Shropshire Council

SHREWSBURY NORTH-WEST RELIEF ROAD

Outline Business Case

REFERENCE NUMBER
CONFIDENTIAL

TYPE OF DOCUMENT (VERSION) CONFIDENTIAL

PROJECT NO. 62240590
OUR REF. NO. REFERENCE NUMBER

DATE: DECEMBER 2017

WSP
Export House
Cawsey Way
Woking, Surrey
GU21 6QX

WSP.com

QUALITY CONTROL

Issue/revision	First issue	Revision 1	Revision 2	Revision 3
Remarks				
Date	21/12/2017			
Prepared by	I. Baker			
Signature				
Checked by	R. Surl			
Signature				
Authorised by	F. Beech			
Signature				
Project number	62240590-107			
Report number	1			
File reference				

CONTENTS

TABLES

FIGURES

APPENDICES

Appendix M

Appendix N

Appendix O

Appendix P

Appendix Q

Appendix R

Ian Baker

Contact details 01483 358 584 | ian.baker@wsp.com

EXECUTIVE SUMMARY

1.1.1.

Ian Baker
Contact details 01483 358 584 | ian.baker@wsp.com

1 INTRODUCTION

1.1 BACKGROUND TO THE OUTLINE BUSINESS CASE (OBC)

1.1.1. This document is the Outline Business Case (OBC) for the Shrewsbury North West Relief Road (NWRR). It follows published DfT guidance, including Web-based Transport Analysis Guidance (WebTAG).

1.1.2. The OBC supports a funding request to the Department for Transport (DfT) from Shropshire Council and the Marches Local Enterprise Partnership (LEP), the scheme promoters. It explains why the scheme should receive support, and provides a clear audit trail for the purposes of public accountability.

1.1.3. The OBC is more than just a bid for financial support. It also explains how and why Shropshire Council has decided to put the scheme forward in its current form, and at the present time. It shows that the proposals are based on a realistic analysis of the current situation, a clear vision of how things should be in the future, a careful consideration of options, a robust appraisal of costs and benefits, and a clear plan for delivering the scheme.

1.1.4. The NWRR represents the “missing link” in Shrewsbury’s road network. It will reduce congestion, improve accessibility and support development economic growth in and around Shrewsbury.

1.2 OVERVIEW

LOCATION OF THE SCHEME

1.2.1. Shrewsbury is located 47 miles west of Birmingham, and 12 miles east of the border with Wales, and is the principal town and administrative centre of Shropshire. It is an historic market town which serves as a cultural and commercial centre for Shropshire and a large area of mid-Wales. It lies at the intersection of the A5, A458 and A49 (south) trunk roads, and is the focal point for other principal roads: the A53 (north), the A458 (east) the A488 (west) and the A49 (north). The surrounding area is rural and sparsely populated.

1.2.2. Shrewsbury’s defining physical characteristic is an almost complete natural loop of the River Severn, within which the mediaeval town grew up. The river loop now encloses the present day town centre, which has just three main points of entry by road and a largely unaltered mediaeval street pattern.

1.2.3. Present day Shrewsbury extends over a much wider area, with suburban development, mainly from the 19th and 20th centuries, extending outward from the river loop. There are out-of-town supermarkets and shopping centres to the north and south. Some traditional industry remains to the north of the town and there are newer employment areas at Battlefield to the north and London Road to the south east. The suburbs of Shrewsbury form a broad crescent from Harlescott in the north to Copthorne and The Mount in the west. Within this crescent lie the main schools, colleges, hospitals, and public and private sector employment areas.

1.2.4. By contrast, the north-west sector of Shrewsbury is generally undeveloped and comprises mainly agricultural land. Settlement is sparse, with small isolated farmsteads and properties scattered through the landscape. The River Severn meanders through this area, with steep wooded valley slopes and extensive floodplains, forming one of the main physical barriers dividing the landscape. The area is crossed by the Shrewsbury-Chester railway line, and by footpaths and other rights of way.

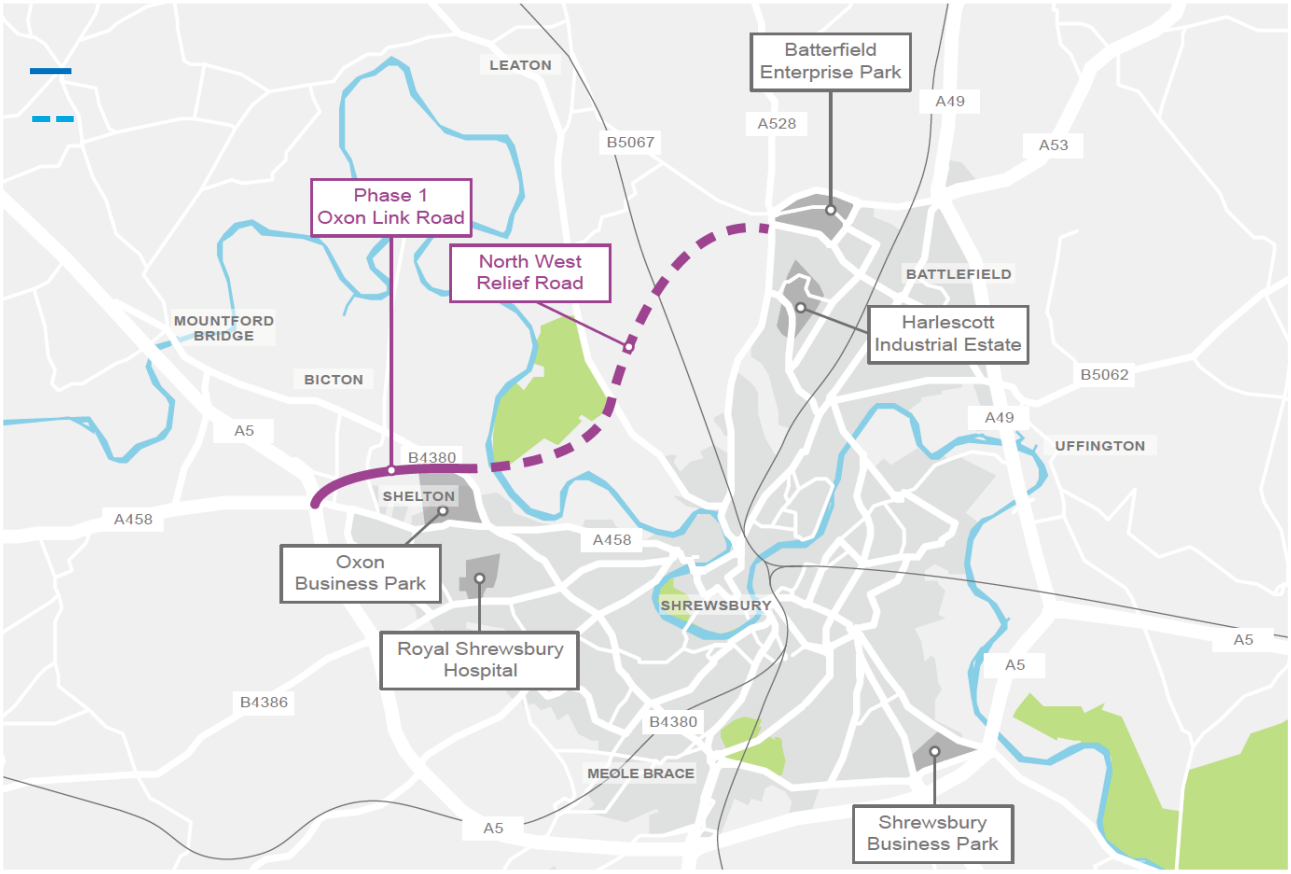


Figure 1 - Location of the proposed NWRR and the current Shrewsbury road network

DESCRIPTION OF THE SCHEME

1.2.5. The NWRR will provide a new, single carriageway road linking the northern and western parts of Shrewsbury. It will include a new bridge over the River Severn and its flood plain, and a new bridge over the Shrewsbury-Chester railway line. The NWRR would connect to existing roads with new roundabouts. The end points of the NWRR have been determined by the existing Battlefield Link Road in the north, and the planned Oxon Link Road in the west. These roads were designed as precursors of a NWRR, and each provides access to important employment and development areas.

1.2.6. The Oxon Link Road is included in the Marches LEP's £75 million Growth Deal and will be delivered by 2021 as part of the proposed western Sustainable Urban Extension (SUE). Key Features

1.2.7. The key features of the scheme are summarised below:

- The NWRR will be a 7.3m single carriageway all-purpose road with 1.0m margins and at-grade junctions
- The NWRR will be bounded on both sides by open space and will include a shared footway / cycleway on its southern side
- The NWRR will have a speed limit of 60 mph
- Bridges and at-grade crossings will be provided for pedestrians and cyclists to maintain connectivity and ensure safety

1.2.8. The scheme includes landscaping, planting, and environmental mitigation work including the acquisition of Hencott Pool to enable habitat improvements.

1.2.9. Links between the north and west of Shrewsbury are presently very poor. The most direct route passes through the “river loop” and consists entirely of single carriageway, all-purpose roads, including residential and shopping streets. Congestion on these routes causes delays and makes journeys unreliable.

1.2.10. As a result, some of the traffic between north and west uses other, longer routes to avoid the town centre. Extra traffic on the distributor ring road and the outer bypass adds to the congestion on these important routes and reduces the resilience of the network. Some traffic uses the network of small lanes to the north-west of Shrewsbury as rat-runs to avoid the town altogether.

1.2.11. Other problems arise directly from this fundamental weakness in Shrewsbury’s transport network. Noise, visual intrusion and poor air quality affect people in residential areas and the town centre, as well as people walking and cycling. Accident rates are higher on roads not designed to modern standards. Journeys to work and for business can be slow and unreliable, adding to the cost of transport (including public transport) and discouraging investment.

1.2.12. As Shrewsbury continues to develop and grow, these problems are expected to get worse, affecting the town’s economy and local people’s quality of life.

Figure 2 – Castle Foregate, approaching the town centre

BENEFITS OF THE NWRR

1.2.13. The NWRR will provide a new, high standard, direct route between the north and west of Shrewsbury, offering big time savings for road users. For example, a peak hour journey from A5 Churncote to A49 Battlefield would take about 6 minutes using the NWRR, instead of about 20 minutes through the town centre or 15 minutes on the bypass. Traffic will therefore transfer from the existing routes, reducing congestion and making them more efficient. These benefits will be felt over a wide area, including the outer bypasses and rural lanes, as well as the roads leading into and through the town centre.

1.2.14. The NWRR will also help to reduce accidents and carbon emissions, and will improve air quality in areas where people shop, work and live. It will give Shrewsbury a more efficient and resilient road network and support the town's continued growth and economic development.

COST OF THE NWRR

1.2.15. The cost of constructing the NWRR is estimated to be **£71,399,500**. Shropshire Council is asking the Government to contribute a fixed sum of **£54,406,419** from the DfT's Large Local Major Schemes Fund. Shropshire Council will provide the balance of the cost, estimated at **£16,993,081**, and accepts responsibility for any cost increases.

1.2.16. The proposed contributions are set out in Table 1.

Table 1 - Breakdown of scheme costs by funding sources

Source	Contribution (£)	Contribution (%)
Government/ DfT Funding	£54,406,419	76.2%
Shropshire Council	£16,993,081	23.8%
Total	**£71,399,500**	**100%**

TIMETABLE FOR THE DELIVERY OF THE SCHEME

1.2.17. The scheme is programmed to commence in 2021 and will be completed in 2022. Further details are supplied in Chapter 6 (The Management Case).

1.3 THE FIVE CASES

1.3.1. The business case is made up of five separate cases, as prescribed in DfT guidance. These are:

- The strategic case which shows that there is a robust 'case for change', closely aligned to wider strategic and public policy objectives
- The economic case which shows that the scheme provides high value for money, based on a formal appraisal undertaken in line with DfT guidance
- The financial case which explains how much the scheme will cost and how it will be paid for, showing that it is affordable
- The commercial case which shows that the scheme is commercially viable
- The management case which shows that the scheme is achievable in practical terms, and explains how the project will be managed to ensure it achieves its objectives.

1.4 SUMMARY OF THE STRATEGIC CASE

1.4.1. The Strategic Case sets out the reasons why the NWRR is needed. It shows how the proposed investment fits into a wider strategy for investment in Shrewsbury and the surrounding region, and demonstrates that it will further the strategic objectives of Shropshire Council, Shrewsbury Town Council, and Marches LEP. It describes how the proposed scheme has been identified after consideration of a full range of options and consultation with stakeholders. The Strategic Case explains why this investment is needed now, in order to address existing problems and capitalise on opportunities for economic growth and development.#

TRANSPORT CONTEXT

1.4.2. Shrewsbury lies at the intersection of the A5 and A49, which bypass the town on the south and east sides. A partial ring of local distributor roads serves the developed area on the south and east sides. There is no equivalent road between the north and west of Shrewsbury, so traffic either has to pass through the town centre or take a very much longer route around the south and east of the town, adding to the congestion on these roads.

POLICY BACKGROUND

1.4.3. **National**: The Government's vision is for a transport system that supports and promotes economic growth and improves the quality of life for people. A well-functioning transport system is key to continued economic success, and to enable delivery of housing, employment and social infrastructure. The Government invests directly in the Strategic Road Network, providing the capacity and connectivity to support economic activity and combat congestion, and to connect communities. The Government recognises that local roads are a crucial element of the transport system, and provides financial support for key local transport schemes through Growth Deals and Large Local Majors Fund. The Shrewsbury NWRR has been allocated development funding from the Fund.

1.4.4. **Regional**: Regional transport strategies define corridors for growth, including the Birmingham – Telford – Shrewsbury corridor, in which improved connectivity will facilitate business clustering, unlock economic potential and create jobs. However, congestion, ageing transport infrastructure and poor accessibility to employment centres are identified in The Marches Strategic Economic Plan as barriers to growth. The Shrewsbury NWRR will help deliver homes and jobs by improving connectivity and reducing congestion in Shrewsbury.

1.4.5. **Local**: The challenge for Shrewsbury is to achieve economic and physical development within the constraints of the town's unique form and character. Connectivity between north and west is constrained by the River Severn and the islanded town centre. Planned growth is focused on two urban extensions, providing new homes and jobs in sustainable locations to the south and west. Local strategies and plans identify three linked transport schemes to support these: Shrewsbury Integrated Transport Package, Oxon Link Road and the Shrewsbury NWRR. The NWRR will link new and established employment clusters to wider markets, whilst enabling the local transport network to continue functioning efficiently into the future.

CURRENT PROBLEMS

1.4.6. The lack of a direct road link between the northern and western parts of the town has been a major source of traffic problems for a very long time. Both the northern and western approaches to the town centre are heavily congested at peak times, and the presence of through traffic in the centre leads to long queues and delays, blocking back through key junctions. None of these routes is suitable for this traffic, but there are no practical alternatives for most trips.

1.4.7. The main problems are:

- Poor connectivity between the north and west of Shrewsbury for all modes of transport
- Traffic congestion in Shrewsbury Town Centre
- Traffic congestion on the northern and western approaches to the town
- Traffic congestion on Shrewsbury's outer bypass and distributor ring roads
- Unreliable journey times and long delays
- "Rat-running" traffic on unsuitable rural roads
- Inefficiency of the transport network, especially for buses
- Lack of network resilience
- Road accidents
- Poor air quality
- Carbon and other greenhouse gas emissions

FUTURE PROBLEMS

1.4.8. Shrewsbury continues to grow. New development is already under way at the southern Sustainable Urban Extension (SUE), and further growth is planned at the western SUE. If nothing is done, all of the above problems will worsen. Traffic congestion is likely to get worse and journey times will become longer and less predictable as the network becomes less resilient, affecting both public and private transport. Rat-running could increase, as could accidents.

1.4.9. In addition:

- Junctions on the bypasses (especially A5/A49 "Dobbies" Island) will become increasingly congested
- The Shrewsbury West Sustainable Urban Extension will suffer from poor accessibility to the north, making it less attractive to new development
- New transport investments, especially the Oxon Link Road, will not achieve their full potential.

1.4.10. The problem of increasing congestion on the trunk road A5 Shrewsbury Bypass is evident from DfT forecasts of congestion on the Strategic Road Network in 2010 and 2040.

OBJECTIVES

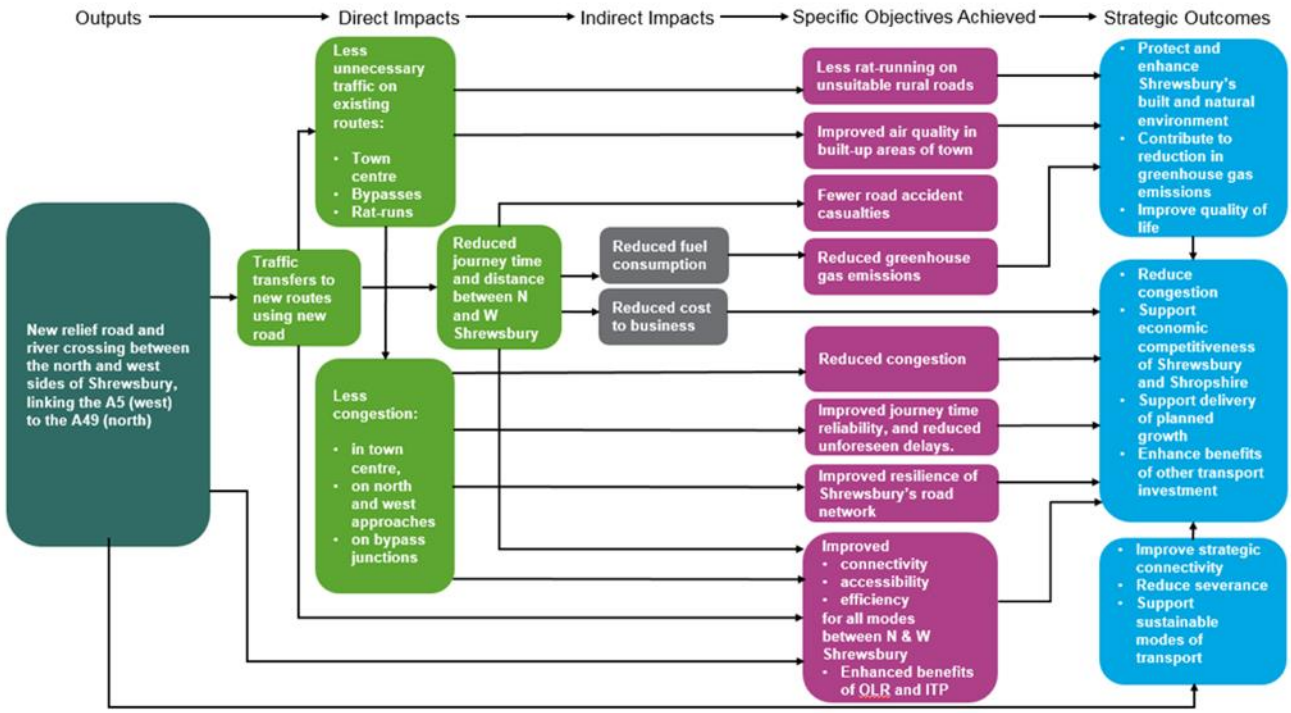
1.4.11. The desired high level or strategic outcomes are:

- To reduce congestion
- To support the economic competitiveness of Shrewsbury and Shropshire
- To support the delivery of planned growth and development in Shrewsbury
- To enhance the benefits of other transport investment
- To protect and enhance Shrewsbury's built and natural environment
- To contribute towards a reduction in greenhouse gas emissions
- To improve the quality of life for people in Shrewsbury
- To improve road safety
- To support sustainable modes of transport

1.4.12. The specific or intermediate objectives are:

- To improve connectivity and accessibility between the north and west of Shrewsbury for all modes of transport
- To reduce traffic congestion
- To improve the reliability of journey times and reduce unforeseen delays
- To reduce the amount of traffic rat-running on unsuitable rural roads
- To improve the efficiency of Shrewsbury's transport network for all modes of transport.
- To improve the resilience of Shrewsbury's transport network.
- To enhance the benefits of the Oxon Link Road and Integrated Transport Plan schemes.
- To reduce the number of people killed or seriously injured on roads in Shrewsbury.
- To improve air quality, especially in the built-up areas of Shrewsbury
- To reduce net emissions of CO_2 and other greenhouse gases.

1.4.13. The Strategic Case explains why the NWRR is expected to deliver these outcomes.



CONSTRAINTS

1.4.14. The following types of constraint have been taken into account in developing the scheme:

- Physical
- Environmental
- Financial
- Contractual
- Public acceptability

1.4.15. It is evident that there are no insurmountable constraints on the construction of the Shrewsbury NWRR. However detailed consideration of the physical, environmental and public acceptability constraints was critical to the identification of the preferred route.

OPTIONS

1.4.16. The Strategic Case describes in detail how a very large number of options has been investigated in order to identify the best solution for Shrewsbury. These include alternative routes in the N-W corridor, as well as a wide range of non-car and non-road options including road pricing.

PROPOSED SCHEME

1.4.17. The proposed scheme is the option which is most acceptable to local people, allowing most effective mitigation of environmental impacts.

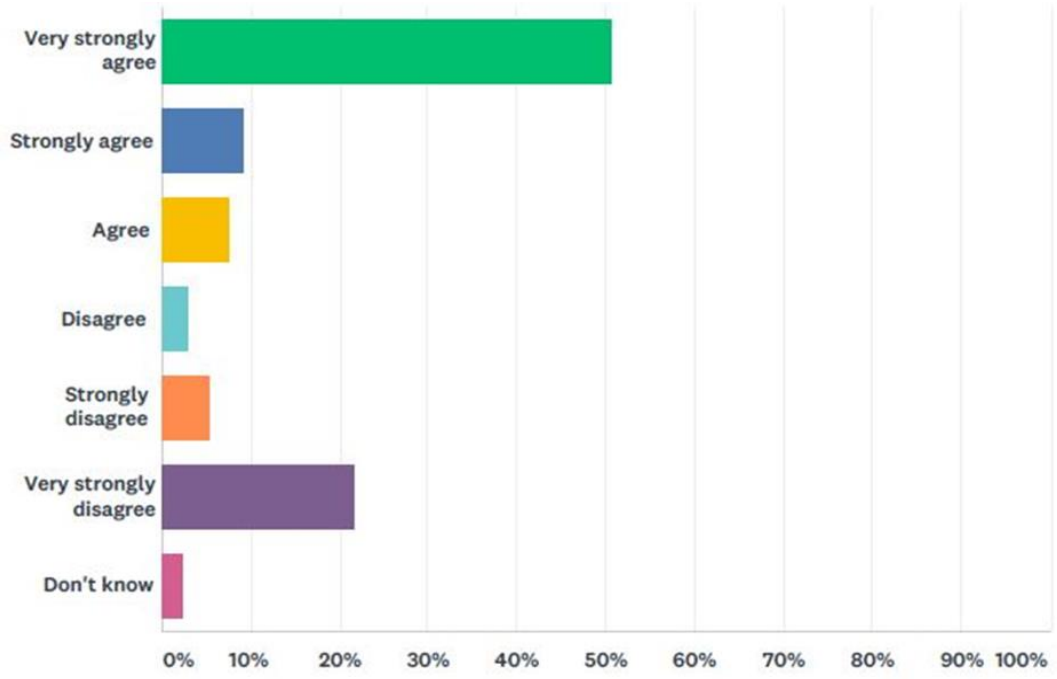
Figure 3 **– Visualisation of the NWRR bridge over the River Severn**

CONSULTATION

1.4.18. Consultation in 2017 indicated a high level of support (67.5%) for the proposed scheme from local people and stakeholders, though some people and groups do not support it.

Table 2 - How strongly do you agree that the NWRR preferred route should be built?

	Very strongly agree	Strongly agree	Agree	Disagree	Strongly disagree	Very strongly disagree	Don't know
Number	321	58	48	19	35	138	14
Percentage	50.7	9.2	7.6	3.0	5.5	21.8	2.2



EXPECTED IMPACTS OF THE NWRR

1.4.19. Modelling shows that the NWRR will have a big impact on Shrewsbury's road network:

- Traffic will reduce on the western and northern approaches to the town centre, and on the Smithfield Road route through the town centre
- Traffic will reduce on the rural lanes to the north-west of Shrewsbury (the rat run routes)
- Traffic will reduce on most sections of the A5 and A49 outer bypasses
- Traffic will reduce on several sections of the distributor ring road
- Traffic will increase on the Oxon Link Road and Battlefield Link Road
- Traffic will increase on local roads leading to and from the NWRR

1.4.20. The traffic impacts of the Shrewsbury NWRR will not just be on the north – west corridor through the town centre. Significant reductions will also occur on the other roads which, though less direct, presently carry traffic between the north and the west – the outer bypasses, the distributor road ring and the rural lanes.

1.4.21. These forecasts show that the NWRR will have exactly the sort of impact it has been intended to have. Moreover, the NWRR will lead to traffic reductions on most parts of the town's network, with many more routes experiencing a reduction in traffic than an increase.

ACHIEVEMENT OF OBJECTIVES

1.4.22. The Strategic case explains, with evidence, the reasons why the NWRR is expected to achieve all of its objectives, including reductions in accidents and greenhouse gas emissions.

1.5 SUMMARY OF THE ECONOMIC CASE

1.5.1. The Economic Case identifies and assesses all the impacts of the proposed scheme to determine its overall value for money. It takes account of the costs of developing, building, operating and maintaining the scheme, and a full range of its impacts, including those impacts which can be monetised.

1.5.2. Only the proposed scheme has been assessed in the Economic Case. The assessment of alternative options is described in the Options Appraisal Report and summarised in the Strategic Case..

METHODOLOGY

Traffic model

1.5.3. The economic assessment is underpinned by the use of a SATURN highway assignment model. A new model for Shrewsbury was developed, based on surveys in 2017 and up to date planning information. The modelled assessment years are:

- Base Year (2017)
- Opening Year (2022)
- Design Year (2037)

1.5.4. The following future networks were developed:

- Do Minimum – includes all planned highway network changes in 2022 and 2037
- Do Something – as the Do Minimum but with the addition of the NWRR scheme

Costs

1.5.5. Economic costs are calculated from

- Investment costs (scheme preparation and construction)
- Operating costs
- Maintenance and renewal cost

1.5.6. Scheme costs have been adjusted for risk. An optimism bias adjustment has also been made – this is only done in the Economic Case.

Benefits

1.5.7. Economic benefits from time and vehicle operating cost savings, and reductions in greenhouse gas emissions are calculated using TUBA (Transport User Benefit Analysis).

1.5.8. Economic benefits from savings in accidents are calculated using COBALT (Cost and Benefit to Accidents – Light Touch)

1.5.9. The economic benefits of reliability improvements are calculated separately.

Price base and discounting

1.5.10. All costs and benefits have been adjusted to 2010 values, projected for 60 years beyond the opening year, and then discounted to 2010. The values in the Economic Case therefore appear different to those in the Financial Case, though they are based on the same original estimates.

BENEFIT COST RATIO

1.5.11. The Benefit Cost Ratio (BCR) for the Shrewsbury NWRR is **5.33**, calculated as set out Table 3 below.

Table 3 - Present value of costs and benefits assessed

Analysis of monetised costs and benefits (Initial BCR)	2010 prices discounted to 2010 £,000
Greenhouse Gases	3,350
Accidents	30,637
Economic Efficiency: Consumer Users (Commuting)	77,214
Economic Efficiency: Consumer Users (Other)	126,505
Economic Efficiency: Business Users and Providers	87,228
Wider Public Finances (Indirect Taxation Revenues)	-7,365
Present Value of Benefits (PVB)	**317,569**
Cost to Broad Transport Budget:	
Investment cost	58,513
Operating costs	3,018
Present Value of Costs (PVC)	**61,532**
Net Present Value (NPV)	**256,037**
Initial BCR	**5.161**
Reliability	10,115
Adjusted Present Value of Benefits (PVB)	**327,684**
Adjusted Net Present Value (NPV)	**266,152**
Adjusted BCR	**5.33**

VALUE FOR MONEY CATEGORY

1.5.12. The BCR of 5.33 demonstrates that the scheme offers **very high** value for money, as defined in DfT guidance.

SOCIAL AND DISTRIBUTIONAL IMPACTS

1.5.13. The Economic Case includes an analysis of the distribution of the user benefits between different sectors of society. The results show that in terms of distribution of user benefits, the most benefits are received by areas of moderate to less deprivation.

ENVIRONMENTAL IMPACTS

1.5.14. The Economic Case describes the appraisal of the environmental impacts of the scheme, including.

- Greenhouse gases

- Landscape
- Townscape
- Historic Environment
- Biodiversity
- Water Environment

1.5.15. Except for greenhouse gases, these impacts are not monetised and do not contribute to the BCR. The qualitative assessment of each non-monetised impact is summarised in Table 4 below.

Table 4 – Environmental impacts

Type of impact	Key impacts	Qualitative assessment
Landscape	The landscape is typical of the wider area, with landscape features that are common throughout Shropshire and which within the medium to long term are relatively easily replaced. There is anticipated to be some loss of existing landscape features and disruption to landscape pattern and land cover. Visually the scheme corridor is likely be relatively well contained and localised due to the tree cover along field boundaries and rolling topography which limits long distance views. The crossing of the River Severn is likely to be a highly conspicuous element of the proposed scheme.	Moderate adverse
Townscape	Not applicable to this scheme.	Not applicable
Historic environment	Moderate adverse impact on the buried archaeology, if present, including the Berwick cropmark complex of potential prehistoric date. Moderate to slight adverse impact on settings/context of 27 Listed Buildings and 1 Registered Park and Garden (Grade II). Neutral impacts on the settings of 1 Scheduled Monument and 1 Registered Battlefield.	Moderate adverse
Biodiversity	Neutral impact on Hencott Pool, Part of the Midland Meres and Mosses (Phase 2) Ramsar and Hencott Pool SSSI. Slight adverse impact to River Severn (Montford Shrewsbury) LWS and Alkmund Park Pool LWS. Slight adverse impact protected and priority species if they are found to be present in the proposed scheme area. Moderate adverse impact on Alkmond Park Coppice Planted Ancient Woodland Site. Slight adverse impact on important hedgerows (if present).	Moderate adverse
Water environment	Potential impacts to surface and groundwater include potential pollution/contamination to public water supply sources (both surface and groundwater) operated by Severn Trent Water and possible impact to the Old River Bed SSSI. Potential floodplain volume displacement associated with the River Severn and Alkmund Park Wood watercourse floodplains. Potential displacement of surface water in two areas at high risk of surface water flooding. The scheme is within the maximum extent of flooding from reservoirs associated with the course of the River Severn, potentially constricting flows. The proposed scheme could interfere with groundwater flow, potentially increasing groundwater flood risk.	Moderate adverse

1.5.16. In each case, potential mitigation of environmental impacts is identified in the Economic Case.

1.6 SUMMARY OF THE FINANCIAL CASE

1.6.1. The Financial Case sets out the full cost of the scheme and demonstrates that it is affordable.

COST

1.6.2. The estimated capital cost of the scheme, at out-turn prices excluding non-recoverable VAT, is **£71,399,500**.

1.6.3. The cost includes an allowance for risk, based on a detailed Quantified Risk Assessment, and inflation. The scheme cost is built up as set out below:

Table 5 – Scheme Costs

Scheme element	Cost (£)
Construction Contracts	£44,847,000
Design Investigations, Surveys, Procurement, Supervision and Client Costs	£7,692,500
Statutory Undertakers Works	£1,513,000
Land and Compensation	£4,300,000
Total Cost (2017 Q4)	**£58,352,500**
Quantified Risk	£7,658,500
Risk-adjusted total Cost (2017 Q4)	**£66,011,000**
Inflation	£5,388,500
Scheme cost (out-turn)	**£71,399,500**

BUDGETS AND FUNDING COVER

1.6.4. The overall funding package for the scheme is:

- Estimated scheme cost £71,399,500
- DfT Funding £54,406,419
- Balance funded by the Shropshire Council £16,993,081 (23.8% of the total)

ANNUAL EXPENDITURE PROFILE

1.6.5. The annual spending profile is set out below:

Table 6 – Budgetary impact summary

	Budgetary Impact Summary						
	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	Total
Government/ DfT Funding	£192,535	£5,151,574	£3,995,409	£10,660,476	£34,406,425	£0	£54,406,419
SC Contribution	£350,000	£991,491	£768,971	£2,051,754	£6,622,535	£6,208,330	£16,993,081
Total	**£542,535**	**£6,143,065**	**£4,764,380**	**£12,712,230**	**£41,028,960**	**£6,208,330**	**£71,399,500**

FUTURE ANNUAL MAINTENANCE COSTS

1.6.6. The maintenance costs for the scheme are expected to average £26,864 in 2017:Q4 prices per annum, the funding for which will be sourced from Shropshire Council's annual maintenance budget; and

1.6.7. Capital renewal costs over 60 years are expected to be approximately £10,864,641 in 2017:Q4 prices. Funding for the works will be ring-fenced from Shropshire Council's maintenance budget.

1.7 SUMMARY OF THE COMMERCIAL CASE

1.7.1. The Commercial Case provides evidence of the commercial viability of the proposed scheme, and describes the procurement strategy that will be used to engage the market and deliver the scheme.

1.7.2. Alternative procurement strategies were considered.

FORM OF CONTRACT

1.7.3. The following forms of contract were considered:

- Infrastructure Conditions of Contract (ICC)
- NEC Engineering and Construction Contract

1.7.4. Shropshire Council has selected the New Engineering and Construction Contract NEC Form of Contract for the NWRR. The additional flexibility and existing in-house familiarity with NEC suite makes it the preferred option for the delivery of the NWRR.

1.7.5. The NEC suite offers flexibility in both the form of procurement and Conditions of Contract, these are discussed in more detail in the following sections.

