results are provided here.

The four shortlisted options are very similar in essence with some options containing a number of the same interventions as shown in Table 34: Shortlist of Schemes . Therefore, for Stage 2 of the assessment process, the interventions at each key junction along the corridor were compared under each of the scenarios, rather than the overall package.

For **Tarvin Roundabout**, as indicated in Table 34, the Do Something Option is the same for Options 2, 3 and 7. The benefits of proposed measures when compared to the Do Minimum scenario are summarised in Table 35. This shows the reduction in delay and resultant queues on the worst performing arm, the A51 south.

Table 35: Tarvin Roundabout Modelling Results Summary

AM peak	A51 (south)	
	Delay (seconds)	Queue (PCUs)
Do Nothing	119.9	22
Do Something	12.1	2
PM peak	**A51 (south)**	
	Delay (seconds)	Queue (PCUs)
Do Nothing	111.6	22
Do Something	11.2	2

Source: Mott MacDonald

For the **Stamford Bridge junction**, the shortlisted options vary from changes to carriageway markings (Do Minimum) to an additional westbound lane through the junction with a long merge (Do Something 2 and 7) and short merge (Do Something 3).

The benefits of a longer merge over a shorter merge cannot be assessed in the modelling package used (Linsig), however, it is expected that the extra carriageway space will result in more efficient junction operation. There will also be added benefits with regard to raod safety as the longer merge would be to highway standards (in combination with a reduction in speed limit).

Table 36 compares the modelling output results for the Do Nothing, Do Minimum and Do Something scenarios and indicates the improved resultant capacity and reduced delay.

Table 36: Stamford Bridge Modelling Results Summary

AM peak	Stamford Bridge	
	PRC (%)	Total Delay (PcuHr)
Do Nothing	5.4	12.1
Do Minimum	12.2	9.8
Do Something	19.4	7.7
M peak	**Stamford Bridge**	
	PRC (%)	Total Delay (PcuHr)
Do Nothing	14.8	10.5
Do Minimum	28.2	8.8
Do Something	29.8	7.7

Source: Mott MacDonald

With regard to introducing right turn bans at the **Hare Lane/ Littleton Lane junction**, although numbers of turning vehicles are relatively low, there is still expected to be some benefit in restricting these movements. The cost of this scheme would also be low and easy to install as it would be limited to minor kerb works and amendments to road markings.

Modelling of this junction is not likely to show any major improvements in traffic flow through the junction. However, removing the right turn movements will enable an extended right turn lane

into Littleton Lane, improving safety and reducing delays on the A51. By removing the right turn movements from Littleton Lane this will make it easier to turn left onto the A51 as traffic waiting to turn right or travel straight ahead to Hare Lane currently blocks this movement.

Measures proposed for this junction were included as part of the Do Something 3 option.

At the **A55/A51 junction**, extending the eastbound merge will provide benefits to traffic leaving this junction, however, it has not been possible to model this using a stand-alone junction modelling package such as Linsig. This measure was included as part of Do Something 3.

In addition, to aid traffic travelling west towards this junction on the A51, it is proposed to widen the southern kerbline to assist left turning traffic heading towards Wales. At present, the middle (straight ahead lane) can block back, restricting access to the left turning lane.

From the modelling assessment, components of the Do Something 3 Option were identified as providing the greatest benefits in terms of reducing delays along the A51 corridor. The one change identified was the amendment of the short merge for westbound traffic leaving the Stamford Bridge to a long merge over the bridge to comply with highway design standards and mitigate issues of road safety.

3.3 The Scheme

The robust options appraisal process detailed above aims to ensure that selected components of the scheme would enhance local and strategic connectivity in order to support economic growth and improve environmental and safety conditions for local residents. The scheme components identified below also aim to support wider aspirations for the A51 corridor and a potential longer-term programme of investment.

Considering the benefits and problems identified, the impacts of doing nothing and the scheme objectives the selected preferred option is as follows:

- An additional left turn lane at Tarvin roundabout from the A51 South to the A51 West;
- Signal and carriageway marking changes at Stamford Bridge to provide 2 lanes straight ahead for eastbound traffic;
- Provision of an extra westbound lane through the Stamford Bridge junction, with a long merge for westbound traffic exiting the junction;
- Widening of the existing bridge over the River Gowy to accommodate the additional westbound traffic lane;
- Removal of some of the existing right turn movements at the Hare Lane/Littleton Lane junction;
- Modifications to the westbound approach and eastbound merge on the A51 at the A51/ A55 junction; and
- New crossing points and footpath provision for pedestrians, bus users and cyclists at the above key junctions along the A51 corridor.

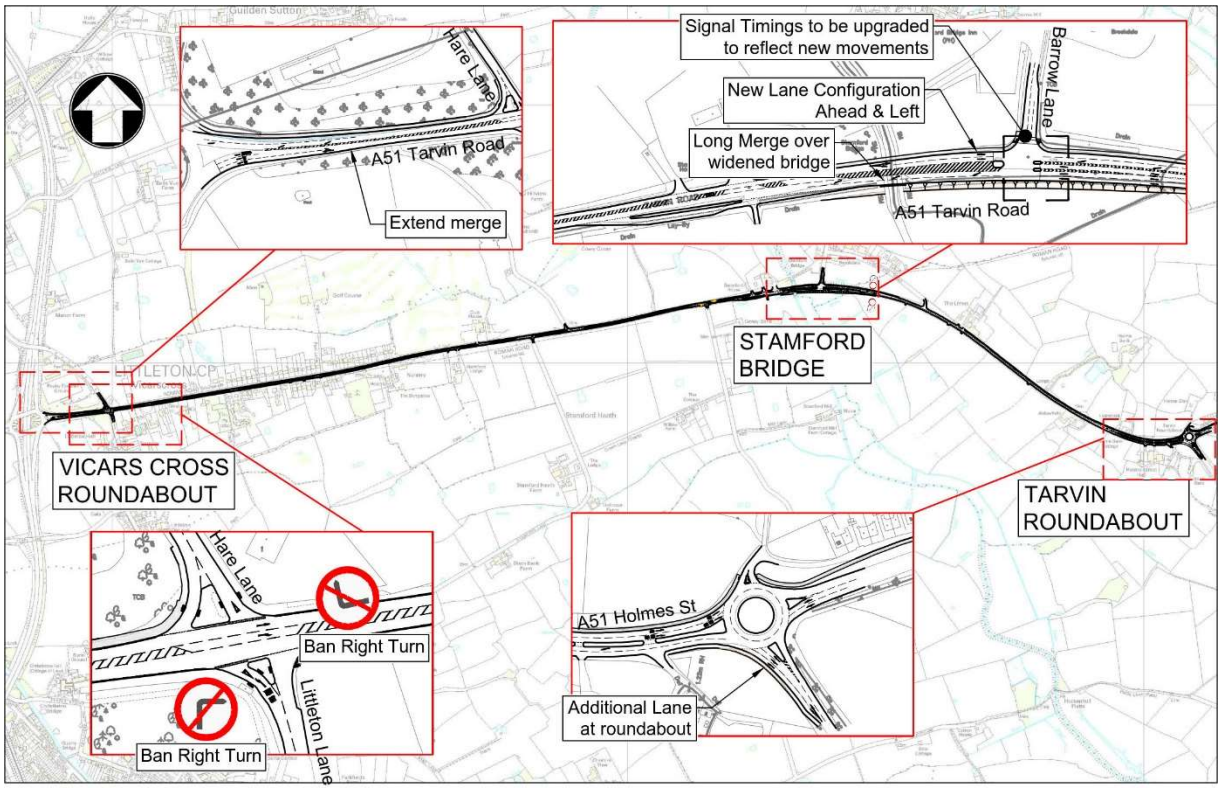
The implementation of the scheme components set out above aim to deliver the following key outcomes:

- Reduction in journey times, particularly in the AM and PM peak periods for people travelling along the A51 corridor.
- Reduced levels of Nitrogen Dioxide (NO2) measured at roadside locations along the A51 corridor.

- Junctions along the A51 corridor that are able to function within capacity (<85%) up to 2030 and beyond.
- Retain and increase the amount of investment in and around Chester by ensuring highway network remains efficient and reliable in order to support and accelerate economic growth.
- Increased levels of walking and cycling as a result of improved infrastructure.
- Reduction in number of rear-ending shunt and turning relating accidents occurring at junctions along the A51.

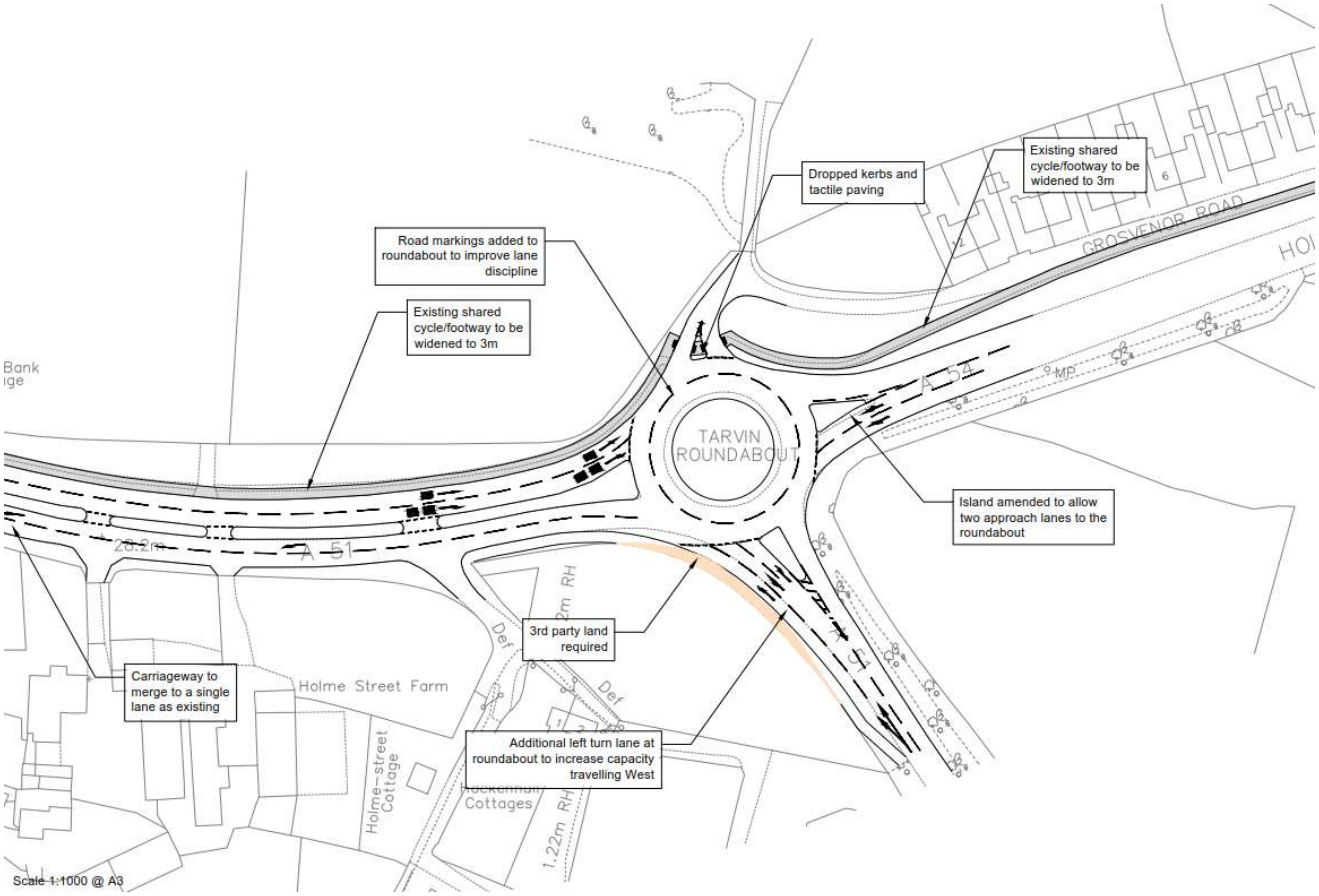
The overall scheme is shown in Figure 36 with detailed scheme designs of each of the key components shown in Figure 37 to Figure 39. Full drawing details are provided in Appendix B.

Figure 36: Scheme Components Summary



Source: Mot MacDonald

Figure 37: Left Turn Slip at the Tarvin Roundabout from the A51 North



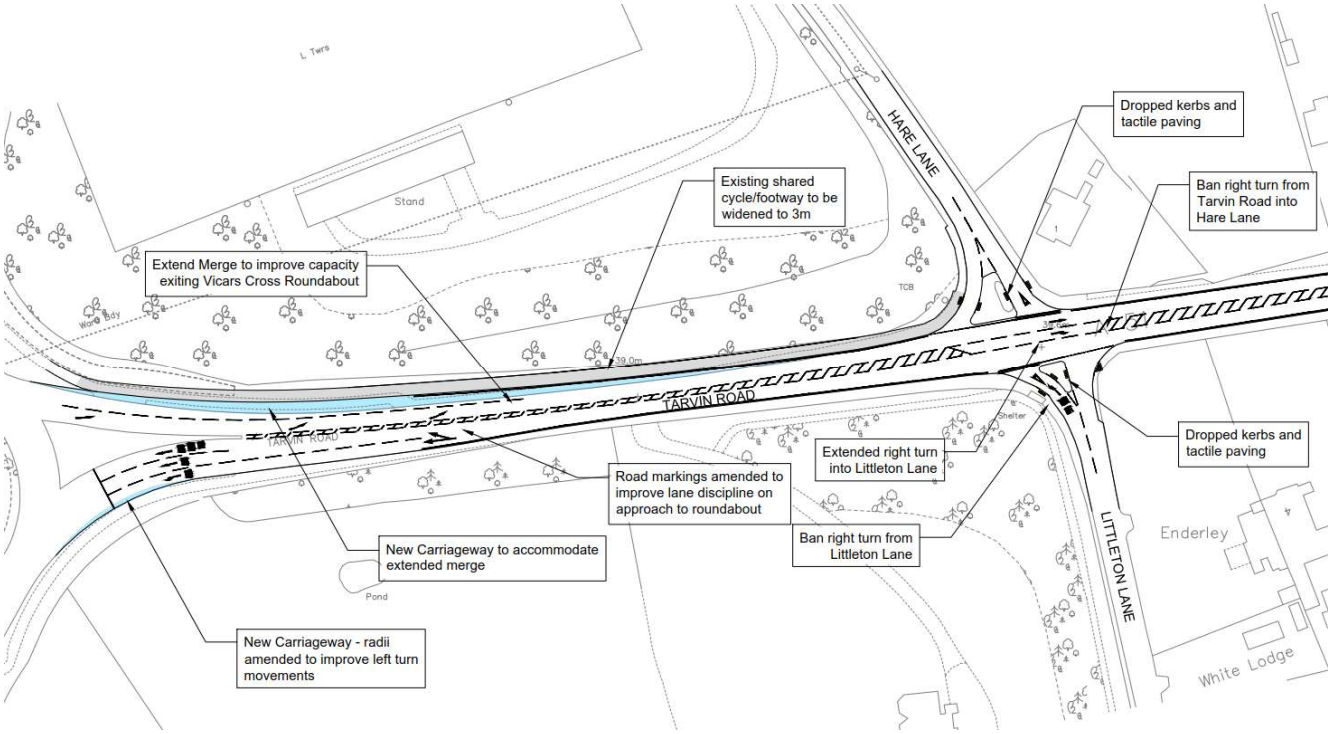
Source: Mott MacDonald

For the A51 (S) approach and traffic turning left towards Chester, observations indicate the outer traffic lane is under-utilised prior to the merge to a single lane. This adds to the already large traffic queues encountered on the A51 through Tarvin roundabout. To address this and improve flow in this direction widening is proposed to provide a dedicated left turn for the nearside lane. This would result in two left turn lanes and a right turn lane to the A54 at the entry point of the roundabout, as indicated in Figure 37.

In addition, slight modifications to kerblines would be provided on the A54 approach and central island to the roundabout. This would enable two approach lanes to be marked out on the A54 approach and two lanes also marked out on the circulatory carriageway.

The extra lane for left turning traffic should increase capacity and the addition of carriageway markings should further assist in guiding motorists through the roundabout and improving utilisation of the two lanes heading towards Chester on the A51 prior to the merge to a single lane. To accommodate the additional traffic lane, some third-party land would be required to the south-west of the roundabout.

Figure 38: Extension of Merge/Diverge from/ to the A55 Junction and Right Turn Bans at Hare Lane/ Littleton Lane Junction



Source: Mott MacDonald

To assist traffic in merging as it leaves the roundabout in an eastbound direction it is proposed to extend the merge from the A55/A51 Vicars Cross junction to a suitable point on the A51 as shown in Figure 38.

This would involve widening on the northern side utilising existing footway. This footway, an existing shared cycle/ footway, would be widened into existing verge space on the northern side within land under the ownership of Cheshire West and Chester.

Banning right turn movements at Hare Lane and Littleton Lane would help to resolve issues created by these junctions through 'rat running' as traffic seeks to avoid the busy A55 junction. During busy periods, since traffic is often queuing through this junction on the A51, motorists tend to let waiting vehicles out from both the Hare Lane and Littleton Lane entry points which can add to delays. The number of turning movements at this junction has also led to a number of turning related/ shunt collision.

This option seeks to restrict the number of turning movements by banning the following movements through the provision of increased splitter islands and amendments to road markings.

- Right turn from the A51 into Hare Lane;
- Right turn from Littleton Lane to the A51; and
- Ahead movement from Littleton Lane to Hare Lane.

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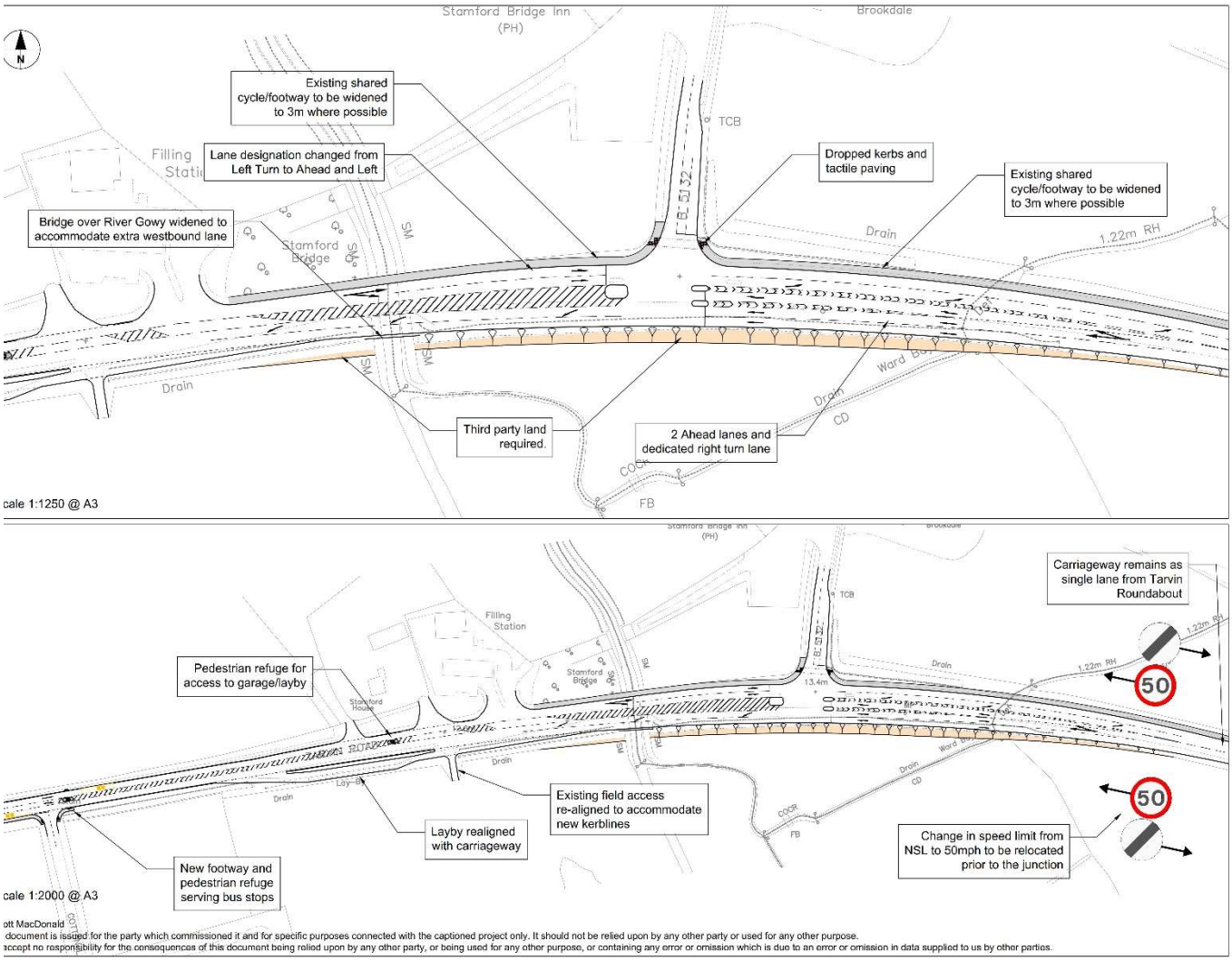
Figure 39: Stamford Bridge Lane Configuration and Long Merge Over Bridge



Source: Mott MacDonald

At the A51/Barrow Lane junction carriageway markings would be amended on the eastbound approach to the signals as shown in Figure 3939. At present, the left turn only lane into Barrow Lane is under-utilised with traffic queues resulting in the single straight-ahead lane.

By modifying the nearside lane to straight-ahead and left (along with required changes to the signals) this will increase capacity on this approach. The amendment to road markings on the eastbound approach would result in an improvement in the Practical Reserve Capacity PRC and resultant delay in both the AM and PM peak periods.

To improve capacity in the westbound direction towards Chester this option would provide an additional straight-ahead lane through the signals at the Stamford Bridge Junction. Due to the presence of an existing bridge over the River Gowy to the west of the junction the implementation of a long merge would include widening of the bridge. The long merge would

extend for a distance of approximately 150m back to single carriageway and is shown in Figure 39.

Additional third-party land would be required to accommodate this additional lane due to the existing level difference to the south. Relocating the southern kerbline would require an existing embankment to extend into fields beyond the current highway boundary fence.

The long merge option has been designed for a 50mph speed limit and can be accommodated prior to the garage on the northern side of the A51. At present, the A51 is subject to the National Speed Limit through the junction, dropping to 50mph approximately 30m west of the junction. As part of scheme proposals this speed limit change is to be relocated to the east of the junction. These changes would enable the merge to be to required design standards.

The existing parking layby to the south of the A51 opposite the garage would need to be relocated as part of this proposal.

Also included in this option is additional widening to the north-east of the junction to allow for the longer merge from 2 lanes to 1 on the eastbound exit to the signals.

3.4 Impacts of Scheme Not Being Delivered

Potential impacts of the scheme not coming forward are outlined in this section to reiterate the importance of the scheme and its benefits. The following impacts need to be considered if improvements along the A51 Chester-Tarvin corridor are not delivered:

- An increase in congestion along this section of the corridor with junctions such as the Tarvin roundabout and Tarvin Road / Barrow Lane junction at Stamford Bridge operating significantly over capacity by 2030.
- Increasing levels of Nitrogen Dioxide along the A51 Chester-Tarvin corridor producing poorer quality of life for residents and potential health effects.
- Continued low levels of road safety reducing opportunities for pedestrians and cyclists and increasing the number of rear-end shunt accidents at junctions.
- Reduced attractiveness of the area for future investment hindering economic growth.
- Increasing levels of noise pollution reducing the attractiveness of the area to future residents and developers.
- Reduced access to opportunities for people living either side of the corridor as it forms a key route between key centres such as Crewe Hub, Ellesemere Port Enterprise Zone and the Atlantic Gateway.
- Increasing journey times to key centres for both commuters and freight traffic reducing opportunities for continued economic growth.

4 The Economic Case

Section Summary

The Economic Case assesses options to identify all their impacts, and the resulting value for money, to fulfil Treasury's requirements for appraisal and demonstrating value for money in the use of taxpayers' money. The Economic Case identifies what economic, environmental, social and distribution impacts the scheme is expected to deliver.

A long list of 17 options was developed in response to the scheme objectives and sifted using Mott MacDonald's in-house Investment Sifting and Evaluation Tool (INSET) to produce a short list of 4 potential schemes.

Junction modelling and assessment of the wider economic benefits found that capacity improvements at Stamford Bridge, Tarvin roundabout, and the A55/A51 junction as well as banning right turn movements at Hare Lane and Littleton Lane provided the maximum benefits in terms of reduction in journey times and benefits to the economy.

Transport benefits and wider economic benefits have been assessed for the preferred option showing strong support for the scheme. Economic appraisal has shown the scheme presents High Value for Money with an initial Benefit Cost Ratio (BCR) value of 3.1. When adjusted for the inclusion of journey time reliability benefits, this BCR increases to 3.2.

The surrounding land use and development sites have been reviewed to assess whether the scheme could assist in unlocking development. There are no employment sites in proximity to the A51 which will be directly influenced by improvements along the corridor but 200 houses are proposed in Tarvin with an additional 500 in Tarporley, Cuddington and Sandiway. This scheme could help to unlock this development however it is not possible to quantify how many of these houses rely on A51 improvements at this stage.

Although this scheme forms part of a wider package of investments this particular intervention has the potential to provide 10 to 20 jobs (including construction, indirect and induced jobs) and £433,800 to £864,500 GVA in construction benefits during the construction period only. £171,840 to £343,680 worth of council tax can also be attributed to the proposed interventions within the scheme, once new homes supported by the scheme are occupied.

Assessment of social and distributional impacts demonstrates that the scheme could be beneficial to journey quality as although there will be a temporary increase in route uncertainty during construction, once operational the scheme is likely to produce a reduction in user frustration and fear of accidents. Severance is also likely to be reduced once operational, creating an improved connection to community facilities in Tarvin and Chester and there will be no severance during construction.

From an environmental perspective, a number of constraints have been identified that will impact the scheme, however these are minor issues and it is expected that these can be appropriately avoided or mitigated as the scheme develops.

The Economic Case therefore provides strong support for the scheme demonstrating High Value for Money and generating positive economic benefits for the local area in terms of GVA uplift during the construction period, and council tax generation. On a qualitative basis it is likely the scheme can be delivered without any adverse environmental impacts and when complete will enhance journey quality for users of the route and improve local connectivity within local communities as severance is reduced.

The purpose of the Economic Case is to assess options to identify all their impacts, and the resulting value for money, to fulfil Treasury's requirements for appraisal and demonstrating value for money in the use of taxpayers' money. This section summarises what economic, environmental, social and distribution impacts the scheme is expected to deliver.

As agreed with the C&W LEP, the level of appraisal carried out for this application is proportional to the scale and cost of the scheme. Therefore, this section assesses the economic impacts of the preferred option only.

4.1 Transport Economic Benefits

This section sets out the calculation of transport economic benefits consisting of:

- Journey time benefits to transport users;
- Journey time reliability benefits; and
- Accident benefits.

The Economic Appraisal Report (EAR) is included as Appendix E.

This assessment has considered the preferred option only. The short-listed options were assessed using individual junction models and from this analysis the preferred option was determined. The Options Appraisal Report in Appendix A provides full details.

4.1.1 Assumptions

In order to arrive at the economic benefits, a number of modelling and appraisal assumptions have been adopted. The standard TAG appraisal forms the basis of the approach with specific assumptions and simplifications made to allow best use of available local modelling data, the perceived nature of the schemes and the longevity of their impacts. The assumptions adopted for economic assessment of this scheme are summarised in the points below:

- Measures have been taken to ensure that the benefits included in this assessment are relevant to the scheme by only including benefit to, from and within the area influenced by the scheme.
- The economic assessment has been based on 2020 and 2030 traffic modelling where data is available from the A51 Chester Traffic Model.
- Traffic modelling has been undertaken for the following weekday periods:
  - AM (08:00-09:00)
  - Interpeak (Average hour 10:00-4:00)
  - PM (17:00-18:00)

The TAG recommended assessment period of 60 years has been adopted.

4.1.1.1 A51 Chester SATURN Model

The primary transport modelling platform is the A51 Chester Traffic Model (A51 CTM) which is a junction based model developed in the SATURN software.

The A51 CTM[10] model has a base year of 2017 and includes up to date transport forecasts for Cheshire West and Chester. The model was developed based on a proportionate update the 2010 CTM to specifically assess this scheme, including the collection of new traffic count and

[10] A51TarvinRoadCapacityImprovementsScheme_ModelBaseYearUpdate_RevA

journey time data in the vicinity of the scheme. All junctions in the scheme are part of the model simulation area and additional buffer network has been added to allow the impacts of re-assignment to be examined. Within the study area, full junction coding is included (SATURN simulation), outside of this link based speed flow curves are applied.

Therefore, this is suitable for calculating a BCR for the proposed transport improvements.

Full details of the base and future year models are presented in Appendices C and D respectively.

4.1.2 Scheme Costs Adjusted for Risk

The base cost of the scheme has been adjusted to allow for risk and optimism bias for the purposes of economic modelling. The total estimated cost of the scheme covering only design, construction, and preliminaries costs is £4,488,926. A Quantified Risk Assessment (QRA) figure has been applied based on all identified risks, including strategic and funding risks, inclusive of inflation which is set out in detail in the appended QRA Report (Appendix K).

Quantified risk assessment (QRA) enables an expected value of the cost of the scheme to be calculated. The key assumptions of where risk has been calculated is stated in the QRA along with the likely impact and appropriate mitigation measures. The base cost of the scheme (with no risk) is estimated at £4,488,926. Based on this cost the QRA has been calculated at £633,183. The assumption is therefore that the base cost amounts to £5,122,109. Optimism bias has also been applied on top of this QRA figure for the purposes of economic appraisal which brings the total cost of the scheme to £5,890,425. The adjusted scheme costs in relation to the application of risk allowance are summarised in the table below.

Table 37: Scheme Costs used for Economic Appraisal

Component	Cost (£)
Base Cost	£4,488,926
QRA	£633,183
Sub Total	£5,122,109
Optimism Bias (15%)	£768,316
TOTAL	£ 5,890,425

Source: Mott MacDonald

4.1.2.1 Indirect Taxation Factor

Prices measured in the factor cost unit of account can be converted to (or from) the market price unit of account by multiplying (or dividing) by the indirect tax correction factor, (1+t), where t is the average rate of indirect tax on goods and services in the open market, in this case 1.19. TAG A1.3 states that indirect tax revenues should be converted to market price. This conversion is undertaken with TUBA which has been used for this assessment.

4.1.2.2 Inflation

The economic appraisal is based on 2017 prices with no allowance made for inflation through to construction year. The financial case reviews inflation costs in more detail and overall predicted scheme costs. Sensitivity tests undertaken (see paragraph 4.1.5) suggests the impact of increasing scheme costs by 25% would result in a reduced BCR of 2.6. Since inflation is calculated to be 4.2% (see paragraph 5.2.1) through to construction start, the impact on overall results will be minimal. The impact of inflation will be assessed in more detail at FBC stage.