FORM OF PROCUREMENT

1.7.6. The following forms of procurement were considered:

- Traditional contract
- Design and build
- Early contractor involvement (ECI)
- Term service contract

1.7.7. The Traditional form of procurement is feasible for the delivery of the NWRR and is more compatible with the condensed programme. The option does not offer some of the benefits of the Design and Build model but does provide greater cost and programme certainty at the point of procuring the main works. The existing consultancy framework with WSP provides the Council with access to the necessary skills and experience to produce the detailed design required for a Traditional procurement.

1.7.8. Without likely benefit from a Design and Build approach and increased risk at the planning and Public Inquiry stage, a Traditional contract with improved time and cost predictability is a more attractive option and is the preferred form of procurement for the NWRR.

CONTRACT STRATEGY

1.7.9. The preferred form of contract, NEC3 Engineering and Construction Contract suite, offers five Conditions of Contract options for scheme delivery:

- Option A: Priced contract with activity schedule;
- Option B: Priced contract with bill of quantities;
- Option C: Target cost with activity schedule;
- Option D: Target cost with bill of quantities; and

- Option E: Cost reimbursable.

1.7.10. A target cost contact, Option C, would offer potentially delivery benefits especially if the more complex elements of the NWRR, such as the River Severn Viaduct and the Shrewsbury to Chester Railway bridge, are not fully developed ahead of procurement. However, these benefits are offset by the increased risk retained by Shropshire Council.

1.7.11. Achieving sufficient design maturity prior to tender is often the most significant obstacle to tendering a fixed price contract. However, adopting a Traditional form of procurement and post-planning tender will lead to a high level of design maturity at the point of tender. As a result NEC3 Option A, with the benefit of increase price and programme certainty, is the preferred contract strategy and delivery mechanism for the NWRR.

1.7.12. The preferred procurement method, NEC Option A, was also validated through market engagement with several major contractors capable and interested in delivering the NWRR.

PROCUREMENT ROUTE

1.7.13. The following procurement route options were considered for the NWRR:

- Midlands Highways Alliance; and
- OJEU Competitive Tender Process.

1.7.14. Due to the increased tendering costs and restricted contract options of the Midlands Highway Alliance Framework the preferred procurement route for the NWRR is an OJEU Restricted Tender.

SELECTED PROCUREMENT STRATEGY

1.7.15. Shropshire Council has selected a traditional procurement model of an NEC3 Form of Contract with Option A Fixed Price conditions for delivery of the NWRR works. The Council will adopted an OJEU Restricted Tender as the mechanism for procuring this contract. The preferred model has been market tested with contractors capable and interest in delivering the scheme. As well as confirming market appetite for the NWRR generally, Shropshire Council's preferred strategy is seen as appropriate and would not discourage any contractor from tendering for the scheme.

1.7.16. Shropshire Council will utilise its existing term consultant, WSP, to progress the NWRR through detail design including the planning process and public Inquiry. Once the main works contract has been tendered, the term consultant will provide contract administration and construction supervision support to the Council.

1.7.17. Shropshire Council will tender the works contract based upon a fixed price. Control of costs throughout the scheme development will be achieved through the use of the NEC3 Option A (Priced Contract with Activity Schedule) contract.

1.7.18. Tendering will facilitate the transfer to the contractor of some risk associated with costs increasing above those predicted in the financial case. The risk of costs being higher than currently predicted remains until the tendering process is complete.

1.7.19. The tender invitations will assume a construction period of 18 months.

1.8 SUMMARY OF THE MANAGEMENT CASE

1.8.1. The Management Case demonstrates that the NWRR scheme is capable of being delivered successfully in line with recognised best practice. It describes the processes that are being put in place to ensure that the project is effectively delivered, and properly evaluated.

EXPERIENCE AND EXPERTISE

1.8.2. The delivery of the scheme will build upon experience from a number of major highways schemes undertaken by Shropshire Council and its consultants WSP. Details of similar projects, together with evidence of the Delivery Team's experience, are set out in the Management Case.

PROJECT GOVERNANCE

1.8.3. Shropshire Council has established a Project Board aligned with best practice guidance on project management. The Project Board is the decision-making body for the project. It provides overall direction to the project and is accountable for its success. A Project Delivery Team will be established to deal with day to day planning and delivery of the project. Details of the operation of the Board and Delivery Team are set out in the Management Case.

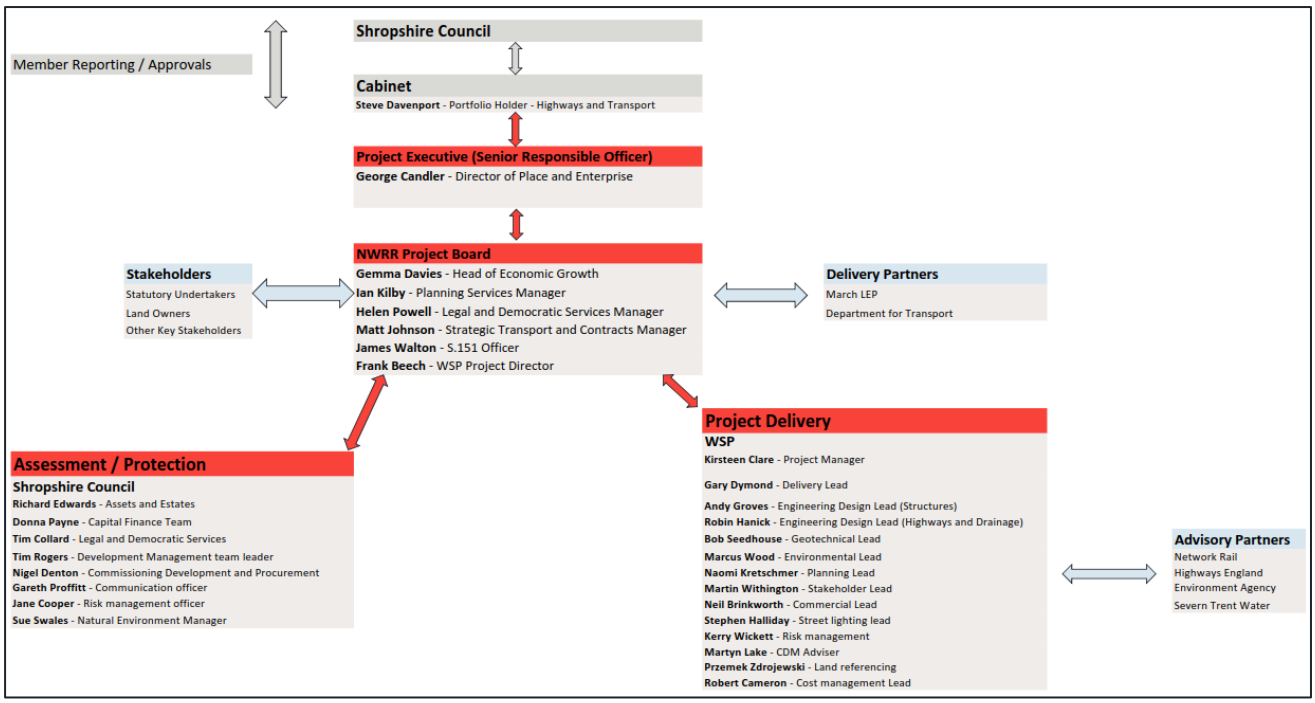


Figure 4 – High level project governance

PROJECT PROGRAMME

1.8.4. A project programme has been developed for this Business Case setting out all the key project tasks and their duration and interdependencies, key milestones and gateways. It will act as a live document, with progress being monitored on a weekly basis by the project manager.

PROJECT DEPENDENCIES

1.8.5. Approval of the planning application and completion of the Oxon Link Road, which effectively acts as Phase 1 of the NWRR, is the biggest interdependency of the scheme. If the Oxon Link Road scheme were not to achieve planning approval this could delay the NWRR.

COMMUNICATIONS AND STAKEHOLDER MANAGEMENT

1.8.6. Key stakeholders have been identified and a stakeholder management plan will be adopted, following the practice used in previous projects.

RISK MANAGEMENT

1.8.7. The Management Case describes in detail how project risks will be assessed and managed

MONITORING AND EVALUATION

1.8.8. Monitoring and evaluation will be undertaken to assess the performance of the NWRR when built. A benefits realisation plan will be developed, linked to the Monitoring and Evaluation Plan.

2 THE STRATEGIC CASE

2.1 INTRODUCTION

2.1.1. The Strategic Case for the Shrewsbury North West Relief Road (NWRR) has been prepared in accordance with Government Guidance[1,2] and is one of five sections which make up the outline business case for the scheme. The other sections are:

- The economic case
- The financial case
- The commercial case
- The management case

2.1.2. The provision of a new relief road and river crossing for Shrewsbury is a key element of Shropshire Council's strategy to support growth and development. It will enable the local road network to operate more efficiently by reducing congestion, improving the predictability of journey times, and providing more capacity for growth. It will help to make Shrewsbury a better place in which to live and work. For these reasons, there is a long held local aspiration to build the Shrewsbury North West Relief Road.

2.1.3. The Strategic Case sets out the reasons why Shropshire Council believes a north-west relief road is needed for Shrewsbury. It shows how the scheme fits into a wider strategy for the town's development, and demonstrates that it aligns with national, regional and local strategic policy objectives.

2.1.4. The Strategic Case describes how the Council has considered a full range of options, including non-road and non-car options, and has undertaken extensive consultation with stakeholders and local people. The resulting scheme is the one which the Council considers to be best able to meet local aspirations and deliver the strategic objectives.

2.1.5. Together with the other four cases in the Outline Business Case, the Strategic Case explains why this investment is needed now - to address existing concerns about congestion, and to facilitate future economic growth and development.

2.2 OVERVIEW

2.2.1. This chapter covers:

- A brief description of Shrewsbury and its transport system
- The policy background and business strategy for the scheme
- Opportunities for growth, regeneration, and inward investment
- The existing problems which the scheme needs to address
- Future problems - the impacts of not changing
- The aims and objectives of the scheme
- How success will be measured

[1] The Transport Business Cases, Department for Transport, January 2013
[2] WebTAG, The Department for Transport's website for guidance on the conduct of transport studies

- The scope of the scheme – what it will, and will not, include
- Any constraints (physical, financial, political etc.) which could affect delivery of the scheme
- Interdependencies - other factors that could affect the timely delivery of the scheme
- The role of stakeholders – what they require from the scheme, how they have been involved so far, and how they can support the delivery of the scheme
- Options considered and the results of assessment
- The proposed scheme, and reasons why it is considered the most appropriate solution
- The expected impacts of the proposed scheme - how and to what extent it will achieve the objectives

2.3 SHREWSBURY AND ITS TRANSPORT SYSTEM

2.3.1. To set the Strategic Case in context, a brief description of Shrewsbury and its transport system is given below.

ADMINISTRATIVE CONTEXT

2.3.2. Shrewsbury is the principal town and administrative centre of the County of Shropshire. It is an historic market town which serves as a cultural and commercial centre for Shropshire and a large area of mid-Wales.

2.3.3. Shropshire became a unitary council in 2009 and is the local transport authority and local planning authority for Shrewsbury[3]. Together with Herefordshire and Telford & Wrekin, Shropshire is part of the Marches Local Enterprise Partnership. Shrewsbury Town Council, established in 2009, provides a range of local services.

2.3.4. Shrewsbury is in the Shrewsbury and Atcham parliamentary constituency.

PHYSICAL CONTEXT

2.3.5. Shrewsbury lies about 12 miles east of the Welsh Border, 15 miles west of Telford and 47 miles west of Birmingham. Its defining physical characteristic is an almost complete natural loop of the River Severn, within which the mediæval town grew up. The river loop now encloses the present day town centre, which has only three main points of entry by road and a largely unaltered mediaeval street pattern.

2.3.6. To the south west of the town centre, and within the river loop, is the riverside Quarry Park. On the north-west side of the centre, the riverside represents a largely unexploited asset, mainly because it is separated from the town centre by busy roads. Shrewsbury is moderately hilly, with land rising away from the river.

2.3.7. Shrewsbury has over 660 listed buildings which, like the town centre roads, have been adapted over many centuries to serve present day purposes whilst retaining much of their original character.

2.3.8. Present day Shrewsbury extends beyond the historic centre, with development, mainly from the 19th and 20th centuries, spreading outward from the river loop. There are out-of-town supermarkets and shopping centres to the north and south. Some traditional industry remains in the north of the town and there are newer employment areas at Battlefield to the north and London Road to the south east. The suburbs of Shrewsbury form a broad crescent from Harlescott in the north to Copthorne and The Mount in the west. Within this crescent lie the main schools, colleges, hospitals, and public and private sector employment areas.

2.3.9. By contrast, the north-west sector of the town is almost completely undeveloped.

[3] These functions had previously been the responsibilities of Shropshire County Council and Shrewsbury and Atcham Borough Council.

2.3.10. The surrounding area is rural and sparsely populated. A north-west relief road would cross a wedge of open countryside extending almost to the centre of the town from the north-west, comprising agricultural land, wooded cliff, river terrace, flood plain and pockets of woodland. The area is bounded by the River Severn, which the NWRR would cross at its western end, and by the Old River Bed – a former river meander, north of the town.

Figure 5 - Aerial view of Shrewsbury

SOCIO-ECONOMIC CONTEXT

2.3.11. Shropshire's productivity in 2015, measured as GVA, was £19,299 per head of population[4], 25% less than the national figure (£25,601).

2.3.12. In 2015[5], average earnings by workplace, at £466 per week, are also well below the regional and national average, although average earnings by residence are significantly higher at £492. This suggests that people tend to live in Shropshire but commute to higher paid jobs in other towns and cities. The 2011 census showed that Shropshire had more resident workers than it does jobs, and consequently net out-commuting was significant (-5,313 people in 2011). However, in-commuting rose more rapidly than out-commuting in the

[4] https://shropshire.gov.uk/media/7027/skills-evidence-for-shropshire-2017.pdf
[5] http://shropshire.gov.uk/media/5320/shropshire-council-key-facts-and-figures-2016-17.pdf

decade to 2011. A tendency to out-commute is more prevalent amongst higher earners, and this factor contributes to the considerable differential between workplace and residents' earnings. 10.8% of all workers travel more than 30km to their main place of work – this proportion rises to 16.4% amongst those qualified to NVQ level 4 and above. (Census, 2011)

2.3.13. Shropshire has a much smaller manufacturing base than its nearest neighbour, Telford, though there has been strong growth in commercial floorspace in recent years due to the development of new business parks. The percentage of people in employment in 2016 was 81.4%, higher than the regional and national averages. Nevertheless, there are significant numbers of economically inactive people who would like to be in employment (10,400 in 2016, Annual Population Survey), suggesting that there is an untapped labour resource within the County. 31% of Shropshire employers report employing staff who have qualifications or skills that are not used in their current role (UKCES Employer Skills Survey, 2015) and levels of part-time employment are exceptionally high (34.8% of all Shropshire jobs in 2015 against 30.9% nationally, BRES). All of these factors are indicative of a level of underemployment within the County.

2.3.14. The above figures are for Shropshire, as comparable information is not readily available for Shrewsbury. Nevertheless they bear out a recognisable picture of Shrewsbury as a sub-regional administrative and cultural centre with a moderate standard of living, not much manufacturing industry, reasonably high employment levels but limited opportunities for skilled, full-time employment and significant out-commuting.

2.3.15. Car ownership in Shropshire is relatively high, with 84% of households owning at least one car. This higher than that for the West Midlands region or for England and Wales as a whole. This indicates a relatively high degree of car dependence.

Table 7 - Car ownership 2011 (Source: 2011 census)[6]

	Shropshire	West Midlands	England and Wales
No car	15.8%	24.7%	25.6%
1 car	42.2%	41.5%	42.2%
2 or more cars	42.0%	33.8%	32.1%

TRANSPORT CONTEXT

2.3.16. Shrewsbury lies at the intersection of the A5 and A49 trunk roads. A bypass of the original A5, completed in 1933, now forms a section of a partial inner ring road (the B4380). More recently constructed, modern roads, originally part of the A49, extend this partial ring to serve the east and north of the town.

2.3.17. In the 1990s, new outer bypasses for the A5 and A49 were built on the south and east sides of the town respectively, and the A5 was realigned to form a high capacity link between Shrewsbury and the M54 at Telford. As a result, Shrewsbury is well connected by road to the West Midlands and the national motorway network.

[6] 2011 Census, Table KS404EW

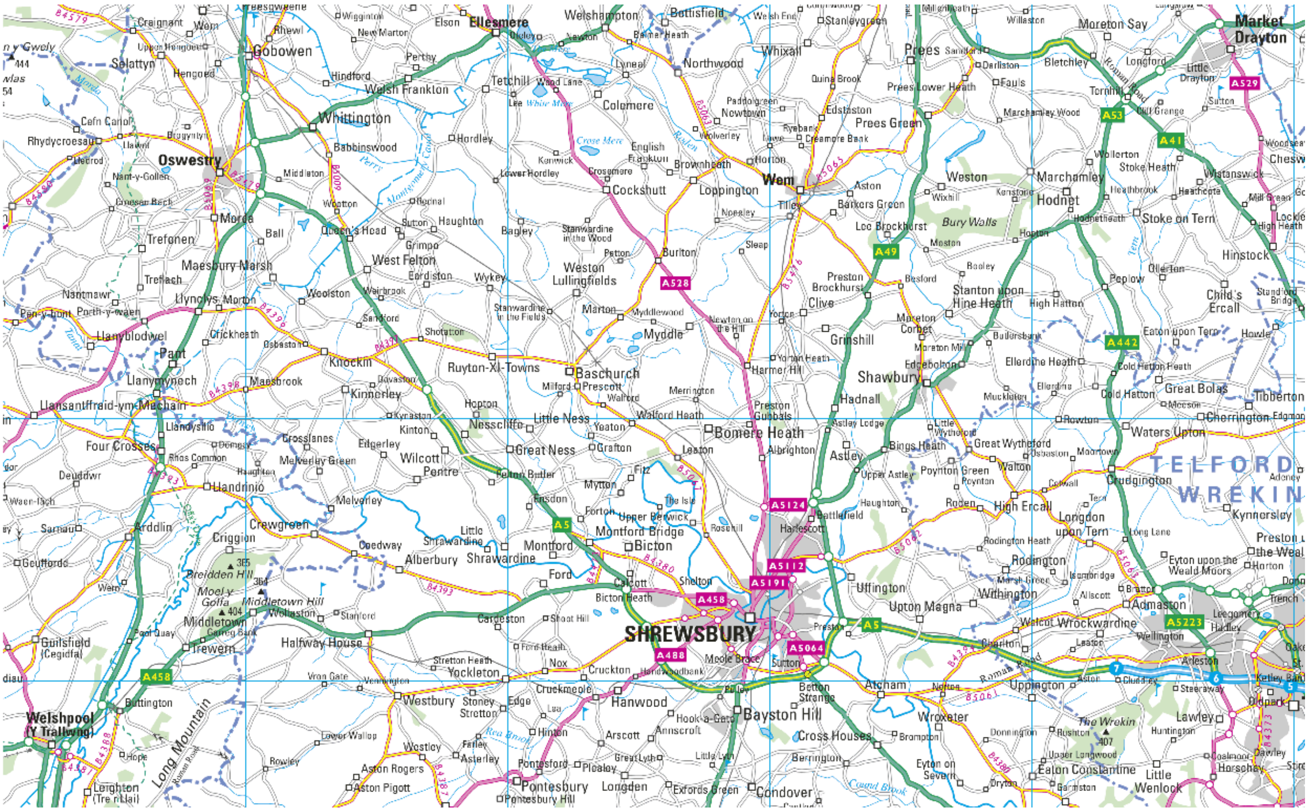


Figure 6 – Local highway network: Shrewsbury and surrounding area

Figure 7 – Local highway network: Shrewsbury

2.3.18. The present direct route for traffic between the north and west of the town is entirely composed of single carriageway roads. Outside of the town centre, these include residential and shopping streets which also carry through traffic. The shortest route from the A5/A49 Churncote Roundabout in the west to the A49/A53 Battlefield Roundabout in the north is described below:

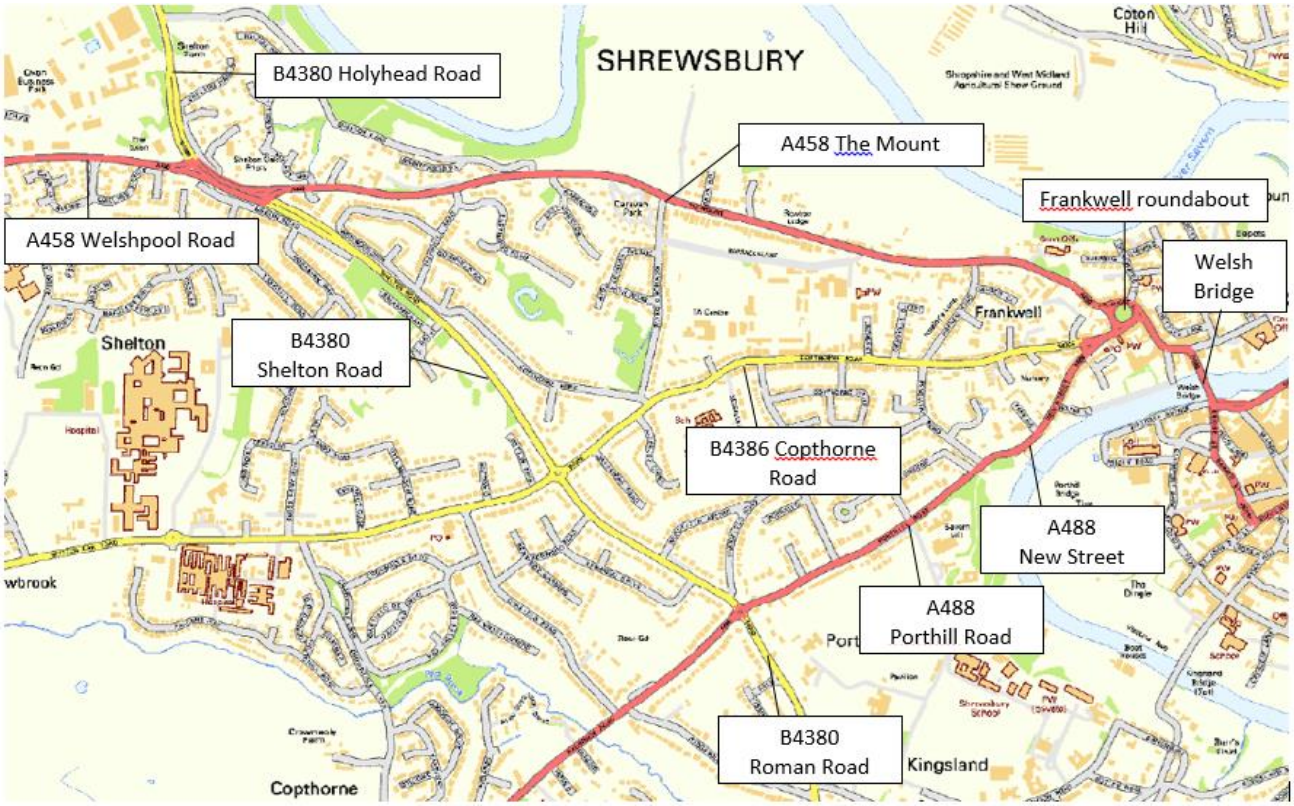


Figure 8 – Western approaches to Shrewsbury town centre

Churncote to Shelton (A458 Welshpool Road)

2.3.19. This section starts as a rural/edge of town single carriageway, subject to 40 mph speed limit, becoming built up with frontage development at Shelton end (30 mph). It gives access to Oxon Park and Ride, a caravan park, local shops, houses, and a dental surgery.

Shelton to Frankwell (A458 The Mount)

2.3.20. The amount is a mainly residential, single carriageway suburban road with frontage access and on-street parking, especially approaching Frankwell Roundabout. It becomes narrow and hilly with narrow footways at the Frankwell end, and has a 30 mph speed limit.

Frankwell

2.3.21. The large roundabout/gyratory has frontage access, including houses and local shops, and on-street parking. Frankwell serves local shops and some houses, traffic signal junction (with restricted turning) gives access to Frankwell Car Park and Theatre Severn.

Figure 9 - Town Centre Highway Network

Welsh Bridge

2.3.22. The Welsh bridge is a single carriageway stone bridge with one lane in each direction. It has footways but no cycle facilities.

Mardol Quay

2.3.23. The Welsh Bridge gives onto a large traffic signal junction with Mardol Quay and Bridge Street. Mardol Quay is the first section of the riverside route through the town centre. It has two lanes northbound and one southbound, with a short cycle lane at the junction. It provides access shops and a hotel.

Figure 10 – Smithfield Road

A458 Smithfield Road

2.3.24. Smithfield Road is the busiest road in the town centre and an important bus route. It runs along the eastern bank of the River Severn and is a three lane single carriageway with traffic signal controlled junctions. It is fronted by shops, a garage, pubs, some houses, a health centre and a large hotel. At its northern end, it gives access to Shrewsbury Bus Station. Despite its river frontage, it is not attractive to pedestrians due to the heavy traffic, and has only limited provision for cyclists.

Figure 11 – Chester Street Gyratory

A528 Chester Street Gyratory

2.3.25. The gyratory is traffic signal controlled and restricted by buildings and very low, narrow railway bridges which are frequently struck by large vehicles. Despite the heavy traffic, it is fronted by houses, flats, pubs and restaurants, with some on-street parking, and the Gateway community arts centre. It provides access to Shrewsbury's railway station. Egress from the railway station forecourt is directly onto the gyratory and is notoriously difficult for cars and taxis, with long delays. Despite recent streetscape improvements, it remains a difficult area for cyclists and pedestrians.

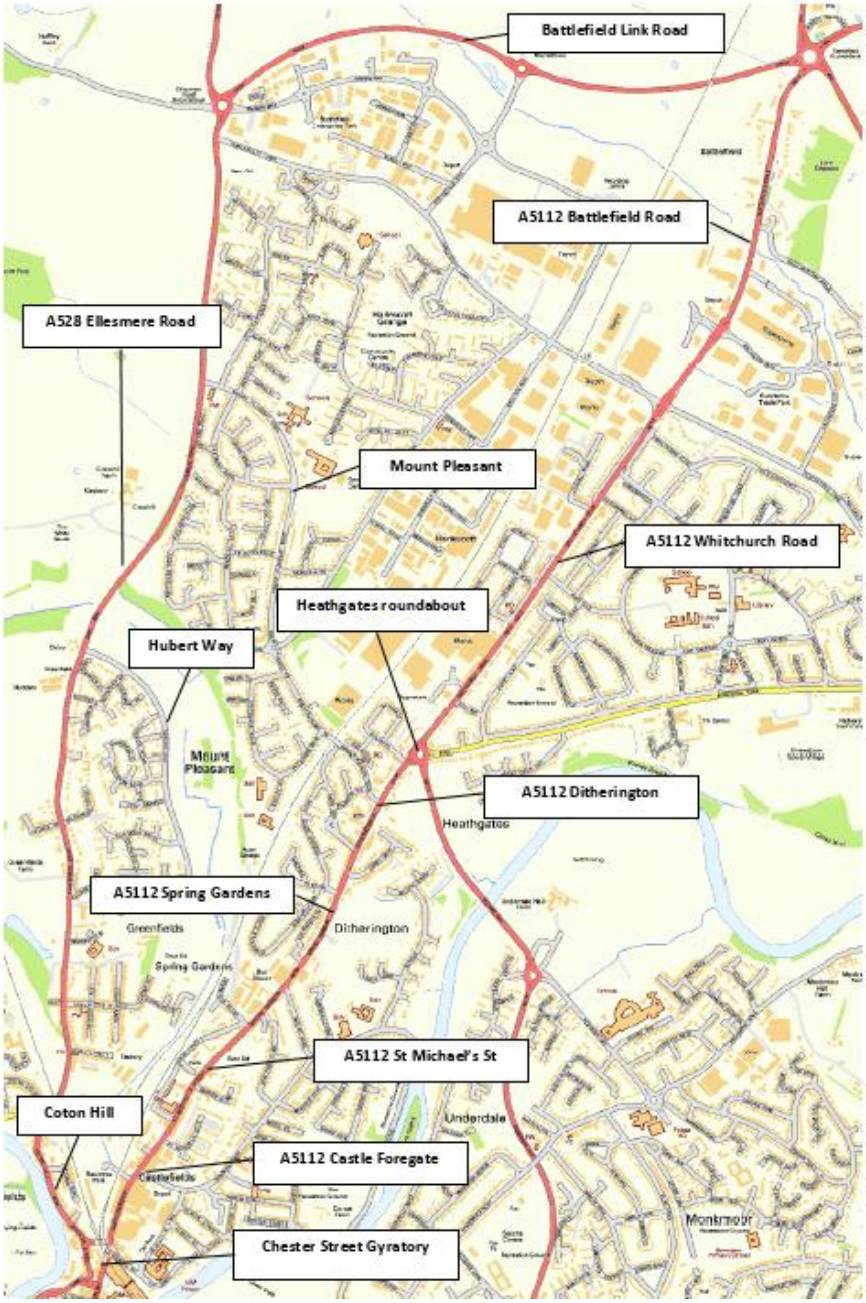


Figure 12 – Northern approaches to Shrewsbury Town Centre

A5191 Castle Foregate

2.3.26. Castle Foregate is a two lane single carriageway urban street, fronted by terraced housing, small shops, commercial premises and the town's main postal sorting office. It has on-street parking for some of its length.

Figure 13 – Castle Foregate, approaching the town centre

A5191 St Michael's Street

2.3.27. St Michael's Street is fronted by small terrace houses and commercial properties, as well as the town's fire station and a recreation ground. Few of the houses have private parking and the single carriageway street includes on-street parking.

A5191 Spring Gardens

2.3.28. Spring Gardens is fronted by small terrace houses, flats, a pub, and commercial premises. This single carriageway urban street also gives access to the Shrewsbury Flaxmill Maltings, an important historic building which is presently being restored under the supervision of Historic England as part of a major regeneration scheme[7].

A5191 Ditherington Road

2.3.29. Ditherington Road provides frontage access to terraced and semi-detached houses, small shops and commercial premises. Urban in character, it has one lane in each direction and some on-street parking.

[7] https://historicengland.org.uk/get-involved/visit/shrewsbury-flax-mill/

Figure 14 – St Michael's Street

A5191/A5112/B5062 Heathgates Roundabout

2.3.30. Heathgates is a large, very busy roundabout, fronted by houses and a pub. The Ditherington approach has a three lane flared entry, and there are uncontrolled pedestrian and cycle crossings at the roundabout.

A5112 Whitchurch Road

2.3.31. Whitchurch Road is a two lane, urban road with some local widening at junctions and a dedicated cycle track on one side. It is fronted by houses, a large supermarket, a DIY centre, shops and commercial and employment sites, including the large Doncasters Engineering premises (former Sentinel Works). For part of its length, it is flanked by a service road giving local access. It is subject to a 30 mph limit, having previously been 40 mph.

Harlescott Crossroads

2.3.32. Harlescott crossroads is a large four arm, multi lane, signal controlled crossroads which has been enlarged in recent years to accommodate new commercial developments including supermarkets and warehouse-type retail outlets.

Harlescott Crossroads to Battlefield Roundabout (A5112 Battlefield Road)

2.3.33. North of Harlescott Crossroads, Battlefield Road has up to four lanes, and provides access to a range of garages and large commercial premises. Further north, it narrows to one lane in each direction, and becomes more suburban / semi-rural in character. It has a 30 mph speed limit.

2.3.34. Overall the existing north-west corridor through Shrewsbury comprises a series of roads which, to varying degrees, are not suited to heavy through traffic. Though classified as principal roads, most are also residential streets with homes very close to the road and limited off-street parking. A Shrewsbury NWRR will provide an attractive, purpose built alternative for some of the traffic which presently uses these streets.

Other routes used by N-W traffic

2.3.35. In addition to the route described above, A528 Ellesmere road provides an alternative, but equally constrained, route to the north of the town centre, whilst the B4386 Copthorne Road and A488 Radbrook Road / New Street, both residential streets, offer alternative routes on the western side.

2.3.36. To the north-west of the town, a number of minor lanes allow traffic to rat run between the A5 west of Montford Bridge and the A528, keeping to the north of the meandering River Severn.

Figure 15 – Huffley Lane

2.3.37. Because of congestion on the direct routes, some of the traffic in the N-W corridor also travels around the south and east sides of the town, using the A5/A49 bypasses, or the distributor ring roads which lie between the bypasses and the town centre.

2.4 POLICY BACKGROUND – THE BUSINESS STRATEGY

2.4.1. This section sets out the wider strategic and policy context against which the proposed scheme has been developed, and the strategic aims and responsibilities of Shropshire Council as promoter of the scheme. The proposed North West Relief Road is closely aligned with the following national, regional and local transport plans and policies:

- **National Policies**
  - Moving Britain Ahead – the Government's Transport Investment Strategy (2017)
  - Creating Growth, Cutting Carbon: Making Sustainable Local Transport Happen. Local Transport White Paper (2011)
  - Roads Investment Strategy 2015/16 to 2019/11
  - National Infrastructure Delivery Plan (2016 – 2021)
  - Roads Investment: The Roads Funding Package (2016)
  - National Planning Policy Framework (2012)
- **Regional Policies and Guidance**
  - The Midlands Engine for Growth Prospectus and Midlands Connect Strategy (2017)
  - The Marches Strategic Economic Plan: "Accelerating Growth through Opportunity (2014)
  - The Marches LEP –Strategy for Growth (2013 – 2022)
  - The Marches Growth Deal (2014 and 2015)
  - The Marches and Mid-Wales Freight Strategy (2017)
- **Local Policies**
  - Shrewsbury Growth Point (2008)
  - Shropshire Local Plan (2011 - 2026)
  - Shrewsbury and Surrounding Area Place Plan (2015 - 2016)
  - Shropshire Local Transport Plan (2011 – 2026)
  - Shropshire Economic Growth Strategy (2017 - 2021)

NATIONAL POLICIES AND GUIDANCE

Moving Britain Ahead – the Government's Transport Investment Strategy[8]

2.4.2. The Government's strategy for transport investment, published in July 2017, sets out the case for continued investment in Britain's transport infrastructure. Through this investment, the government seeks to:

- create a more reliable, less congested, and better connected transport network that works for the users who rely on it

[8] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/627306/transport-investment-strategy.docx

- 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
- support the creation of new housing

2.4.3. The Shrewsbury NWRR will reduce congestion on both local and strategic roads, and will help create a better connected, more reliable transport network for those who depend on it.