4.1.3 Benefit to Cost Ratio

The BCR for the preferred option of this scheme has been calculated by modelling two scenarios; one without implementation of the scheme and one with the scheme to produce trip and cost matrices. The calculation of the initial BCR and an estimate of the adjusted BCR value are given in Table 38.

In line with the appraisal guidance, a modified BCR has been calculated by including journey reliability benefits that arise from the transport interventions.

Table 38: Assessment summary (in £000s, 2010 prices if not stated)

	Initial BCR	Adjusted BCR
Scheme Costs in 2017 prices	4,489	4,489
Scheme Costs including risk and optimism bias of 15% in 2017 prices	5,890	5,890
(All entries below are present values discounted to 2010, in 2010 prices)		
Cost to Public Accounts (including risk and optimism bias of 15%)	4,842	4,842
Main Transport Economic Benefits	13,242	13,242
Journey Time Reliability Benefits	-	497
Accidents	547	547
Present Value of Costs (PVC)	4,481	4,481
Present Value of Benefits (PVB)	13,789	14,285
Benefit to Cost Ratio (BCR)	3.1	3.2

4.1.3.1 Transport Economic Benefits

The transport economic benefits of the scheme have been calculated using the Transport Users Benefit Appraisal (TUBA) program (Version 1.9.9), which carries out an economic assessment in accordance with published DfT guidance. The analysis uses transport modelling results from the A51 Chester Traffic Model that reflect delay and traffic reassignment impacts of the A51 Tarvin-Chester Improvements scheme.

The economic benefits calculated for the scheme include:

- **Transport economic benefits (TAG A1 and TAG A2.3).** The transport economic appraisal has been undertaken using the TUBA program, which carries out an economic appraisal in accordance with published DfT guidance. This is based on trip and cost matrices from the A51 CTM and travel cost changes implied by the proposed schemes.
- **Accident benefits.** Estimation of accident benefits has been carried out using COBALT, the DfT's tool for accident appraisal.
- **Journey reliability benefits (TAG A1).** The estimate of journey time reliability benefits is made to satisfy the 'Reliable journeys' sub-objectives within the 'Economy' section of scheme appraisal. The calculations assume that the model area is dominated by urban regions and therefore uses the urban journey time reliability calculations that are set out in the TAG unit.

The transport modelling has shown that the A51 Tarvin-Chester Improvements Scheme produces reductions in delay and journey time for traffic. The TEE table reflects this and shows that the transport interventions when assess in isolation result in some benefits for all road users. Table 38 shows that the A51 Tarvin-Chester Improvements Scheme is forecast to deliver a present value of main transport economic benefits (PVB) of **£13.79m** over a standard

appraisal period of 60 years. When the PVB is taken together with the present value of scheme costs (PVC) of **£4.48m** the initial BCR is calculated as **3.1**. According to Department for Transport guidance, the BCR of **3.1** represents **High Value for Money**.

4.1.3.2 Economic Appraisal Results Tables

The completed Transport Economic Efficiency (TEE) table is shown in Table 39. The transport modelling has shown that the A51 Tarvin Road Capacity Improvements scheme produces reductions in delay and journey time for traffic. The TEE table reflects this and shows that the transport interventions when assessed in isolation result in benefits for all road users.

The overall Present Value of Transport Economic Efficiency Benefits is **£13.45m** (2010 prices, discounted to 2010). This is shown in Table 39.

Table 39: Economic Efficiency of the Transport System (TEE) Table

Economy: Economic Efficiency of the Transport System (TEE) - £000's			
Consumer – Commuting User Benefits	**All Modes**		**Road**
Travel Time	5,277		5,277
Vehicle Operating Costs	403		403
User Charges	0		0
During Construction & Maintenance	0		0
NET CONSUMER – COMMUTING BENEFITS	**5,680**		**5,680**
Consumer – Other User Benefits	**All Modes**		**Road**
Travel Time	2,471		2,471
Vehicle Operating Costs	198		198
User Charges	0		0
During Construction & Maintenance	0		0
NET CONSUMER – OTHER BENEFITS	**2,669**		**2,699**
Business	**All Modes**	**Goods Vehicles**	**Business Cars & LGV**
Travel Time	4,365	2,465	1,900
Vehicle Operating Costs	740	515	225
User Charges	0	0	0
During Construction & Maintenance	0	0	0
Subtotal	**5,105**	**2,980**	**2,125**
Private Sector Provider Impacts	**All Modes**		
Revenue	0		
Operating Costs	0		
Investment Costs	0		
Grant/Subsidy	0		
Subtotal	**0**		
Other Business Impacts	**All Modes**		
Developer Contributions	0		
NET BUSINESS IMPACT	**5,105**		

Economy: Economic Efficiency of the Transport System (TEE) - £000's	
TOTAL	**All Modes**
Present Value of Transport Economic Efficiency Benefits (TEE)	**13,454**

Note: Benefits appear as positive numbers, while costs appear as negative numbers. All entries are present values discounted to 2010, in 2010 prices.

The impact on public accounts for the A51 Tarvin Road Capacity Improvements scheme is set out in Table 40, and is a cost to the public accounts of **£4.48m**. There is a cost of **£0.4m** in Indirect Tax Costs for central government.

Table 40: Public Accounts (PA) Table

Public Accounts - £000's		
Local Government Funding	**All Modes**	**Road**
Revenue	0	0
Operating Costs	0	0
Investment Costs	0	0
Developer Contributions	0	0
Grant/Subsidy Payments	0	0
NET IMPACT	0	0

Central Government Funding: Transport	All Modes	Road
Revenue	0	0
Operating Costs	0	0
Investment Costs	4,481	4,481
Developer Contributions	0	0
Grant/Subsidy Payments	0	0
NET IMPACT	4,481	4,481

Central Government Funding: Non - Transport	All Modes	Road
Indirect Tax Revenues	361	361

TOTALS	All Modes
Broad Transport Budget	**4,481**
Wider Public Finances	**361**

Note: Benefits appear as positive numbers, while costs appear as negative numbers. All entries are present values discounted to 2010, in 2010 prices.

The Analysis of Monetised Costs and Benefits (AMCB) details are set out in Table 41 and show an overall PVC of the scheme as **£4.48m** against an overall PVB of **£13.79m** having allowed for impacts of indirect taxation on the economy and greenhouse gases.

Table 41: Analysis of Monetised Costs and Benefits (AMCB) Table

Analysis of Monetised Cost and Benefits - £000's	
Local Air Quality	0
Greenhouses Gases	149
Accidents	547
Economic Efficiency: Consumer Users (Commuting)	5,680
Economic Efficiency: Consumer Users (Others)	2,669
Economic Efficiency: Business Users and Providers	5,105
Wider Public Finances (Indirect Taxation Revenues)	-361
Present Value of Benefits (PVB)	**13,789**
Broad Transport Budget	4,481
Present Value of Costs (PVC)	**4,481**
Overall Impact	
Net Present Value (NPV)	**9,308**
Benefit to Cost Ratio (BCR)	**3.1**

This table includes costs and benefits which are regularly or occasionally present in monetised form in transport appraisals, together with some where monetisation is in prospect. There may also be other significant costs and benefits, some of which cannot be presented in monetised form. Where this is the case, the analysis presented above does NOT provide a good measure of value for money and should not be used as the sole basis for decisions.

4.1.3.3 Accident Benefits

Accident benefits have been calculated using the DfTs Cost and Benefit to Accidents – Light Touch (COBALT) software. COBALT assesses the safety aspects of road schemes using details of the roads and junctions that would be impacted by the scheme. The assessment is based on a comparison of accidents by severity and associated costs across the network (in this case the section of the A51 from Vicars Cross, Chester to Tarvin roundabout, Tarvin). The assessment uses link and junction characteristics, relevant accident rates and costs, and forecast traffic volumes for each link and junction. Default accident rates have been used, and accidents have been calculated for the A51 study area only.

Accident benefits are included in the initial BCR calculation and provide a benefit of £0.55m. The details are shown in the table below. The accident benefits largely arise from the removal of the left and straight-ahead movements from Littleton Lane to A51 Tarvin Road, and the removal of the right turn from A51 Tarvin Road to Hare Lane.

Table 42: Accident Benefits

Accident Benefits	£000s
Total Accident Benefits saved by Scheme	547

All entries are in thousands of pounds discounted to 2010 in 2010 prices

4.1.3.4 Journey Time Reliability Benefits

The term reliability refers to variation in journey times that individuals are unable to predict (journey time variability, or JTV). Such variation could come from recurring congestion at the same period each day (day-to-day variability, or DTDV) or from non-recurring events, such as incidents. It excludes predictable variation relating to varying levels of demand by time of day, day of week, and seasonal effects which travellers are assumed to be aware.

The measure of travel time variability is the standard deviation of travel time, and reliability benefits are calculated based on the change in standard deviation of travel time with a transport scheme in place as per the guidance in TAG A1.3. The urban roads calculation has been used.

The journey time reliability benefits have been calculated using the equation:

$$Reliability = -\frac{1}{2}\sum_{ij} \Delta\sigma_{ij} * \left(T_{ij}^{0} + T_{ij}^{1}\right) * VOR$$

where:

- $\Delta\sigma_{ij}$ = change in standard deviation of journey time from i to j (in seconds)
- $T_{ij}^{0} + T_{ij}^{1}$ = journey time, without and with scheme, from i to j (in seconds)
- VOR = value of time multiplied by the reliability ratio, where the reliability ratio is set to 0.4 as per TAG Unit A1.3.

The journey time reliability details are set out in Table 43 and show a benefit of £0.5m. The journey time reliability benefits are included in the adjusted BCR calculation.

Table 43: Journey Time Reliability Benefits

Reliability Benefits	£000s
Journey Time Variability Benefits 2020	10.8
Journey Time Variability Benefits 2030	9.9
Journey Time Variability Benefits (60 year period)	496.5

All entries are in thousands of pounds discounted to 2010 in 2010 prices

4.1.4 Value for Money Statement

The Value for Money (VfM) assessment of a transport intervention has been designed as a staged process to ensure that a complete and robust analysis is undertaken by the practitioner.

Table 44 summarises the comparative BCR results. The full assessment summary showing the calculation of both BCR's is provided in Table 38.

Table 44: BCR Results

	Results
Initial BCR	3.1
Adjusted BCR	3.2

A VfM statement was produced using the BCR assessment to appraise whether the benefits outweigh the costs. The A51 Tarvin-Chester Improvements Scheme VfM was judged based on the categories below:

- Poor VfM if BCR is below 1.0
- Low VfM if the BCR is between 1.0 and 1.5
- Medium VfM if the BCR is between 1.5 and 2.0
- High VfM if the BCR is between 2.0 and 4.0.

The full value for money statement is included in Appendix E of the OBC.

According to DfT guidance and criteria, the modified BCR of 3.2 for the A51 Tarvin to Chester Improvements Scheme represents High Value for Money. The initial BCR of 3.1 calculated

based on transport benefits alone also yields High Value for Money. It should be noted that this assessment has been based on a pessimistic development schedule, and has incorporated the Quantified Risk Assessment (QRA) at £633,183 and optimism bias at 15%.

In addition to the monetized benefits noted above there are also additional qualitative benefits that cannot be monetised, namely:

- Journey quality will be improved as a result of the scheme, with reduced frustration and fear of potential accidents, and reduced route uncertainty; and
- Severance will be reduced by improving motorised vehicle access to community facilities in Chester from Tarvin.

Table 45: Value for Money Summary for the Preferred Option

	Initial BCR	Adjusted BCR
Present Value of Benefits	13,789	14,285
Present Value Costs	4,481	4,481
BCR	3.1	3.2
Value for Money Category	High	High

4.1.5 Sensitivity Test

Two sensitivity tests have been undertaken:

- Test 1: Increase of scheme costs by 25%;
- Test 2: Reduction of scheme benefits by 25%; and
- Test 3: Increase of scheme costs by 25% and reduction of scheme benefits by 25%.

Table 46 presents the output of the sensitivity tests. It can be seen that for Tests 1 and 2 the BCR is still above two and classified as High Value for Money. Test 3 has a BCR of just under two, which is classified as Medium Value for Money, but this is a worst case sensitivity test. Therefore, it can be concluded that the BCR is robust and can account for reasonable changes in costs or benefits without adjusting the Value for Money categorisation.

Table 46: Sensitivity Tests

Item	PVB	PVC	BCR
Adjusted BCR	14,285	4,481	3.2
Test 1	14,285	5,601	2.6
Test 2	10,713	4,481	2.4
Test 3	10,713	5,601	1.9

4.2 Wider Economic Impacts

The Wider Economic Benefits Appraisal carried out for this scheme establishes the key employment and housing development sites that are located near the study area and how these sites could be supported by the highway improvements through alleviating congestion and improving journey times, thus improving labour market access into the city and supporting planned growth in Cheshire West and Chester.

4.2.1 Residential Sites

The Cheshire West & Chester Council Local Plan Strategic Policies (Part One) document demonstrates that there is significant demand for development land around the area. 20

residential sites have been identified in proximity to the scheme which account for 84.6 ha of land available for development. The 2013 Strategic Housing Land Availability Assessment (the most recent publicly available document at the time of writing) and local data for Cheshire West and Chester indicates that this would support 2,790 dwellings, housing 6,417 residents. The Local Plan Part One also proposes 200 new dwellings in Tarvin with an additional 500 in Tarporley, Cuddington and Sandiway, however although this scheme offers potential to unlock housing development along the corridor it is not possible at this stage to state how many of these houses will be dependent upon improvements to the A51.

Considering the travel to work patterns of commuters living around the A51, it is clear that the eastern side of Chester forms part of the 'commuter belt' to the city. While the area in which the scheme falls does not currently have high levels of this east-west commute, it is immediately located next to an area with a much higher level of commuting. Therefore, there is a possibility that as Chester's economy grows and access to the city centre improves, these residential development sites will become more attractive to developers. However, the extent to which the scheme influences the decision to develop the sites is likely to be fairly low, as there are currently other housing sites closer to the city being brought forward.

As such, we have attributed a low level of the economic benefits of this sites to the A51 improvements (5-10%). These benefits are as follows:

- 10 to 20 jobs and £433,800 to £864,500 GVA in construction benefits could be attributed to the road improvement scheme **during the construction period only.**
- £171,840 to £343,680 in council tax could be attributed to the road improvement scheme, however these will only be generated once new homes are occupied.

Additional information and evidence to support these calculations is detailed in Appendix F, Land Use and Economic Development Report.

4.2.2 Employment Sites

There are two development sites designated for employment in proximity to the A51 Tarvin Corridor. The details of these development sites are shown in the table below. These two employment sites account for 19.8 ha of land available for development.

Table 47: Employment development sites

Map Number	Reference	Site Name	Local Plan Area	Site size (ha)	Planned use
1	TAR/0068	Land south of Heath Green, Tarporley	Tarporley	19.2	Mixed (non resi)
2	TAK/0162	Town House Farm, High Street, Clotton, Chester	Rural	0.6	Employment

Source: Cheshire West and Chester Council

Given that the predominant travel to work pattern on the A51 is in an east-west direction, it is highly unlikely that many commuters will travel in the other direction (i.e. from Chester - with its larger economy - to an area with lower economic activity). Site 1 (the larger of the two identified sites) is accessible via a number of different routes and as such, potential employees at the site are not dependent on the A51 around Tarvin. Given the location of these sites and current access routes, it is not anticipated that the development of these sites can be attributed to the A51 junction improvement scheme and benefits have not been calculated. Nevertheless, there is potential for these sites to be supported by the scheme, as future businesses located there will have good access into Chester potentially enabling them to expand.

4.2.3 Tourism and Retail

The improvements to the A51 will support key sectors, developments, employment and transport opportunities across the region.

The improvements included in this scheme will be taking place on a key eastern corridor into Chester, which will support the visitor economy by improving the reliability and time of trips. Visitors will be able to access Chester's tourism and retail offer more easily, which should subsequently help to increase visitor trips and visitor expenditure and associated multiplier benefits into the local economy.

These proposed improvements to the A51 at Tarvin will also help to improve access to rail services at Chester railway station in the centre of the city. Chester railway station is a regional hub, with links across the North West to Liverpool, Manchester, North Wales and Crewe (which will become a HS2 Hub). Improving access into Chester on the A51 will help people living on the eastern side of the city access opportunities further afield. Finally, as the scheme will improve access into Chester, it will thereby indirectly support key development sites within the city centre (many of which are likely to be connected to the Atlantic Gateway Corridor and the Cheshire Science Corridor Enterprise Zone).

4.3 Social and Distributional Impacts

4.3.1 Social Impact Appraisal

To support the development of the Outline Business Case a Social Impact Appraisal (SIA) has been carried out for the preferred option. This SIA has been carried out drawing on WebTAG Guidance Unit A4.1. It assesses the human experience of the scheme and its impact on social factors. The eight social impacts covered in the WebTAG guidance (Unit A4.1) are:

- Accidents;
- Physical activity;
- Security;
- Severance;
- Journey quality;
- Option and non-use values;
- Accessibility; and
- Personal affordability.

A screening stage was carried out to identify which impacts were relevant to the scheme and which could be assessed at this stage for the OBC. The number of impacts that were relevant to the Scheme were narrowed down at this stage. Option and non-use values and accessibility were scoped out of the SIA due to the scheme being a highways improvement, and these two impacts relate to public transport improvements. Personal affordability assessment was also scoped out due to potential changes in affordability being insignificant due to the scale of the scheme. The following table provides a summary of the SIA analysis.

Table 48: SIA Summary

Impacts	Summary of key impacts	Quantitative	Qualitative	Monetary £(NPV)
Reliability impact on commuting and other users	N/A		-	
Physical activity	Some footpath restrictions during construction. Once operational the footpaths will have been widened which may encourage an increase in pedestrian trips.		Neutral	
Journey quality	Temporary increase in route uncertainty during construction. Once operational there is likely to be a reduction in user frustration and fear of accidents.		Beneficial	
Accidents	Reduction the occurrence of rear-ending accidents at Tarvin roundabout. Potential increase in accidents associated with an increase in new trips.	-	Beneficial	-
Security	There are not likely to be any impacts on security. Street lighting and landscaping will be replaced.		Neutral	
Access to services	N/A		-	
Affordability	N/A		-	
Severance	No severance during construction. Reduced severance once operational, creating an improved connection to community facilities in Tarvin and Chester. The scheme will improve footways, and introduce a dropped crossing to assist mobility impaired residents.		Beneficial	

Source: Mott MacDonald

This assessment demonstrates that the scheme could be beneficial to journey quality as although there will be a temporary increase in route uncertainty during construction, once operational the scheme is likely to produce a reduction in user frustration and fear of accidents. Severance is also likely to be reduced once operational, creating an improved connection to community facilities in Tarvin and Chester and there will be no severance during construction. A detailed analysis of the SIA is included as Appendix H.

4.3.2 Distributional Impact Appraisal

A Distributional Impact Appraisal (DIA) has also been carried out in line with WebTAG guidance Unit A4.2, proportionate to the size of the scheme and the availability of data. It assesses the variance of the scheme's impact across different social groups, including low income, children, and older people. The impacts are presented in maps and DIA tables to show whether the net benefits or disbenefits of a scheme are disproportionately impacting the relevant groups. Full details are provided in Appendix I.

An initial screening process was carried out which examined the eight impact areas identified in WebTAG A4.2 and determined whether they needed to be appraised further. The eight impact areas are:

- User Benefits (Non-Business);

- Noise;
- Air Quality;
- Accidents;
- Security;
- Severance;
- Accessibility; and
- Personal Affordability.

The Distributional Impact Assessment conducted for the OBC submission has been progressed to stage 2C of the DIA guidance document. The exception to this is the user benefits chapter which has been quantitatively assessed using the guidance in TAG unit A4.2.

The impact area for the user benefits DIA is the same as the core modelling area in the Chester Transport Model. The analysis shows that user benefits are largely experienced by the population that are located within the least deprived quintiles. The proportion of the population in these quintiles is also higher, but the proportion of the benefits is disproportionately higher in comparison.

Table 49: DIA Summary

Impacts	Sub Impacts	Summary of key impacts	Distributional 7-pt scale/ vulnerable grp
Environment	Noise	Not possible to assess the DIA of noise at this stage	Scoring not available at this stage
	Air quality	Not possible to assess the DIA of air quality at this stage	Scoring not available at this stage
Social	Commuting and other users	The user benefits are largely experienced by the population that are located within the least deprived income quintiles	Uneven distribution
	Accidents	The number of casualties is below the minimum threshold required for an assessment	Not appraised
	Security	N/A	Not appraised
	Access to services	N/A	Not appraised
	Affordability	N/A	Not appraised
	Severance	Partial footpath severed during construction. Improved access to facilities once operational. Disabled people most likely to be affected during the construction stage	Scoring not available at this stage

The availability of additional modelling data at the full MSBC stage will allow for the distributional analysis of noise and air quality impacts, and link level COBALT data will enable an accidents analysis to be conducted. Security, Accessibility, and affordability have been scoped out of the DIA. Security impacts have been scoped out due to this relating to changes in public transport stop infrastructure and how this relates to a traveller's perception of security, whilst accessibility impacts relate to changes in public transport routes and service frequencies. None of these are

anticipated at this stage. As per the SIA, affordability issues have been scoped out due to potential changes in affordability being insignificant due to the scale of the scheme.

4.4 Environmental Constraints

A detailed Environmental Mapping Study has been undertaken in order to identify the potential environmental risks and constraints along the A51 between Tarvin and Chester and in the vicinity of the route within 500m of the site boundary. The A51 between Tarvin and Chester and the 500m buffer zone are outlined in Figure 4040.

Figure 40: Environmental Mapping Study Extents

Source: Mott MacDonald

The key risks identified in relation to implementation of the A51 Tarvin-Chester Improvements Scheme are summarised in

Table 50. Further details of this assessment and results can be found within the Environmental Constraints report attached as Appendix G.

Table 50: Summary of Environmental Risks and Constraints

Risk	Within Site Boundary	Within 500m of Site Boundary Potential
Potential Flood Risk	✓	✓
Noise Important Area	✓	✓
Local Wildlife Site		✓
Historic Landfill		✓
Scheduled Monuments		✓

Source: Mott MacDonald

Whilst the assessment has identified a number of constraints, these are minor issues and it is expected that these can be appropriately avoided or mitigated as the scheme develops. Further surveys will be required to establish an accurate environmental baseline. These surveys will be guided by this initial review of existing environmental data and will:

- Identify specific constraints or risks proposed by ecological features and protected species, as the current analysis covers purely high level designated ecological sites; and
- Enable tailored recommendations and/or mitigation to be developed to address any impacts associated with the proposed works to avoid breaching legislation.

4.5 Appraisal Summary Table

The Appraisal Summary Table (AST) provides details of the impacts of the scheme. These include both qualitative and quantitative benefits as required by DfT guidance. The quantitative benefits are given in the AST in Appendix O. The qualitative benefits are given in Table 51 and show that the scheme provides the following qualitative impacts:

Table 51: Estimated Impacts of the Scheme in the AST

Impacts	Sub-impacts	Estimated Impact
Economy	Business users & transport providers	N/A
	Reliability impact on Business users	N/A
	Regeneration	N/A
	Wider Impacts	Low
Environmental	Noise	Low
	Air Quality	Low
	Greenhouse gases	Low
	Landscape	Low
	Townscape	Low
	Heritage of Historic resources	Medium
	Biodiversity	Low
	Water Environment	Medium
Social	Commuting and Other users	High
	Reliability impact on Commuting and Other users	Medium
	Physical activity	Low
	Journey quality	Medium
	Accidents	Medium
	Security	Low
	Access to services	N/A
	Affordability	N/A
	Severance	Medium

Impacts	Sub-impacts	Estimated Impact
	Option values	N/A
Public Accounts	Cost to Broad Transport Budget	Low
	Indirect Tax Revenues	Low

At OBC stage formal environmental assessment or investigations which would enable us to determine an estimated impact have not been undertaken. Further assessment and surveys are recommended at a subsequent stage, at which point we would be able to estimate the level of impact based upon the environmental/ecological sensitivity of the site.

5 The Financial Case

Section Summary

The Financial Case comments on the affordability of A51 Tarvin-Chester Improvements Scheme, its funding arrangements and technical accounting issues. The case presents the financial profile of the different options and the impact of the proposed deal on the Department's budgets and accounts.

The total estimated base scheme cost is £4,488,926 and includes construction costs, preliminaries, design and supervision costs, statutory undertakers works and land acquisition costs. A Quantified Risk Assessment has been applied to the total cost of the scheme and totals £633,183. In addition, inflation has been applied totalling £222,730.

An additional amount of 1% of total scheme construction and delivery costs, rounded up to the nearest thousand, of £54,000 has been allocated to enable robust monitoring and evaluation of the scheme, in accordance with the C&W LEP's Assurance Framework.

The total amount of funding required for the scheme is £5,398,839. These costs have been prepared by Mott MacDonald, in accordance with DfT guidance, Optimism Bias of 15% applied for Economic Appraisal purposes does not form part of the funding ask and is therefore not included in the Financial Case which sets out the level of funding needed and where that funding with originate.

The scheme will be funded by the Cheshire and Warrington LEP with Cheshire West and Chester Council providing £1,741,000 as match contribution, 32% of the overall construction and delivery cost of the scheme.

This section of the OBC summarises the cost of the scheme and how costs are broken down with and without the application of risk allowance. These costs have been prepared by Mott MacDonald. The financial case also identifies how the scheme will be funded and how the cost of the scheme is expected to be spread out from the approval of funding to completion of the scheme.

5.1 Assumptions

Key assumptions made with regards to deriving scheme costs include:

- Construction will begin in 2019/20 and be completed in 2020/21.
- An opening year of 2021.
- Monitoring and Evaluation activities within the scheme programme (2020/21) will form part of the funding ask. Activities undertaken post scheme completion through to 2024/25 will be covered by CWAC.
- In accordance with WebTAG guidance, optimism bias is not included in the Financial Case cost breakdown; it is only included in the Economic Case for the purposes of economic appraisal and does not form part of the funding request.

5.2 Cost Breakdown

Detailed costs of the A51 Tarvin-Chester Improvements Scheme have been produced and are presented in this section. The cost is considered proportionate and affordable to the scale of the issues identified in the Strategic Case and the predicted benefits of the scheme assessed in the Economic Case

5.2.1 Base Construction Costs

The estimated base construction cost for the scheme is £4,488,926, excluding quantified risk of £633,183 This includes for works costs, property and land costs, Statutory Undertakers works and Design/ Supervision fees. Works costs include for all construction items as well as preliminaries.

The base year for the cost estimates is Q4, 2017 and the table below provides details of how the total base cost for construction has been derived.

Table 52: Cost Breakdown

Cost Item	Preferred Option
Work Costs	£3,338,196
Property and Land	£20,000
Statutory Undertakers Works	£630,000
Design/ Supervision Fees	£500,729
Base Cost (excluding risk and inflation)	£4,488,926

Source: Mott MacDonald

A **Quantified Risk Assessment** has been undertaken which calculated risk to be £633,183, or approximately 14% of the base cost. Appendix K details the calculation of the QRA.

In addition, with regard to **inflation**, the Building Cost Information Service, known as BCIS, is a provider of cost and price information for the UK construction industry. The data forecast from BCIS general civil engineering indices has been used to calculate inflation rates from the base year estimate (Q4 2017). Rates used are as follows:

- Mid-construction year (Jun 2019) – 4.2%
- Mid-construction (Apr 2020) – 7.1%

Total costs for inflation are estimated to be £222,730 with full details provided in the cost plan in Appendix L.

Table 53 sets out revised costs inclusive of risk and inflation.

Table 53: Costs with QRA and Inflation Included

Base Cost	£4,488,926
Risk	£633,183
Inflation	£222,730
Sub-Total	**£5,344,839**
VAT (20%)	**£1,068,968**
TOTAL	**£6,413,807**

Source: Mott MacDonald

The total funding required for construction and delivery of the scheme is **£5,344,839**, however, including VAT, the total scheme cost is £6,413,807. All VAT is recoverable to CWAC.

5.3 Maintenance Costs

WebTAG Unit A1.2 (Scheme Costs) states that traffic-related maintenance and renewal costs should also be considered in addition to capital investment costs. The potential financial costs of ongoing maintenance include:

- Resurface roads
- Footways slurry seal
- Gritting
- Roadsweeping
- Outfall and Gully Cleaning
- Structure Inspections, Repainting and bearing replacement,
- Fencing repairs and replacement
- Road restraint systems replacement
- Road Sign Cleaning
- Grass cutting and planting thinning

Maintenance costs are estimated to be £35,000 over 20 years and will be covered by the Council's own maintenance budget; as such they do not form part of the financial ask.

5.4 Cost Allowance for Monitoring and Evaluation

In addition to the construction cost breakdown noted above, an amount of 1% of the total constructions costs, included risk has been allocated to ensure that he the scheme can be monitored and evaluated both during delivery and post completion in line with the requirements of the C&W LEP's Assurance Framework. This is an amount of £53,943, rounded to £54,000.

Added to the construction costs of £5,344,839 this brings the total scheme costs and funding ask to £5,398,839

Monitoring and Evaluation, as detailed in Appendix J will cover monitoring during scheme delivery to ensure the project is being delivered on time, to specification and to budget, and one and four years post completion to evaluate the extent to which scheme outcomes, impacts and benefits have been realised.

The funding allowance sought, as outlined within this section, will cover the costs of monitoring and evaluation throughout the construction of the scheme. Any additional monitoring and evaluation carried out after the scheme delivery will be delivered through CWaC's own budget.

5.5 Implications of Potential CPO issues

At the time of writing no formal requirements for CPO's have been identified and CWaC's Property Team is progressing with land acquisition through private negotiations. Land acquisition at Tarvin roundabout is positive but dialog with the land owner around the Stamford Bridge improvements needs to progress. CWaC are prepared to engage in a CPO process should negotiations stall, and this has a potential cost implication of between £50,000 and £100,000, depending on the level of potential objection although CWAC will do what they can to avoid a CPO including mitigation of any objections raised. Due to the level of uncertainty about the potential cost of any CPO the amount noted here is not included in the funding ask and will,

if required, be financed by the Council. As the engagement in a CPO process has been identified in the work programme (set out in Appendix N) this can be accommodated for within the delivery timescales. Therefore, acquiring third party land will not affect the overall delivery of the scheme.

5.6 Funding Arrangements

This section sets out how much funding is being sought through funding from the LEP and how much is being contributed by Cheshire West and Chester Council. The total scheme cost for construction and delivery is £5,344,839; with an allowance of £54,000 for Monitoring and Evaluation (M&E) it is £5,398,839. The proposed funding mix, on an annual basis is set out in Table 54. A full breakdown is provided in Appendix L including assumptions and exclusions made.