2.4.4. It will also help to support local economic growth and development, make Shrewsbury more attractive to investment, and will connect planned employment and housing development to markets and jobs.

Creating Growth, Cutting Carbon – making sustainable local transport happen[9]

2.4.5. This Government White Paper, published in 2011:

- Sets out the Government's vision for "a transport system that is an engine for economic growth, but one which is also greener, safer and improves quality of life in our communities
- Highlights the need to make transport choices that support society as a whole, as well as needing to reduce our carbon emissions to meet national commitments.
- Highlights the Government's commitment to more equal access to employment, education and healthcare by increasing social mobility.
- Considers that better design and management of the local network can improve traffic flow and the attractiveness of the local environment.

2.4.6. The Eddington Transport Study (2006) demonstrated that a well-functioning transport system is key to continued economic success. Without an efficient transport system, economic prosperity can be hindered by unreliable travel journey times, increased congestion and reduced accessibility, all of which affect productivity and business costs.

2.4.7. The Shrewsbury NWRR will support local economic growth and development, and is expected to contribute to reduced carbon emissions.

The Road Investment Strategy (RIS) 2015/16 to 2019/20[10]

2.4.8. The RIS:

- Highlights the need for a national network of modern roads that meets social, economic and environmental aspirations.
- Aims to achieve a network in 2040 that will be smoother for connecting people and businesses to support economic growth:
- Providing capacity and connectivity to support national and local economic activity to combat congestion.
- Connecting communities and providing flexible travel.

2.4.9. The Shrewsbury NWRR will complement the RIS by easing pressure on congested parts of the A5 / A49 Shrewsbury bypass.

[9] https://www.gov.uk/government/publications/creating-growth-cutting-carbon-making-sustainable-local-transport-happen
[10] https://www.gov.uk/government/publications/road-investment-strategy-for-the-2015-to-2020-road-period

The National Infrastructure Delivery Plan (2016 – 2021)[11]

2.4.10. The Delivery Plan, published in March 2016:

- Outlines the Government's plans for economic infrastructure over the five year plan period to support the delivery of housing and social infrastructure
- Outlines the Government's commitment to providing a step change in the capacity of the Strategic Road Network (SRN).
- States that local roads are a crucial element of the transport system, and that their maintenance and improvement is the responsibility of Local Authorities.

2.4.11. The Shrewsbury NWRR will connect the Strategic Road Network to major local roads north of Shrewsbury. It will help reduce congestion on the SRN by providing alternative routes for some journeys which would otherwise use the A5 Shrewsbury Bypass.

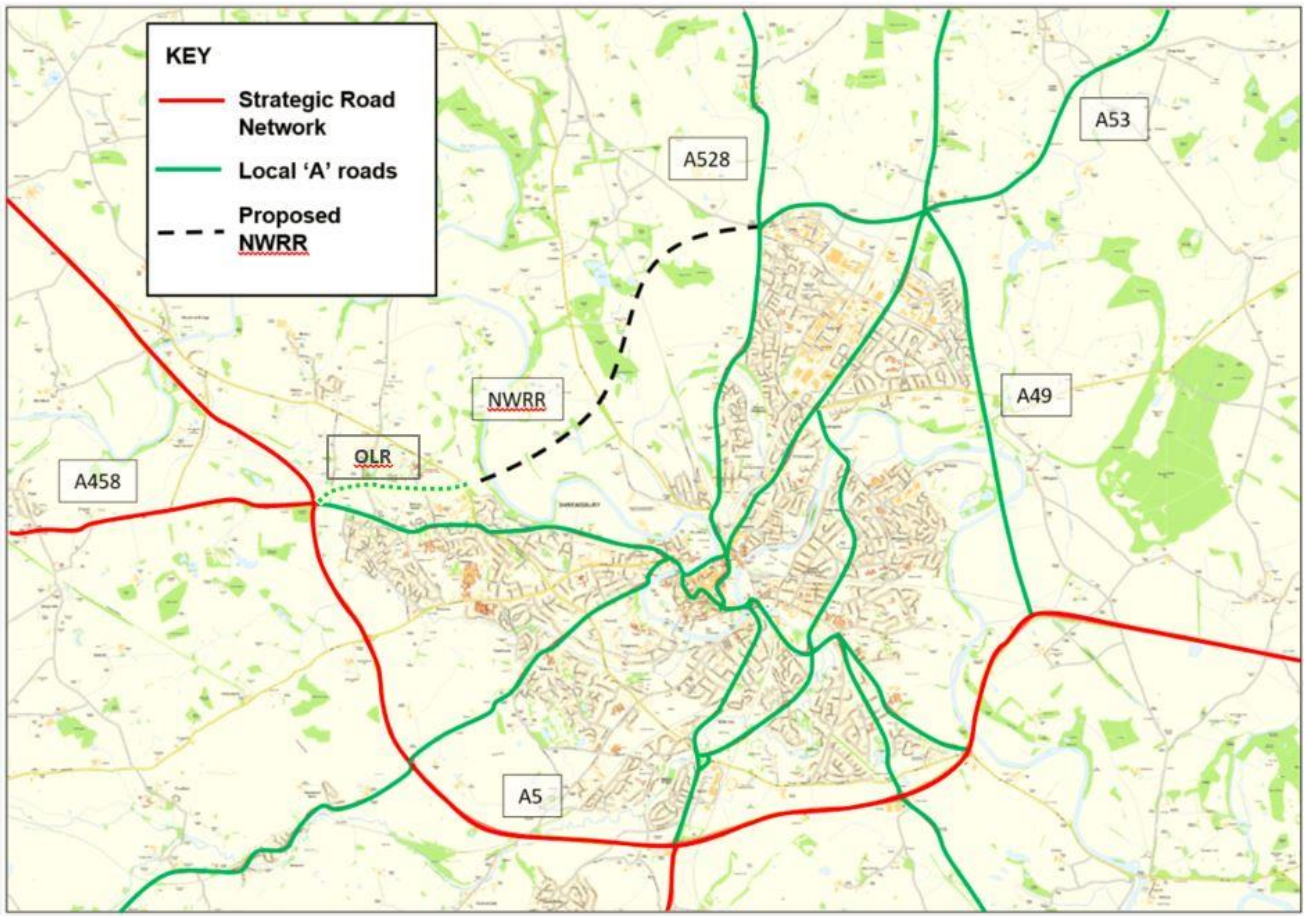


Figure 16 - Shrewsbury NWRR in relation to the SRN and local 'A' roads

Roads Investment: The Roads Funding Package[12]

2.4.12. The funding package, published by the Government in November 2016, states that:

[11] https://www.gov.uk/government/publications/national-infrastructure-delivery-plan-2016-to-2021
[12] https://www.gov.uk/government/publications/the-roads-funding-package

- Roads are the backbone of the United Kingdom, connecting lives, linking communities and boosting business. Quicker and safer journeys help build a stronger economy, promote jobs and enable a country that works for everyone, not just the privileged few.
- The Government is committed to upgrading and renewing the local highway infrastructure and complementing other investment initiatives to help economic growth both locally and nationally and to ensure that all road users have a well maintained and safe network which is fit for the future.
- The Shrewsbury NWRR is one of twelve local major projects to receive funding from the **Large Local Majors Fund** for the development of business cases to determine whether they can be taken forward to construction. The fund is for projects considered too large to be funded through the local Growth Deal (see below).

National Planning Policy Framework (NPPF)[13]

2.4.13. The Government's National Planning Policy Framework (NPPF, 2012) emphasises the importance of rebalancing the transport system in favour of sustainable transport modes, whilst encouraging local authorities to plan proactively for the transport infrastructure necessary to support the growth of major generators of travel demand.

2.4.14. At the heart of the NPPF is the presumption in favour of sustainable development which is seen as 'the golden thread running through both plan making and decision taking'[14]. The Shrewsbury West Sustainable Urban Extension (SUE), including the planned Oxon Link Road, is located within a sustainable location as identified in the Core Strategy (Paragraph 2.4.39 below).

2.4.15. The Shrewsbury NWRR will support development of the SUE West by extending the Oxon Link Road across the River Severn, improving access between the SUE and the northern side Shrewsbury

REGIONAL POLICIES AND GUIDANCE

The Midlands Engine for Growth Prospectus[15] and Midlands Connect Strategy[16]

2.4.16. The Midlands Connect Strategy was published in March 2017. Backed by business, local authorities and eleven LEPs, it aims to make the East and West Midlands an engine for growth for the UK economy. It identifies the Birmingham-Shrewsbury-Telford transport corridor as an "intensive growth corridor" in which improvements to connectivity will facilitate business clustering, unlock economic potential, and create jobs.

[13] https://www.gov.uk/government/publications/national-planning-policy-framework--2
[14] National Planning Policy framework, paragraph 14, page 4
[15] https://www.gov.uk/government/publications/midlands-growth-prospectus
[16] https://www.midlandsconnect.uk/media/1082/midlands-connect-strategy-march-2017.pdf

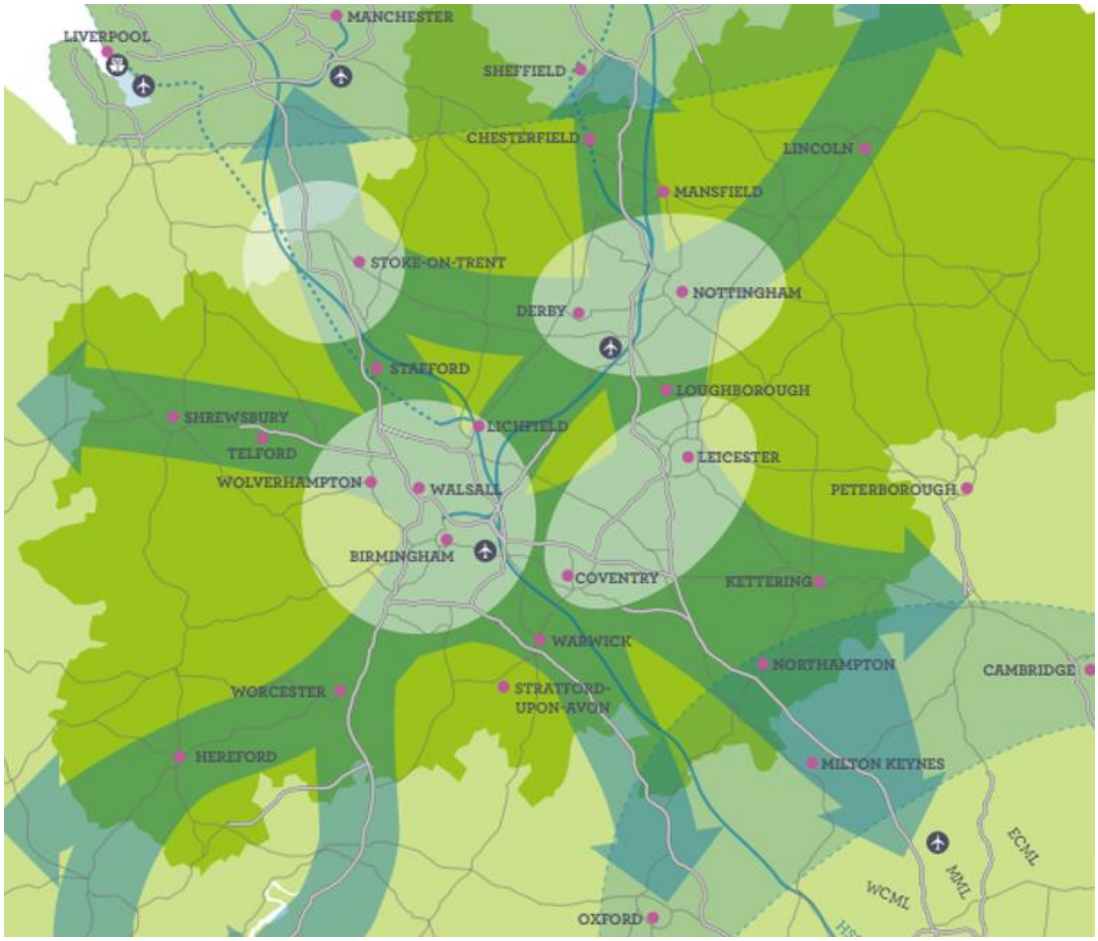


Figure 17 - Midlands Connect Corridors and Hubs

2.4.17. The Shrewsbury NWRR will enhance economic potential in the intensive growth corridor by reducing travel costs, improving connectivity for local businesses, and reducing pressure on congested parts of the A5 Shrewsbury Bypass.

The Marches Strategic Economic Plan: "Accelerating Growth through Opportunity[17]

2.4.18. The Strategic Economic Plan (SEP), submitted to Government by the Marches LEP in March 2014:

- Presents a vision for "a strong, diverse and enterprising business base, operating in an exceptional and connected environment where innovation, investment and economic growth is fostered".
- Considers that transport is a barrier to growth in the Marches because of poor accessibility to employment centres, ageing transport infrastructure and congestion.
- Sets strategic objectives for the LEP's work programme:
  - Supporting business

[17] http://www.marcheslep.org.uk/download/economic_plans/strategic_economic_plan/Marches%20LEP%20SEP%20FINAL310314-2.pdf

- Physical infrastructure
- Skills investment
- Low carbon economy
- Social inclusion

- Identifies the Shrewsbury NWRR as one of six long term infrastructure priorities which would serve the Marches across both urban and rural areas.
- Classified the Shrewsbury NWRR as a "Year 2" project, ready to go in 2016/17
- Considers that the Shrewsbury NWRR would help to deliver 2,645 jobs and 2,900 homes, and that it would have "significant benefits for Shrewsbury, and the town centre in particular".
- Supports the Oxon Link Road as "an incremental step towards the long term provision of the Shrewsbury NWRR.

2.4.19. The Shrewsbury NWRR is part of the SEP strategy, and would help to deliver its objectives by reducing congestion and improving access to jobs and markets.

The Marches LEP –Strategy for Growth (2013 – 2022)

2.4.20. The Marches LEP has developed a 'Strategy for Growth', outlining its vision and strategic priorities up to 2022. A priority investment area for The Marches is transport. The strategy recognises that reducing congestion in urban centres, including Shrewsbury, is a major priority. Transport issues limit movement of the workforce and therefore, can prevent access to jobs.

2.4.21. The Shrewsbury NWRR has the ability to unlock economic potential in the region, by contributing to reductions in travel time costs for businesses and commuters.

The Marches Growth Deal[18, 19]

2.4.22. The Marches Growth Deal, agreed between the Government and the Marches LEP in 2014 and 2015, supports growth in the three urban centres of Hereford, Shrewsbury and Telford, by investing in critical transport and infrastructure improvements. This will enable the development of housing, employment and mixed use development sites, supporting job creation and allowing new homes to be built. The Growth Deal will bring together local, national and private funding as well as new freedoms and flexibilities to focus on two key priority areas:

- Enabling and accelerating new housing and employment sites
- Growing the local skills and business base

2.4.23. The Marches LEP has secured £75.3 million from the Government's Local Growth Fund to support economic growth, and is expected to draw down at least £20 million from local partners and the private sector.

2.4.24. As part of the Growth Deal, the Government agreed priorities and funding allocations for 2016-17 to 2020-21 including:

- Shrewsbury Integrated Transport Package
- Oxon Link Road, Shrewsbury

[18] https://www.gov.uk/government/publications/the-marches-growth-deal
[19] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/399433/The_Marches_Factsheet.pdf

2.4.25. The **Integrated Transport Package** represents the latest phase in delivering transport measures intended to complement and enhance, but not remove the need for, a NWRR. The **Oxon Link Road** will deliver the first section of the Shrewsbury NWRR by providing a link between the A5/A458 junction, west of Shrewsbury, and the B4380 Holyhead Road where it will eventually connect to a new River Severn crossing and the rest of the NWRR.

2.4.26. As noted above, the Shrewsbury NWRR was considered by Government to be too large for inclusion in Growth Deal allocations, and was therefore allocated development funding from the Large Local Majors Fund.

The Marches and Mid-Wales Freight Strategy[20] (2017)

2.4.27. The Freight Strategy has been jointly commissioned by the Marches LEP, the Welsh Government, the Growing Mid-Wales Partnership, and Ceredigion, Gwynedd, Herefordshire, Powys, Shropshire and Telford & Wrekin Councils.

- Its overall aim is "to ensure the efficient movement of freight in the Marches and Mid Wales while minimising impacts on the environment and residents".
- Identifies key issues:
- The quality of the single carriageway road network and the resulting slow journey times and lack of journey time reliability;
- Tailbacks and slower journey times due to the number of farm vehicles that use the network to access farms and fields; and
- Congestion at some junctions and through some towns and cities.

2.4.28. The Freight Strategy identifies the Shrewsbury NWRR as one of eight major road schemes to reduce the bottlenecks on the freight road network, provide journey time savings and increased journey time reliability for freight journeys.

LOCAL POLICIES

Shrewsbury Growth Point[21]

2.4.29. Shrewsbury was allocated Growth Point Status in July 2008 as part of the Government's Growth Point initiative. Though not a statutory designation, Growth Point status is a commitment of support from Central Government to Local Authorities and communities who are working towards sustainable growth. It is a long-term partnership between the government and Shropshire Council which, recognises the ambitions for the growth of Shrewsbury and the unique geographical and economic characteristics of the town.

2.4.30. Shrewsbury has a strong record of economic growth. It is the primary retail, office and commercial centre of Shropshire and the County's primary focus for development. However, its potential is constrained by the natural environment, with the meander of the River Severn causing significant access and development issues. As a sub-regional centre, the challenge for Shrewsbury is to achieve economic and physical development within the constraints of the town's unique form and historic character. It is a challenge relished by residential, commercial and employment-related developers and will offer an opportunity to address the issue of the town's location and significantly improve the urban environment.

---

[20] https://councillors.herefordshire.gov.uk/documents/s50051566/Appendix%201%20Freight%20Strategy%20Executive%20Summary.pdf

[21] https://shropshire.gov.uk/committee-services/Data/Enterprise%20and%20Growth%20Scrutiny%20Committee/20110526/Agenda/10%20Growth%20Point%20Delivery%20Plan%2011-13%20v4.pdf

2.4.31. Local partners' ambitions for the sustainable development of Shrewsbury, in relation to the Growth Point initiative, included:

- 6,500 net additional dwellings by 2026 (3,500 by 2016), to include 100 affordable dwellings per annum;
- 85-95 hectares of additional employment land, including new business park development;
- Two Sustainable Urban Extensions (SUE) in Shrewsbury West and Shrewsbury South;
- Improvements to the town centre, with 20,000m2 gross office floor space provision, 80,000m2 comparison retail floor space, and street enhancements;
- Implementing a package of transport measures to tackle access, traffic and air quality issues for the town and town centre in particular;
- Tackling water resource, supply and treatment issues;
- Major new educational, cultural and health facilities to meet the needs of the county town and its wider catchment area; and
- Protection, enhancement and extension of the town's green network.

2.4.32. Achieving these ambitions will depend on a range of public and private funding programmes. From the public perspective, the Government is committed to working with local partners to achieve sustainable growth and maximise the return on investment and to help overcome obstacles to delivery.

2.4.33. The Shrewsbury NWRR will support the development of the Sustainable Urban Extension (West) and, as such, will support the Growth Point Strategy.

Shropshire Local Plan

2.4.34. The Local Plan is a set of policy documents (Local Development Documents or LDDs) which consider a wide range of important planning issues such as housing, employment, transport and the environment. It has a crucial role in prioritising and shaping development in Shropshire until 2026.

2.4.35. The Core Strategy[22] LDD was adopted in February 2011. It sets out a spatial vision for Shropshire in 2026 in which "Targeted improvements to the County's transport infrastructure will have taken place to widen transport choices and help reduce car dependency, improving accessibility and connectivity both within and beyond Shropshire. This will include … the proposed construction of a Shrewsbury North West Relief Road."

2.4.36. The Core Strategy states that "whilst the condition of the main road network and levels of congestion are generally satisfactory, there are specific concerns with respect to strategic routes such as the A49 and the A5 and around Shrewsbury, where there are also air quality issues. A North-West Relief Road has been proposed to help relieve congestion in Shrewsbury town centre."

2.4.37. Specific policies in the Core Strategy refer to the NWRR, including:

- **Policy CS2. (Shrewsbury – Development Strategy)** The development of the town will have regard to the Shrewsbury Integrated Transport Strategy as advanced through the Shropshire Local Transport Plan, and the proposed Shrewsbury North West Relief Road.

[22] http://shropshire.gov.uk/media/830904/shropshire-core-strategy-2011-reduced.pdf

- **Policy CS7 (Communications and Transport):** … a range of opportunities for communication and transport which meet social, economic and environmental objectives by improving accessibility, managing the need to travel, offering options for different travel needs and reducing the impacts of transport. This will be achieved by … promoting and enabling improvements to the strategic and local highway network including improvements to the A5 Shrewsbury and Oswestry bypasses and promotion of the Shrewsbury North West Relief Road.

2.4.38. The Core Strategy considers that "the sub-regional role of Shrewsbury will also be enhanced through the promotion of the North West Relief Road as the final stage of the Shrewsbury bypasses".

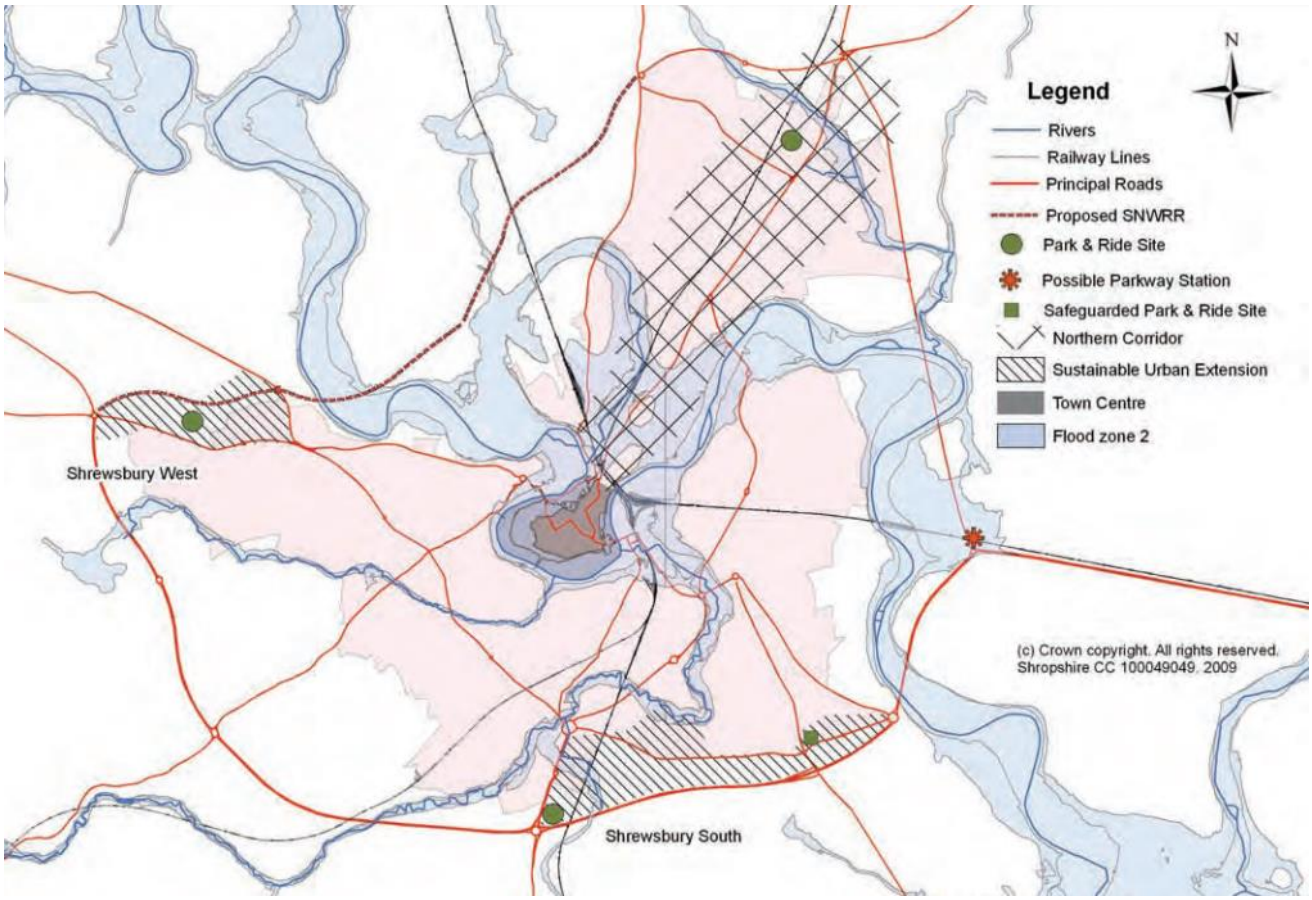


Figure 18 - Shropshire Local Plan – Shrewsbury Key Diagram

2.4.39. The Core Strategy identifies proposed "Sustainable Urban Extensions" to the west and south of the town, and notes that "the Shrewsbury West area enables the delivery of a leg of the proposed Shrewsbury North West Relief Road (NWRR) connecting Churncote Island on the A5 and Holyhead Road [the Oxon Link Road] alongside a mix of housing (approximately 700 dwellings to the north of Welshpool Road), employment (approximately 9-12 hectares of additional employment land), and community facilities provision". The southern part of the SUE West is an expansion of the existing Oxon Business Park, whilst the northern part is being promoted as a location for office and research and development premises based around the medical industry, drawing upon the close links to local hospitals and health facilities. The planned medical focus on part of the business park should lead to an agglomeration of businesses that will thrive on the competition and weight of businesses in this area. This opens up a wider market place for jobs and business opportunities. Businesses in the SUE West will be well placed to reach beyond the Marches LEP area and the West Midlands region, by entering markets in Wales and North West England.

2.4.40. The proposed SUEs, one at Shrewsbury West and the other at Shrewsbury South will together provide 50% of the employment needed for Shrewsbury.

2.4.41. The Core Strategy states that "the implementation of the Shrewsbury Integrated Transport Strategy, with a combination of sustainable transport promotion measures including the Park and Ride facilities, quality bus routes and enhanced walking and cycling facilities provision, is key to the sustainable development of the town given the challenges of the constrained access to and through the town centre and the demand for crosstown traffic. The provision of the Shrewsbury North West Relief Road (NWRR) has been identified as an opportunity to tackle some of these issues. In terms of the strategic road network, limitations on the capacities of the junctions on the Shrewsbury bypasses are a further consideration".

Shropshire Local Transport Plan LTP (2011 – 2026)[23]

2.4.42. The Shropshire Local Transport Plan (LTP) 2011-2026 covers all aspects of transport and highways, including walking, cycling, public transport, car-based travel, freight, and the management and maintenance of highways. It focuses primarily on aspects of transport where Shropshire Council has direct responsibilities.

2.4.43. The Provisional LTP Strategy (2011-2026) outlines the strategic transport objectives and policies for the period 2011 to 2026.

2.4.44. Drafted in 2011, the Provisional LTP Strategy did not at that time expect to be able to deliver the NWRR during the plan period, but stated that the Council would "retain the ability to construct the road in future". To this end Policy E7 stated that "any significant new development along the identified line of a possible future North West Relief Road will be required to either construct part of the road to an appropriate standard or protect the line as appropriate, in order that the future provision of the full road would not be compromised". The planned construction of the Oxon Link Road and SUE (West) reflect this policy.

2.4.45. Other relevant policies in the Provisional Strategy include:

- **Policy E4**, 'Network capacity management hierarchy'. Outlines a hierarchy of measures to tackle and prevent congestion and delays on the local road network, including "New road links or bypasses".
- **Policy E6**, 'Capacity improvements and new roads'. States that where demand and network management measures are not sufficient to deal with network problems building new roads will be considered as a final option.
- **Policy E7**, 'Tackling Shrewsbury's Traffic Problems'. Summarises the key elements of the plan designed to significantly improve active transport mode and public transport networks in Shrewsbury, in order to moderate traffic demand and reduce congestion and traffic volumes passing through Shrewsbury town centre.
- **Policy C7**, 'Improving Air Quality'. Recognises the importance of reducing air pollution, through both general and localised measures. This includes discouraging traffic growth and smoothing traffic flows to reduce vehicle emissions, and reviewing the effectiveness of existing Air Quality Management Area Action Plans (AQMAAPs).
- **Policy C9**, 'Reducing Environmental Impacts'. Shrewsbury's high quality natural and built environment are great assets to the town, and traffic related impacts on it should be minimised.

[23] https://new.shropshire.gov.uk/public-transport/local-transport-plan/

Shrewsbury and Surrounding Area Place Plan (2015-16) [24]

2.4.46. This plan summarises and prioritises the local infrastructure needs required to support the sustainable development of the area. The Plan recognises that focus needs to be placed on developing a strong and robust integrated transport system in Shrewsbury. The Shrewsbury NWRR has been designated 'priority' status by the Place Plan and its implementation will meet the growing needs of the region.

Shropshire Economic Growth Strategy 2017 - 2021[25]

2.4.47. The Shropshire Economic Growth Strategy sets out Shropshire Council's vision, commitment and ambition to grow the local economy. Its objectives are to:

- Support and grow new and existing businesses
- Attract inward investment
- Develop and retain latent talent and skills

2.4.48. To deliver these objectives, it sets six priority actions including:

- Target actions and resources where there are economic opportunities
- Deliver infrastructure to support growth

2.4.49. In respect of the first of these – targeting actions and resources on economic opportunities, the Growth Strategy identifies growth opportunities in Central Shropshire – Shrewsbury, including the major employment sites at Shrewsbury Business Park, Battlefield and the Sustainable Urban Extensions to the south and west of the town.

2.4.50. The Shrewsbury NWRR will directly improve the accessibility of the Battlefield Business Park and the SUE (West), and – by reducing congestion on other local roads, should also benefit Shrewsbury Business Park and the SUE (South).

2.4.51. In respect of the priority action: "deliver infrastructure to support growth", the Growth Strategy identifies "transformational local schemes" including:

- Shrewsbury Integrated Transport Package
- Oxon Link Road
- Shrewsbury NWRR

2.4.52. These three schemes are central to Shropshire Council's transport strategy for Shrewsbury, with the Shrewsbury NWRR being the only one for which delivery is not yet assured. The Strategy confirms the need to "demonstrate clearly the case for investment and articulate with partners how investment in our infrastructure facilitates economic growth".

SUMMARY OF THE BUSINESS STRATEGY

2.4.53. The Government's vision is for a transport system that supports and promotes economic growth and improves the quality of life for people. A well-functioning transport system is key to continued economic success, and to enable delivery of housing, employment and social infrastructure. The Government invests directly in the Strategic Road Network, providing the capacity and connectivity to support economic activity and combat

[24] https://shropshire.gov.uk/media/7212/shrewsbury-place-plan-2015-16.pdf

[25] https://new.shropshire.gov.uk/business-support/economic-growth-strategy-2017-2021/

congestion, and to connect communities. The Government recognises that local roads are a crucial element of the transport system, and provides financial support for key local transport schemes through Growth Deals and Large Local Majors Fund. The Shrewsbury NWRR has been allocated development funding from the Fund.

2.4.54. Government policy and guidance also emphasises the need for sustainable development, and for a transport system which is greener, safer and improves people's quality of life. Limiting carbon emissions, improving local air quality and protecting the built and natural environment are critical factors.

2.4.55. Regional transport strategies define corridors for growth, including the Birmingham – Telford – Shrewsbury corridor, in which improved connectivity will facilitate business clustering, unlock economic potential and create jobs. However, congestion, ageing transport infrastructure and poor accessibility to employment centres are identified in The Marches Strategic Economic Plan as barriers to growth. The Shrewsbury NWRR will help deliver homes and jobs by improving connectivity and reducing congestion in Shrewsbury.

2.4.56. The challenge for Shrewsbury is to achieve economic and physical development within the constraints of the town's unique form and character. Connectivity between north and west is constrained by the River Severn and the islanded town centre. Planned growth is focused on two urban extensions, providing new homes and jobs in sustainable locations to the south and west. Local strategies and plans identify three linked transport schemes to support these: Shrewsbury Integrated Transport Package, Oxon Link Road and the Shrewsbury NWRR. The NWRR will link new and established employment clusters to wider markets, whilst enabling the local transport network to continue functioning efficiently into the future.

2.5 THE NEED FOR THE SCHEME – PROBLEMS IDENTIFIED

UNDERLYING CAUSES

2.5.1. The lack of a direct road link between the northern and western parts of the town has been a major source of traffic problems for a very long time. Both the northern and western approaches to the town centre are heavily congested at peak times, and the presence of through traffic in the town centre leads to long queues and delays, blocking back through key junctions. None of these routes is suitable for this traffic, but there are no practical alternatives for most trips.

2.5.2. Other problems arise directly from this fundamental weakness in Shrewsbury's transport network. Noise, visual intrusion and poor air quality affect people in residential areas and the town centre, as well as people walking and cycling. Accident rates are higher on roads not designed to modern standards. Journeys to work and for business can be slow and unreliable, adding to the cost of transport (including public transport) and discouraging investment.