Table 54: A51 Tarvin-Chester Improvement Scheme Expenditure Profile

Funding Source	2016-17	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23	2023-24	2024-25	Total
LGF (67%)	£0	£0	£189,259	£1,803,768	£1,624,195	0	0	0	0	**£3,617,222**
Local CWAC (32.2%)	£10, 000	£130,000	£113,223	£717,826	£729,951	£10,000	£10,000	£10,000	£10,000	**£1,741,000**
Third Party (s106) (0.8%)			£40,617							**£40,617**
Total	£10, 000	£130,000	£343,099	£2,521,594	£2,354,146	£10,000	£10,000	£10,000	£10,000	**£5,398,839**

Source: Cheshire West and Chester Council

The scheme will be funded by the Cheshire and Warrington LEP (67% of the overall cost) with Cheshire West and Chester Council providing £1,741,000 as match contribution, which equates to 32.2% of the overall cost of the scheme. This will be funded through the Council's own capital resources including; Integrated Transport Block, Maintenance Block allocation, the Council's own capital reserves while seeking third party funding contributions towards the scheme from Community Infrastructure Levy (CIL) for the A51/A54 Tarvin roundabout, Barrow Lane. Section 106 contributions amounting to £40,617 (0.8% of the overall cost) will also be sought to fund sustainable transport improvements at the Hare Lane/Littleton Lane junctions.

Appendix M provides details of Executive Board papers highlighting that the council acknowledge the requirement for local contribution match funding as part of the submission to the Local Growth Fund for their schemes. The section 151 officer signed the submission to the LEP. The paper to Full Council in July 2016 (provided in Appendix M) would not have been able to proceed had the Section 151 officer not been supportive of the bid.

5.6.1 Impact of funding not coming forward

CWaC and CW&LEP have both identified the A51 strategic road corridor as a key priority for enhancing connectivity, improving capacity while reducing congestion to key economic centres, through dedicated adopted policies. In the event that the A51 OBC not receive conditional approval from the CW&LEP, the Council would seek alternative future funding streams to deliver the scheme, including (but not an exhaustive list); future Department for Transport congestion pinch point Funding, other government grants, third party contributions through S106 Agreements and Community Infrastructure Levy (CIL) funding and future growth deals. As outlined below in section 5.7 of this report, the Council's own local contribution to deliver this scheme has already been approved and secured.

5.6.1.1 Cost Overruns

Understanding that funding from the LEP which covers construction, delivery, monitoring and evaluation cannot exceed £3,617,222, CWaC will cover any additional costs the scheme may encounter to ensure its completion.

5.6.2 Council and Cabinet Funding Approvals

The client team for this project, have already secured and received Cabinet and Full Council approvals (in June and July 2016) to progress this scheme at risk, using Council resources to secure third party funding, with commitment to match and accept grant funding to deliver the A51 Tarvin-Chester Improvement Scheme, subject to a successful bid submission. The decisions, approved by the Council include (refer to Appendix M):

- To approve submission of the Local Growth Fund 3 (LGF) funding bid via the Cheshire and Warrington Local Enterprise Partnership (CWLEP).

- To approve the use of Council funding as match to draw down the Local Growth Fund 3 monies and ring fence the identified funding for delivery of the proposed schemes.

- To approve the acceptance of the Local Growth Fund 3 funding for all or such bids as are successful, subject to compliance with the Finance and Contract Procedure Rules (External Arrangements) and approve incurring the total project expenditure as outlined in Appendix 1.

- To authorise the Director of Governance to conclude all necessary legal documentation arising from funding approvals.

This scheme has gained programme entry, subject to receiving conditional approval from the CWLEP upon receipt of the Outline Business Case. If successful, a conditional offer letter will be issued by the CWLEP to the Council, outlining the grant parameters requiring signatories for acceptance from the; Director of Governance, Director of Finance and the Council's Section 151 Officer. The Full Council Paper in July 2016 facilitates this process (refer to Appendix M).

The above process adheres to the Council's Code of Financial Practice. This establishes the fundamental principles on which the conduct of the organisation's financial affairs are based. A revised set of finance procedure rules were approved and adopted by the Council in October 2010.

The code of practice affects any plans to seek external funding sources for projects or any funding bids being prepared. All external funding bids must be in accordance with Cheshire West and Chester Council policy and have secured all resources necessary for a successful project to take place. Schemes over £1m require Full Council Approval. The A51 Tarvin – Chester Improvement Scheme received Full Council Approval in July 2016 (see Appendix M) to

submit the LGF bid, secure and approve the match and accept the allocation, subject to successful business case.

6 The Commercial Case

Section Summary

This section outlines the Commercial Case for the A51 Tarvin to Chester Improvements Scheme and provides evidence on the commercial viability of the proposal and the procurement strategy that will be used to engage the market. Here, risk allocation and transfer, contract timescales and implementation timescales, capability and skills of the team delivering the project and personal implications from the proposal are all documented.

The commercial case requires the A51 Tarvin-Chester Improvements Scheme to meet a number of strategic objectives and outcomes in order to deliver a scheme that ensures best value for highway improvements along the corridor within available funding and at low risk.

A number of procurement options have been considered for the A51 Tarvin to Chester Improvements Scheme to assess the various advantages and disadvantages in order to select the most appropriate method to deliver the scheme.

The preferred procurement route for this project will utilise two sourcing pathways. Initially, to procure design consultant and then latterly procure a separate constructor. This will be done via a mini competition, using the Warrington Borough Council, Transportation and Public Realm Consultancy Services Framework via the Chest North West Portal.

CWaC are also undertaking further investigation into the SCAPE Civil Engineering & Infrastructure Construction Framework for construction. SCAPE has been used on previous LEP funded schemes such as Centre Park Link and Warrington East Phase 2.

A risk analysis has been undertaken for the preferred option to assess any potential strategic, financial, environmental and infrastructure risks and a full risk register is appended within the attached Quantified Risk Assessment Report. The Commercial Case identifies the key risks from the risk register to demonstrate how the responsibility of these risks are shared between the public and private sector.

6.1 Output Based Specification

The A51 Tarvin-Chester Improvements Scheme will deliver the following infrastructure outputs:

- An additional left turn lane at Tarvin roundabout from the A51 South to the A51 West;
- Signal and line marking changes at Stamford Bridge to provide 2 lanes straight ahead for eastbound traffic;
- Provision of an extra westbound lane through the Stamford Bridge junction, with a long merge for westbound traffic exiting the junction;
- Removal of some of the existing right turn movements at the Hare Lane/Littleton Lane junction; and
- Modifications to the westbound approach and eastbound merge on the A51 at the A51/ A55 junction.

6.2 Approach to Demonstrating Commercial Viability

In terms of commercial viability, the A51 Tarvin-Chester Improvements Scheme needs to deliver the scheme within available funding. There is a fixed amount of funding available from the C&W LEP and developer, with the remainder being contributed by Cheshire West and Chester Council. All risks on cost overrun remain with Cheshire West and Chester Council. As such Cheshire West and Chester need to:

- Deliver the scheme in accordance with the budget, timescales and specifications noted in Section 7.3 of the Management Case
- Ensure continued engagement with contractors and stakeholders throughout planning and development of the full major scheme business case through to scheme delivery to ensure the scheme remains valid, current and viable.
- Deliver highway capacity improvements within construction design standards that are will be defined within the future contract with construction providers.
- Reduce risk to a level that is as low as reasonably practicable by obtaining contractor input to risk management and appraisals, including mitigation measures, to capitalise at an early stage on opportunities to reduce construction risk and improve outturn certainty thereby reducing risks.

6.3 Procurement Options

This section provides insight into the procurement options for the A51 Tarvin - Chester Improvements Scheme. The procurement method has been designed to deliver:

- Value for money: Cheshire West and Chester is under a duty to secure value for money in all of its transactions;
- Compliance with legislation: a wide variety of UK and European Union statutes and regulations apply to procurement;
- Avoidance of fraud and corruption: procurement must be visible and tightly controlled to limit potential fraud and avoid any suggestion of corruption; and
- Cheshire West and Chester's vision and ambitions; and
- Fulfil the requirements of commercial viability.

6.3.1 Procurement Strategy

The Council's procurement activities are governed by Contract Procedure Rules (CPR's), which are mandatory and comply with European legislation requirements. The requirements are determined by the value of the purchase/contract in total, not by each transaction. The CPR has set threshold levels for which there is guidance for each:

Thresholds for goods and services:

- CPR's £0 - £24,999
- CPR's £0 - £99,000
- CPR's £25,000 - £100,000
- CPR's £100,000 - Below OJEU
- CPR's £164,176
- £589k+

Works are defined as construction or civil engineering. The threshold for Works contracts differ to those of goods and service and are:

- £0 - £99,999 – One quotation
- £100k - £1million – Three quotations
- £1million - EU threshold (currently £4.3million) – Tender
- EU threshold and over - Restricted or open tender

The Contract Procedure Rules are supplemented by the Council's Procurement Policy Guidance.

Setting up contracts with specific suppliers has its benefits for Services; it creates a more stable market keeping prices secure, and by undertaking a procurement exercise suppliers must compete for business offering the best value product for the best price, ensuring that the Council is spending public money responsibly.

In addition to setting up contracts with specific suppliers, Cheshire West and Chester, together with Warrington and Cheshire East have the Transportation and Public Realm Consultancy Services Framework in place, of which five suppliers are party to: Mott MacDonald; AECOM; Atkins; Halcrow; and WSP.

As an alternative Framework option, the Council can also use Cheshire East's Ringway Jacobs Framework through a call off arrangement; Ringway Jacobs being the term Highway Contractor.

6.3.2 Preferred Procurement Option

As this is an OJEU level scheme key procurement options are either:

- Open Tender,
- Restricted Tender or
- An approved Framework that can be utilised.

There are also other options such as negotiated and competitive dialogue options, however these can be lengthy procurement routes and the timeframe for delivery of the scheme is restricted. For these reasons they have not been considered further. The advantages and disadvantages of the three viable options noted in bullets above are detailed below

6.3.2.1 Open Tender

Open Tenders for Highways schemes is the traditional method of procurement with the design done in house and contractor/ consultancy services procured through the CHEST North West Portal. Once the design is completed there is a normal 14 week timeline from issuing the Open Tender and OJEU notice, through to tender award. If the detailed design is not being done in house, then CWaC will need to include the procurement process in the design commission. Another option on this theme is to package it as a design and build on an open tender basis, but that would be resource heavy with the detailed approvals needed.

6.3.2.2 Restricted Tender

Restricted tender using a Supplier Questionnaire tends to lengthen the procurement timeline and is also resource heavy and it is for these reasons that this option is not favoured.

6.3.2.3 Approved Frameworks

Transportation and Public Realm Consultancy Services Framework

Warrington Borough Council in conjunction with Cheshire West and Chester Council, Cheshire East Council, Halton Borough Council, and Cheshire and Warrington Local Enterprise

Partnership are co-signatories to the Transportation and Public Realm Consultancy Services Framework. This enables each authority to draw down specialist transport consultancy support services through a Framework agreement, of which five suppliers are party to: Mott MacDonald; Aecom; Atkins; Halcrow; and WSP.

Payment Mechanisms: Transportation and Public Realm Consultancy Services Framework

The contract value for the consultancy support for design of the scheme will be set out in the contract awarded between preferred bidder and the Council, awarded through a mini competition using the frameworks terms and conditions. This contract will be finalised as soon as reasonably practicable after the confirmation of full funding from CWLEP, and relevant statutory approvals are obtained. Payment mechanisms to the preferred consultant will be set out in the contract schedule. The consultant will be paid monthly and will be required to submit detailed invoices in accordance with the terms and conditions of the contract. The Council, once satisfied, will pay the consultant for the agreed services. Where funding is drawn down from partial funding contributed by CWLEP, the Council will pay the consultant and provide the evidence of expenditure on valid scheme delivery works to CWLEP.

SCAPE

CWaC are undertaking further investigation into the SCAPE Civil Engineering & Infrastructure Construction Framework for construction. SCAPE has been used on previous LEP funded schemes such as Centre Park Link and Warrington East Phase 2.

The national SCAPE framework is a medium value construction framework that has consultants appointed across seven main lots, one consultant per lot. Balfour Beatty is the current appointee to the civil engineering framework lot. The framework allows project inputs to be staggered across three main gateways including:

1. Feasibility stage - provision of support relating to the development of feasibility design, costs, QRA and other up-front design works. Balfour Beatty provides this through the framework contract at zero cost
2. Pre-construction stage - Balfour Beatty needs to be formally engaged at this stage, appointed to take forward all the work necessary to produce a target (contract) price
3. Construction stage – a further formal appointment through the SCAPE framework where the construction contract is signed and the project taken on site and through to construction completion

The SCAPE framework option possesses several advantages compared to alternative procurement routes. The framework provides a strong balance of risk, control and cost certainty. Thus, overall enabling good value for money. The SCAPE framework offers a low-risk and established route to market. The framework also removes the need for CWaC to conduct its own procurement processes as the SCAPE framework is already in place, with Balfour Beatty as the designated supplier.

The framework would allow the engagement of Balfour Beatty at each of the three stages noted above but does not preclude CWaC from not progressing through each of the three gateway stages within the SCAPE Framework. CWaC has the flexibility to place the scheme development on hold within the SCAPE Framework and progress with the project via other procurement Frameworks should situations arise that warrant this.

It should be noted that the framework, although not likely to be the preferred procurement option at OBC stage, will be subject to further investigation as the scheme progresses to FBC stage ensuring value for money is achieved.

Payment Mechanisms: SCAPE National Civil Engineering and Infrastructure Framework 2015

The SCAPE Framework's contract value for the delivery of the scheme will be contained in the contract between CWaC and Balfour Beatty. This would be completed once the A51 Tarvin Road Improvement Scheme passes through to Full Business Case and full funding from CWaC and the C&W LEP has been agreed.

Balfour Beatty are paid monthly and in return detailed invoices in accordance with the terms and conditions of the contract are submitted each month. Payment would be processed between CWaC and Balfour Beatty for the agreed services.

Funding provided by Cheshire and Warrington LEP will be filtered through to CWaC who would then pay Balfour Beatty. Sufficient evidence of the expenditure on valid scheme delivery will be provided to Cheshire and Warrington LEP by Balfour Beatty

Pricing and Charging Mechanism: SCAPE National Civil Engineering and Infrastructure Framework 2015

The SCAPE framework includes two main payment areas:

- Contractor and their agent payments
- SCAPE Procure Management Team payments

The fee for using the SCAPE framework is set at 0.5% of the total contract value (0.25% at Project Order; 0.25% at Delivery Agreement). The payments direct to the contractors or contractor's agents are determined based on fee quotations or the target contract cost. These costs are not accounted for within the OBC, subject to review if the procurement method is changed these costs will be calculated within the FBC.

If confirmed as the preferred procurement route by CWaC at FBC, the Council will consider a gain share/pain share incentive mechanism as part of the contract. This process can help ensure costs are kept to a minimum and benefits are shared equally among parties. The actual costs will be compared with the target cost and savings, or over expenditure, will be shared between CWaC and the contractor.

6.3.2.4 Preferred Procurement and Payment Method

The Council is reliant on its existing successful relationships with the private sector to develop and deliver major transport schemes. In response to this, the preferred procurement route for this project will utilise two sourcing pathways. Initially, to procure design consultant and then latterly procure a separate constructor.

Procure Design Consultant

This will be done via a mini competition, using the Warrington Borough Council, Transportation and Public Realm Consultancy Services Framework via the Chest North West Portal. CWAC have used this framework since inception and have good experience of calling off design consultancy for a variety of projects. This framework is specifically designed to provide excellent transport related consultancy.

We will then have a professional designer working for the client who can design the scheme, provide tender drawings & technical documents and support the Council during the tender and construction period to control costs and ensure an efficient and effective build.

Procure Separate Constructor

This will be done via a compliant Open Procedure once the scheme has been designed and progressed to the required level. CWAC are experienced in procuring contractors in this way and the process strikes the right balance between providing competitive tension and not being onerous for the bidders to respond thus attracting the relevant “mid-size” contractors who will be most appropriate for this scheme.

As stated above, the A51 Tarvin-Chester Improvement Scheme will utilise two contracts to facilitate the delivery of the project:

- Principal Constructor - This will be done via a compliant Open Procedure using The Chest, North West Portal;
- Design Consultant – through a mini competition using Warrington Borough Council’s, Transportation and Public Realm Consultancy Services Framework.

The contract value for the delivery of the scheme will be set out in the contract between the Principal Constructor and the Council. This contract will be finalised as soon as reasonably practicable after the confirmation of full funding from CWLEP, and relevant statutory approvals are obtained.

Payment mechanisms to the Principal Constructor will be set out in the contract schedule. The Principal Constructor will be paid monthly and will be required to submit detailed invoices in accordance with the terms and conditions of the contract. The Council, once satisfied, will pay the Principal Constructor for the agreed services. Where funding is drawn down from partial funding contributed by CWLEP, the Council will pay the Principal Constructor and provide the evidence of expenditure on valid scheme delivery works to CWLEP. The Council will reserve the right to withhold final payments, until an agreed period to allow for a maintenance period / defects correction period to be reviewed, after which final retention monies will be released.

The contract value for the consultancy support for design of the scheme will be set out in the contract between the Principal Design Consultant and the Council. This contract will be finalised as soon as reasonably practicable after the confirmation of full funding from CWLEP, and relevant statutory approvals are obtained. Payment mechanisms to the Principal Design Consultant will be set out in the contract schedule. The Principal Design Consultant will be paid monthly and will be required to submit detailed invoices in accordance with the terms and conditions of the contract. The Council, once satisfied, will pay the Principal Design Consultant for the agreed services. Where funding is drawn down from partial funding contributed by CWLEP, the Council will pay the Principal Design Consultant and provide the evidence of expenditure on valid scheme delivery works to CWLEP.

Optional SCAPE Route

SCAPE is an unknown for CWAC and the team believe that they are better able to control the costs, design and quality for this highly visible scheme by having a professional design consultant on the client side. The SCAPE framework is single sourced via Balfour Beatty who would usually provide better value on higher value projects due to the high level of overheads they carry.

6.3.3 Contract Management

The Project Board including the Commissioning Lead and Strategy Lead will primarily manage the contracts with both the Design Consultant and Principal Constructor, whereby the Project Delivery Manager will directly manage the day to day activities of the Construction Team. The Senior Responsible Officer for the scheme is Charlie Seward, Strategic Director. The Project Delivery Manager will provide continuity from scheme development, through to detailed design, construction and final account settlement. Cheshire West and Chester Council as the planning authority will monitor the construction works to ensure any specified conditions are adhered to by the contractor. The project teams structure and responsibilities are outlined in the Management Case.

6.3.4 Procurement Timescales

The work programme identifies that procurement is expected to take place between August 2019 and January 2020. Timescales relating to procurement are set out in more detail in Appendix N, Contract Delivery Programme.

As the scheme is subject to OJEU processes, the preferred contractor and delivery structure is not yet known. This will be agreed within the procurement process prior to tender award.

6.4 Statutory and Other Consents

The following Traffic Regulation Orders (TRO's) will be required for the implementation of this scheme:

- Right turn ban from Littleton Lane onto the A51 Tarvin Road;
- Right turn ban from the A51 Tarvin Road into Hare Lane; and
- Relocation of existing 50mph speed limit to the eastern approach of the Barrow Lane signal controlled junction.

Land acquisition will also be required in order to carry out improvements at the A51/Barrow Lane Junction and the Tarvin Roundabout. The following land acquisition will be required:

- Existing farmland to the south of the A51 Tarvin Road at the Barrow Lane signal controlled junction to accommodate carriageway widening; and
- Existing farmland to the west of the A51 N/B approach to Tarvin Roundabout to accommodate carriageway widening.

6.5 Risk Analysis and Transfer

A risk analysis has been undertaken for the preferred option to assess any potential strategic, financial, environmental and infrastructure risks. The QRA report in Appendix K details the full Quantified Risk Assessment for the entire cost plan of the A51 Tarvin- Chester Improvements Scheme and provides full details of all identified risks, including mitigation measures, and how it impacts on cost and delivery timescale of the scheme. However key risks are summarised as part of the Management Case.

The scheme risks associated with A51 Tarvin-Chester Improvement Scheme have been considered and included as part of the detailed QRA found in Annex Q. A further summary of the key project risks is provided within the Risk Management Strategy section of the Management Case. The risks have been identified, recorded and updated regularly throughout

the scheme development phase of the investment lifecycle. Management of these risks will be an ongoing task through to practical completion.

As part of this process, an owner has been allocated to each risk. Where appropriate, the aim is to eliminate the identified risk, or prepare relevant mitigation measures to manage and reduce the impact of the risk.

The Council will attribute all project risks to a nominated party that can best demonstrate value for money in managing the risk. The use of the Principal Constructor and Design Consultant through early contractor involvement will enables a greater degree of design and other construction risk to be mitigated by the contractor and Consultant, while under management/supervision of the Highways Delivery Team.

The QRA will be integral to the engagement of the Principal Contractor, and will be used to allocate risks that are to be priced by the contractor. The Design Consultant will take responsibility for estimating the quantities, mitigation measures and resources required to address risks to be allocated to Principal Constructor as part of the engagement. These will be priced as a lump sum and included within the contract.

It is envisaged that the Council would bear the risks associated with land, planning and environmental permissions. This includes the risks associated with having to prepare a Compulsory Purchase Order or attend a Public Inquiry. This is considered an appropriate strategy as the Council's Property and Legal Teams are currently managing the ongoing negotiations with impacted land owners and if required would prepare the Compulsory Purchase Orders. It is also noted, that the main construction contract between the Council and Principal Constructor would be conditional on the resolution of these risks paving the way for the delivery phase.

7 The Management Case

Section Summary

The purpose of the Management Case is to assesses whether the A51 Tarvin-Chester Improvements Scheme is deliverable. It tests the project planning, governance structure, risk management, communications and stakeholder management, benefits realisation and project assurance.

Cheshire West and Chester Council are the scheme promoter and delivery agent for the A51 Tarvin-Chester Improvements Scheme whilst Cheshire and Warrington Local Enterprise Partnership (C&W LEP) have an integral part in the A51 Tarvin-Chester Improvements Scheme as a key funding source.

The A51 Tarvin-Chester Improvements Scheme will be delivered in line with the LEP Growth Programme Assurance and Accountability Framework and governed by the C&W LEP executive board which set the corporate and strategic direction of the organisation.

The C&W LEP hold the devolved funding from Central Government, however responsibility then falls to Cheshire West and Chester to make the relevant payments to the associated project partners to ensure scheme delivery. Cheshire West and Chester are also required to apply to the Performance and Investment Committee for funding release as well as documenting all expenditure associated with LEP funding.

The Project Team manage the day to day delivery of the scheme and the Project Manager reports to the Project Board. The Project Team consists of officers from the Council's Transport Planning and Highways Team who are responsible for providing advice on monthly spend/budget, funding and delivery agreements, land ownership issues and communication of the project with key stakeholders.

Key milestones within the scheme delivery indicate that from funding approval to the proposed activity end date, the project, which includes four-year post completion monitoring and evaluation will be "live" between 2018 and 2025.

7.1 Evidence of Similar Projects

7.1.1 Northwich Town Centre Gyratory and Leicester Street Roundabout Improvements

Funding was secured from Local Pinch Point Fund in 2014/15 for Leicester Street roundabout capacity improvement scheme and the permanent implementation of the town centre gyratory scheme. Similar to the proposals identified in this scheme these highway improvements at key junctions aimed to increase capacity of the network in order to reduce congestion and support large scale local development. The cost of this scheme was also around £5m.

The scheme included: remodelling of the roundabout and new car park, alterations to five signalised junctions, incorporated two swing bridges over the Weaver Navigation while linking them to an Urban Traffic Management Control system. The increased capacity from the scheme was designed to support future levels of traffic as part of the overall town's regeneration programme, enabling access to the new £80m retail and leisure development at Barons Quay.

Extensive public consultation was carried out prior to construction to discuss alternative design options. Construction of the scheme then began in February 2016 and was completed in September 2016.

Figure 41: New Barons Quay Development (Left) and New Leicester Street Roundabout (Right)

Source: Mott MacDoanld

7.1.2 A556 Gadbrook Park Junction Upgrade

This scheme was developed in close collaboration with businesses at Gadbrook Park, whose employees, suppliers and customers currently face severe congestion problems when accessing the Park. Cheshire West and Chester Council worked together with the Gadbrook Park Business Improvement District (BID) and the Cheshire and Warrington LEP to create the right conditions for job growth at the Park.

This scheme aimed to ease congestion around the site entrance junction to Gadbrook Business Park in order to unlock economic growth and job creation opportunities. Options were tested in LinSig, based on current job numbers and traffic levels, plus forecast traffic growth up to the year 2020.

Figure 42: Southbound Approach to Gadbrook Park during typical AM Peak Period

Source: Mott MacDonald

7.1.3 Chester Bus Interchange and Frodsham Street Public Realm

This scheme saw the implementation of a £13.5m fully accessible contemporary Bus Interchange, providing; 13 new bus stands, Coffee shop, Newsagents, Information Desk with improved public realm and pedestrian linkages near the site and throughout Frodsham Street. Frodsham Street works (£3.5m) forms part of the wider bus interchange project requiring that: all surfaces being at one level creating a shared space for pedestrians and traffic using high quality materials, while creating social spaces.

The new £10m bus station opened in June 2017 creating a key gateway into the historic city of Chester, whilst enabling the commencement of the proposed Chester Northgate Redevelopment.

The total £13.5m of funding was secured from the Local Growth Fund (LGF) through the Cheshire and Warrington 'Growth Deal'. The bus interchange is now fully operational, and provides state of the art facilities for passengers as well as an important visual element to the historic City Gateway site. The Interchange was delivered with a 6-month delay to the original programme, but this delay was largely unavoidable due to unforeseen issues inherent with a brownfield site in a historic Roman city.

Figure 43: New Chester Bus Interchange and Frodsham Street Shared Space

Source: Mott MacDonald

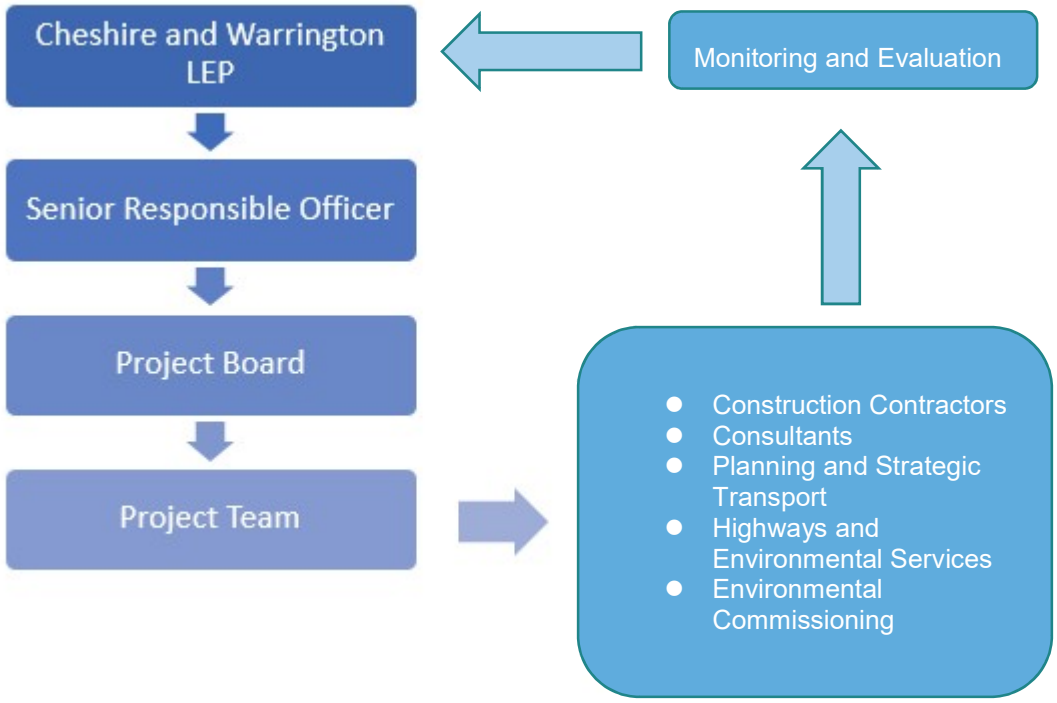
7.2 Management Arrangements

This section outlines the governance structure and the roles and responsibilities of those within that structure that will deliver, monitor, approve and ultimately be responsible for the A51 Tarvin-Chester Improvements Scheme.

7.2.1 Strategic Project Governance

Cheshire West and Chester Council are the scheme promoter and delivery agent for A51 Tarvin-Chester Improvements Scheme, but remain accountable to the C&W LEP who are the major funding contributors. A summary of the key tiers in the strategic governance structure is provided in Figure **44** and in the text below.

Figure 44: Key Tiers in the Governance Structure



Source: Mott MacDonald

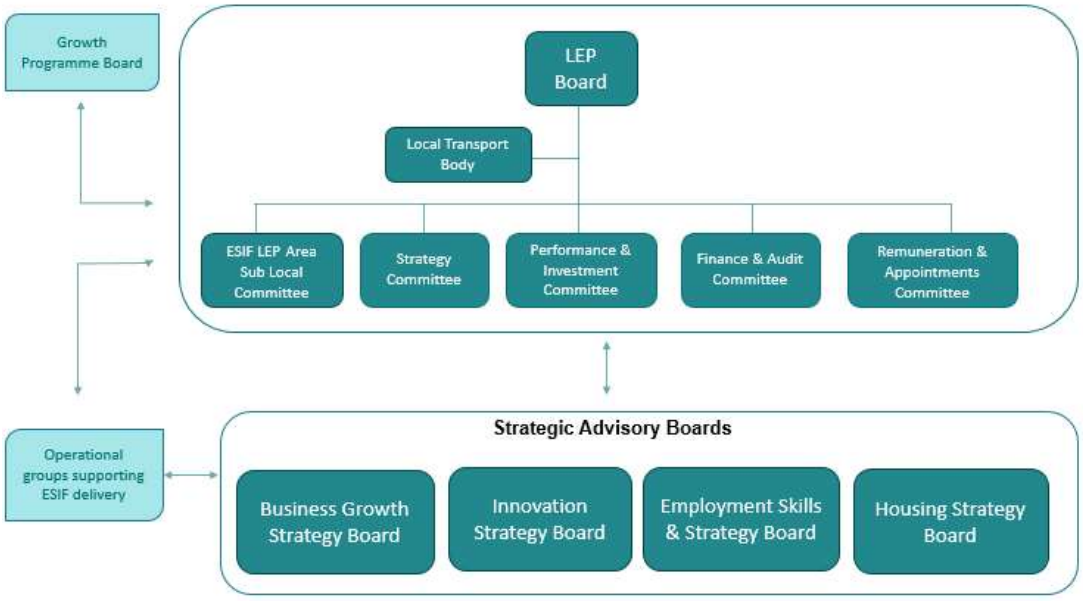
7.2.1.1 Cheshire and Warrington LEP

The C&W LEP are one of 38 public-private partnership bodies across England. They have an integral part in the A51 Tarvin-Chester Improvements Scheme and are the key funding source for the scheme. The C&W LEP's Performance and Investment Committee have delegated authority to grant funding for the A51 Tarvin-Chester Improvements Scheme.

C&W LEP have a key role across Cheshire and Warrington; the organisation sets local economic priorities in order to help focus and boost economic growth and job creation. C&W LEP decide how funding devolved from central Government is spent within the area.

The following diagram sets out the governance structure of C&W LEP in relation to the A51 Tarvin-Chester Improvements Scheme.