2.5.3. Over the past 30 years, Shrewsbury has grown in size and background traffic has increased. This growth has been accommodated through investment in transport links on the north, east and south sides of the town, including the A5/A49 bypass, the distributor ring road and the Battlefield Link Road. Cycle and pedestrian infrastructure has been improved, Park and Ride services introduced and significant enhancements made to the historic centre. By comparison, there has been little or no road investment in the north-west corridor, because this would require a new crossing of the River Severn, and because of this the problems described above remain unresolved.

2.5.4. Shrewsbury continues to grow. New development is already under way at the southern Sustainable Urban Extension (SUE), and further growth is planned at the western SUE. Nationally, traffic levels are starting to rise again after the years of recession. The highway network is again under strain. One consequence of this is that incidents on one part of the network quickly lead to traffic backing up, or diverting, causing problems over a wider area. This lack of resilience is a concern. As traffic demand increases, we expect to see more traffic on the north-west corridor through the town, increased congestion, queuing and delay, adverse impacts on noise and air quality and increased transport costs to the regional and local economy.

CURRENT TRANSPORT-RELATED PROBLEMS

2.5.5. The current transport related problems which the scheme needs to address are:

- Poor connectivity between the north and west of Shrewsbury for all modes of transport
- Traffic congestion in Shrewsbury Town Centre
- Traffic congestion on the northern and western approaches to the town
- Traffic congestion on Shrewsbury's outer bypass and distributor ring roads
- Unreliable journey times and long delays
- "Rat-running" traffic on unsuitable rural roads
- Inefficiency of the transport network, especially for buses
- Lack of network resilience
- Road accidents
- Poor air quality
- Carbon and other greenhouse gas emissions

Poor connectivity between the north and west of Shrewsbury for all modes of transport

2.5.6. As the town of Shrewsbury grew in the 19th and 20th centuries, almost all of the development took place in the NE, SE and SW quadrants of the town. Throughout the 20th century, the town's road infrastructure developed to accommodate this growth – again entirely within the NE, SE and SW quadrants. A bypass of the original A5, completed in 1933, now forms a section of a partial inner ring road (B4380) through the western and southern inter-war suburbs. More recently constructed, modern roads, originally part of the A49, extend this partial ring to serve post-war suburbs in the east and north of the town. In the 1980s, new outer bypasses for the A5 and A49 were built on the south and east sides of the town respectively. As a result, Shrewsbury is well connected to the West Midlands and the national motorway network, and there are good connections into, within and between the NE and SE, and the SE and SW suburbs. There are three road crossings of the meandering River Severn in the town centre, one on the distributor ring road and four on the outer bypasses.

2.5.7. Within the NW sector, the picture is completely different. There is no crossing of the River Severn between the Welsh Bridge in the town centre and Montford Bridge on the B4380, some 6 km further east. The area is generally undeveloped, forming a "green wedge" extending almost all the way into the centre.

2.5.8. As a result, connectivity across the NW sector is very poor. Consider, for example a journey between the Oxon Business Park and the Battlefield Enterprise Park. Table 8 shows distances and typical journey times[26] for the alternative routes illustrated in Figure 19.

Table 8 - Journey times and distances, NW sector (Oxon to Battlefield)

[26] based on Google Maps, 23 October 2017

Battlefield to Oxon (N-W)	As the crow flies	Via Montford Bridge and Leaton (rat run)	Via A5 and A49 (outer bypasses)	Via B4380 and A5112 (distributor ring)	Via town centre (Welsh Bridge and Smithfield Road)
Journey distance (km)	3.5 miles	10.2 miles	11.9 miles	7.4 miles	5.6 miles
Typical free-flow	-	20 min	18 min	18 min	18 min
Typical a.m.peak period time		18 – 22 min	18 – 35 min	18 – 26 min	16 – 24 min
Typical p.m. peak period time		18 – 24 min	20 – 35 min	20 – 30 min	18 – 26 min

Oxon to Battlefield (W-N)	As the crow flies	Via Montford Bridge and Leaton (rat run)	Via A5 and A49 (outer bypasses)	Via B4380 and A5112 (distributor ring)	Via town centre (Welsh Bridge and Smithfield Road)
Journey distance (km)	3.5 miles	10.2 miles	11.9 miles	7.4 miles	5.6 miles
Typical free-flow	-	20 min	18 min	18 min	14 min
Typical a.m.peak period time		18 – 22 min	18 – 35 min	18 – 24 min	14 – 20 min
Typical p.m. peak period time		18 – 22 min	18 – 28 min	18 – 26 min	14 – 22 min

2.5.9. As can be seen, the lack of connectivity in the NW sector of the town means that these two locations, which are only 3.5 miles apart " as the crow flies" are nearly six miles apart by the shortest road route, a journey which can take 20 minutes or more at busy times. Drivers have a choice of routes – the shortest distance, 5.6 miles, being via the town centre, which is subject to congestion on the approaches to the "river loop" and on the Smithfield Road corridor. The outer bypasses provide an alternative route, similar in terms of overall time but at 11.9 miles more than twice the distance. Traffic between the N and W sectors of town adds traffic to both the outer bypasses and the partial distributor ring road, reducing the level of service these routes offer to other traffic which they were primarily designed to carry. The journey time examples also illustrate the potential attractiveness at busy times of the 10.2 mile rat-run along minor rural roads via Montford Bridge, Leaton and Huffley Lane.

Figure 19 - Alternative routes between Oxon and the Battlefield Enterprise Park

2.5.10. The example journey was selected because it illustrates how two important employment areas of Shrewsbury – the established Battlefield Enterprise Park and the emerging Oxon Business Park – are not as well connected to each other as might at first seem. There is an opportunity to improve this situation by providing a new river crossing and NW link.

Traffic congestion in Shrewsbury Town Centre

2.5.11. Shrewsbury's town centre is almost completely surrounded by a loop of the River Severn. There are just three main points of entry and a largely unaltered mediaeval street pattern. A toll bridge provides a minor additional point of entry from the southern suburbs.

2.5.12. The main shopping streets (High Street, Castle Street, Pride Hill) do not form part of the N-W corridor. Traffic on these streets has been managed over recent years by a combination of pedestrian priority, traffic calming and enhancement, and by ensuring alternative routes are available for through traffic. The direct corridor passes though the town centre on the route illustrated in Figure 20 comprising (from west to north):

- Frankwell
- Welsh Bridge
- A458 Mardol Quay and Smithfield Road
- A528 Chester Street Gyratory

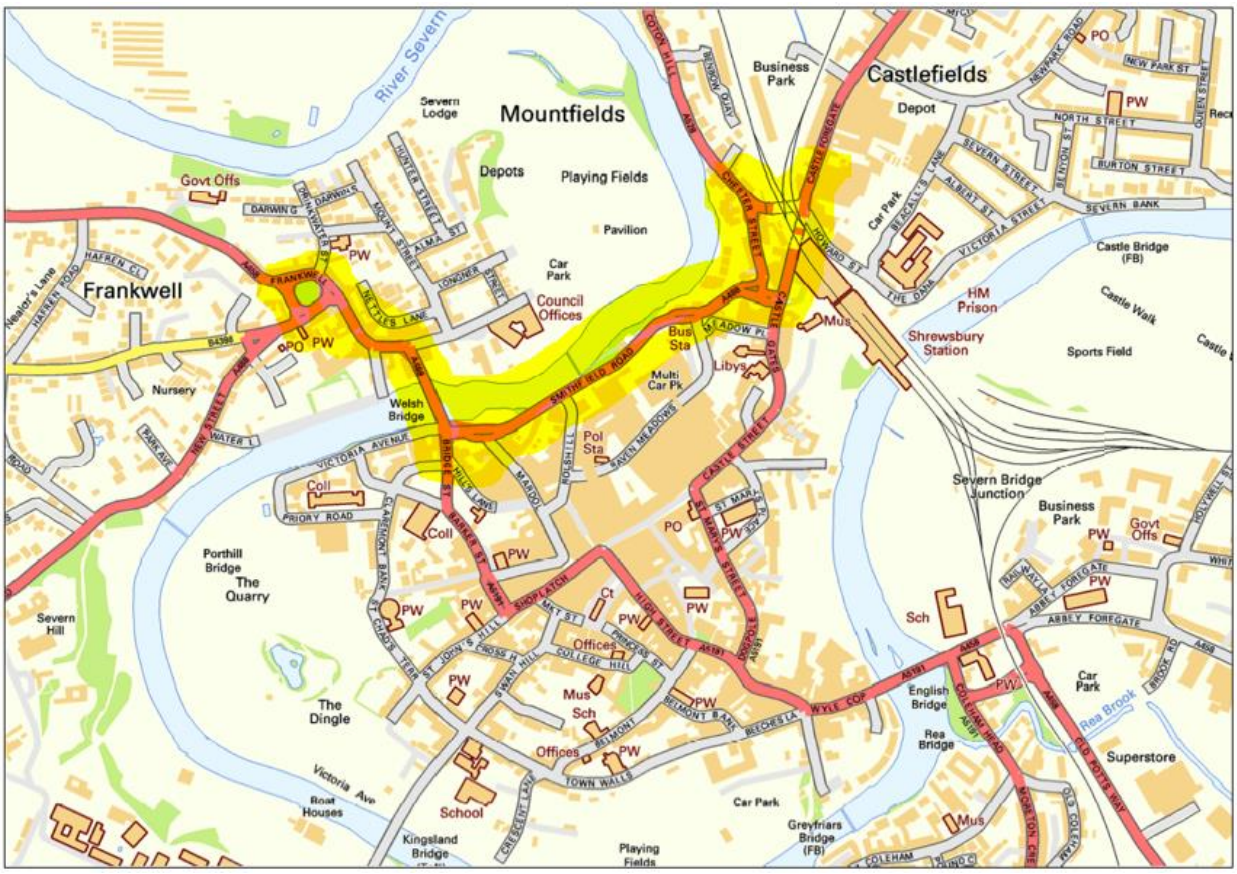


Figure 20 - Town Centre Highway Network – NW corridor

2.5.13. These roads are subject to significant congestion in the morning and evening peak periods, and at other busy times of the day.

- At **Frankwell**, where the traffic island is bordered by local shops, traffic backs up along the Mount and Copthorne Road, and blocks the junction with New Street. Congestion around Frankwell causes delays to traffic on both the NW corridor and local traffic, including people wanting to access the large Frankwell car park on the north side of the river.
- The **Welsh Bridge** has just one lane in each direction. Its junction with Bridge Street, Mardol Quay and Victoria Avenue is controlled by traffic signals, linked to pedestrian crossings and the adjacent junction with Claremont Bank. Despite recent improvements, both these junctions suffer queuing and delay at busy periods, and are a source of frustration to local drivers, including drivers requiring access to town centre car parks in the Bridge Street area.
- **Smithfield Road** is subject to queueing and delay at peak periods, and this affects local traffic seeking to access the main town centre car parks (e.g. Raven Meadows) as well as traffic on the NW corridor. It is also a very important bus route, providing the main access to Shrewsbury Bus Station at Meadow Place. Buses represent 3.6% of all traffic. In 2016, the road carried approximately 23,350 motor vehicles[27] over an average 24-hour period. The Design Manual for Roads and Bridges (DMRB) recommends that two-way daily traffic flows on a typical single carriageway principal road should range between 20,000 and 23,000[28]. On this basis Smithfield Road is operating at full capacity, with little scope to increase further. It is likely that any additional demand in the NW corridor would put pressure on alternative routes, though the corollary of this is that traffic presently using other routes might re-route to Smithfield Road if capacity was available. 94% of traffic consists of cars, taxis and light goods vehicles. HGVs represent about 1% of traffic.
- **Chester Street gyratory** is severely constricted by the two large, low railway bridges at the approaches to Shrewsbury Station. Despite some recent improvements, it remains a difficult area for pedestrians and cyclists. At busy times, traffic forms long queues on Chester Street and Castle Foregate, constraining vehicular access to the railway station and other parts of the town centre. This congestion affects buses and taxis, as well as general traffic.

Table 9 - Traffic volume and composition Smithfield Road (24 hrs)

	2016 (vehs)	2016 (%)	2017 (vehs)	2017 (%)
HGV	236	1.0	231	1.0
LGV	2,855	12.0	3,067	13.0
Bus and coach	855	3.6	858	3.6
Car and taxi	19,246	81.6	18,982	80.6
Motorcycles	217	0.9	214	0.9
Pedal Cycles	222	0.9	205	0.9
TOTAL	**23,811**	**100.0**	**23,557**	**100.0**

(DfT traffic counts 2016 and 2017)

2.5.14. There is little scope for further improvement of these roads, due to the historic environment (Frankwell), lack of space and proximity of the river (Smithfield Road), and restrictive railway infrastructure (Chester Street Gyratory).

[27] Department for Transport Traffic Counts, Count ID 18556 (2016)
[28] Design Manual for Roads and Bridges, Volume 5 Section 1, Part 3 TA 46/97

2.5.15. Representative 2-way traffic volumes on sections of the NW corridor within the town centre are set out in Table 10 below. Forecast traffic on the same sections of road will be examined later in the Strategic Case to demonstrate the expected impact of the NWRR.

Table 10 - Smithfield Road Corridor – traffic volumes

Modelled 2-way traffic flow 2017	Frankwell	Welsh Bridge	Mardol Quay	Smithfield Road	Chester Street (part of gyratory)	Castle Foregate (part of gyratory)
a.m. peak	2,088	1,920	2,093	1,753	1,047	1,044
p.m. peak	1,819	1,629	1,891	1,754	913	892
A.A.D.T.	21,418	19,178	22,718	20,021	11,406	10,898

2.5.16. Automatic Number Plate Recognition (ANPR) surveys undertaken in March 2012 showed that most of the traffic using the Smithfield Road corridor was “through traffic” in that it did not have an intermediate destination in the town centre. The survey did not distinguish between long distance through traffic and “local through traffic” (i.e. between different areas of Shrewsbury). Some 93% of eastbound trips observed at the Welsh Bridge and Coton Hill, and 91% of those observed at Welsh Bridge and Castle Foregate were through trips according to this definition, as were 87% of the eastbound trips observed at Coton Hill or Castle Foregate and Welsh Bridge.

2.5.17. **Traffic congestion on the northern approaches to the town**

2.5.18. As noted above, the shortest (though not always the fastest) route for traffic between the north and west sectors of the town is via the river loop. Congestion is a problem on most of the radial routes leading into the town from the north and the west, as described below and in the succeeding section.

2.5.19. Two key radial routes approach from the north:

- A528 Ellesmere Road and Coton Hill
- A5119 Battlefield Road, Whitchurch Road, Ditherington, Spring Gardens, St Michael’s Street and Castle Foregate

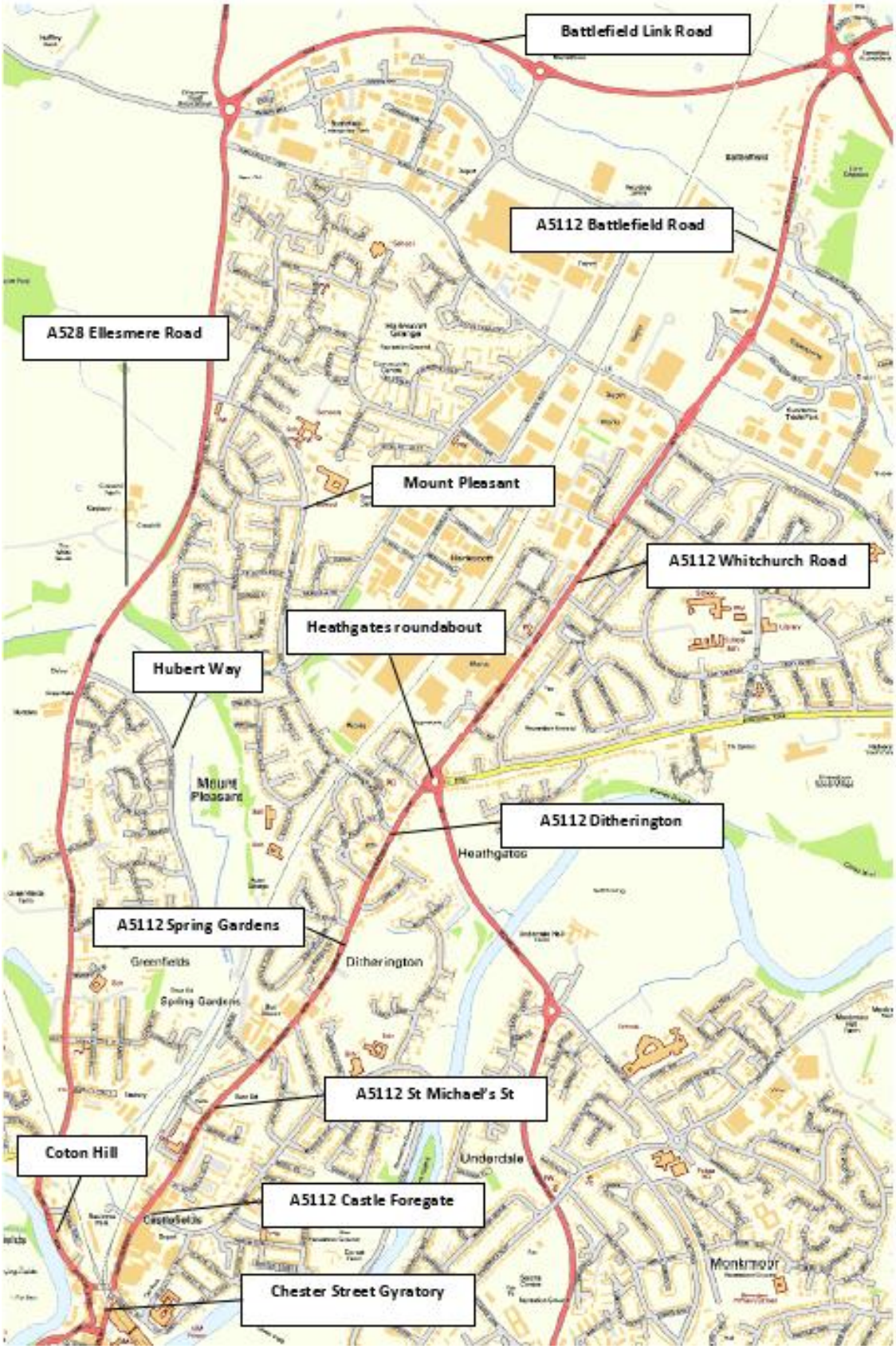


Figure 21 – Northern approaches to Shrewsbury Town Centre

2.5.20. Representative two-way peak hour traffic volumes on each section of the **A528 route** are set out in Table 11 below. Forecast traffic on the same sections of road will be examined later in the Strategic Case to demonstrate the expected impact of the NWRR.

Table 11 – Northern approaches (A528) – traffic volumes

Modelled traffic flow, 2017	Ellesmere Road (north of Mount Pleasant)	Ellesmere Road (Mt Pleasant to Hubert Way)	Ellesmere Road (South of Hubert Way)	Coton Hill
a.m. peak	1,188	1,087	1,040	1,228
p.m. peak	1,162	983	905	978
A.A.D.T.	12,919	11,536	10,662	12,200

2.5.21. To the north of Hubert Way, A528 Ellesmere Road is semi-rural with no frontage development. South of Hubert Way, this character gradually changes to include some limited frontage development which then becomes denser with terrace housing towards the southern end. Coton Hill has residential frontage development, and as it approaches the town centre skirts the river with recently built houses and flats on its north side.

2.5.22. Typical uncongested speeds on the full 2.2 mile long route (from Battlefield Link Road to the Chester Street Gyratory) average about 26 mph. However, at the busiest periods, the average southbound speed can fall to around 15 mph, adding up to 4 minutes to the journey duration. Coton Hill is subject to the most severe queuing and delays, due to the limited capacity of the Chester Street gyratory, and queuing also extends northwards along Ellesmere Road from the junction with B5067 Coton Hill. Congestion on these sections is not limited to peak periods, but can occur at various times of the day, depending on conditions.

2.5.23. Representative traffic peak hour traffic volumes on the **A5112** are set out in Table 12 below. Forecast traffic on the same sections of road will be examined later in the Strategic Case to demonstrate the expected impact of the NWRR.

Table 12 – Northern approaches (A5112) – peak hour traffic volumes

Modelled traffic flow, 2017	Whitchurch Road	Ditherington	Spring Gardens	St. Michael's Street	Castle Foregate
a.m. peak	919	1,288	1,169	604	790
p.m. peak	836	1,351	1,245	685	781
Inter-peak	9,798	14,835	13,480	7,932	9,755

2.5.24. Battlefield Road is residential at its northern end, quickly giving way to mixed commercial development, including several car dealerships. South of the Harlescott Lane junction, Whitchurch Road has a mixture of residential frontages, a supermarket and the Doncaster Aerospace Components Factory (former Sentinel works). South of the Heathgates roundabout, Ditherington is mainly residential with some local retail units. Spring Gardens provides access to some traditional housing and extensive newer flats and houses constructed on brownfield sites. It also serves the old Flaxmill (Ditherington Maltings), an important historic building which is currently being restored. St Michael's Street has new and Victorian terraced housing, and is subject to on-street parking. It also gives access to the town's fire station and commercial development. Castle Foregate has Victorian terraced housing with some modern infill, giving way to local shops and business premises on the approach to the Chester Street gyratory.

2.5.25. Typical uncongested speeds on the full 2.9 mile length of road average about 22 mph. However, at busy periods, the average southbound speed can fall to as low as 9 mph, adding up to 12 minutes to a typical journey duration. Castle Foregate and St Michael's Street are subject to the most severe queuing and delays, due to the limited capacity of the Chester Street gyratory, and congestion also occurs on Ditherington and Whitchurch Road associated with the busy Heathgates roundabout and Harlescott Lane traffic signals. Congestion is not limited to peak periods, but can occur at various times of the day, depending on conditions.

2.5.26. Both the A528 and the A5112 provide routes towards the town centre from the residential and employment areas in north Shrewsbury. Drivers will often choose the route that appears less congested, especially with satellite navigation.

Traffic congestion on the western approaches to the town

2.5.27. Three radial routes approach the town centre from the west:

- A458 The Mount
- B4386 Copthorne Road
- A488 New Street

2.5.28. All three of these roads are residential, with frontage development along their full length and some on-street parking. The Mount and New Street are flanked by Victorian and Edwardian houses, whilst Copthorne Road serves inter-war housing and the former army barracks. These roads provide indirect access to the large estates of inter-war housing between the B4380 Roman Road and Frankwell, and to several schools.

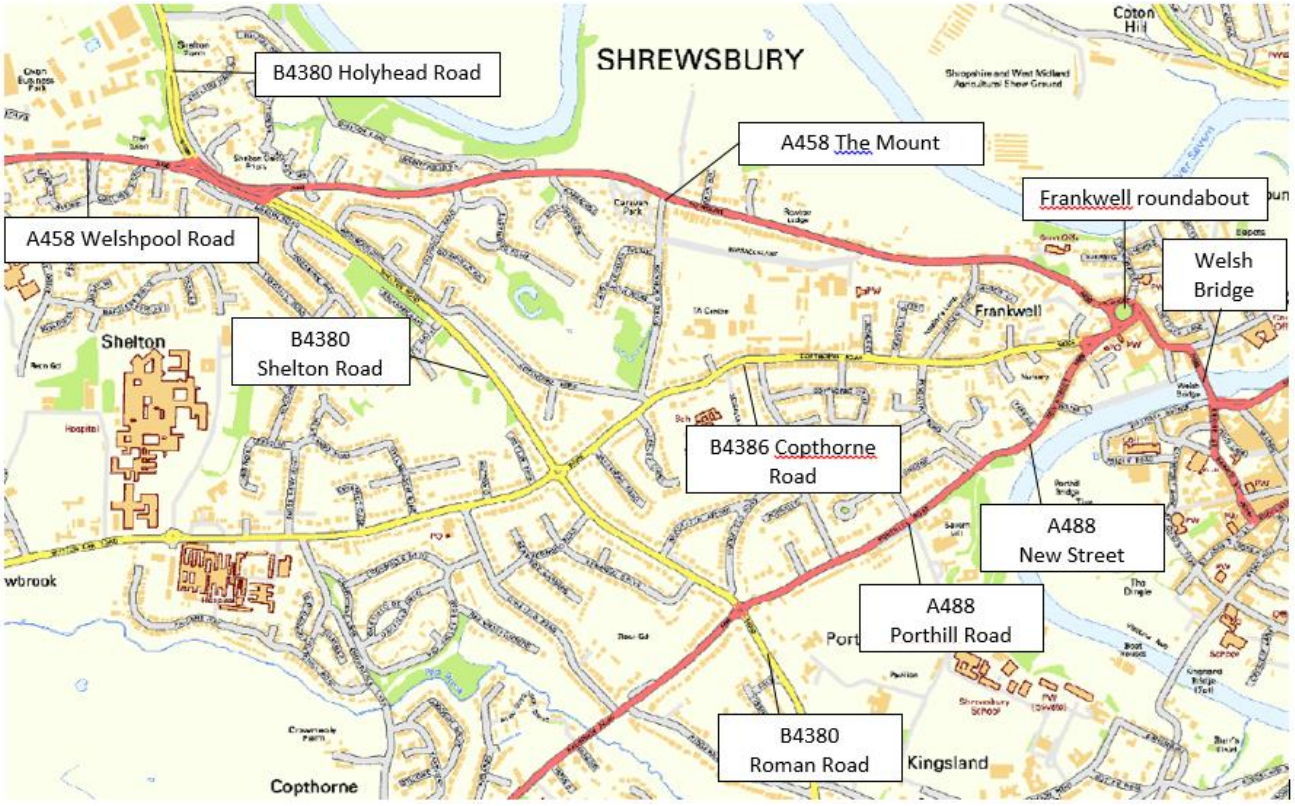


Figure 22 – Western approaches to Shrewsbury town centre

2.5.29. Representative traffic peak hour traffic volumes on the western approaches are set out in Table 13 below. Forecast traffic on the same sections of road will be examined later in the Strategic Case to demonstrate the expected impact of the NWRR.

Table 13 – Western approaches – traffic volumes

Modelled traffic flow, 2017	A458 The Mount	B4386 Copthorne Road	A488 New Street
a.m. peak	670	839	631
p.m. peak	638	717	532
A.A.D.T.	7,424	7,959	6,333

2.5.30. Typical uncongested average speeds on these routes (between their junctions with the B4380 and Frankwell) are 15 to 20 mph. These can typically fall to between 9 and 13 mph at the busiest periods, adding up to 2 or 3 minutes to a typical journey.

2.5.31. The main cause of congestion on these approaches is queuing at the Frankwell Roundabout, where the three radial roads converge before entering the "river loop" by the Welsh Bridge. At busy times, traffic backs up from the Frankwell Quay junction, through the roundabout and along Copthorne Road. This makes it difficult for traffic on The Mount to enter the roundabout, and this movement has to rely on other drivers giving way. Similarly, traffic queuing on Copthorne Road blocks the exit from New Street onto Copthorne Road, leading to queuing back along New Street. Individual vehicles may try to minimise their delay by using Pengwern Road, a residential street which links New Street and Copthorne Road.

2.5.32. Modelled 2017 journey times on the north – west corridor through the town centre (between A5/A458 Churncote Roundabout and A49/A53 Battlefield Roundabout) are summarised in Table 14.

Table 14 – Journey times on north – west corridor via the town centre (2017)

From	To	2017 a.m. peak	2017 inter-peak	2017 p.m. peak
Churncote Roundabout	Battlefield Roundabout	22 mins 31 secs	20 mins 24 secs	21 mins 5 secs
Battlefield Roundabout	Churncote Roundabout	21 mins 10 secs	19 mins 56 secs	21 mins 5 secs

2.5.33. Forecast journey times on the same route are examined later in the Strategic Case to demonstrate the expected impact of the NWRR in reducing congestion.

Unreliable journey times and long delays

2.5.34. On congested roads and junctions, queueing and congestion is not uniform but can vary from month to month, day to day, or even within peak periods. For this reason, individual journeys may on occasions be delayed by more than the average amounts, and queues can build up and reduce rapidly over a short period of time. This can make perceptions of delay worse than average figures suggest, and means that journey times will be less reliable than on uncongested routes. People travelling to work, for example, or to a fixed appointment need to allow more time to avoid the risk of being delayed.

"Rat-running" traffic on unsuitable rural roads

2.5.35. The lack of purpose-built road between the north and west of Shrewsbury, and the congestion on the routes into and through the town centre, means that some traffic finds it attractive to use the network of minor roads in the north-west sector, illustrated in **Figure 23**. This has been a longstanding source of concern locally. These routes are, for the most part, unclassified country lanes with, but there are also concerns about through traffic, including HGVs on the B4397 and B5067 through the villages of Baschurch and Ruyton XI Towns, and on the road through Bomere Heath.

2.5.36.

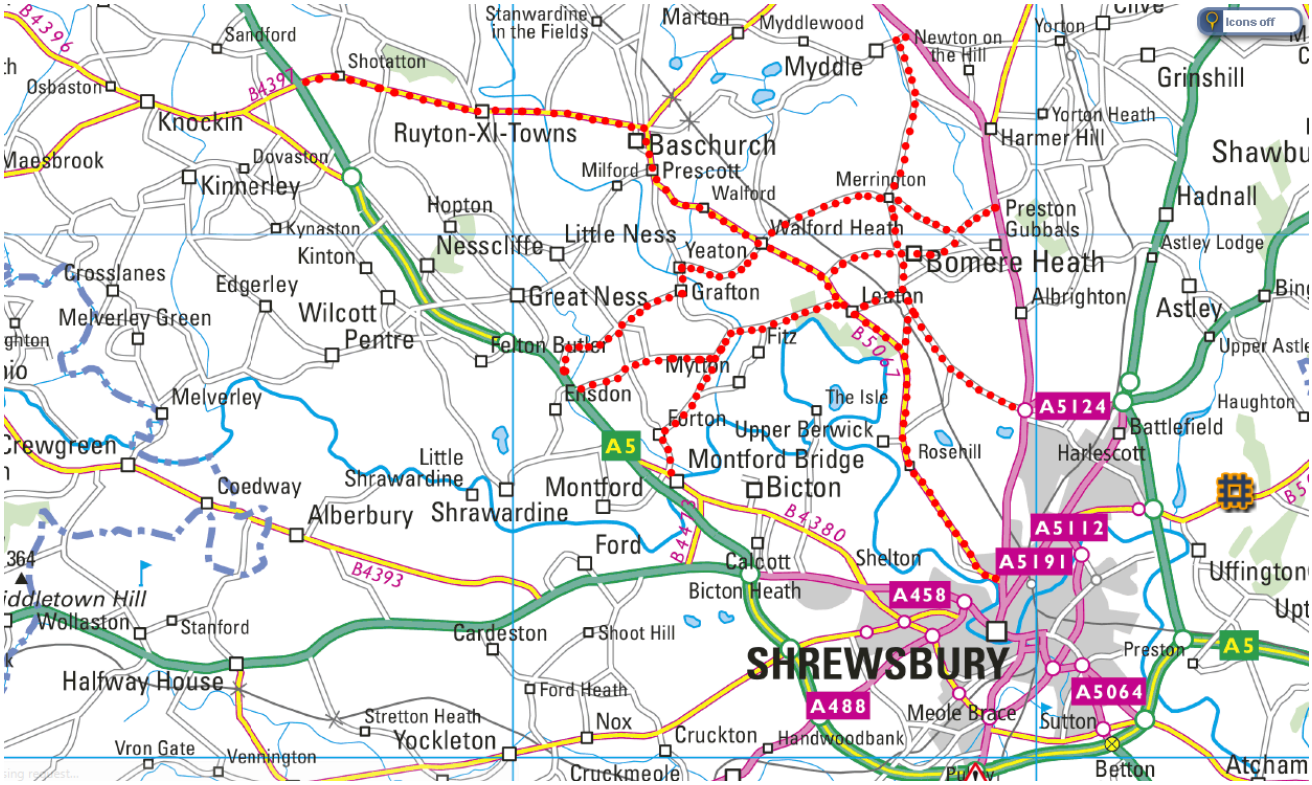


Figure 23 - Rat-runs on minor roads in the N-W sector of Shrewsbury

2.5.37. In the absence of a north-west relief road, these routes do provide a tempting alternative for through journeys that do not have either origin or destination in the areas affected, including journeys generated by the Battlefield Enterprise Park and development at Oxon.

2.5.38. A registration number survey was undertaken on 21/22 April 2009 to determine how many of the goods vehicles using the B4397 through Ruyton XI towns had neither origin nor destination in the local area. Over an average 7.5 hour period, 204 goods vehicles (two way, LGV and HGV) were observed using the B4397 at Shottaton Crossroads. Examination of registration number matches led to the conclusion that approximately 10% of these were through traffic.[29]

2.5.39. Representative traffic volumes on some of the routes affected are set out in – "Rat run" routes – traffic volumes**Error! Reference source not found. Error! Reference source not found.**.

Table 15 – "Rat run" routes – traffic volumes

Modelled traffic flow, 2017	a.m. peak (veh)	p.m. peak (veh)	A.A.D.T. (veh)
B4473 Preston Montford Lane	119	149	1,247
North of Montford Bridge	346	299	3,001
West of Leaton	280	229	2,408
North of Leaton	506	636	5,819

[29] Ruyton XI Towns Goods Vehicle Survey Analysis v2, Technical report to Shropshire CC, October 2009

East of Leaton	565	641	5,976
Berwick Road, south of Leaton	62	98	879
Huffley Lane	498	607	5,405

2.5.40. Forecast traffic on the same sections of road will be examined later in the Strategic Case to demonstrate the expected impact of the NWRR.