Figure 45: Governance Structure of C&W LEP



Source: Mott MacDonald

Governance

The C&W LEP Executive Board sets the corporate and strategic direction of the organisation and oversees five committees. Of specific note is the Performance and Investment Committee, which has the delegated authority to approve funding for projects put forward for Local Growth Funding, provided their value is within certain financial limits, which the A51 Tarvin-Chester Improvements Scheme is. They will also:

- Provide scrutiny and oversight to funded schemes
- Monitor programme performance
- Ensure that the processes set out in the LRP's Assurance and Accountability Framework are adhered to

Delivery

The A51 Tarvin-Chester Improvements Scheme will be delivered in line with the LEP Growth Programme Assurance and Accountability Framework. C&W LEP have devised the framework in order to establish a clear decision-making process within its Growth Programme (Local Growth Fund Programme, Growing places Fund and European Structural Investment Fund). This framework provides a mechanism for the Council, the LEP and key stakeholders to be clear about their responsibilities and to ensure good project governance.

Funding

C&W LEP hold the devolved funding from Central Government, however responsibility lies to Cheshire West and Chester Council to make the relevant payments to the associated project partners to ensure scheme delivery. In accordance with the C&W LEP Assurance Framework, CWaC are then required to apply to the Performance and Investment Committee for funding release in arrears, providing evidence of paid invoices as well as documenting all expenditure associated with LEP funding.

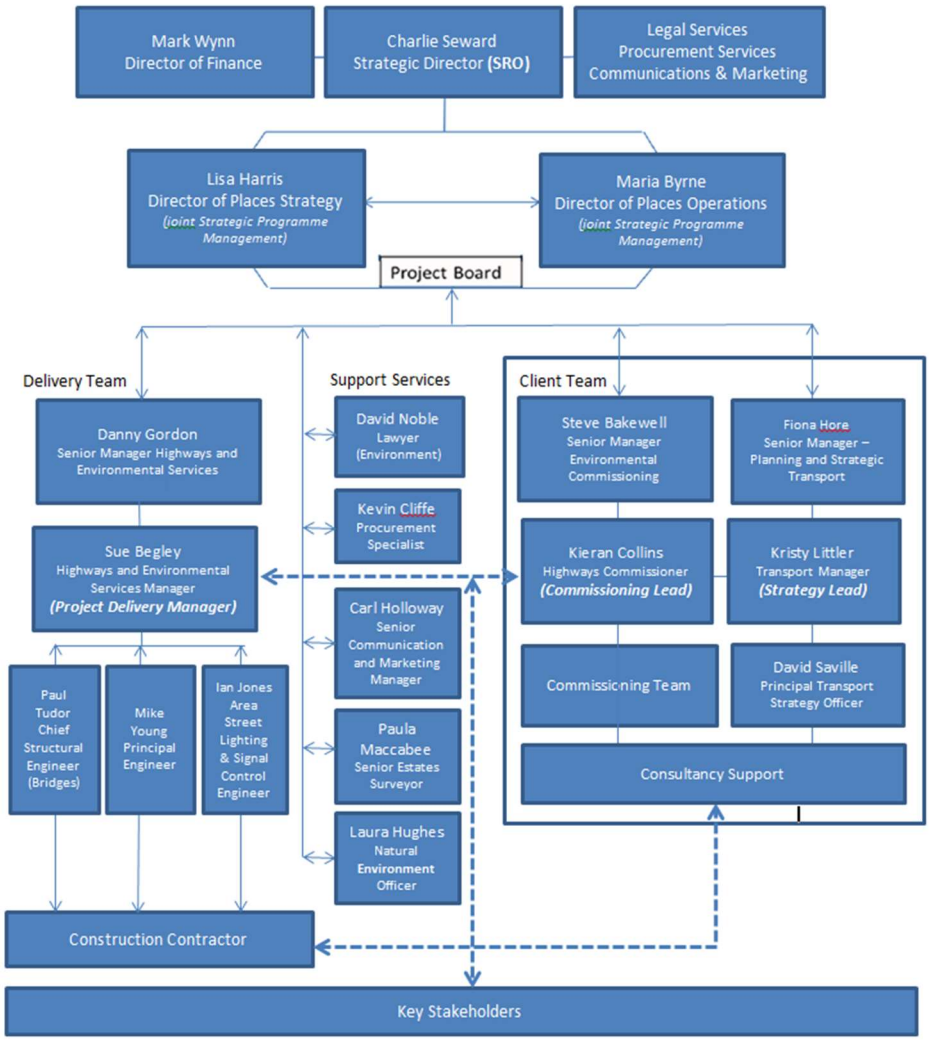
LEP Growth Programme Assurance and Accountability Framework

Cheshire & Warrington LEP's partial funding of the A51 Tarvin-Chester Improvements Scheme warrants the use of the LEP Growth Programme Assurance and Accountability Framework. The framework includes the appointment of an independent technical advisor to review the Business Case and Value for Money appraisal on behalf of the LEP. For the A51 Tarvin-Chester Improvements Scheme, the C&W LEP have appointed a reviewee from AECOM. In meeting the framework requirements, the Cheshire & Warrington LEP Performance and Investment Committee will, as noted in the paragraph above also be responsible for approving funding for the scheme.

7.3 Governance Structure within Cheshire West and Chester Council

Figure 46 illustrates the governance structure for both the delivery and project management of the A51 Tarvin-Chester Improvements Scheme with Cheshire West and Chester council.

Figure 46: Project Governance



Source: Cheshire West and Chester Council / Mott MacDonald

Key stakeholders and their level of influence and interest are noted in Figure **47**. The following sections detail the roles and responsibilities of this identified in Figure 46.

7.3.1 Roles and Responsibilities

At a strategic level the Senior Responsible Officer (SRO) will be a key point of contact between financial and legal services and the project board. The SRO for the A51 Tarvin-Chester Improvements Scheme. will be Charlie Seward, Strategic Director. Mark Wynn, Director of Finance and Legal Services will provide guidance directly to the SRO at a strategic level.

Table 55: Cheshire West and Chester Key Roles and Responsibilities

Role	Who	Key Responsibilities
Senior Responsible Office (SRO)	Charlie Seward	• Organise chair project board • Monitor and control project plan • Provide progress reports enabling the board to be in a position to provide guidance on project decisions
Joint Strategic Programme Management	Lisa Harris and Maria Byrne	• Provide joint Strategic Programme Management • Overseeing and being responsible for reporting to members and key stakeholders
Director of Finance	Mark Wynn	• Providing advice on monthly spend/budget, monthly financial reporting to the Strategic Management Team and reporting requirements associated with C&W LEP funding
Legal Services	Legal Team	• Provide advice relating to land ownership issues.

Source: Mott MacDonald

Whilst the key people outlined in Table 55 above will take a more strategic role in the scheme, the Project Board will be responsible for governing the operational deliverability of the scheme. The structure of the Project Board for this scheme is highlighted in Figure 4646 above. The Board will be accountable to Cheshire West and Chester Council members and in turn the report to the C&W LEP. The key roles and responsibilities of the Project Board are summarised in the table below.

Table 56: Project Board Roles and Responsibilities

Role	Who	Key Responsibilities
Project Delivery Managers	Danny Gordon, Steve Bakewell and Fiona Hore	• Manage delivery of the project. • Prepare and monitor Project Plans • Manage project delivery through project delivery team and co-ordination of meeting • Manage allocated funding • Report to the C&W LEP • Planning and development of work programme • Completion of work packages to meet project timescales • Directing and co-ordination of Project Team resources
Commissioning Lead	Kieran Collins	• Management of internal and external procurement contractors and reporting.
Construction / Project Delivery Lead and overall Project Manager	Sue Begley	• Manage engineering, building, communications and operation advisory services as Project Delivery Manager • Manage overall project progress and day to day delivery as the overall Project Manager
Strategy Lead	Kristy Littler	• Communicate the project with key stakeholders • Manage consultancy support
Construction Contractors	Subject to procurement	• Agree objectives for supplier activities • Ensure resources available

Role	Who	Key Responsibilities
		• Contribute supplier opinions • Brief non-technical management on supplier aspects • Manage the procurement of the scheme
Consultancy Support	Subject to Procurement	• Business case development support • Design and engineering support
Key Stakeholders	See Table 27	• Provide input and feedback on scheme as it develops

Source: Mott MacDonald

As summarised in Table 56, key roles within the Project Board include the Construction Lead and Strategy Lead who will essentially lead members if the project team in carrying out day to day tasks such as overseeing the delivery of the works, the management of risks and issues on a daily basis, project reviews, cost loaded schedules and monthly update reports in accordance with Cheshire West and Chester Councils project and programme management processes.

7.3.2 CWaC Approval Process / Accountability

The contract delivery programme provided in Appendix N sets out the approvals process along with dates, if known. Key tasks are set out as follows:

Table 57: Approvals Programme

CWaC Approvals	Dates
Cabinet Report and Approval	08th June 2016
Full Council Cabinet Report & Approval	21st July 2016
LGF Expression of Interest (SOBC Application Form)	22nd July 2016
ODN to waive rules to procure Motts Support for OBC	17th July 2017
Complete OBC and Peer Review	26th Feb 2018
OBC & Peer Review submitted to CWLEP P&I Board	7th March 2018
ODN to waive rules to procure Motts Support for FBC	TBC
ODN for Conditional Approval Letter / Grant Acceptance	TBC
ODN with Legal to start Public Consultation	TBC
Complete FBC and Updated Peer Review	TBC
FBC submitted to CWLEP P&I Board	TBC

7.4 Delivery Milestones

Those identified in the governance arrangements outlined above will have key responsibility for ensuring The A51 Tarvin-Chester Improvements Scheme is delivered on time, within budget and to the required specification.

The following table sets out the key milestones for the scheme and expected delivery timescales. A detailed programme delivery schedule is included in Appendix N.

Table 58: Key Project Milestones

Key Milestone	Timescale (Financial years)
Funding Approvals	Q1 2018/2019
Start date (Date from which eligible expenditure will be incurred)	Q1 2018/2019
Consultation Engagement	Q2 2017/18 – Q2 2019/20
Land Acquisition	Q3 2017/18 – Q2 2019/20

Key Milestone	Timescale (Financial years)
Ecology Surveys	Q4 2017/2018 – Q1 2020/2021
Engineering Investigations (GI, Drainage, C3/ C4 Stats Searches)	Q4 2017/18 – Q2 2018/2019
Highway Design (Preliminary/ Detailed Design)	Q1 2018/2019 – Q2 2019/2020
Structural Design (Options/ Feasibility/ Detailed Design)	Q1 2018/2019 – Q2 2019/2020
Contract Procurement	Q1 2019/2020 – Q4 2019/2020
Construction Start	Q3 2019/2020
Construction End	Q4 2020/2021
Maintenance/ Defects Correction Period	Q4 2020/2021 – Q4 2021/2022
Final financial claim date	Q4 2020/2021
Proposed project completion date – date by which outputs will be achieved	Q4 2020/2021
Proposed activity end date – date by which all project activities described in the application will be completed (monitoring and evaluation of outcomes post scheme completion)	Q3 2025

Source: Mott MacDonald

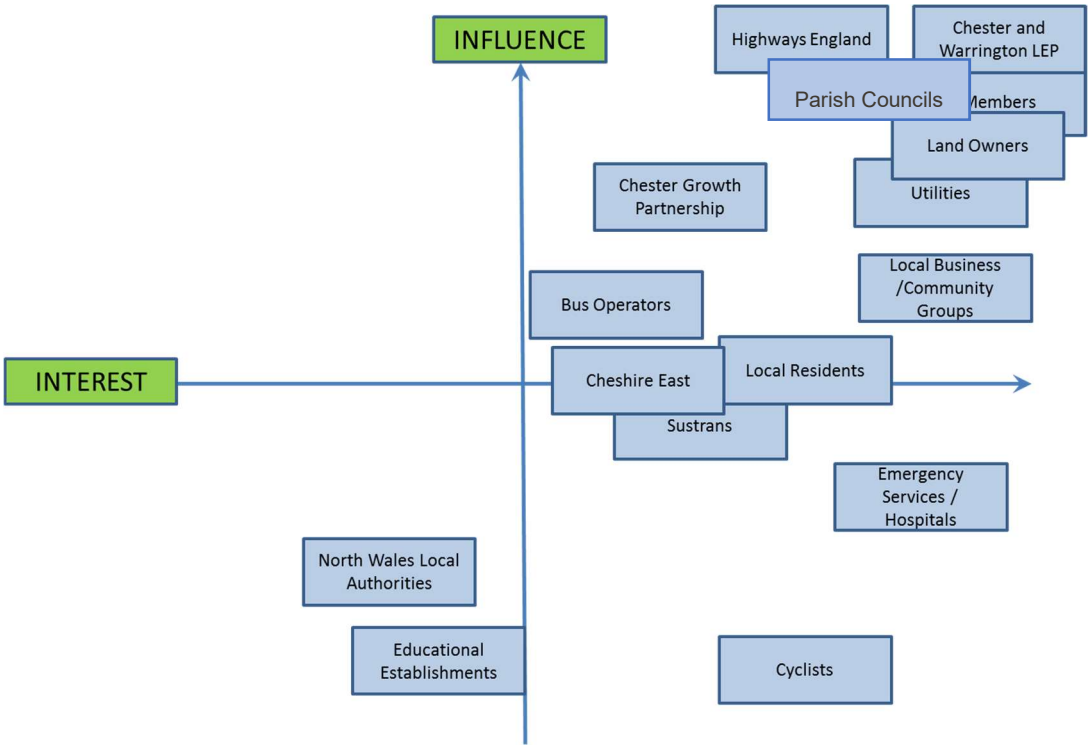
7.4.1.1 Approach to future design and cost review

A key part of ongoing delivery for CWaC as the scheme promotor will be the management of designs and costs as they are updated. CWaC will expand existing progress meetings to include cost management review. Key legal, design and construction elements will be budgeted with ongoing review at these meetings. At this stage it is anticipated that several specialists / consultants as well as a contractor will be involved with these reviews.

7.5 Communications and Stakeholder Management

Stakeholder consultation has been noted as a key requirement of the Outline Business Case for the A51 Tarvin-Chester Improvements Scheme. A number of stakeholders for consultation were identified prior to this stage within the SOBC including Highways England and local residents. The key stakeholders and their level of interest and influence on the scheme are set out in Figure **47**.

Figure 47: Key Stakeholders



Source: A51 Tarvin Road – A51/A54 roundabout & A51/B5132 junction SOBC

However, due to the timescales for completion of this Outline Business Case, ability to conduct a full consultation was limited.

Therefore, a scaled back consultation exercise was undertaken at this stage to involve those stakeholders with most interest and influence and consultation was focused on the preferred option resulting from strategic and transport modelling as well as alignment with scheme objectives. Stakeholders engaged with at this stage include:

- Highways England;
- Christleton Parish Council;
- Littleton Parish Council;
- Guilden Sutton Parish Council; and
- Tarvin Parish Council.

Consultation with the above stakeholders focused on the development of SOBC and OBC and background of the scheme. This included the options appraisal process and arrival at the preferred scheme and details. Consultation materials included scheme costs, benefits and design drawings. The key findings of stakeholder consultation are summarised within Section 2.13.5 of this document.

Full public consultation was not undertaken at OBC stage as it was deemed necessary to initially finalise an agreed scheme to present to key stakeholders. It was also considered that without secured funding, public consultation may have served to raise expectations of delivery without any guarantee of the scheme coming to fruition.

Public consultation will however be undertaken at the full business case stage once the scheme is finalised and conditional funding for approval obtained.

7.6 Project Reporting

Project reporting will be used to ensure the scheme is delivered effectively and within budget. Reporting will be thoroughly carried out in two stages to address issues associated within any changes to the delivery or costs of the scheme at the earliest possible stage. The two ways in which the project will be reported are outlined in the sections below.