Traffic congestion on Shrewsbury's outer bypass and distributor ring roads

2.5.41. The problem of congestion on the trunk road A5 Shrewsbury Bypass is evident from DfT forecasts of congestion on the Strategic Road Network in 2010 (Figure 24), based on the National Traffic Model (NTM), cited in the Government's 2017 Transport Investment Strategy[30].

2.5.42. The section of the A5 bypass between the A49 (south) at Dobbies roundabout and A49 (north) at Preston Boats roundabout, on the eastern side of Shrewsbury, is already subject to regular congestion at peak times. This situation is not improved by the fact that through traffic between north and west, including HGVs, is directed around the bypass because of the lack of suitable routes in the NW sector.

2.5.43. Representative traffic volumes on the A5/A49 bypass are set out in Table 16 below.

Table 16 – Traffic volumes on A5/A49 bypasses

Modelled traffic flow, 2017	a.m. peak (veh)	p.m. peak (veh)	A.A.D.T. (veh)
A5 (Montford Bridge to Churncote)	1,655	1,600	17,872
A5 (Churncote to B3486)	2,282	2,386	26,060
A5 (B4386 to A488)	2,942	2,912	31,056
A5 (A488 to A49 Dobbies RB)	3,501	3,422	36,601
A5 (A49 Dobbies RB to A458 Weeping Cross)	4,006	4,156	42,998
A5 (A458 Weeping Cross to B4380 Emstrey)	3,164	3,327	34,336
A5 (B4380 Emstrey to Preston Boats)	3,754	3,819	39,772
A49 (A5 Preston Boats to B5062)	2,518	2,667	27,029
A49 (B5062 to Battlefield)	1,616	1,780	18,572

2.5.44. Forecast traffic on the same sections of road will be examined later in the Strategic Case to demonstrate the expected impact of the NWRR.

[30] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/627306/transport-investment-strategy.docx

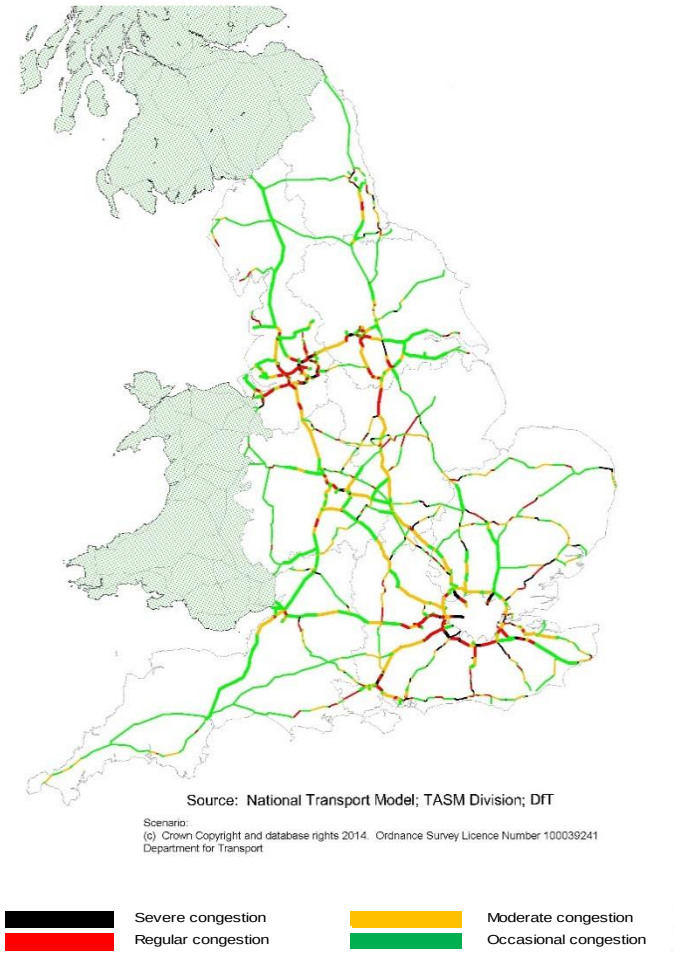


Figure 24 – Trunk road congestion 2010

2.5.45. Shrewsbury's outer bypass and its partial ring of distributor roads work together to provide routes for local and longer distance through traffic, and this is key to keeping unnecessary traffic away from the historic town centre. Congestion on the outer bypass can lead to additional pressure on the distributor ring, and this too can become congested at peak times.

2.5.46. Representative traffic volumes on the distributor ring road are set out in Table 17 below.

Table 17 – Traffic volumes on distributor ring road

Modelled traffic flow, 2017	a.m. peak (veh)	p.m. peak (veh)	A.A.D.T. (veh)
B4380 Shelton Road (The Mount to Mytton Oak Rd)	948	977	8,795
B4380 Shelton Road (Mytton Oak Rd to Radbrook Rd)	1,195	1,129	12,077
B4380 Roman Road (Radbrook Rd to Longden Rd)	1,484	1,501	15,672
B4380 Roman Road (Longden Rd to Meole Brace Isl)	1,423	1,529	15,987
A5112 Hazledine Way (Meole Brace to Reabrook RB)	1,266	1,271	14,703
A5112 Pritchard Way (Reabrook RB to Old Potts Way)	1,394	1,343	15,405
A5112 Bage Way (Old Potts Way to Crowmere Rd)	1,563	1,543	17,036

A5112 Robertson Way (Crowmere Rd to Telford Way)	1,866	1,821	20,980
A5112 Telford Way	2,300	2,276	26,005

2.5.47. Forecast traffic on the same sections of road will be examined later in the Strategic Case to demonstrate the expected impact of the NWRR.

2.5.48. **Inefficiency of the transport network, especially for buses**

2.5.49. The north-west corridor is heavily used by buses in Shrewsbury. As illustrated in Figure 25, most bus services from north Shrewsbury are concentrated on the A5112 Whitchurch Road approach which is heavily congested at peak times. The town bus station is located at the north-east end of Smithfield Road, near to the railway station, and as a result Smithfield Road carries more buses than any other road in Shrewsbury – between 30 and 35 local buses per hour. The bus station is not used by Park and Ride services, but all three routes use Smithfield Road to complete their circuit around the town centre. The Harlescott and Oxon Park and Ride services respectively use the northern and western approaches to the town, as illustrated in Figure 26. As noted, these routes are congested, particularly at peak times.

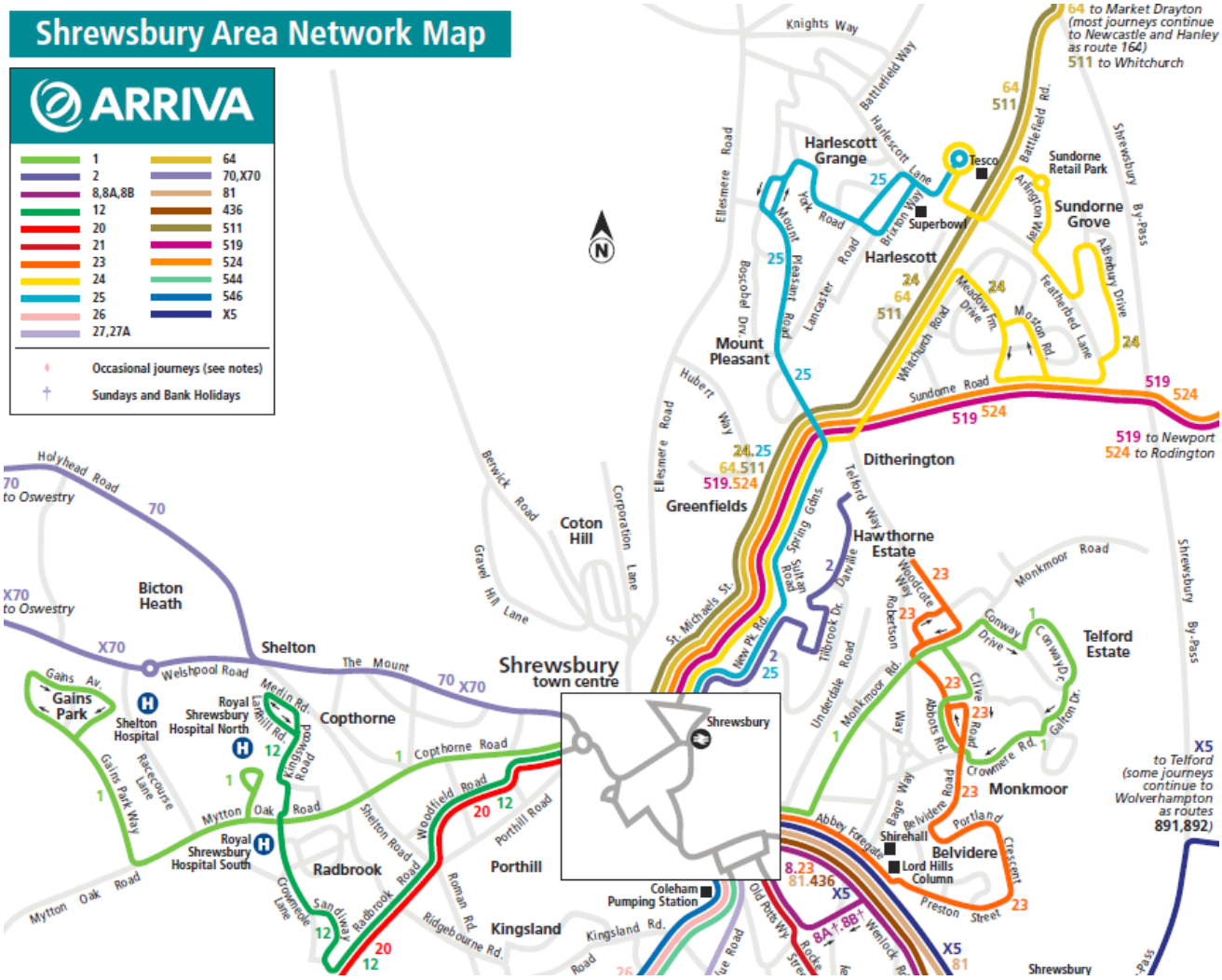


Figure 25 - Bus routes in Shrewsbury

2.5.50. Buses have to share local roads with general traffic, so when there is congestion, bus services are also delayed. This makes services less efficient and less reliable, whilst also being more expensive to operate, reducing the attractiveness of this more sustainable mode of transport.

2.5.51. Congestion on the northern and western approaches, and on Smithfield Road, makes Shrewsbury's transport network less efficient for other transport users too. It reduces the accessibility of town's railway station for traffic from all directions, and also affects people trying to access the town's main car park at Raven Meadows, off Smithfield Road.

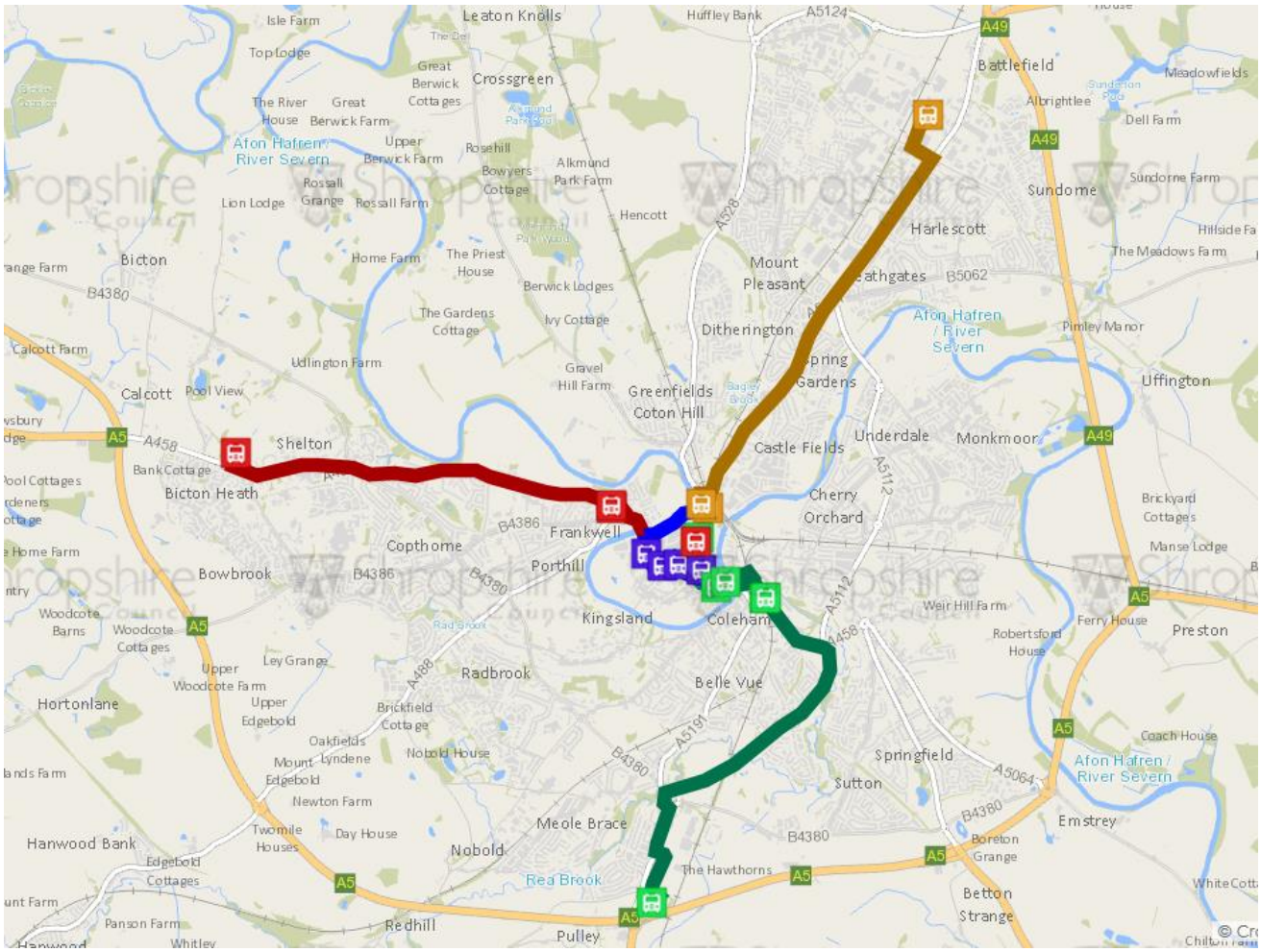


Figure 26 - Park and Ride routes

Lack of network resilience

2.5.52. Resilience in a transport network has been defined[31] as "the ability to absorb shocks gracefully". It may be understood in terms of the way different components of the network work complement each other:

- **Redundancy** Different components serving the same function

[31] Resilience Theory and System Evaluation, Verification and Validation of Complex Systems: Human Factor Issues, Vol.110, p35-60, Harold Foster (1993)

- **Diversity** Components are functionally different
- **Efficiency** Network performance is optimised
- **Autonomy** Components are able to function separately
- **Strength** Ability to withstand a disruptive event
- **Collaboration** Information and resources shared amongst components
- **Adaptability** Flexible, able to learn from past experiences
- **Mobility** Ability to reach a chosen destination with an acceptable level of service
- **Safety** Exposes fewer users to hazards
- **Recovery** Level of service can be restored quickly

2.5.53. Lack of resilience is a problem if a transport network is unable to cope with disruptive events, such as surges in demand, accidents, extreme weather conditions or road works. The more common the event, the more important it is for the network to be able to recover quickly in order to restore an acceptable level of service and avoid compounding the problem.

2.5.54. Lack of network resilience can be a problem in Shrewsbury because of the lack of acceptable alternatives for trips between north and west. The shortest route via the town centre is often congested. The "rat runs" through rural lanes are unacceptable and inefficient. The "longer ways round" via the distributor ring road or outer bypass to the south and east of Shrewsbury use up valuable capacity on these routes, and detract from the primary function of these roads. In terms of resilience, there is a lack of **redundancy**, **diversity** and **efficiency** in the network in the north west sector.

2.5.55. Incidents such as accidents or major roadworks on any of these routes[32] can cause more widespread and long-lasting disruption because of the lack of suitable alternative routes. Also, as already noted, journey times to key destinations such as the bus and railway stations can be unpredictable during peak periods. In terms of resilience, there is a lack of **strength**, **recovery** and **mobility**.

2.5.56. A north west relief road should increase the resilience of Shrewsbury's road network. In terms of the factors identified above by facilitating:

- **Redundancy** An alternative, more direct route between north and west
- **Diversity** A purpose built route and additional river bridge
- **Efficiency** Shorter, more direct routes for many journeys which currently use inefficient routes
- **Autonomy** Allows outer bypass and distributor ring to fulfil their intended functions better
- **Strength** Ability to withstand disruptive events
- **Mobility** More reliable access to bus and railway stations and town centre car parks
- **Safety** Shorter journeys on a route designed to modern safety standards
- **Recovery** Extra capacity allowing level of service to be resumed more quickly after an incident

[32] In the recent past, Smithfield Road and Frankwell were often closed due to flooding of the River Severn. The construction of flood defences in 2003 has effectively solved this problem, although the car parks near the river still flood, affecting traffic patterns.

2.5.57. There is no “acceptable” level of injury accidents, and local authorities have a statutory duty[33] to undertake studies into road traffic collisions, and to take steps both to reduce and prevent them. Routes or sites where large numbers of accidents are known to have occurred can offer the greatest potential for improvement.

2.5.58. Figure 27 shows the location and severity of all personal injury accidents in Shrewsbury during a five year period from June 2012 to June 2017. As might be expected, there is a concentration of accidents within the “river loop” (town centre), where the road network is dense and the potential for vehicle/vehicle and vehicle/pedestrian collisions is high, and at the busiest junctions on the bypass. There is a concentration of accidents along the heavily trafficked Smithfield Road, and at the junctions at each end.

2.5.59. On the western approaches to the town centre, there is a concentration of accidents on B4386 Copthorne Road and a cluster at the Frankwell junction. On the northern approaches, there is a concentration of accidents on the A5112 Whitchurch Road and especially at the busy A5112/A5191/B5062 Heathgates roundabout, and also on the A528 Coton Hill and Chester Street approach.

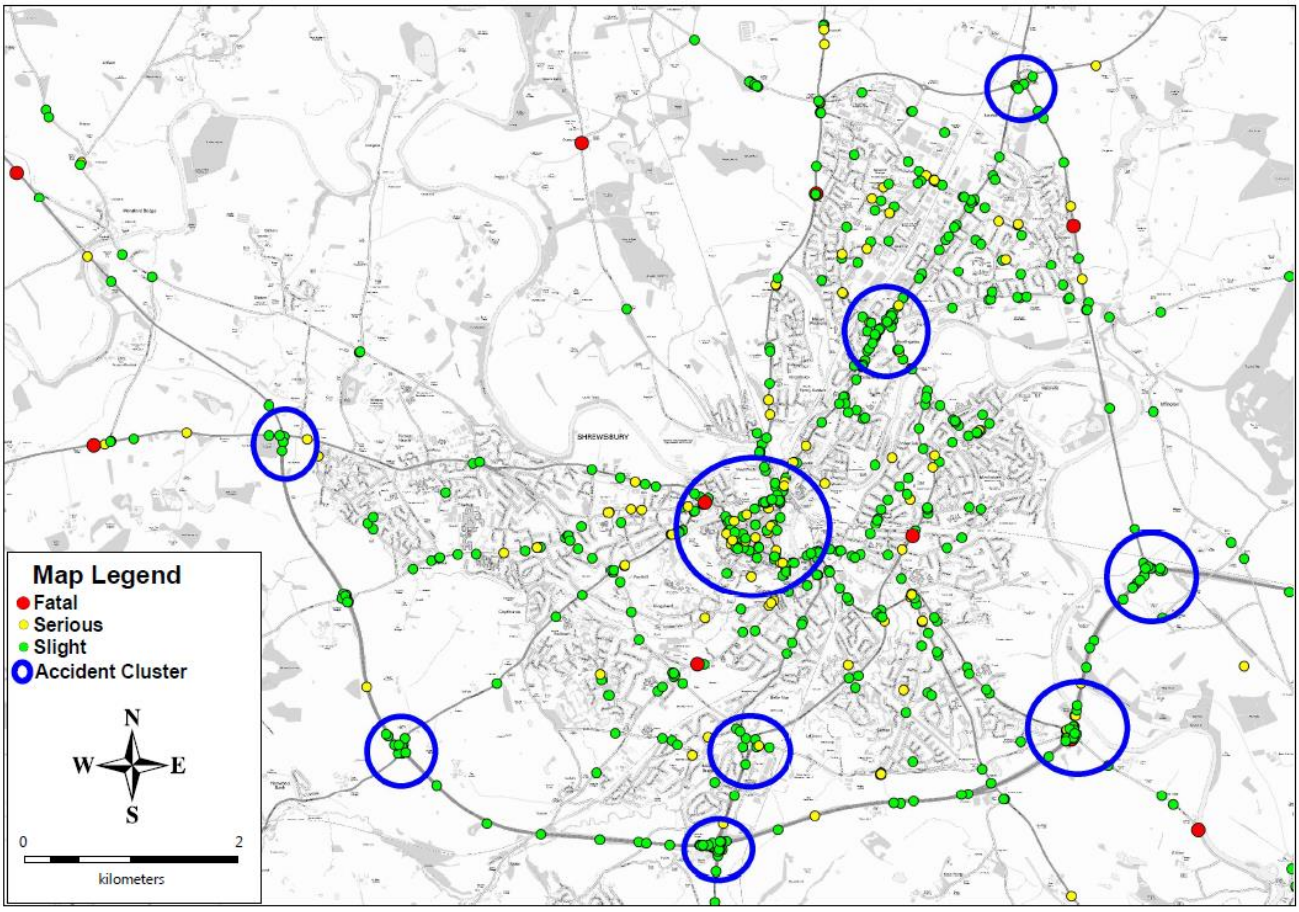


Figure 27 - Injury accidents in Shrewsbury 2012 - 2017

2.5.60. Figure 28 similarly shows the location of all personal injury accidents involving pedestrians and cyclists in Shrewsbury during a five year period from June 2012 to June 2017. There are concentrations of collisions

[33] Road Traffic Act,1988

involving cyclists and pedestrians in the town centre, including Smithfield Road and the junctions at each end. Also in the north west corridor, there are concentrations of pedestrian and cycle accidents on B4386 Copthorne Road, A488 New Street, Frankwell, A528 Chester Street, A5112 Whitchurch Road and at the Heathgates roundabout.

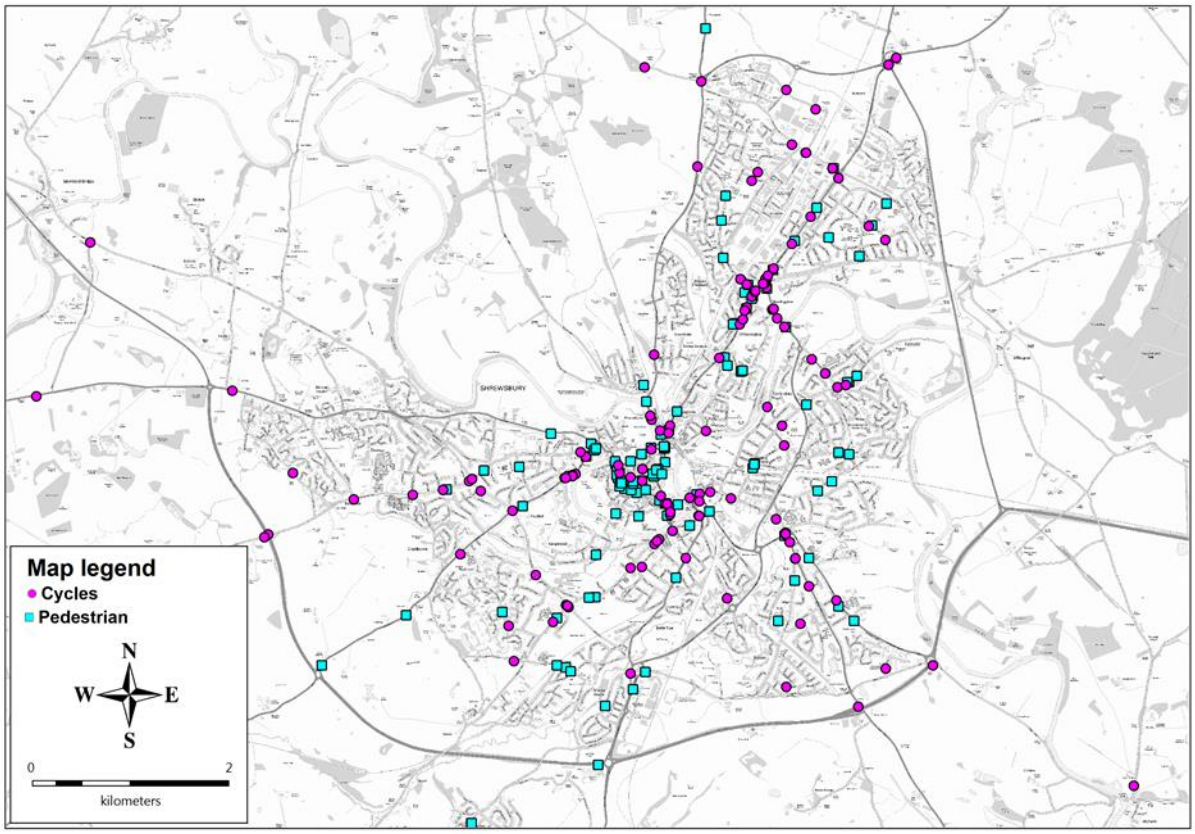


Figure 28 - Pedestrian and cycle injury accidents in Shrewsbury 2012 - 2017

2.5.61. A NWRR is expected to reduce traffic on the north-west corridor through the town centre, and it is reasonable to expect that this will lead to a proportional reduction in collisions on these routes, including those involving pedestrians or cyclists. A NWRR is also expected to attract some traffic which currently uses either the outer bypass or the distributor ring road to travel between the north and the west, so it is reasonable to expect that this will lead to a proportional reduction in collisions on these routes too.

2.5.62. As a purpose built, modern road with separate cycle facilities low pedestrian use, a NWRR is expected to have a lower accident rate than roads through the built up area. It will also be a shorter distance for north-west traffic than the bypass or distributor ring, so there should be less overall exposure to accident risk and a net reduction in accidents, including those involving pedestrians or cyclists, even allowing for accidents on the NWRR itself and the roads leading to and from it.

Poor air quality

2.5.63. Under an EU directive and the 1995 Environment Act local authorities have a statutory duty to periodically review and assess the air quality within their area. This involves consideration of present and likely future air quality against air quality standards and objectives. Where the results of this 'Review and Assessment' process highlight that the relevant Air Quality Standards and Objectives are not likely to be achieved, the authority is required to declare an Air Quality Management Area (AQMA).

2.5.64. There are currently two Air Quality Management Areas in Shrewsbury's main urban area, including the area around Heathgates Roundabout on the northern approaches to the town centre, and most of Shrewsbury town centre (illustrated in Figure 29).

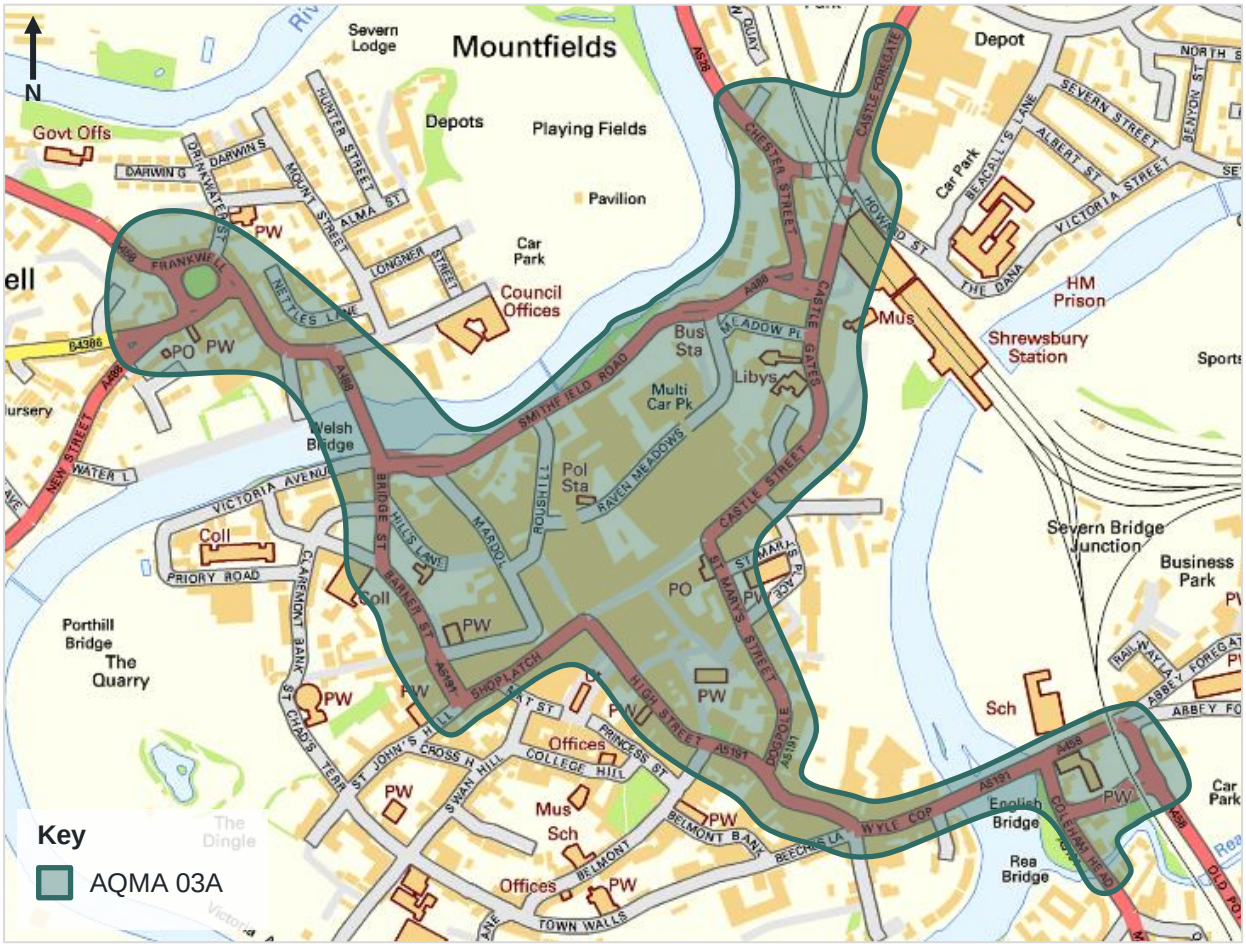


Figure 29 - Shrewsbury Town Centre Air Quality Management Area 03A (Source: UK Air, DEFRA)

2.5.65. These sites were declared as AQMAs due to expectations that levels of Nitrogen Dioxide (N02) (from traffic emissions), would exceed the EU objective of 40 µg/m3 NO2 (annual mean). Air quality at these sites is monitored and evaluated.

2.5.66. The Shrewsbury Town Centre AQMA covers most of the town centre inside the "river loop" as well as Frankwell and the Welsh Bridge. The original AQMA, declared in 2003, included Frankwell, part of Bridge Street, Smithfield Road, Castle Gates and adjacent land. Following further monitoring, this was further extended in 2006 to cover most of the town centre, including High Street, Wyle Cop, English Bridge, the English Bridge Gyratory and Coleham Head.

2.5.67. The Evidence Base for the Shropshire Local Transport Plan (LTP3) reported in 2010 that NO2 levels were near to the EU objective level of 40µg/m3 at the Heathgates Island AQMA, on the distributor ring road to the north of the town centre. However at Caste Foregate (in the town centre AQMA) annual average NO2 levels were significantly above the EU objective level, although levels had fallen slightly since 2006, in line with general traffic reductions observed in Shrewsbury town centre in that period.

2.5.68. The results of air quality monitoring from 2009 to 2016 are set out in Table 18.

Table 18 - Selected NO_2 diffusion tube monitoring locations and concentrations (µg/m^3) in Shrewsbury[34]
(Source: Shropshire Council Public Protection Service)

Tube Location Descriptor		Concentration of NO_2 (µg/m^3)							
		2009	2010	2011	2012	2013	2014	2015	2016
Town Centre	Severn Steps	36.3	34.2	33.0	32.1	29.6	31.4	26.7	28.2
	Britannia Inn, Castle Foregate	37.2	37.0	35.8	34.3	36.4	40.6	39.5	43.5
	Frankwell	29.8	31.7	27.2	28.0	27.9	27.2	26.6	28.0
	Raven Meadows	37.6	37.6	33.4	32.9	35.1	34.8	30.4	32.4
	Smithfield Road	38.0	38.9	34.4	34.1	33.9	33.7	30.1	31.7
	Station Hotel, Castle Gates	76.8	75.5	61.8	74.2	64.6	53.6	57.9	59.8
	The ALB Public House	36.7	37.9	33.2	39.8	42.7	38.4	35.6	38.4
Inner Relief Road	Oteley Road (Stadium)	-	-	-	-	19.6	19.7	15.3	15.5
	Meole Brace	30.3	32.5	30.4	32.6	27.5	26.3	24.6	31.8
	Heathgates Public House	25.9	28.1	25.6	27.1	26.1	25.0	22.9	24.9

2.5.69. Air quality is a serious problem. High levels of nitrogen dioxide are linked to heart and lung disease and are estimated to contribute to the early deaths of 40,000 people a year in the UK.

2.5.70. Traffic is the main cause of air pollution in Shrewsbury. Areas of poor air quality tend to be where there are high volumes of stationary traffic, and /or stop-start movements in built up areas where the ability for pollution to disperse is limited. Different vehicles emit different levels of pollutants depending on vehicle and engine size and efficiency. Older, heavy diesel vehicles tend to be the most polluting. For example one older style diesel bus can emit the same pollution as 40 cars. Improved vehicle technology and reductions in traffic can both improve air quality.

2.5.71. By reducing the volume of north-west traffic using roads in the town centre, and by reducing congestion on the busy northern approaches to the town centre, a NWRR is expected to contribute to an improvement in air quality in this area.

Carbon and other greenhouse gas emissions

2.5.72. The build up of greenhouse gases, especially CO_2 and methane, in the atmosphere is contributing to global warming. Unless action is taken to reduce emissions of greenhouse gases, the world's climate could change, increasing the frequency and intensity of heatwaves, floods, droughts and storms.

2.5.73. The Climate Change Act (2008) set a long-term legally binding framework for greenhouse gas reduction in the UK. The Act requires the UK Government to reduce greenhouse gas emissions by at least 34% by 2020 and 80% by 2050 from 1990 levels in the UK. The Government has set out its plan of action for greenhouse gas reduction in the Carbon Plan (December 2011). The plan identifies that transport has a critical role in meeting the Climate Change Act (2008) obligations.

[34] Annual average data is corrected by a bias factor defined by Defra (excluding 2014)

2.5.74. Transport accounts for about a quarter of the UK's emissions of greenhouse gases. The CO_2 emissions of a car are directly proportional to the quantity of fuel consumed by an engine, so any reduction in motorised traffic will also reduce CO_2 emissions. In the short term, the most significant greenhouse gas savings from transport are likely to come from improving the fuel efficiency of conventional vehicles and increased use of sustainable biofuels.

2.5.75. Because the Shrewsbury NWRR would provide shorter, more efficient routes for some journeys, it could contribute to a reduction in CO_2 emissions, although there would also be a carbon cost associated with its construction.

2.6 FUTURE PROBLEMS – THE IMPACT OF NOT CHANGING

2.6.1. In the future, as the town grows and background traffic demand increases, if nothing is done it is expected that all of the above problems will worsen. Traffic congestion is likely to get worse and journey times will become longer and less predictable as the network becomes less resilient, affecting both public and private transport. Rat-running could increase, as could accidents. In addition:

- Junctions on the existing bypasses (especially A5/A49 Dobbies Island) will become increasingly congested
- The Shrewsbury West Sustainable Urban Extension will suffer from poor accessibility to the north, making it less attractive to new development
- New transport investments, especially the proposed Oxon Link Road, will not achieve their full potential as a transport link.

2.6.2. The problem of increasing congestion on the trunk road A5 Shrewsbury Bypass is evident from DfT forecasts of congestion on the Strategic Road Network in 2010 and 2040, based on the National Traffic Model (NTM), cited in the Government's 2017 Transport Investment Strategy[35].

2.6.3. The section of the A5 bypass between the A49 (south) at Dobbies roundabout and A49 (north) at Preston Boats roundabout, on the eastern side of Shrewsbury, is already subject to regular congestion at peak times. This situation is not improved by the fact that through traffic between north and west, including HGVs, is directed around the bypass despite it being the "long way round", because of the lack of suitable routes in the NW sector.

2.6.4. The NTM forecasts indicate that this section of the A5 could be subject to severe congestion by 2040, as a result of expected traffic growth. This would be a serious problem for Shrewsbury, as the efficiency of its transport system depends on each part of the road hierarchy performing its function. Congestion on the outer bypass can push additional traffic on the town's distributor ring, whilst congestion on the distributor ring can encourage local traffic to use less appropriate streets in the historic town centre.

2.6.5. Because the Shrewsbury NWRR would provide a shorter, more appropriate, purpose-built route for some of the traffic which currently uses the trunk road bypass, it is expected to lead to a reduction in traffic demand on this section of the A5, helping to reduce congestion. This would provide a benefit for both long distance and local traffic.

[35] https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/627306/transport-investment-strategy.docx

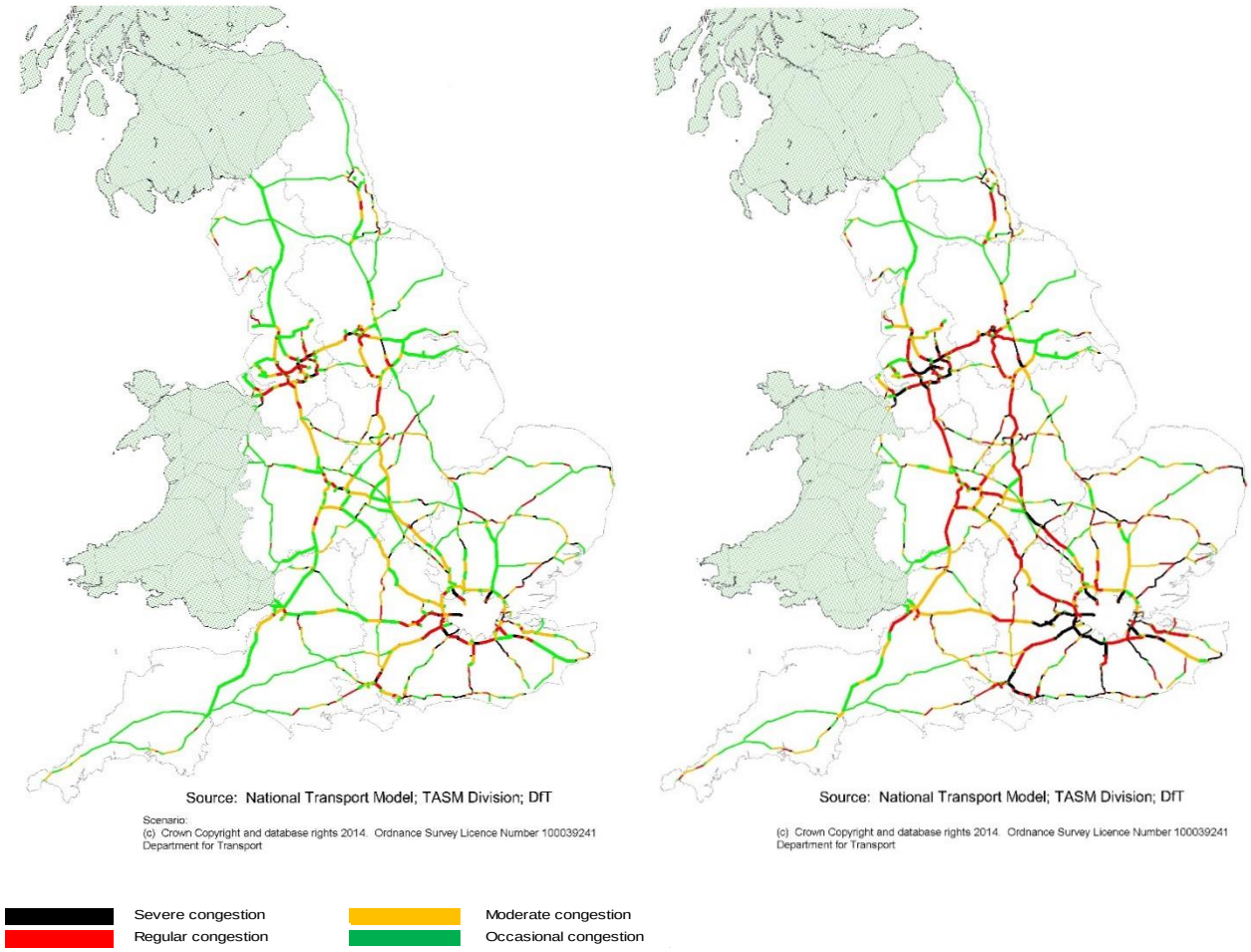


Figure 30 - Congestion on the strategic road network in 2010 (left) and forecast in 2040 (right)

2.7 DRIVERS FOR CHANGE

INTERNAL DRIVERS FOR CHANGE

2.7.1. The key internal drivers for change are:

- Current and planned housing and employment growth in Shrewsbury
- The need to consolidate the benefits of the Integrated Transport Strategy, and to further enhance the town as a place in which to live and work
- The need to strengthen Shrewsbury's economy and attract inward investment

EXTERNAL DRIVERS FOR CHANGE

2.7.2. The key external drivers for change are:

- Forecast traffic growth
- Public and stakeholder concern about traffic congestion and through traffic
- The need to free up capacity on the existing A5/A49 outer bypasses, so they can continue to operate efficiently in future

2.8 AIMS AND OBJECTIVES

2.8.1. The primary aim of the Shrewsbury North West Relief Road is:

- To improve Shrewsbury as a place in which to live, work and invest, by reducing congestion.

2.8.2. In order to achieve the Council's primary aim, and in response to the problems and opportunities identified, clear objectives have been established for the NWRR. A distinction has been drawn between the desired high level or strategic outcomes, the specific or intermediate objectives, and the operational objectives:

HIGH LEVEL OR STRATEGIC OUTCOMES

2.8.3. The desired high level or strategic outcomes are:

- To reduce congestion
- To support the economic competitiveness of Shrewsbury and Shropshire
- To support the delivery of planned growth and development in Shrewsbury
- To enhance the benefits of other transport investment
- To protect and enhance Shrewsbury's built and natural environment
- To contribute towards a reduction in greenhouse gas emissions
- To improve the quality of life for people in Shrewsbury
- To improve road safety
- To support sustainable modes of transport

SPECIFIC OR INTERMEDIATE OBJECTIVES

2.8.4. The specific or intermediate objectives are:

- To improve connectivity and accessibility between the north and west of Shrewsbury for all modes of transport
- To reduce traffic congestion
- To improve the reliability of journey times and reduce unforeseen delays
- To reduce the amount of traffic rat-running on unsuitable rural roads
- To improve the efficiency of Shrewsbury's transport network for all modes of transport.
- To improve the resilience of Shrewsbury's transport network.
- To enhance the benefits of the Oxon Link Road and Integrated Transport Plan schemes.
- To reduce the number of people killed or seriously injured on roads in Shrewsbury.
- To improve air quality, especially in the built-up areas of Shrewsbury
- To reduce net emissions of CO_2 and other greenhouse gases.

OPERATIONAL OBJECTIVES

2.8.5. The operational objectives are:

- To provide a new river crossing between the western and northern parts of the town, linking the A5 (west) to the A49 (north).

- To significantly reduce journey times and distances between the north and west of Shrewsbury
- To significantly reduce the amount of traffic unnecessarily crossing the town centre
- To provide traffic relief to key junctions on the existing bypasses, including the A5/A49 Dobbies Island.
- To reduce traffic congestion in Shrewsbury town centre, on the north and west approaches to the town, and on the bypasses
- To significantly improve the accessibility of the Shrewsbury West Sustainable Urban Extension.

2.9 MEASURES FOR SUCCESS

2.9.1. It is important to consider from the outset what constitutes successful delivery of the objectives, as this informs the development and appraisal of the scheme, the selection of the preferred option, and the monitoring and evaluation of the scheme's performance after construction.

Cause and effect

2.9.2. Figure 31 is a Logic Map or Causal Chain Diagram which shows the expected relationship between the outputs of the scheme, the achievement of objectives, and the delivery of the strategic outcomes.

2.9.3. In general it is easier to measure achievement of the specific objectives (e.g. changes in traffic volume or journey time) than the strategic outcomes (e.g. support competitiveness) because the latter often take time to achieve and can be influenced by factors other than the proposed relief road.

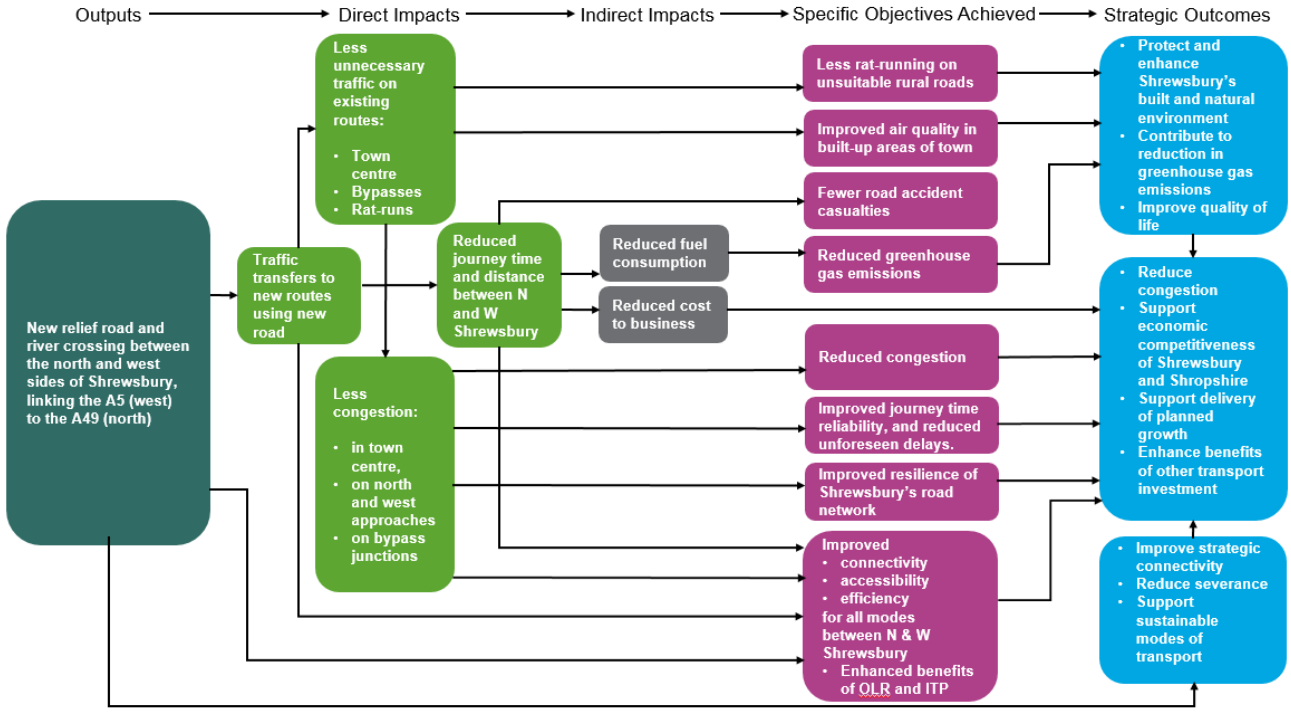


Figure 31 – Causal chain diagram (logic map)

Example: tackling congestion

2.9.4. For example, the logic map shows how the primary aim of the NWRR – reducing congestion – will be achieved as a result of the creation of the North West Relief Road. It also shows how reductions in congestion on key elements of the local road network will contribute to a wide range of related objectives, including supporting the delivery of planned housing and employment growth, improving competitiveness, and enhancing the

benefits of other transport investment such as the Oxon Link Road and the Shrewsbury Integrated Transport Plan.

2.9.5. This is illustrated in Figure 32 below:

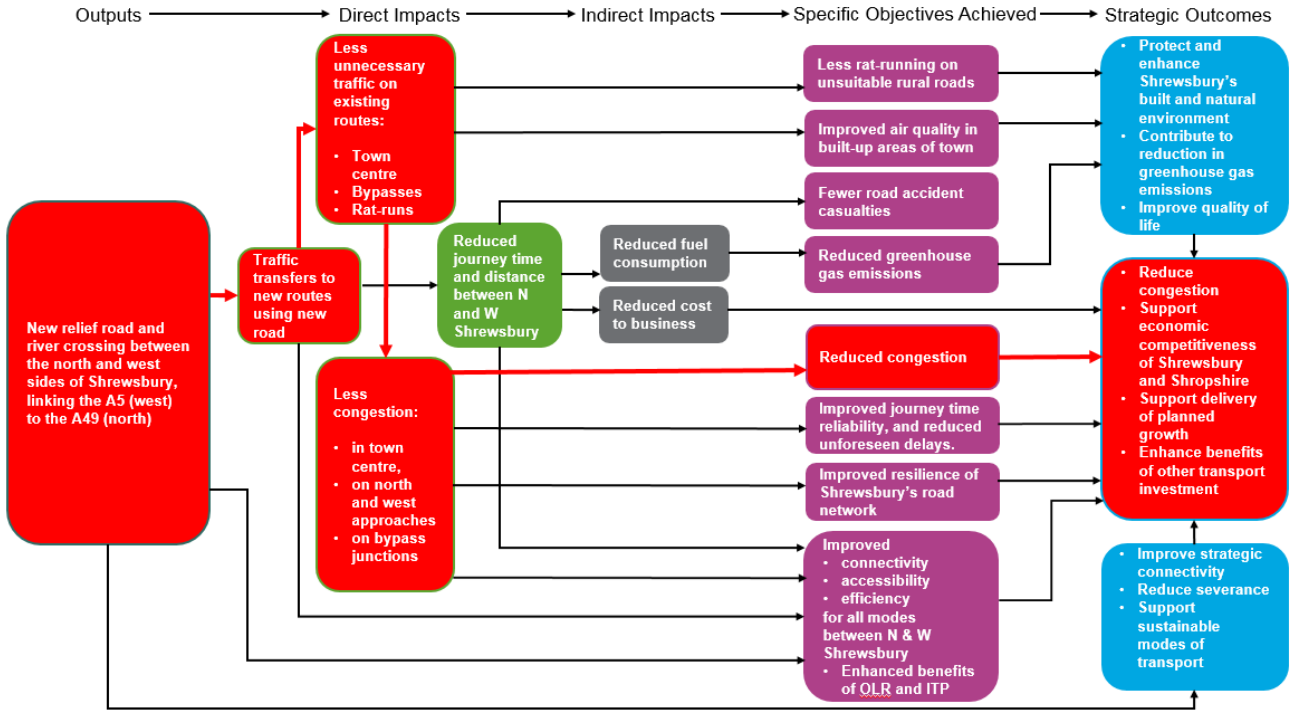


Figure 32 – Causal chain diagram (logic map) highlighting congestion impacts

Achievement of objectives

2.9.6. The specific objectives will have been achieved if the scheme leads to:

- Less traffic congestion (i.e. shorter journey times) in Shrewsbury town centre (e.g. Smithfield Road)
- Less traffic congestion (i.e. shorter journey times) on the northern and western approaches to Shrewsbury town centre, and on the bypasses
- Improved connectivity and accessibility (i.e. shorter journey times and distances) between the north and west of Shrewsbury for all modes of transport
- More reliable journey times and fewer unexpected delays
- Less traffic rat-running on rural roads to the north and west of Shrewsbury
- A more efficient network (i.e. shorter journey times and distances in the area generally) for cars, goods vehicles, buses and cycles
- A more resilient network, better able to cope with unexpected or unusual events
- Enhanced benefits of the Oxon Link Road (i.e. improved accessibility to new development at Oxon)
- Enhanced benefits of the Shrewsbury Integrated Transport Plan:
  - Less traffic overall in the town centre
  - Less congestion at junctions on the distributor ring road
- Fewer people killed or seriously injured on roads in Shrewsbury

- Improved air quality, especially in the declared AQMAs at Heathgates and Shrewsbury Town Centre
- Reduced overall emissions of CO_2 and other greenhouse gases

2.9.7. Most of these can, and will, be measured directly. Greenhouse gas emissions, resilience and reliability are less easy to measure but, as the causal chain diagram shows, they are predictable consequences of reduced congestion and delay, and the availability of shorter routes.

Monitoring and evaluation

2.9.8. In most cases, achievement of the specific objectives will be measured directly by means of:

- Traffic counts
- Journey time surveys
- Accident statistics
- Air quality monitoring

2.9.9. As noted above, greenhouse gas emissions and improved reliability and resilience are difficult to measure directly but are predictable consequences of reduced traffic, congestion and delay and the availability of shorter routes.

2.9.10. Not all of the strategic outcomes can be measured directly, but they can all be seen to be logical consequences of achieving the specific objectives. However longer term monitoring of local development, business growth and relocations, and employment will continue to take place, and will contribute to an understanding of the success of the scheme.

2.9.11. Anecdotal information, especially in relation to perceptions of congestion, resilience and the attractiveness of the town as a place in which to live, also has a supporting role in evidencing the success of the scheme.

2.9.12. A full monitoring and evaluation plan will be developed and included with the Full Business Case.

2.9.13. The project will be judged successful if it delivers the expected benefits at levels close to, or exceeding, those forecast, without any unforeseen disbenefits.

2.10 SCOPE OF THE PROPOSED SCHEME

In-scope:

2.10.1. The proposed scheme will comprise a new single carriageway all-purpose road to the north-west of Shrewsbury, from the eastern end of the proposed Oxon Link Road to the western end of the existing Battlefield Link Road, including a new single carriageway bridge over the River Severn and its floodplain, and a new bridge over the railway.

2.10.2. The NWRR, Oxon Link Road and Battlefield Link Road will form a complete route between the A5 trunk road at Churncote Roundabout and the A49/A53 Battlefield Roundabout, completing an orbital bypass for Shrewsbury.

2.10.3. The scheme will include “at grade” roundabout junctions at Holyhead Road and Berwick Road and an enlarged roundabout at Ellesmere Road.

2.10.4. Huffley Lane will be diverted to a new junction with A528 Ellesmere Road, north of the roundabout.

2.10.5. The scheme will include:

- A 7.3m wide single carriageway with 1m hard strips
- A separate 3m wide combined footway, cycleway and bridleway

- Re-located rights of way and field paths as required

2.10.6. The scheme includes landscaping, planting, and environmental mitigation work including the acquisition of Hencott Pool to enable habitat improvements.

Out of scope:

2.10.7. The scheme does not include the Oxon Link Road, as this will be funded separately and constructed in advance.

2.10.8. The scheme does not include physical improvements, enhancements or traffic management in other streets or areas of Shrewsbury

2.10.9. The scheme does not include provision of public transport facilities or services

Note

2.10.10. The above description of the scope of the scheme refers to the preferred route, as proposed in this Business Case. At the outset of the appraisal process however, a wider range of alternative solutions to the identified problems was considered to be “in scope”. These included alternative routes in the NW sector of Shrewsbury as well as non-road options. These alternatives were only set aside after appropriate investigation and appraisal, as described in the Options Assessment Report and in section 2.13 below.

2.11 CONSTRAINTS

2.11.1. The following types of constraint have been taken into account in developing the scheme:

- Physical
- Environmental
- Financial
- Contractual
- Public acceptability

2.11.2. These are summarised below. It is evident that there are no insurmountable constraints on the construction of the Shrewsbury NWRR. However, as explained in the Option Assessment Report and in Section 2.13 below, detailed consideration of the physical, environmental and public acceptability constraints was critical to the identification of the preferred route.

Physical constraints

2.11.3. The north-west sector of Shrewsbury is generally undeveloped and comprises mainly agricultural land. Settlement is sparse, with small isolated farmsteads and properties scattered through the landscape. The River Severn meanders through this area, with steep wooded valley slopes and extensive floodplains, forming one of the main physical barriers dividing the landscape. The area is crossed by the Shrewsbury-Chester railway line, and by footpaths and other rights of way.

2.11.4. The main physical constraints are

- The need to construct a new crossing of the River Severn
- The need to cross the Shrewsbury-Chester railway line
- The need to cross the Marches Way long-distance footpath and other public rights of way
- The need to tie in with the existing and planned road network – the A5 and Oxon Link Road in the west, B5067 Berwick Road, and the A528 Ellesmere Road and Battlefield Link Road in the north

- The need to acquire land for the construction of the scheme

2.11.5. There are no insurmountable physical constraints on the construction of a NWRR.

Environmental constraints

2.11.6. Whilst there are relatively few physical constraints in the NW sector of Shrewsbury, the undeveloped nature of the area means that there are significant environmental constraints which need to be taken into account in both the design of the scheme and in the appraisal of its costs and benefits. Taking an overall view, the area forms a “green wedge” which penetrates deep into the built up area, extending almost all the way to the town centre. It comprises agricultural land – arable and pastoral – wooded cliff, river terrace, flood plain, and pockets of woodland. Any new road will therefore have a significant and permanent impact upon this area.

2.11.7. The NWRR Preferred Route Report (January 2007) stated that “the area to the north west of Shrewsbury is relatively rich in environmental constraints however, very few of these would be directly affected by the options under consideration”.

2.11.8. The main environmental constraints that have been identified are illustrated in Figure 33. The traffic impacts of the Shrewsbury NWRR will not just be on the north – west corridor through the town centre. Significant reductions will also occur on the other roads which, though less direct, presently carry traffic between the north and the west – the outer bypasses, the distributor road ring and the rural lanes.

2.11.9. These forecasts show that the NWRR will have exactly the sort of impact it has been intended to have. Moreover, the NWRR will lead to traffic reductions on most parts of the town’s network, with many more routes experiencing a reduction in traffic than an increase.

2.11.10. The following sections describe in more detail the forecast impacts of the Shrewsbury NWRR on the specific sections of road highlighted earlier in the Strategic Case.

2.11.11. and include:

- The River Severn (wildlife site) and its floodplain
- The Shelton boreholes (for extraction of drinking water) and related source protection zone (SPZ)
- Other water bodies: Willow Pool, Alkmund Park Pool, a pond in Alkmund Park Wood and Cot Brook
- The Hencott Pool Conservation Site of International Importance (Ramsar site)
- The “old river bed” – an ancient course of the River Severn comprising a wildlife site to the west of Ellesmere Road and a Site of Special Scientific Interest (SSSI) to the east of Ellesmere Road
- Alkmund Park Wood (wildlife site) - an area of ancient woodland.
- Shelton Rough (wildlife site), adjacent to the River Severn
- Archaeology, principally the Berwick Cropmark Complex
- Shrewsbury conservation area, which extends along part of The Mount
- Listed buildings
- Registered park and garden of special historic interest (Berwick Hall)
- Footpaths, cycle routes and other rights of way

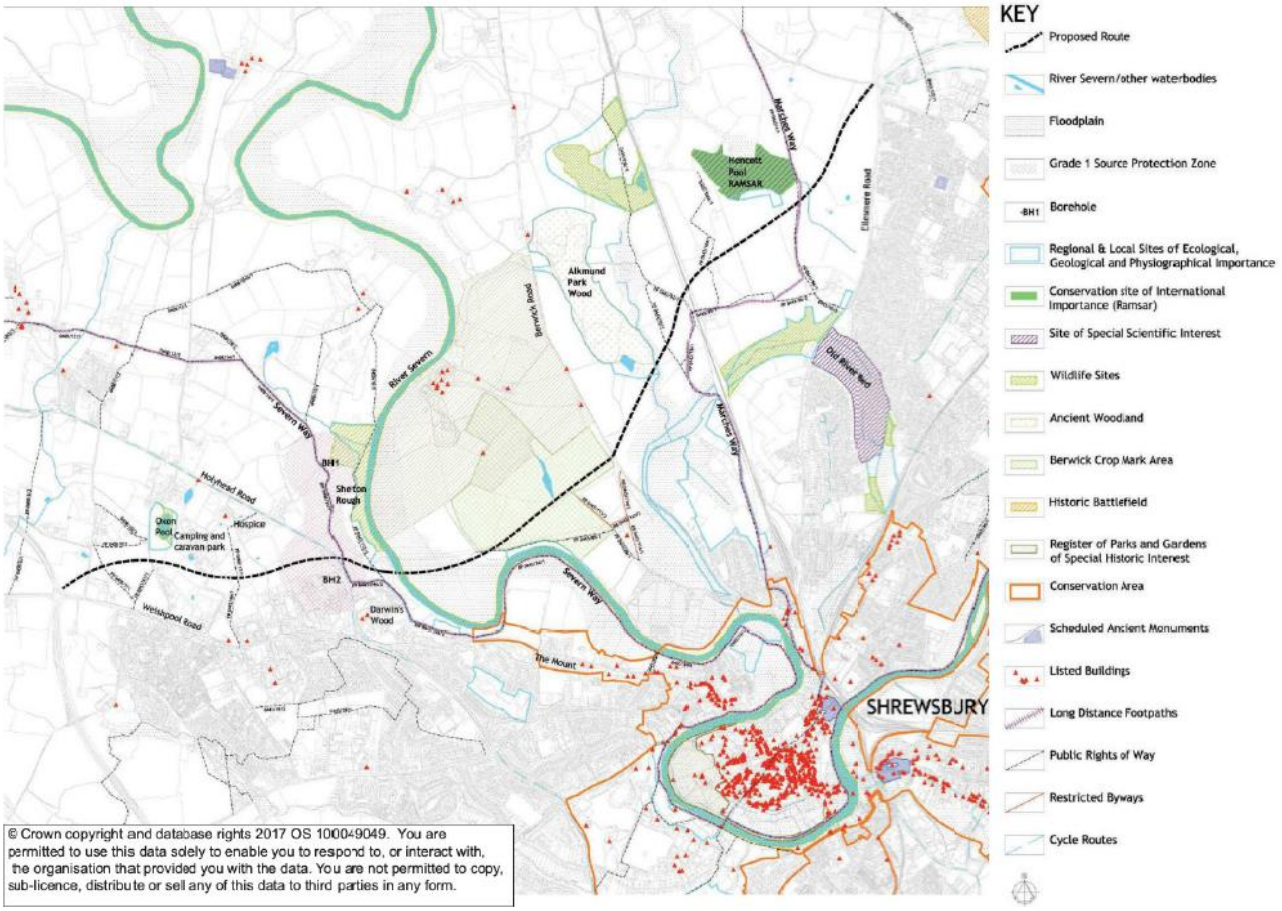


Figure 33 – Environmental constraints

2.11.12. A Stage 2 Environmental Assessment[36] was undertaken in 2005, as part of the consideration of a range of six possible options for a NWRR. This considered the impacts of each option on:

- Noise
- Air quality
- Greenhouse gases
- Landscape character
- Townscape character
- Heritage of historic resources: built and archaeological
- Biodiversity
- Water environment: hydrological, chemical and biological
- Physical fitness and accessibility for walkers, cyclists and equestrians
- Journey ambience for travellers

[36] Shrewsbury NWRR Stage 2 Environmental Assessment Report (Mouchel Parkman for SCC, May 2005)

- Agriculture
- Integration with government and local policies.

2.11.13. A supplementary study[37] of geology, including contaminated ground, was undertaken in 2006.

2.11.14. The results of the Stage 2 Environmental Assessment are summarised in the Preferred Route Report[38] (2007), which also describes the more detailed assessment of the environmental issues which had a key impact on the route location and had been raised during public consultation or in subsequent discussions with interested parties.

2.11.15. A further review of the environmental impacts of the current preferred route has been undertaken in 2017, in connection with this Outline Business Case. The appraisal of environmental impacts is discussed further in the Economic Case, and the results of the updated appraisal are summarised in the Appraisal Summary Tables (ASTs).

2.11.16. The scheme will need to include significant mitigation of environmental impacts, and further surveys and investigation will be undertaken in 2018. Subject to this, it is considered that there are no insurmountable environmental constraints on the construction of a NWRR.

Financial constraints

2.11.17. The Council does not have the resources to deliver a North West Relief Road without funding support from the Government. The Marches LEP's guideline threshold[39] is £34 million. Schemes costing more than this cannot be funded from regular Growth Deal funding. It would not be possible to deliver a scheme meeting the objectives for less than £34 million. For this reason the delivery of the scheme is dependent upon funding from the Government's Local Majors Fund. Delivery is also dependent upon the receipt of a tender price acceptable to Shropshire Council and the approval by Government of a Full Business Case.

2.11.18. The anticipated programme for financial approval is:

- Spring 2018: Funding decision from DfT based on Outline Business Case
- Summer 2020: SCC invite tenders for construction of the scheme
- Spring 2021: DfT agrees to release funds for construction

2.11.19. Shropshire Council undertakes to contribute 23.8% of the capital cost of the scheme up to a maximum of £25m, including previous expenditure on land acquisition and scheme preparation. Shropshire Council will fund in full any costs in excess of the approved DfT funding, and will also fund the future operating and maintenance costs of the scheme.

2.11.20. Subject to this, it is considered that there are no insurmountable financial constraints on the construction of the NWRR.

2.11.21. Further details are given in the Financial Case (Chapter 4).

Contractual constraints

2.11.22. The Commercial Case describes the type of contract proposed.

2.11.23. There are no contractual constraints which the Council considers would inhibit delivery of the scheme.

[37] Geology and Soils Impact Assessment (Mouchel Parkman for SCC, 2006)
[38] Shrewsbury NWRR Preferred Route Report (Mouchel Parkman for SCC, January 2007)
[39] Large Local Major Transport Schemes Guidance Notes, (DfT, 2015)

Public acceptability constraints

2.11.24. Throughout the development of the scheme, and the selection of a preferred route, Shropshire Council has consulted local people and stakeholders repeatedly about the principle of a NWRR, possible alternatives, and the route the road should take if built.

2.11.25. The views of local people and stakeholders were given significant weight in the route selection process, and the Council is confident that the selected route is, on balance, the most acceptable of all those considered.

2.11.26. With regard to the principle of building a NWRR, the general outcome of past consultations has indicated that a majority of local people believe that a NWRR would benefit Shrewsbury and they would therefore like to see it built on one route or another. However, the same consultations have also indicated that a significant number of people do not think a NWRR should be built, and/or that other measures should be given more priority.

2.11.27. The most recent round of consultation, held in October/November 2017 in connection with the preparation of this business case gave people the opportunity to state their views on the route option now proposed. The results of this consultation are discussed in section 2.19, and the key findings are summarised in Table 19 below.

Table 19 - Consultation results (2017):
"How strongly do you agree that the NWRR preferred route should be built?

	Very strongly agree	Strongly agree	Agree	Disagree	Strongly disagree	Very strongly disagree	Don't know
Number	321	58	48	19	35	138	14
Percentage	50.7	9.2	7.6	3.0	5.5	21.8	2.2

2.11.28. Overall, 67.5% of the people responding to the consultation agreed that the preferred route should be built, whilst 30.3% disagreed.