7.6.1 Delivery Reporting

The Project Delivery Managers will be responsible for the dissemination of information within the Project Team, ensuring that members are up to date with accurate information. Moreover, they also have the responsibility as Project Board leads to report any notable project developments or issues to the SRO, through update reports and if necessary, exception reports if scheme delivery should deviate outside defined tolerances in terms of budget, timescales and delivery specifications.

The Senior Responsible Officer will maintain a close working relationship with the Project Board and provide progress reports enabling the board to be in a position to provide guidance on project decisions.

7.6.2 Cheshire and Warrington LEP Reporting

Cheshire and Warrington LEP are the major funding source for the A51 Tarvin-Chester Improvements Scheme. To ensure correct project spend and funding is being utilised to its greatest potential, monthly control meetings will be undertaken detailing current budget, expenditure, risks and project progress.

7.7 Monitoring and Evaluation

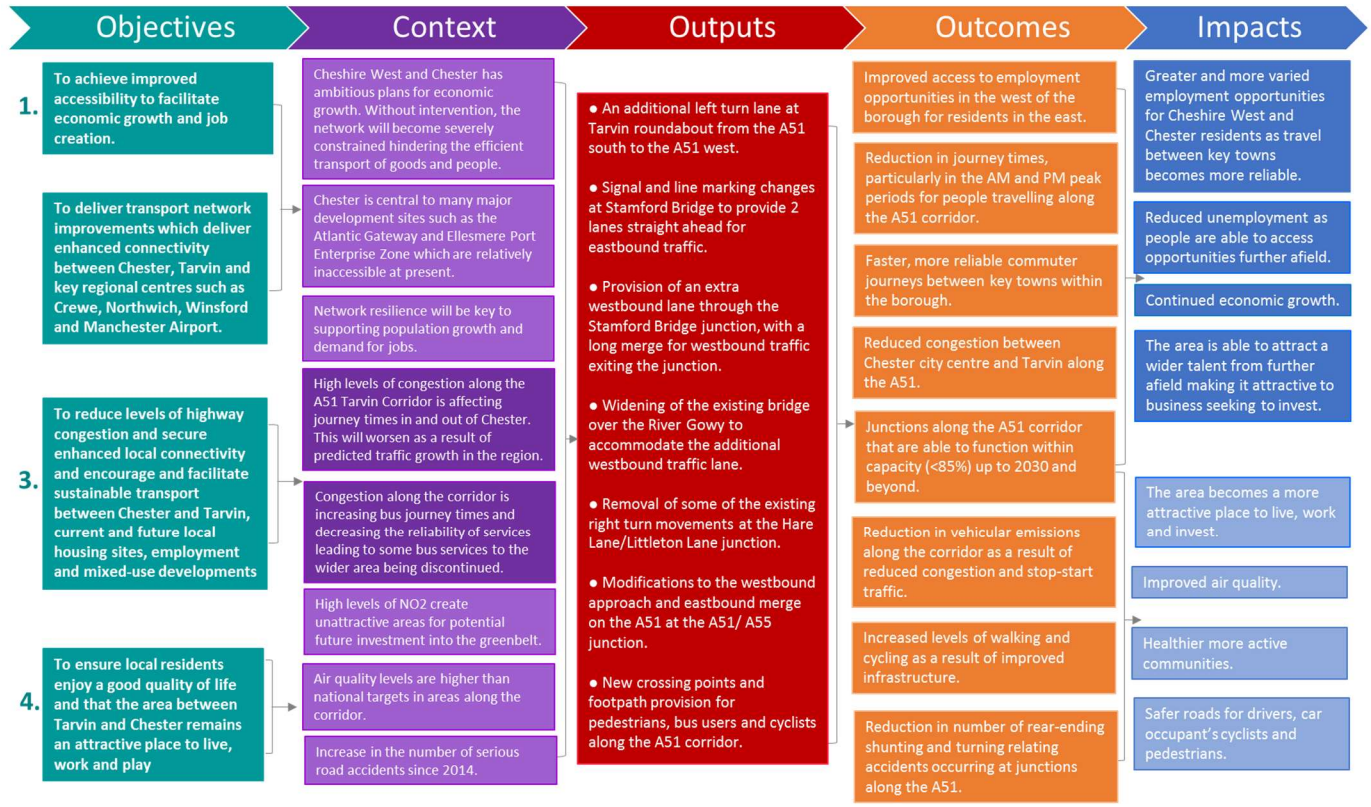
Monitoring and evaluation are essential parts of any infrastructure project. It provides an opportunity to improve performance by reviewing past and current activities, with the aim of replicating good practice in the future and eliminating mistakes in future work. This section outlines the monitoring and evaluation plan for the A51 Tarvin-Chester Improvements Scheme.

Success of A51 Tarvin-Chester Improvements Scheme will be determined by a number of factors:

- Delivery to time, budget and specification;
- Reduction in congestion along the A51 corridor;
- Reduction in queue lengths at key junctions along the corridor;
- Improved journey times for east and westbound traffic travelling along the A51 corridor;
- Continued investment in developments within Chester and the wider region/ success of developments; and
- Helps improve local air quality.

The delivery and likely benefits of the A51 Tarvin-Chester Improvements Scheme are demonstrated in detail within the Benefits Realisation Plan and Monitoring and Evaluation Report attached as Appendix J, however Figure 48 below shows the causal pathway linking scheme objectives to the deliverables and outcomes and impacts that will be measured to determine the success of the scheme.

Figure 48: A51 Tarvin Improvements Scheme: Logic Map



Source: Mott MacDonald

DfT guidance 'Monitoring and Evaluation Framework for Local Authority Major Schemes' has been used as the basis of our monitoring approach. Within this guidance, monitoring is defined as the collection of data to check progress against planned targets and benefits whilst evaluation is defined as the assessment of the scheme's effectiveness and efficiency during and after implementation; this includes measuring the causal effect of the scheme on planned outcomes and impacts and assessing whether the anticipated benefits and value for money have been realised.

Monitoring and evaluation activities also need to be undertaken during scheme delivery to ensure the scheme is delivered on time, on budget and to specification. To this extent monitoring and evaluation has been split into two categories:

1. Monitoring of project delivery; and
2. Monitoring the achievement of scheme outcomes and impacts

7.7.1 Monitoring and Evaluation Reporting

Monitoring of project delivery will be undertaken by the Area Manager, who in accordance with delivery timescales will report on progress on a quarterly basis to the Project Board, and on a monthly basis to the joint Project Delivery Managers. This will focus on construction milestones, budgets and delivery of outputs to specification

Monitoring and evaluation of scheme impacts will be reported on in two stages:

- One year after scheme delivery – with the primary aim of understanding the impact of A51 Tarvin-Chester Improvements scheme on journey times and travel patterns.
- Four years after scheme delivery to understand the longer-term benefits associated with the improvements and how they address the strategic objectives of the scheme.

The Benefits Realisation Plan and Monitoring and Evaluation Report attached as Appendix J details the methodology for monitoring realisation of scheme outcomes and subsequent benefits

7.8 Risk Management and Mitigation

The management of risk and uncertainty is key to the successful delivery of the scheme, and an appropriate strategy will identify threats to project delivery and enable effective risk management actions to be assigned.

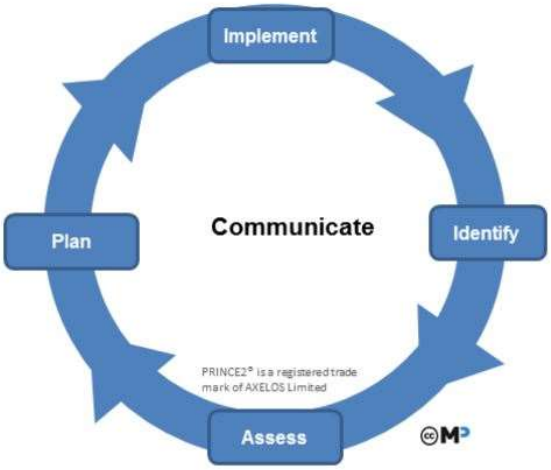
7.8.1 Risk Management Strategy

An effective risk management strategy for the project will be based on the principles for risk management contained within the OGC PRINCE2 guidance. The procedure for identifying key risks should follow as below:

- Identify: complete the risk register (as appropriate to the area of the project and/or the producing organisation) and identify risks, opportunities, and threats;
- Assess: assess the risks in terms of their probability and impact on the project objectives
- Plan: prepare the specific response to the threats (e.g., to help reduce or avoid the threat), or this could also be to plan to maximize the opportunity if the risk happens
- Implement: carry out the above in response to an identified threat or if one occurs
- Communicate: report and communicate the above to relevant project team members and stakeholders

The risk management strategy is owned by the SRO and it is recognised that risk management needs to be an ongoing process, shown in Figure 49 below.

Figure 49: Risk management process



7.8.2 Key Risks and Ownership

A number of key risks have been identified which may occur as result of implementing this scheme. Risks include strategic, environmental, infrastructure and financial risks. Full details of

all identified risks can be found in the Quantified Risk Assessment report attached as Appendix K. An overview of the key risks and how they will be managed within the delivery of this scheme are outlined in the table below.

Table 59: Management and Mitigation of Key Identified Risks

Risk Type & (risk owner)	Risk Event	Likely timeframe for occurrence	Consequences	Mitigation
Strategic Risk				
Policy Risk (CWaC, Lisa Harris/ Charlie Seward)	Changes of national / local policy direction not involving legislation.	Throughout project delivery	Scheme components become redundant and / or additional measures are required to support local and national ambitions.	Funding for the scheme has been devolved from central government to the C&W LEP for locally based decision making as to whether the scheme should progress, so changes in national policy will have a lesser impact than changes in Local policy. Local policy is well established through the Cheshire West and Chester Local Plan Parts One and Two and the LTP3 which this scheme aligns with and have been developed within the last two years.
Construction Programme Risk (Contractor/ CWAC, Maria Byrne)	The construction of the physical assets is not completed on time and to specification.	During construction	Funding is clawed back because of failure to meet delivery targets established by the C&W LEP. Additional costs required to deliver completed scheme with no opportunity to secure additional external funding. The benefits of the scheme are delayed.	Due diligence during procurement process. Ongoing monitoring of progress against delivery milestones and stringent project management during delivery with clear procedures in place for reporting and addressing any slippage.
Stakeholder Risk (CWaC, Graham Pink, Carl Holloway)	Change in support from key stakeholders, Highways England and local parish councils.	Throughout project delivery	Scheme lacks support from the local community who were not consulted during scheme development, resulting in unfavourable public criticism of elected members	Consultation has been carried out with key stakeholders presenting the preferred option and three alternative options.
Planning Risk (CWaC, Lisa Harris)	Failure to progress to statutory process and achieve appropriate approvals (planning)	Prior to construction	Hinders scheme progression delaying overall delivery.	The planning and statutory process requirements have been identified at OBC stage and key parties remain engaged to ensure there is adequate allowance in the programme.
Funding Risk				
Cost Risk (Contractor/ CWaC, Mark Wynne)	Increase in scheme costs e.g. cost of materials and infrastructure.	During detailed design and construction	The level of funding available is insufficient to meet the proposed scheme delivery costs and scheme cannot be delivered in full, impacting the benefits and BCR upon which the scheme was awarded funding.	The Project Board will monitor cost and delivery throughout the project.
Cost Estimate Risk (CWaC, Maria Byrne)	Inaccurate scheme cost estimate	During detailed design and construction	Delays to procurement and funding approvals	Progress scheme in sufficient detail to enable robust cost to be produced. Apply suitable risk allowances and

Risk Type & (risk owner)	Risk Event	Likely timeframe for occurrence	Consequences	Mitigation
				contingencies to option development stage cost estimate.
Environmental Risk				
Flood Risk (CWaC, Maria Byrne)	Risk of flooding. The majority of the A51/B5132 junction site is within Flood Zone 3 and the land surrounding the river running North West to South East within 500m of the site boundary.	Throughout project delivery	Areas within site boundary may be damaged in the event of a flood which could cause further delays in traffic.	Early engagement has been undertaken with the Environment Agency. A Flood Risk Assessment will be undertaken to identify any issues and potential mitigation measures
Environmental Constraints (CWaC, Maria Byrne)	Unforeseen environmental constraints such as wildlife issues	During detailed Design, prior to construction	May cause delay and cost impact to the scheme as a result	Baseline environmental scoping and surveys undertaken and reviewed through detailed design process.
Infrastructure Risk				
External Interface Risk (CWaC, Maria Byrne)	Delays to programmed diversions to Statutory Undertakers apparatus.	Prior to construction	Delay to scheme delivery, impact on tourism. Complaints from Residents/ businesses.	Ensure works are programmed with least impact on the local and wider road network. Ongoing liaison with public and residents.
External Interface Risk (CWaC, Lisa Harris)	Delay to Third Party Land Acquisition.	Prior to construction	Increased costs and delay to the programme	Ensure land acquisition is completed in good time prior to works commencing.
Structural Constraints (CWaC, Maria Byrne/ Contractor)	Unforeseen structural constraints	During construction	Delay to the scheme design and overall delivery.	Undertake structural surveying / investigation works in support of the detailed design.
Engineering Risk (CWaC, Maria Byrne/ Contractor)	Unforeseen issues at locations of carriageway widening.	During construction	Time delays, with a potential resultant increase in scheme costs e.g. geotechnical issues.	Baseline reports completed and further detailed site surveys to identify any issues.

8 Summary and Conclusions

This Outline Business Case has demonstrated a clear need for the scheme in order to facilitate upcoming developments, mitigate current and future congestion, support economic growth and ensure residents experience a good quality of life through improved air quality and road safety. The A51 is a major route between east and west Cheshire providing connectivity between key developments such as the Atlantic Gateway, Crewe Hub and Northgate retail development for many visitors, shoppers residents and commuters. A resilient highway network that offers reliable journey times is therefore essential to support these developments and ensure the borough remains an attractive place to live work and invest.

A number of options have been assessed in order to develop a scheme which is best positioned to meet the scheme objectives and objectives outlined in local and national policy. Further assessment of the preferred option has shown continued support for the scheme demonstrating a High Value for Money and its benefits to the wider economy provided through construction and access to tourism and leisure facilities. Additional economic benefits include up to £864,500 GVA in construction benefits with an additional £343,680 in council tax which can be attributed to the road improvement scheme.

At a total cost of £5,398,839, including an allowance for monitoring and evaluation, this scheme falls within the funding limits available from the LEP, with Cheshire West and Chester providing 32.2% of the total scheme construction and delivery costs as match contribution. The delivery of the scheme has been thoroughly considered and will be procured through an Open and Restricted tender and delivered in line with the LEP Growth Programme Assurance and Accountability Framework. A Project Board has been put in place setting out roles and responsibilities for key member of the project team to ensure successful and efficient management of scheme delivery. Monitoring and evaluation are essential parts of any infrastructure project which will be carried out following the implementation of this scheme the success of the scheme will be monitored, evaluated and reported measuring any reductions in queue lengths and congestion.

A number of risks have been identified in association with the delivery of the scheme associated with infrastructure, funding and managing of the scheme. However, these have been quantified and costs adjusted to allow for risk and measures have been identified for each of the individual risks in order to mitigate the impacts of potential risks.

Consultation has been carried out with key stakeholders presenting the preferred option and three alternative options identified in the short list in Stage 1 of the options appraisal process. Key stakeholders consulted with at this stage included Christleton, Littleton Parish, Guilden Sutton and Tarvin Parish councils. Findings from these workshops have shown a general support for the scheme with key concerns around pedestrian crossings and the location of laybys which have been addressed by altering scheme design. All key issues raised during stakeholder consultation have been used to inform the design of the scheme in order to address any concerns. Public consultation will be undertaken at full business case development stage.

Overall, this report has presented a robust evidence base highlighting the need for the A51 Tarvin-Chester Improvements Scheme and proved the scheme is deliverable, affordable ad achievable producing significant benefits for people in Cheshire West and Chester and the wider area.

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