2.12 INTERDEPENDENCIES

2.12.1. The Shrewsbury NWRR, in the form now proposed, depends on the successful delivery of the proposed Oxon Link Road (from A5 Churncote to Holyhead Road). This scheme is being funded separately from the Local Growth Fund and is expected to be complete in advance of the NWRR.

2.12.2. There are no currently proposed schemes which are themselves dependent on provision of the NWRR.

2.12.3. Delivery of the Shrewsbury NWRR also depends upon the granting of planning permission. The anticipated timetable is:

- Winter 2018: Planning application
- Autumn 2019: Public inquiry
- Summer 2020: Result of public inquiry decision

2.13 OPTIONS CONSIDERED

BACKGROUND

2.13.1. The issues arising from the lack of a river crossing in the north-west sector of Shrewsbury have been a concern for Shropshire Council and its antecedents for many years, and the idea of providing some form of north-west relief road is not new. Plans have been put forward at various times in the past thirty years. Detailed investigations began in the mid-1980s, and versions of a scheme were included in Local Plans and

successive TPP and LTP documents[40], as well as forming part of an outline TIF[41] package in 2007 (not submitted). Extensive preparatory work was undertaken for a possible MSBC[42] in 2010, (not submitted).

2.13.2. Because of this long history, the Shrewsbury NWRR has been the subject of option appraisal, public and stakeholder consultation, scheme investigation and design over a very long period of time. Some of this work (including scheme design, environmental studies, traffic modelling and economic appraisal) was more detailed than is normally required for an Outline Business Case. This work represents a valuable source of information and insight into the issues driving the scheme and the relative merits of different solutions.

2.13.3. Throughout this long process, the NWRR has always been assessed as part of a wider transport strategy for Shrewsbury. However, most of the other identified transport measures have now been, or are being, delivered whilst measures considered as possible alternatives to a NWRR have been tested and found to be either not effective or not deliverable. The NWRR remains the "missing link" in Shrewsbury's transport system and the key to addressing current and future congestion problems.

THE OPTIONS ASSESSMENT REPORT

2.13.4. The Options Assessment Report (OAR) is based on the above work. It has been prepared in accordance with Transport Appraisal Guidance (WebTAG) published by the Department of Transport, and follows the following principles:

- There must be a **clear rationale** for the proposal, based on a clear presentation of the problems and challenges that establish the need for the scheme.
- There must be consideration of **genuine, discrete options**, and a range of solutions should be considered across networks and modes.
- There should be an **auditable, documented process** which identifies the best performing options to be taken forward for further appraisal.
- There should be an appropriate level of **public and stakeholder participation** and engagement at suitable points in the process. This informs the evidence base which establishes the need for the scheme, guides the option generation, sifting and assessment, and informs the subsequent appraisal.

2.13.5. Table 20 below lists the various steps in the appraisal process and maps these onto the chapters of the OAR.

Table 20 – Steps in the Stage 1 Appraisal Process

	Description	Chapter
Step 1	Understand the current context and conditions in the study area	**Chapter 2.** Current situation
Step 2	Understand the future conditions in the study area	**Chapter 3.** Future situation
Step 3	Establish the need for the intervention	**Chapter 4.** The need for improvement

[40] Transport Policies and Programme and Local Transport Plan

[41] Transport Innovation Fund

[42] Major Scheme Business Case

Step 4a	Identify intervention-specific objectives to address the identified need	**Chapter 5.** Objectives
Step 4b	Define the geographical area for the intervention to address	**Chapter 6.** Area of impact
Step 5	Generate options reflecting a range of modes, approaches and scales of intervention	**Chapter 7.** Options identified
Step 6	Undertake initial sift. Discard options that would fail to address key objectives or are unlikely to pass key viability and acceptability criteria	**Chapter 8.** Initial sift of options
Step 7	Develop and assess potential options to identify the better performing ones. Undertake public consultation on potential options	**Chapter 9.** Option development and assessment **Chapter 10** Preferred option
Step 8	Document the option development process in an Option Assessment Report (OAR) or similar	
Step 9	Clarify the methodology and scope for further appraisal of better performing options in an Appraisal Specification Report (ASR) or similar.	

2.13.6. Steps 5, 6 and 7 are summarised below. Full details may be found in the OAR.

OPTIONS IDENTIFIED

2.13.7. This section describes the initial options that were identified for the scheme, including non-car or non-road options, in line with Step 5 of the Transport Appraisal Process , as defined in WebTAG:

> "*Generate options reflecting a range of modes, approaches and scales of intervention*"

2.13.8. The initial generation and appraisal of options took place over a considerable period of time, and according to the standards of the day. This section summarises the options which were identified prior to 2001.

Road options identified (1980-2001)

2.13.9. By the mid-1980s the idea of a new road link between the northern and western parts of the town was being considered as a possible solution to traffic problems in Shrewsbury. A technical report[43], published by Shropshire County Council in 1988, identified a number of route options which were evaluated according to the standards of the day. Public consultations were held to assess support for the scheme, and to help identify possible routes for a north-west relief road (NWRR).

2.13.10. The route options identified by the end of the 1980s are described below and illustrated in Figure 34.

- **Green Route** – a new road between the A5/A458 at Shelton and the A528 Ellesmere Road near Harlescott Lane
- **Red Route** – a new road between the A5/A458 at Shelton and the A528 Ellesmere Road, closer to the town centre, together with an online improvement of A528 Ellesmere Road to Harlescott Lane

[43] Shrewsbury North West Relief Road, Technical Appraisal Report, SCC County Surveyor's Department, September 1988

- **Red Route + C3** – as above, but with the addition of a link between A528 Ellesmere Road and the (then) A49 Spring Gardens following the line of the old river bed and bridging the Shrewsbury-Crewe railway line.
- **Red Route + C4** – as Red, but with the addition of a link between the NWRR and the (then) A49 Spring Gardens, having a junction with A528 Ellesmere Road, and crossing the Shrewsbury Crewe railway line, on a more southerly alignment
- **Yellow Route** – a new road between the A5/A458 at Shelton and the (then) A49 Spring Gardens, having a junction with A528 Ellesmere Road, and crossing the railway line, on a more southerly alignment
- **Blue Route** – as above, but starting from a point on The Mount, east of Shelton.

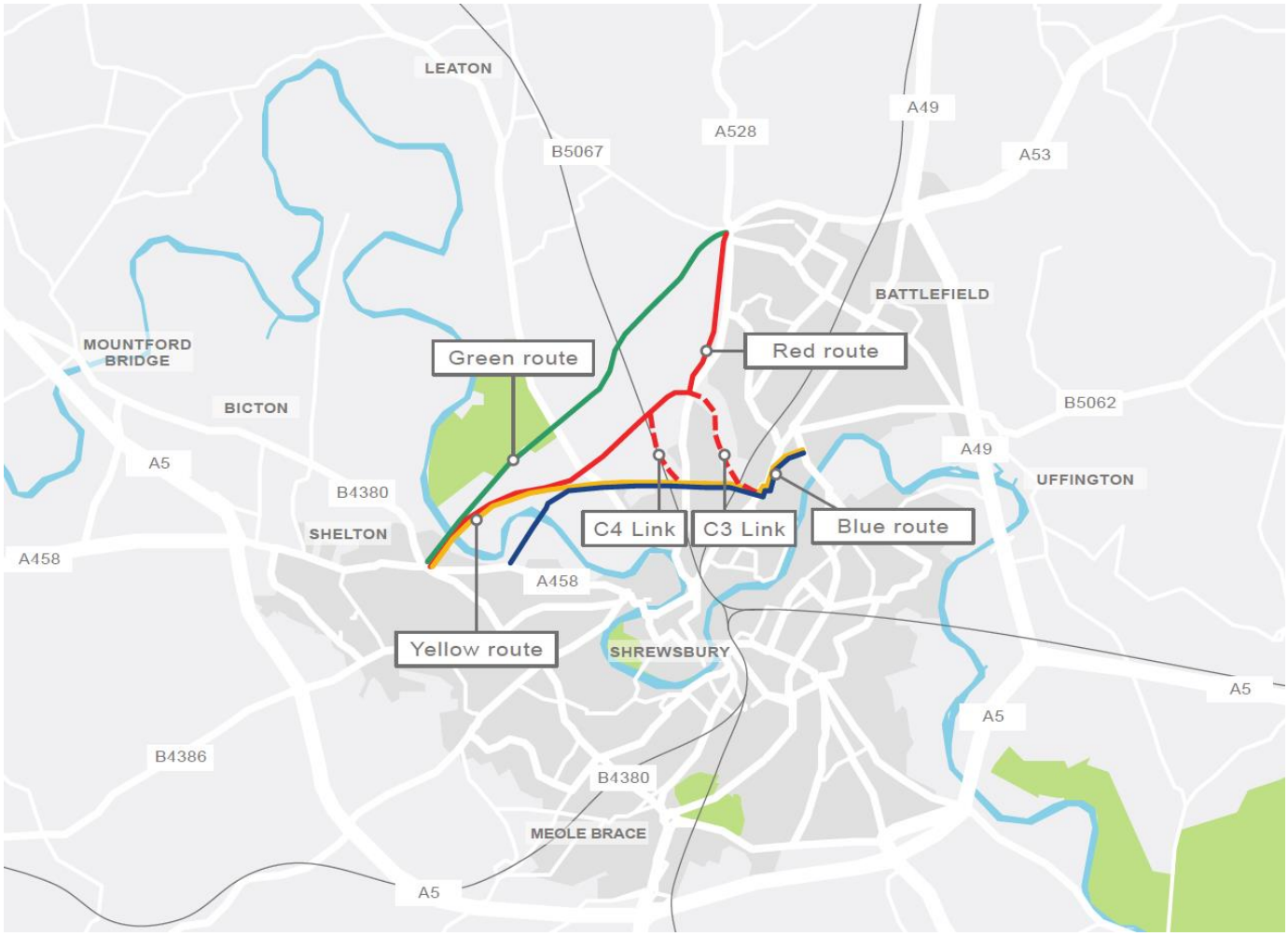


Figure 34 - Route options (1988)

2.13.11. The 1988 technical report describes the cost-benefit analysis of these options, using the models available at that time. It was concluded that the "**Red + C3**" route option was the best of the six road options considered, as it offered the highest net present value (benefits minus costs). Details of the analysis are given in the OAR.

2.13.12. The **Red + C4** route option was not considered further at this stage, as it was found to have adverse impacts on proposed housing development. The "blue" and "yellow" inner route options were considered the least acceptable because of their adverse impact on local roads and the built environment.

2.13.13. An additional option was identified in Shropshire County Council's TPP submission for 1992/93[44]:

- **Green Route + C3** – a new road between the A5/A458 at Shelton and the A528 Ellesmere Road near Harlescott Lane, together with a link to Spring Gardens, crossing Ellesmere Road and following the line of the old river bed and bridging the Shrewsbury-Crewe railway line.

2.13.14. Whilst "**Red + C3**" remained the preferred option, the introduction of a "**Green + C3**" variant reflected the views of some consultees that an "outer" route would be more acceptable. The inclusion of a connection to Ellesmere Road and a link to Spring Gardens addressed some of the deficiencies of the original "**Green**" route. However, a further feasibility study and economic assessment confirmed "**Red + C3**" as the preferred option for inclusion in the County Council's 1992 TPP submission.

2.13.15. A cost-benefit analysis in January 1997, using the traffic model available at that time, showed that including the "C3" link (between the A528 Ellesmere Road and A5112 Spring Gardens) would reduce the overall benefit-cost ratio45 of the NWRR, because of the high cost of providing a new railway bridge. In July 1997 the County Council's TPP46 confirmed that the NWRR "should not include a link between Ellesmere Road and Spring Gardens, as this would be difficult to justify in economic terms", and this was later reflected in the County Structure Plan[47].

2.13.16. In 1992, new bypasses for the A5 and A49 trunk roads were opened to the south and west of Shrewsbury, connecting the town to the M54 motorway (which had been completed in 1985). This removed long-distance through traffic from the "old" A5/A49 route (the partial ring road described above), enabling it to function better as a local distributor road. Despite these benefits, the trunk road bypasses did not address long-standing problems on the northern and western approaches to the town.

2.13.17. In order to maximise the benefits of a NWRR, by connecting it to the new trunk road bypasses, additional options were identified:

- **Battlefield Link Road** – a direct connection between the northern end of the proposed NWRR at Elllesmere Road and the new A49 bypass, at the A49/A53 junction.
- **Alternative junction at Shelton** – an alternative location for the junction between the western end of the proposed NWRR and the A458.

2.13.18. Although originally conceived as an extension to a NWRR, the Battlefield Link Road (A5124) was actually completed in 1998. It provides access to a major employment area - the Battlefield Enterprise Park - and allows traffic to avoid the level crossing on Harlescott Lane.

2.13.19. An investigation of alternative junction locations at the western end of the NWRR in 1996 initially confirmed the plan for a tie-in at The Mount (A5/A458)[48]. This has been superseded by the proposal for the Oxon Link Road.

---

[44] Shropshire Transport Policies and Programme (TPP) for 1992/93, SCC, July 1991

[45] Shrewsbury North West Relief Road, Wide Single Carriageway Traffic Assignments and COBA analysis (Internal technical report, Shropshire County Council, 8 January 1997).

[46] Shropshire Transport Policies and Programme (TPP) for 1998/99, Integrated Transport Plan for Shrewsbury (Package Proposal), SCC July 1997

[47] Major Highway Schemes in the New Structure Plan, Report to Environment, Planning and Transportation Committee (SCC 6 February 1998)

[48] Shrewsbury NWRR – Review of alternative routes from Shelton to Berwick Road. Report to Environment, Planning and Transport Committee (SCC, 24 October 1996).

2.13.20. A corridor for the NWRR was protected in the Shrewsbury and Atcham Local Plan, which was adopted in 2001. It was based on the "Red route", as illustrated in Figure **35** below.

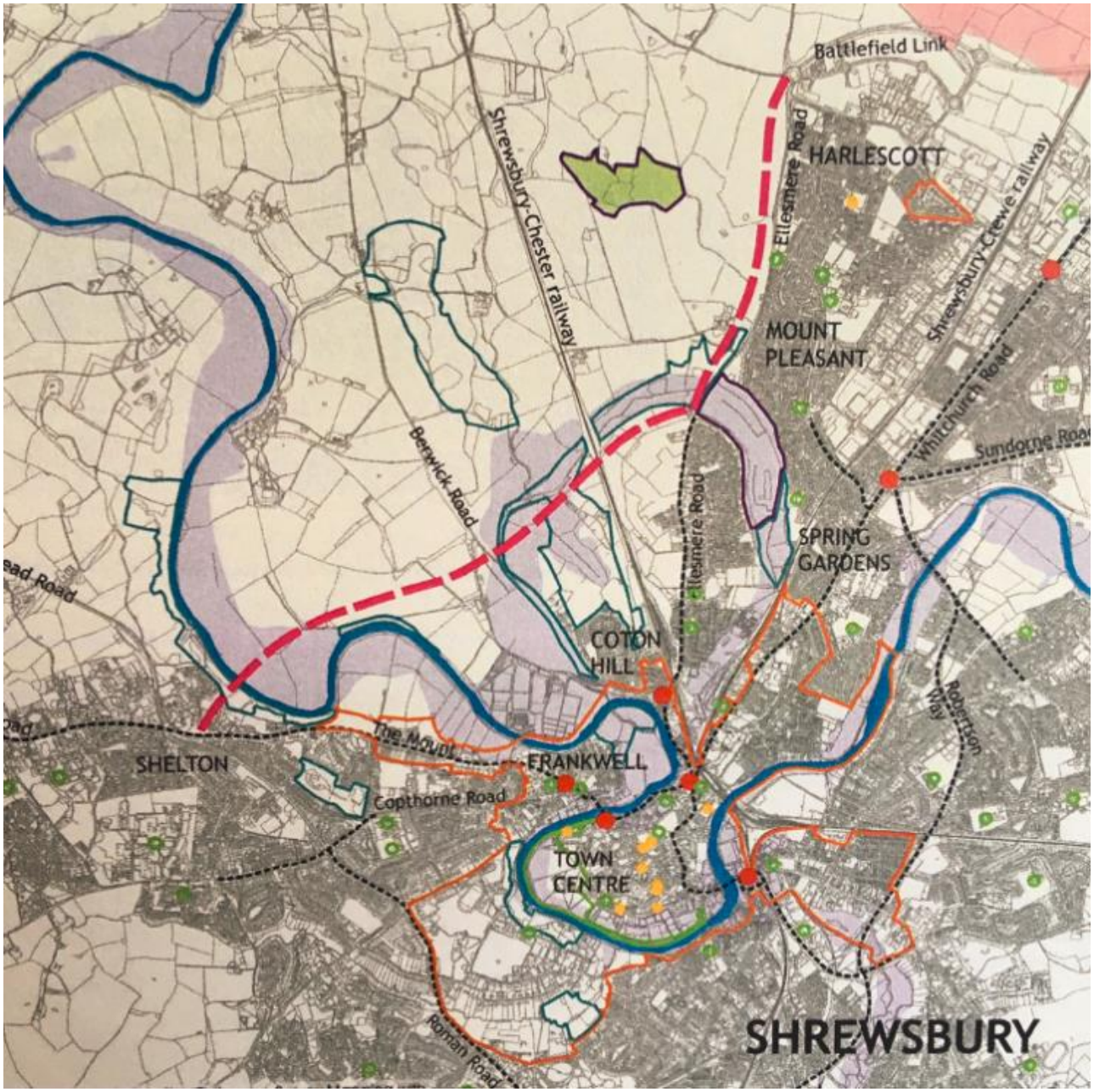


Figure 35 **- NWRR corridor protected in 2001 Local Plan**

Non-road options identified

2.13.21. A wide range of non-car options was also identified, including possible alternatives to a Shrewsbury NWRR and opportunities that might be afforded by a NWRR:

- **Non car options – alternatives to a NWRR**
  - Development of a light rail or guided bus transit system
  - Improvements to the existing bus network

- Improvements in the existing passenger rail system
- Investment in cycling infrastructure
- Investment in pedestrian infrastructure
- HGV improvements, including rail freight
- Demand management measures, including car park pricing strategy, traffic management and travel plans for schools and businesses
- A package of measures to encourage non-car use including investment in bus, rail, cycling and walking facilities

- **Non-car options – opportunities afforded by a NWRR**
  - Road space re-allocation
  - Improved access to rail station
  - Bus priority measures
  - Enhanced pedestrian and cycle facilities
  - Traffic management
  - Travel planning / demand management (including car park strategy)
  - Freight strategy
  - Town centre enhancements

2.13.22. The appraisal of these non-car options is described in the next section.

2.14 INITIAL SIFT OF OPTIONS

2.14.1. In its first Local Transport Plan (LTP1) Shropshire County Council made a commitment to review the Shrewsbury NWRR scheme during the plan period, 2000/01 – 2005/06.

2.14.2. This section describes in more detail the initial appraisal of options which took place between 2000 and 2003. As this process was, for the most part, qualitative and led to the discarding of some less feasible solutions, it generally fulfils Step 6 of the Transport Appraisal Process, as defined in WebTAG:

> *"Undertake initial sift. Discard options that would fail to address key objectives or are unlikely to pass key viability and acceptability criteria"*

2.14.3. The main purpose of the initial sift was therefore:

- To determine whether there were any viable alternatives to constructing a north-west relief road
- To identify which routes would be most acceptable to local people and stakeholders

2.14.4. Because of the passage of time, and the changes that had taken place since the initial appraisals described above (including the construction of the A5 and A49 bypasses and the Battlefield Link Road), Shropshire County Council decided to re-consider options which had been previously rejected.

2.14.5. The following options were therefore considered in the initial sift:

- Road-based options:
  - A new road within the corridor protected in the 2001 SABC Local Plan (Figure **35** above)
  - All route options previously considered (Figure 34 above)

- Additional route options identified by consultees

- Non-car options – alternatives to a NWRR
- Non-car options – opportunities afforded by a NWRR

2.14.6. At this stage, the assessments were generally qualitative.

QUALITATIVE ASSESSMENT OF NON-CAR OPTIONS

2.14.7. The initial appraisal of non-car options is described in the 2002 Non-car Options Report[49], and summarised in Table 21 and Table 22.

Table 21 - Initial appraisal of non-car options (2002) – alternatives to a NWRR

Measure	Assessment	Conclusion
Development of a light rail transit or guided bus system	Would be subject to significant constraints including practical, political, environmental and financial concerns.	The traffic reduction effects of a NWRR scheme are unlikely to be matched even on the basis of a significantly higher level of investment.
Improvements to the existing bus network	Could benefit local, cross-town and long distance travel	It is likely that a package approach combining bus infrastructure and service upgrading could increase patronage and bring about a modest level of modal transfer from the private car.
Improvements in the existing passenger rail system	Could potentially benefit long distance journeys into Shrewsbury and (to a lesser extent) through travel, but would be of limited relevance for local trips.	Rail improvements could potentially lead to some increase in patronage, however the potential for modal transfer is likely to be more limited than for bus investment and there are concerns regarding the deliverability of rail infrastructure improvements under present circumstances
Investment in cycling infrastructure	Likely to benefit local and cross-town journeys. A significant level of enhancement could be provided for an equivalent investment to the NWRR.	Would be of limited benefit for long distance and through trips.
Investment in pedestrian infrastructure	As a result of the relatively short range of walking trips, this is likely to be of principal benefit to local journeys only.	The development of pedestrian facilities could however play a significant role in enhancing accessibility by other non-car modes.
HGV improvements, including rail freight	A relatively low proportion of heavy vehicle movements between western and northern areas are likely to use town centre routes at present as a result of height restrictions. Hence the effect of any investment in alternatives	While the development of the proposed rail freight terminal at Harlescott could bring about local benefits, the proportion of road freight that could potentially be converted to rail is low overall.

[49] Shrewsbury North West Relief Road: Non-car Options Report. Mouchel for Shropshire CC, November 2002

	may not be noticeable in terms of reduced flows through the central area.	
Demand management measures including car park pricing strategy, traffic management and travel plans for schools and businesses	Can potentially restrain traffic in combination with other complementary measures.	Potential effects of such measures to be assessed in greater detail.
A package of measures to encourage non-car use including investment in bus, rail, cycling and walking facilities	Could be provided for an equivalent sum to the NWRR proposals. These might potentially be complemented by demand management techniques such as revised car parking charges and traffic management measures.	Whilst a modest level of modal transfer could be achieved, a NWRR is likely to facilitate a significantly higher level of traffic reduction in the town centre and on northern and western radial routes than is likely to be achieved by non-road measures even in combination.

Table 22 - Initial appraisal of non-car options (2002) – opportunities afforded by a NWRR

Measure	Assessment	Conclusion
Road space reallocation	Implementation of a NWRR scheme is expected to significantly reduce traffic flows in Shrewsbury town centre and on northern and western radial routes, providing the opportunity for re-allocation of road space to benefit pedestrians, cyclists and public transport.	The potential for road space reallocation is recognised in Local Authority publications including the Integrated Transport Plan for Shrewsbury as a key benefit of the NWRR proposals. The principal public transport operator also supports the scheme on this basis.
Improved access to rail station	The reduction of traffic flows associated with NWRR proposals would provide the opportunity for improving access to Shrewsbury rail station as desired by the Local Authorities and operators of bus and train services.	Provision of the NWRR scheme itself is unlikely to adversely affect rail patronage since few local journeys are made by rail.
Bus priority measures	The reduction in traffic flows resulting from a NWRR would facilitate the development of bus priorities both in the town centre and on key northern and western radial routes.	While a NWRR route itself is unlikely to be used by many bus services, it could form part of the route of a future orbital service connecting outlying areas of Shrewsbury.
Enhanced pedestrian and cycle facilities	The reduction in traffic flows in the town centre and on key radial routes resulting from the NWRR proposals would provide an enhanced environment for pedestrians and cyclists and hence would encourage the use of these modes. Road space could be reallocated to pedestrian and cycle facilities including on the Smithfield Road corridor and in the area of the rail station and bus station in the town centre.	The provision of a high quality cycle route as part of the NWRR proposals could open up new journey opportunities by this mode and form part of an integrated cycle network for Shrewsbury.
Traffic management	A reduction in traffic flows on northern and western corridors and in the town centre would be facilitated by a NWRR scheme	This would provide the opportunity for traffic management measures to be introduced in these areas.

Travel planning / demand management (including car park strategy)	The provision of a NWRR as part of the Integrated Transport Plan for Shrewsbury would enhance the existing transport system with the effect of increasing travel choices.	This could be exploited through the continued development of demand management measures including Travel Plans for schools and businesses and car parking strategies.
Freight Strategy	Provision of a NWRR scheme would enhance the orbital road system for Shrewsbury which would help to reduce the impact of delivery vehicles in the town centre	This would allow the Freight Transport Strategy proposed by the Local Authorities to be delivered more easily.
Town centre enhancements	An enhanced town centre environment could be achieved as a result of reduced traffic flows and improved conditions for non-car travel	Likely to make Shrewsbury a more attractive place to live, work, shop and do business.

2.14.8. The outcomes of the 2002 assessment are summarised in Table 23.

Table 23 - Initial (2002) assessment of non-car options vs. NWRR - summary

Non-car intervention (compared with a NWRR)	Limited impact or limited opportunity	Potential for significant impact	Opportunity in combination with NWRR
Light rail or guided bus	●		
Improve existing bus network		●	
Improve existing rail system	●		
Invest in cycle infrastructure	●		
Invest in pedestrian infrastructure	●		
HGV improvements / rail freight	●		
Demand management & road pricing		●	●
Package to encourage non-car use		●	●
Road space re-allocation			●
Improved access to rail station	●		●
Bus priority measures			●
Enhance pedestrian & cycle facilities			●
Traffic management			●
Freight strategy			●
Town centre enhancements			●

2.14.9. The overall conclusion at this stage was that:

- the provision of non-car options alone would be unlikely to provide equivalent benefits to the NWRR proposals
- a package of demand management measures including road pricing and investment in alternative modes, especially public transport, could have a significant impact and would be worth investigating

- the implementation of a NWRR scheme could itself provide significant opportunities for the delivery of improvements in non-car accessibility.

2.14.10. Shropshire County Council was able to act on these conclusions a few years later when, in 2007, it was one of ten local authorities which took part in the Government's "Transport Innovation Fund" (TIF) initiative, designed to encourage development of smarter and more innovative transport strategies which would:

- Tackle congestion
- Improve public transport
- Introduce road pricing

2.14.11. The County Council developed and tested a package of innovative measures which included:

- A North West Relief Road
- A "first class public transport system" with new buses, improved services and new passenger facilities
- Flexible road pricing (tolling on town centre approaches and, as an option, on the NWRR)
- Environmental and other improvements, especially in the historic town centre

2.14.12. Each component was, on its own, considered to be either difficult to achieve, expensive or controversial (and some were all of these). The TIF project sought to demonstrate that together they could form a virtuous circle. In simple terms, road pricing would generate the income needed to support improved public transport, encouraging mode change and reducing congestion. The NWRR would remove long distance traffic from the town centre, further reducing congestion and allowing improvements to be made for buses, pedestrians and cyclists.

2.14.13. Although none of the TIF projects, including the one developed by Shropshire, came to fruition[50], the exercise is significant in that it enabled the NWRR to be evaluated both against a package of radical alternative options, and as part of such a package.

2.14.14. Details of the measures considered and the results of the analysis are set out in detail in the Transport Innovation Fund Study Final Report (2007)[51] and summarised in the Options Assessment Report.

PUBLIC AND STAKEHOLDER CONSULTATION - 2003

2.14.15. A major public consultation exercise was undertaken during January and February 2003. Exhibitions were held in five locations, and an information leaflet and questionnaire were made available. The objectives were:

- To update the public on work undertaken to date and achieve a wider public involvement in the development of the scheme
- To set the NWRR within a wider transport policy context
- To explore attitudes towards travel and transport in Shrewsbury, and determine the level of support for a NWRR in principle
- To determine the level of support for the protected alignment and to allow people to suggest alternatives.

2.14.16. The number of questionnaires returned was 829. The number of people attending the exhibitions is likely to have been higher than this. A petition of 331 signatures was also received.

[50] SCC Cabinet Report: "Shrewsbury Transport Innovation Fund and North West Relief Road" (14 December 2007)
[51] TIF Study Final Report, (Mouchel for SCC, November 2007)

2.14.17. Full details of the consultation materials provided and responses received are set out in the 2003 Public Consultation Report[52], and summarised briefly below.

2.14.18. Most people agreed that traffic is a problem in the NW sector of Shrewsbury (Table 24).

Table 24 - Traffic problems (2003 consultation)

Issue – traffic problems (2003)	% agree or strongly agree
Traffic congestion is a problem in N & W Shrewsbury	75%
There is too much traffic on the main roads into town	72%
The traffic makes the town a less attractive place	62%

2.14.19. All of the top five problem areas identified were in the NW sector of Shrewsbury (Table 25).

Table 25 - Problem areas (2003 consultation)

Top 5 locations identified as problem areas (2003)	No. of times mentioned
Smithfield Road	136
Castle Gates gyratory	103
Frankwell	100
Chester Street / Coton Hill	99
Welsh Bridge	84

2.14.20. People placed a high value on the built and natural environment (Table 26).

Table 26 - Attitudes to environment (2003 consultation)

Attitudes to the environment (2003)	% agree or strongly agree
The existing environment in / around Shrewsbury is valuable	85%
It is important to protect and improve wildlife habitats	87%
The “green wedge” to the NW of Shrewsbury is an important asset	75%

2.14.21. The most frequent comment about the environment was: “*The green wedge and green areas are important and should not be degraded*” (91 comments).

2.14.22. People’s responses in 2003 to questions about the best way to tackle transport problems are summarised in Table 27.

Table 27 - Dealing with traffic problems (2003 consultation)

Attitudes to dealing with transport problems (2003)	% agree or strongly agree	% don’t know, neutral, or no reply	% disagree or strongly disagree
It is important to deal with the transport problems of NW Shrewsbury and the town centre.	78%	11%	11%

[52] Shrewsbury NWRR, Public Consultation Report. Report No. 1051/14/4 (Mouchel Parkman, July 2003)

The best way to deal with the problems is:			
▪ Improve public transport services and facilities?	82%	13%	5%
▪ Improve footpaths / crossing points for pedestrians?	77%	18%	5%
▪ Create more cycle paths and cycle lanes?	64%	23%	13%
▪ People should use their cars less	59%	23%	19%
▪ Build more roads, e.g. a North West Relief Road?	58%	13%	29%
▪ Increase charges for car parking in the town centre?	26%	21%	53%
▪ Do nothing?	8%	19%	73%

2.14.23. A majority (58%) of respondents agreed that new roads, such as a NWRR, were a good way to solve transport problems, but there were higher levels of support for other solutions.

2.14.24. Specific answers to questions on a possible NWRR gave a further insight into this (Table 28).

Table 28 - Attitudes to a possible NWRR (2003 consultation)

Attitudes to a possible North West Relief Road (2003)	% agree or strongly agree	% don't know or no reply	% disagree or strongly disagree
A NWRR should be built	58%	12%	31%
A NWRR should be built, but only if:			
▪ The environment and landscape are protected	62%	31%	7%
▪ Public transport is also improved	51%	37%	12%
▪ Access for pedestrians and cyclists is improved	48%	40%	12%
▪ The town centre is enhanced	48%	43%	9%
▪ Traffic is reduced in the town centre	59%	33%	8%

▪ It does not increase traffic on other roads	54%	39%	7%
If a NWRR is to be built, the protected line is the best option	34%	29%	37%
A different route should be considered	41%	35%	24%

2.14.25. Again, 58% of respondents supported the idea of a NWRR. People's main concerns related to protecting the environment and reducing traffic.

2.14.26. The preferred route (the line then being protected in the Shrewsbury and Atcham Local Plan) was supported by 34% of respondents, but 41% said that a different route should be considered. A very large number of alternative routes were suggested by people visiting the exhibitions or returning questionnaires, as illustrated in Figure **36**. This shows that, although no single alternative was as popular as the preferred route, many people preferred routes further away from the built-up area.

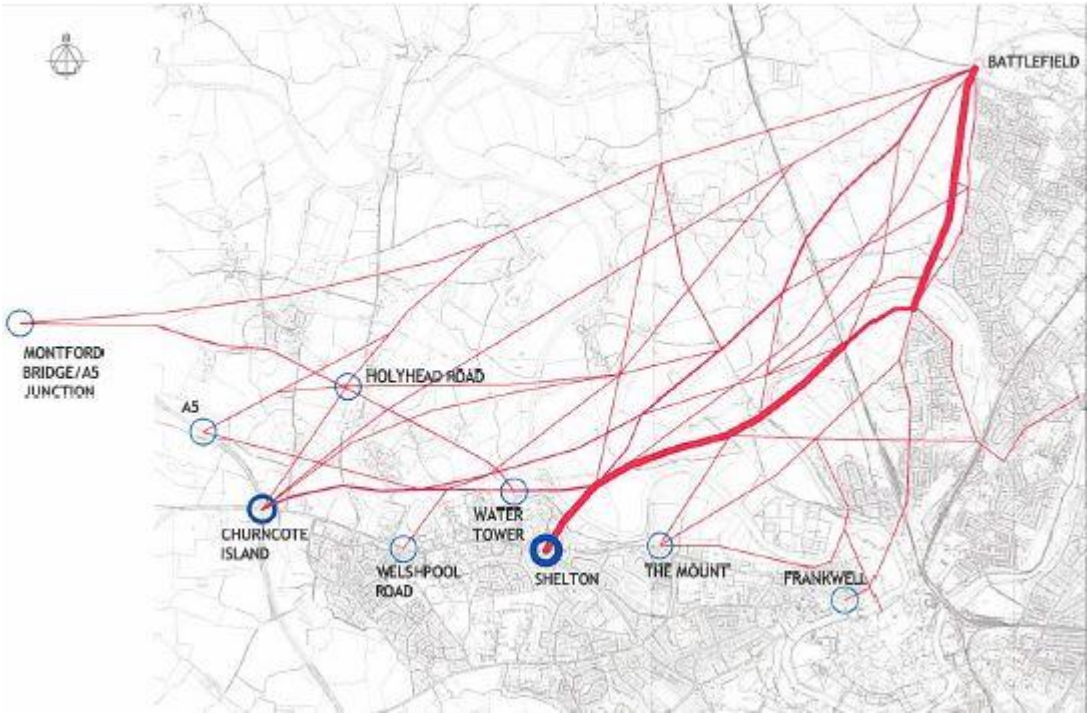


Figure 36 **- Alternative routes suggested by the public, 2003**

2.14.27. The top five comments made by people on the issue of the NWRR route are shown in Table 29.

Table 29 - Problem areas (2003 consultation)

Top 5 comments on NWRR route (2003)	Times mentioned
Impact on the Shelton / Bicton Heath / Mount areas should be avoided	145
The environment is too important to build a road	100
If the NWRR is built, it should be designed as a bypass	64
Whatever other considerations there are, a NWRR should be built	56
Money could be better spent	55

2.14.28. The Public Consultation Report (2003) gives more detail on the responses and comments, including petitions signed by people opposing the scheme.

2.14.29. The 2003 public consultation showed that:

- People felt the problems were real and that solutions needed to be found.
- A majority of people were in favour of building a NWRR,
- There should be further consideration of alternative routes further away from the built up area.
- Consideration should be given to a route avoiding the Welshpool Road through Bicton Heath, and connecting directly to the A5 bypass.
- A significant minority did not support building a NWRR.

2.14.30. There was significant support for other transport measures, especially public transport, either as an alternative to a Shrewsbury NWRR or in addition to a road solution.

2.14.31. The 2003 consultation did not however provide strong evidence of support for the (then) preferred route (Shelton to Ellesmere Road). Rather, it suggested that a longer route, further away from the town, with a direct connection to the A5 bypass might be more acceptable.

OPTIONS TAKEN FORWARD FOR FURTHER ASSESSMENT

2.14.32. As described above, option assessment during the period 2000 – 2003 was based on a qualitative assessment of a wide range of non-car options, a review of the all the route options previously considered, and an extensive public consultation in 2003 seeking people's views on both non-car and roads-based options. From this work, it was concluded by the County Council that:

- A short list of possible routes should be developed, reflecting the wide range of views and suggestions obtained from consultees and stakeholders.
- A range of non-road measures should be developed, including:
  - Public transport initiatives
  - Road user charging
  - A package of investment in non-car options on the A5/A458 corridor
- The road and non-road options should be assessed in more detail, including traffic, economic and environmental assessments
- Further public and stakeholder consultation should be undertaken.

Short-listed route options

2.14.33. The very large number of route options suggested by consultees, in addition to those previously considered, were rationalised into six representative route options for further assessment, as illustrated in Figure 37.

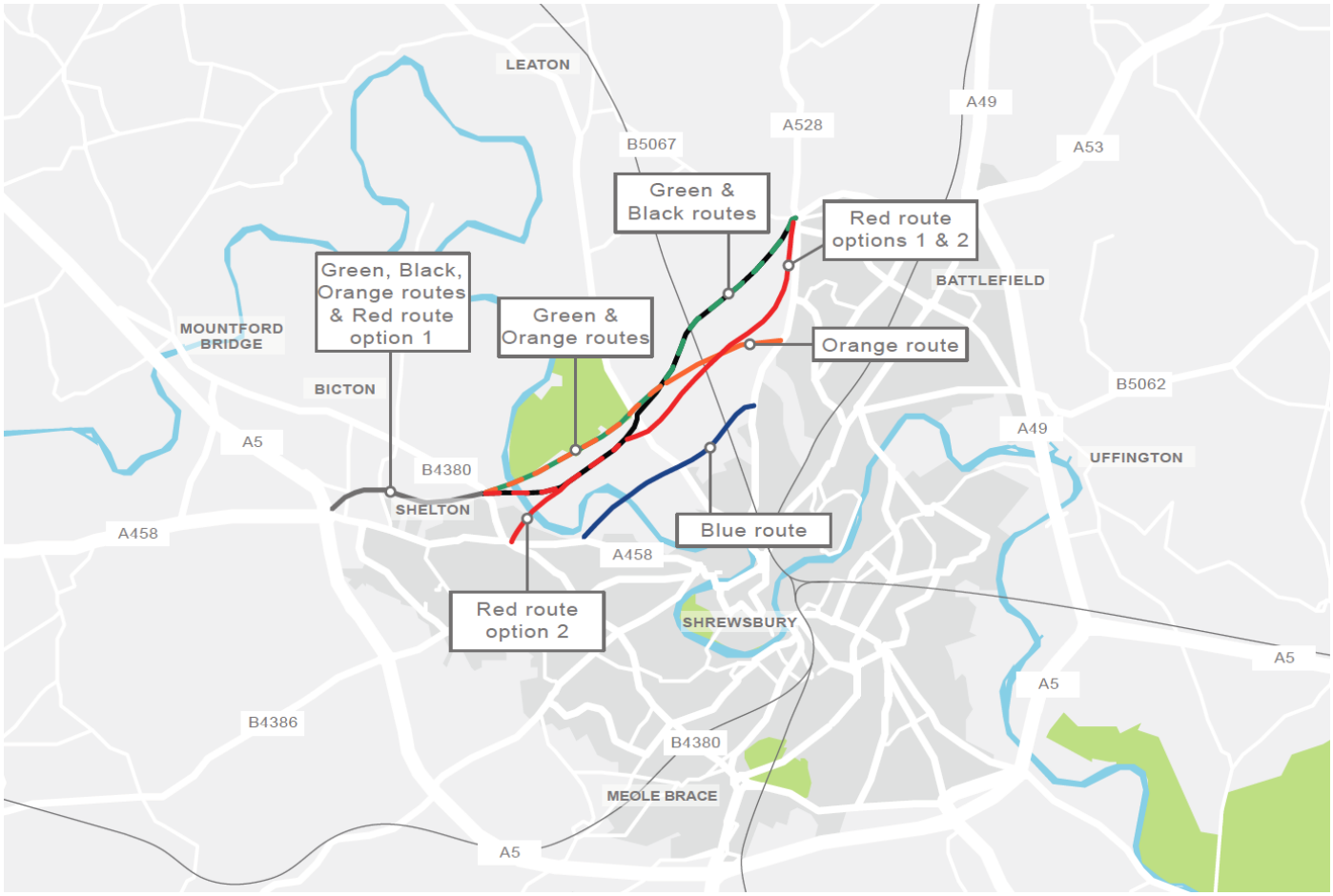


Figure 37 - NWRR route options for assessment in 2004

2.14.34. The routes fell into two distinct groups:

- **Blue** and **Red** (**Option 2**) were shorter routes which rely on parts of the existing road network.
- **Green, Black, Orange and Red (Option 1)** were longer routes which would provide a completely new road starting from the A5/A458 Churncote roundabout on the A5 bypass, reflecting the public view, expressed in the 2003 consultation that A458 Welshpool Road should be relieved of through traffic.

2.14.35. Routes starting from points further west than Churncote were not short-listed, as they would be less effective in traffic terms, whilst a Landscape Assessment[53] concluded that they would have a *Large Adverse* impact on landscapes associated with the River Severn and *Substantial* visual impacts for outlying communities.

2.14.36. The following section describes the further assessment, between 2004 and 2007, of

- non-road options.
- the short-listed route options.

[53] Shrewsbury NWRR Northern Corridors Stage 1 Landscape Assessment, Moore Environment (November 2004)

2.15 OPTION DEVELOPMENT AND ASSESSMENT

2.15.1. This section covers Step 7 of the Transport Appraisal Process, as defined in WebTAG:

2.15.2. "Develop and assess potential options to identify the better performing ones. Undertake public consultation on potential options"

2.15.3. It describes the more detailed development and assessment of short-listed road options, and of non-road options, in the period 2004 - 2007.

2.15.4. Specifically it summarises the results of:

- Cost estimates (2004)
- Stage 2 Environmental Assessment (2005)
- Stage 2 Traffic, Economic and Safety Assessment (2004)
- Public consultation (2005)
- The Transport Innovation Fund (TIF) study, including the detailed assessment of non-car options and road pricing (2007)

FURTHER ASSESSMENT OF NON-ROAD OPTIONS

2.15.5. Further assessment was undertaken of possible alternatives to building a NWRR, building on the options assessed qualitatively in 2002. Alternatives were considered under the following headings:

- Walking
- Cycling
- Public transport (light rail transit or guided bus)
- Public transport (rail)
- Public transport (bus)
- Public transport (Park & Ride)
- Freight
- Traffic management
- Demand management

2.15.6. A workshop was held in June 2004, to clarify the non-road options for further assessment. The results of the subsequent assessment, including a quantitative assessment of selected options using the traffic model, are set out in detail in the Non-road Study Report (2005) and summarised in the Options Assessment Report. The key findings are set out briefly in Table 30 below.

Table 30 - Assessment of non-road options: key findings

Type of on-road option	Potential benefits	Effectiveness as an alternative to NWRR?	Conclusions and subsequent developments
Walking	Walking offers the opportunity to replace the car for short trips, including some trips into Shrewsbury town centre. Walking is also an essential link with other modes of transport and an	Improvements for pedestrians, though beneficial and desirable, would not have a significant impact on the number of cross-town trips between the north and west of	The review concluded that there was scope for further improvement to pedestrian facilities, and that this could be done relatively quickly if resources were available.

	important part of an integrated transport strategy.	Shrewsbury, and would therefore not meet the objectives of the scheme.	Since the 2005 study, further improvements have been made to the pedestrian environment in the historic town centre, and other improvements are proposed as part of the Integrated Transport Strategy.
Cycling	Improvements for cycling could encourage more local cycle trips within Shrewsbury.	Even with a greatly improved cycle network, there is much less scope for cycling to meet the needs of longer distance travellers and through trips. Overall the review concluded that improved cycle facilities, though beneficial and desirable in themselves, would not meet the objectives of the scheme.	The review concluded that improvements could be delivered quite quickly if resources were available. Since the 2005 study, further improvements have been made to cycle routes in the town centre, and other improvements are being delivered as part of the Integrated Transport Strategy. The review noted the scope for providing cycle facilities along the length of a NWRR
Light rail transit or guided bus	A new LRT or GB system could potentially be developed, subject to resources being available, on a corridor connecting northern and western areas with the town centre. LRT and GB systems are effective ways of persuading car users to change mode, and could help deliver wider regeneration benefits.	It would be difficult to provide LRT or GB infrastructure in the town centre because of the combination of existing traffic and narrow, historic streets. Even with investment of up to £32 million, it was forecast that town centre traffic flows would be reduced by less than 4%, a much smaller impact than a NWRR. The cost would outweigh the benefits, and the option was therefore rejected.	No further action
Heavy rail	Scope for improvements to Shrewsbury railway station, possible provision of a Parkway station east of Shrewsbury, and improved train services, especially to London.	Heavy rail is mainly used for travel on specific long-distance routes and is less suited to inter-urban or cross-town movements. It does not provide an alternative for local through trips. Investment in rail improvements, though beneficial and desirable in other ways, would not meet the objectives of the scheme.	Since the 2005 review, improvements have been made to Shrewsbury railway station. Direct trains to London have been reinstated.
Bus	Improvements to existing bus services could help	More frequent services could be delivered quickly, if	

	reduce dependence on car travel for local trips.	sufficient resources were available. The review concluded the physical difficulty in providing extensive bus priority on local roads in Shrewsbury meant that bus improvements alone would not have an equivalent impact to a NWRR	
Park & Ride	Shrewsbury has a successful Park & Ride service, operating from three sites. The review examined the possibility of adding a fourth Park & Ride site to the east of the town, in conjunction with the Parkway Station discussed above.	Even with this investment, it was forecast that town centre traffic flows would be reduced by no more than 5%, a much smaller impact than a NWRR. Park & Ride services can reduce the number of car trips to and from the town centre, helping to reduce congestion, but they do not reduce local through traffic, and would not meet the objectives of the scheme.	
Freight strategy	Scope to further reduce the impact of freight vehicles by developing a Lorry Route Network to direct HGVs to the most appropriate routes and further restricting HGVs in the historic core during peak periods. Potential for providing an intermodal rail freight terminal at Harlescott in north Shrewsbury, to encourage more use of rail for locally generated freight traffic.	Height and weight restrictions limit the amount of through HGV traffic in most parts of Shrewsbury town centre. A study of rail freight concluded that only about 5% of the road freight in and around Shropshire could be considered as potentially convertible to rail. Whilst there may be some scope for improvement to freight without a NWRR, it was very unlikely that these would result in a significant reduction in the number of HGVs on the town's road network.	HGV through traffic on the north-west corridor is presently directed to use the A5/A49 bypasses, and would use the NWRR, if built. The Marches and Mid-Wales Freight Strategy identifies the Shrewsbury NWRR as one of eight major road schemes to reduce the bottlenecks on the freight road network, provide journey time savings and increased journey time reliability for freight journeys.
Traffic management	Speed limits, traffic calming and road space reallocation to pedestrians, cyclists and buses on the northern, central and western corridors could, potentially, provide a better environment for non-car users.	Measures such as road-space allocation would be difficult to achieve without first reducing traffic on routes in the N-W corridor.	Traffic management measures alone would not achieve the objectives of the scheme.
Demand management	Road user charging could discourage car use in the town centre, and provide an	The Shrewsbury Traffic Model was used to test the possible impact of a £2 toll on a town centre cordon,	Road user charging – both with and without a Shrewsbury NWRR – was taken forward for detailed

	income stream to support more sustainable modes	and found that this could lead to similar overall reductions in traffic to those that could be achieved with a NWRR.	testing as part of the Shrewsbury TIF study in 2007 (see below).

2.15.7. Of the non-road options considered, only road user charging was found to be capable of resulting in a level of traffic reduction comparable with the provision of a NWRR. The assessment indicated that for road charging to work in terms of the economic viability of the town, and to maintain good levels of access, it would need to be introduced as part of an integrated package of measures to provide efficient and economic means of access, such as improved public transport services and other measures.

2.15.8. A package of improvements for Shrewsbury including road user charging options, was subsequently developed and evaluated in detail in 2007 as part of the Transport Innovation Fund initiative, as described in 2.16.57 below.

FURTHER ASSESSMENT OF SHORT-LISTED ROUTE OPTIONS

Costs

2.15.9. The cost of each NWRR route option was estimated at a 2004 price base, including the cost of land, scheme preparation and supervision costs, public utilities, compensation and a 20% contingency. Where appropriate, cost estimates include the section which was subsequently promoted separately as the Oxon Link Road.

Table 31 - Costs of NWRR options (2004 price base)

Route	Cost (2004 base)	Length	Cost per km
Blue	£17.9 million	2.2 km	£8.1 million
Red (Option 1)	£42.9 million	6.5 km	£6.6 million
Red (Option 2)	£39.5 million	4.7 km	£8.4 million
Green	£48.5 million	6.3 km	£7.7 million
Black	£49.6 million	6.4 km	£7.8 million
Orange	£42.8 million	6.6 km	£6.5 million

Engineering assessment of short-listed route options

2.15.10. A detailed engineering assessment was undertaken for each of the six routes, and is described fully in the Route Study Report (2005)[54] and summarised in the Options Appraisal Report.

2.15.11. The study confirmed that whilst engineering issues had been identified which would require further investigation, in general all of the options were considered feasible using normal construction techniques. There were no engineering issues that would preclude the adoption of any option. The preliminary designs used in the assessment did however include departures from design standards which would require consideration as part of later stages of design.

[54] Shrewsbury NWRR Route Study Report, Mouchel Parkman for SCC (April 2005)

2.15.12. A Stage 2 Environmental Assessment[55] for the six route options was published in 2005, and quoted in detail in the 2007 Preferred Route Report[56].

2.15.13. The above reports provide very full details of the environmental assessment. A summary of the main findings is given in the OAR, and the key results are summarised in Table 32 and discussed below.

Table 32 - Summary of Stage 2 Environmental Assessment (2005)

Topic	Green	Black	Orange	Red (Option 1)	Red (Option 2)	Blue
Noise (No. of people annoyed)	-124	-124	-128	-111	-74	-35
Local air quality	Better	Better	Better	Better	Better	Better
Regional air quality (tonnes NOx/year	-6	-6	-5	-6	-8	-5
Greenhouse gases (% of Do Min CO_2)	98.0	98.0	98.4	98.1	97.6	98.3
Landscape/Visual	Moderate to large adverse	Moderate to large adverse	Large adverse	Slight to moderate adverse	Moderate adverse	Large adverse
Townscape	Slight beneficial	Slight beneficial	Slight beneficial	Slight beneficial	Slight adverse	Moderate adverse
Archaeological heritage	Large adverse	Large adverse	Large adverse	Large adverse	Large adverse	Slight adverse
Built heritage	Slight adverse	Slight adverse	Slight adverse	Neutral	Neutral	Slight adverse
Biodiversity	Significant adverse	Significant adverse	Significant adverse	Significant adverse	Significant adverse	Significant adverse
Water environment	Large adverse	Large adverse	Large adverse	Large adverse	Moderate adverse	Moderate adverse
Agriculture	High	High / moderate	High	High	Moderate	Low
Accessibility / Community severance	Moderate negative	Moderate negative	Slight negative	Moderate negative	Moderate negative	Moderate negative
Physical fitness	Worse	Worse	Worse	Worse	Worse	Worse

[55] Shrewsbury NWRR, Stage 2 Environmental Assessment Report, Mouchel Parkman for SCC (May 2005)

[56] Shrewsbury NWRR, Preferred Route Report (Final), Mouchel Parkman for SCC (January 2007)

Journey ambience	Better	Better	Better	Better	Better	Better
Integration	Neutral	Neutral	Neutral	Neutral	Neutral	Neutral

2.15.14. The impact of each of the route options on a range of environmental indicators is set out in detail in the Appraisal Summary Tables in the April 2005 Route Study Report and some of the key points are summarised below:

- **Noise** – The orange, green and black routes would have the greatest benefits in respect of noise, due to expected traffic reductions in the town. The blue route would be least successful.
- **Air Quality** – Red route (option 1) would bring the greatest air quality benefits, whilst the blue route would be the least successful in improving local air quality.
- **Climate Change** – Significant savings in CO_2 emissions are predicted with all route options, because they would all lead to shorter journey distances and less congestion on existing roads. This takes into account an assumption that the scheme will result in the generation of some additional trips.
- **Landscape** – The most severe impacts on landscape character would result from the orange and blue routes, and these would also be visible from the largest number of houses. The route judged to fit best with the landscape is the red route (option 1).
- **Townscape** – All routes would benefit the appearance of the town by reducing traffic in areas such as Frankwell, Smithfield Road, Coton Hill and Castle Foregate. The blue and red (option 2) would have the greatest adverse effect with direct impacts at their western terminal points and increased traffic on The Mount and Welshpool Road.
- **Heritage** – all routes except the blue route would disturb an archaeological crop mark feature between the River Severn and Berwick Road (the Berwick cropmark complex). These include Ring ditches (ploughed down burial mounds) of the early Bronze Age and Enclosures (farmsteads) ranging from Bronze Age through to early Medieval periods. Each route would improve the setting of many historic buildings in the town by reducing traffic, but the new road would be visible from heritage sites such as the Mount Conservation Area and Shrewsbury Castle, as it crosses open countryside. Overall the blue route is judged to have the least detrimental effect on heritage.
- **Ecology** – The blue route and red route (option 2) would result in the least severance or loss of habitats. The orange route would be the least favourable ecologically, with the largest land take and severance of habitat. The green and black routes are close to Hencott Pool which is a Site of Special Scientific Interest (SSSI) and is designated as a wetland of international importance under the “Ramsar” Convention (The Convention on Wetlands of International Importance especially as Waterfowl Habitat – Ramsar, Iran 1971).
- **Water** – the four routes terminating at Churncote Island (red option 1, green, black and orange) would bridge the River Severn upstream of the extraction point for Shelton Waterworks, which would therefore need to be relocated to avoid a pollution risk. This was considered feasible, although there will be technical issues to resolve with the EA. In general these longer routes also have the largest impact on existing drainage. The four routes terminating at Churncote Island (red option 1, green, black and orange) would also directly pass through the “Source Protection Zone” (SPZ1) around the borehole used for ground water extraction, but this would not preclude construction of these routes. It should however be noted that the red route (option 2) would avoid the SPZ and be downstream of the present river water extraction point. All routes, including both the red routes, would affect the River Severn flood plain in some way. Overall the blue route was judged to have the least detrimental effect on water.
- **Agriculture** – The blue route would have the least detrimental effect on agriculture because it would have the smallest land take and would minimise the severance of farmland.

- **Accessibility** – All the routes would reduce the amenity of some long distance footpaths. The routes linking directly to the A5 bypass would also sever lanes connecting Bicton with the Welshpool Road.
- **Road Transport** – All options would reduce congestion in the urban area and lead to shorter journey times between the west and north Shrewsbury.

2.15.15. The Stage 2 Environmental Assessment identified a number of issues where further investigation was recommended as part of the work to determine a preferred route. Specifically it concluded that:

- There was scope to increase the level of landscape mitigation
- Options could affect other archaeological features associated with the Berwick Cropmark Complex. Further field evaluation is required before the extent to the impact can be determined.
- Further hydrological and ecological data was required for any of the options at Hencott Pool, with a view to avoiding potential impacts
- The implications for the developing local plan spatial strategy should be considered further, especially with regard to infill development pressure on land to the west of Ellesmere Road

2.15.16. The outcomes of these further investigations are discussed in Paragraph 2.16.1.

Traffic assessment of short-listed route options

2.15.17. An assessment of the traffic impacts of the six NWRR route options was undertaken using the Shrewsbury Traffic Model. The development of the model is described in detail in the Shrewsbury SATURN Model, Model Validation Reports (April 2003 and March 2004), and summarised in the Preferred Route Report (January 2007). The model base year was 2003 and traffic forecasts were undertaken for 2011 (assumed opening year) and 2026 (design year, assumed 15 years after opening). The modelled periods were AM peak (07.00 – 10.00), PM peak (16.00 – 19.00) and Inter Peak (10.00 – 16.00). The option tests are described in the Model Tests Report[57].

2.15.18. All of the route options tested were forecast to produce very large reductions in traffic on those town centre routes which presently carry traffic between the west and north of Shrewsbury, especially in the morning peak period.

2.15.19. The forecast reductions on the Welsh Bridge in the a.m. peak ranged from 40.8% (Blue Route) to 46.2% (Orange Route) in the “low growth” scenario, and from 33.0% to 39.5% in the 2011 “high growth” scenario.

2.15.20. Similarly, the forecast reductions on Smithfield Road in the a.m. peak ranged from 39.4% (Blue Route) to 43.7% (Orange Route) in the “low growth” scenario, and from 32.3% to 37.8% in the 2011 “high growth” scenario.

2.15.21. The forecast traffic reductions on Castle Street were smaller, but still significant, ranging from 17.1% (Blue Route) to 10% (Red Route, option 2) in the a.m. peak.

2.15.22. On other routes in the town centre, such as the High Street and the English Bridge, which are not part of the north-west corridor, a NWRR would have much less impact on traffic flows, with forecast changes of less than 5%.

2.15.23. In percentage terms, the traffic reductions were forecast to be less in 2026 than in 2011, though greater in absolute terms.

[57] NWRR Model Tests Report, Mouchel for SCC (May 2004)

2.15.24. The main differences between the route options were on the roads outside the town centre. All route options except **Blue** were forecast to increase traffic on the Battlefield Link Road by about 15%. Significant increases were forecast on Shelton Road (about 65% with Red Option 2 and about 20% for routes starting at Churncote. Similarly, **Red Option 2** would increase traffic on Welshpool Road by about 5%, whereas the routes starting at Churncote would reduce traffic on Welshpool Road by about 20%.

2.15.25. The **Blue** Route was forecast to be less effective in diverting existing traffic onto the NWRR, carrying up to 20% less traffic than the other options. It would also produce increases in traffic of about 40% on Ellesmere Road and 80% on The Mount. In contrast to this, the **Red** and **Green** options would produce reductions of about 30% on Ellesmere Road and 60% on The Mount.

2.15.26. In simple terms, the **Blue** and **Red (Option 2)** routes which terminate closer to the town centre would produce greater increases on the radial routes leading towards them. This was considered to make these options less attractive. The "outer" routes were shown to be broadly similar in terms of their traffic impacts.

2.15.27. An assessment[58] of the potential for induced traffic indicated that the improvements brought about by a NWRR could lead to induced traffic in the region of 1% to 2%.

Economic assessment of the short-listed route options

2.15.28. The results of an economic assessment of the six route options is set out in the Preferred Route Report (2007) and summarised in Table 33.

Table 33 - Economic assessment (low growth)

Route option	Present value of benefits (£,000) PVB	Present value of costs (£,000) PVC	Benefit-cost ratio. BCR
Green	256,007	53,062	4.82
Black	232,385	53,625	4.71
Orange	266,626	48,935	5.45
Red (Option 1)	242,711	47,270	5.13
Red (Option 2)	247,142	46,121	5.36
Blue	183,423	23,345	7.86

Table 34 - Economic assessment (high growth)

Route option	Present value of benefits (£,000) PVB	Present value of costs (£,000) PVC	Benefit-cost ratio. BCR
Green	461,518	60,801	7.49
Black	453,974	61,111	7.34
Orange	477,341	56,743	8.22
Red (Option 1)	442,797	54,542	7.95
Red (Option 2)	459,998	53,714	8.22

[58] Paragraph 4.6, NWRR Model Tests Report, Mouchel for SCC (May 2004)

Blue	307,620	28,423	11.35

2.15.29. All options were shown to have produce benefits significantly in excess of their costs. The **Blue** Route produced the lowest benefits overall but - being the shortest route - it also produced the highest BCR. To a lesser extent, the same was true of the **Orange** and **Red Option 2** routes which produced a slightly higher BCR than the remaining routes. At this level of detail, however, there was little clear distinction between the **Green**, **Black** and **Red (Option 1)** routes in terms of their economic performance. This was unsurprising, as these routes connected to the existing network at the same points, and were similar in cost.

PUBLIC CONSULTATION ON THE SHORT-LISTED ROUTE OPTIONS AND NON-ROAD SOLUTIONS (2005)

2.15.30. A further round of public consultation was undertaken in May 2005 to update people on the technical review, and to determine the level of support and/or opposition to the short-listed route options, and non-road options.

2.15.31. Over 50,000 leaflets and questionnaires were distributed describing the scheme. The questionnaire was available online and at public exhibitions. A total of 1,165 questionnaires were returned. Full details of the consultation responses are given in the Consultation Report[59], and summarised in the Options Assessment Report. The key findings are set out below:

2.15.32. A clear majority (77%) of those who responded agreed that there are traffic problems in Shrewsbury which need to be addressed. Most respondents supported the construction of a NWRR in principle (not, at this stage of the questionnaire, with reference to a specific route).

Table 35 - Support for NWRR in principle (2005)

Question	Agree or strongly agree	Disagree or strongly disagree
A NWRR should be promoted to address the problems caused by traffic in the town centre	53%	41%
Methods other than building a new road should be promoted to solve traffic problems	48%	38%

2.15.33. People were then asked: “What should be included in a future strategy if methods other than building a new road are to be pursued?” The results are set out in Table 36.

Table 36 - Support for alternatives to building a new road (2005)

Alternative methods	Yes	No
Walking – new routes and improvements to existing facilities	60%	20%
Cycling – new and improved cycle routes and secure parking	66%	15%
Buses – increase frequency and operating hours. Dedicate more space to bus lanes	52%	29%
Park & Ride – increased frequency and extended operating hours, increased capacity at existing sites. New sites.	61%	25%

[59] Shrewsbury NWRR Public Consultation Report 2005 (Mouchel for SCC, October 2005)

Road charging – introduce peak time congestion charges for using town centre roads and invest the income in improved passenger transport services	32%	52%

2.15.34. Walking, cycling and improvements to buses and Park & Ride were the most popular elements for inclusion in an alternative strategy. Road charging, as an alternative to building a new road, was supported by 32% of all respondents.

2.15.35. Finally, people were given an opportunity to select their first, second or third preferences, or to reject any of the six route options. The results are set out in Table 37.

Table 37 - Option preferences (2005)

Route option	1st	2nd	1st or 2nd	Rejected
Green route	26%	17%	43%	22%
No new road to be built	37%	0%	37%	20%
Red (Option 1)	22%	10%	32%	25%
Black	6%	14%	20%	25%
Red (Option 2)	5%	5%	10%	37%
Orange	2%	7%	10%	32%
Blue	3%	4%	7%	41%

2.15.36. Written responses were received from 22 organisations and interest groups, and from 24 members of the public. Details are given in the consultation report and summarised in the OAR. Views ranged from strong support to strong opposition to a Shrewsbury NWRR.

2.15.37. Of the six route options considered, only two found any significant degree of support. The **green** route was the first or second choice of 43% of people. This is not quite a majority of those who responded, but neither is the 37% who, after considering the options, felt that no road should be built at all. The **red route (option 1)** was the first or second choice of 32% of people.

2.15.38. The **red route (option 1)**, and the **black** route are technically very similar to the **green** route, with similar costs and similar effects on traffic. Because the **black** and **red (option 1)** routes share part of the route of the **green** option, it seems likely that people found it difficult to discriminate between them. Although the **green** route attracted the most public support, presumably because it was demonstrably the “outer” route, the technical differences between the three outer routes were not considered sufficiently great to eliminate any of them from further consideration at this stage - at least not until the potential impacts of the **green** and **black** routes on the ecology of Hencott Pool, a “Ramsar” and SSSI site, had been further investigated.

2.15.39. The **red route (option 2)** was the first or second choice of only 10% of respondents. It has a junction closer to the town at its western end, and would attract more traffic to the Welshpool Road and affect more residential properties than other routes. For these reason it was not taken forward in the development of a preferred route. (Land that had been protected for this route option has since been developed, so it is no longer deliverable.)

2.15.40. The **orange** route was only the first choice of 2% of people, and was rejected by 32% (more than the **green**, **black** or **red (option 1)** routes). Although it has a very good benefit-cost ratio, it appears that people do not support this route which is slightly closer to the town centre and would have a junction connecting to Ellesmere Road north of Hubert Way. At one time there had been a proposal for Hubert Way to link to Spring Gardens by

way of a new railway bridge but this (the "C3 link") was ruled out in 1997 on cost and feasibility grounds[60] (and is no longer deliverable, due to planned regeneration at the Flaxmill Maltings).There is therefore less remaining justification for a junction on Ellesmere Road. The **orange** route was also judged to be the least satisfactory in ecological terms. For these reasons it was concluded that the **orange** route should not considered in the development of a preferred route.

2.15.41. The **blue** route (closest to the town) would be the shortest and cheapest, and had the best benefit-cost ratio, but was clearly rejected by local people. It was therefore agreed that the blue route should not be considered in the development of a preferred route.

2.15.42. To summarise:

- The consultation results revealed very strong feelings both for and against the idea of building a NWRR.
- Most people agreed that there are traffic problems to be tackled. A majority, (53%) of respondents felt that a NWRR was the best way to solve them. There was also significant support for other measures, such as improvements to public transport, walking and cycling, but the technical study shows that these alone could not achieve the same level of traffic benefits as a road.
- The technical study indicated that a congestion charge (in conjunction with better public transport) could, in theory, achieve equivalent levels of traffic reduction to a road scheme, but only about a third of people supported this as an alternative to building a new road, although this in itself was a surprisingly high figure.
- The **blue**, **orange** and **red (option 2)** routes were least well supported and technically least acceptable. It was therefore decided that a preferred route should be developed based on the remaining routes: **green**, **black** and **red (option 1)**.

2.15.43. It was concluded that a NWRR should be taken forward, as part of a wider package of measures.

2.15.44. The preferred route option was developed in parallel with the County Council's participation in the government funded Transport Innovation Fund (TIF) initiative. This provided a unique opportunity to investigate in more detail the feasibility of road-user charging, either as an alternative to a NWRR or as part of a package including a NWRR. The findings of the study are summarised in Paragraph 2.16.57 below.

2.16 IDENTIFICATION OF THE PREFERRED OPTION

2.16.1. This section describes the development of a single preferred route in the light of further consideration of the environmental impacts of the three remaining options – **Green**, **Black** and **Red (option 1)**. It does not go into great detail, but this may be found in the full technical report: Shrewsbury North West Relief Road, Preferred Route Report[61] (January 2007). A fuller summary is given in the OAR.

2.16.2. This section also summarises the outcome of the Transport Innovation Fund study which examined the feasibility of road pricing as an alternative to, or in conjunction with, the preferred route.

TRAFFIC IMPACTS

2.16.3. There would be no significant difference, in traffic terms, between the three different routes, as each follows the same general alignment and has similar connections to the existing road network.

[60] See paragraph 2.13.1
[61] Shrewsbury NWRR, Preferred Route Report (Final), Mouchel Parkman for SCC (January 2007)

Air quality

2.16.4. Consultations with English Nature and the Shropshire Wildlife Trust identified concerns about the impact of nitrogen deposition from vehicle exhausts upon the Hencott Pool Ramsar site, which is of international importance for nature conservation, and the Old River Bed.

2.16.5. Increased deposition of nitrogen-containing compounds can lead to changes in the competition between plant species in a delicate ecosystem, changing the composition of the system. The pollutant of most concern is NOx. Road transport is the major source of UK NOx emissions, although these are now decreasing due to improved vehicle design.

2.16.6. The air quality impacts of the alternative routes have been assessed in accordance with the Interim Advice Note 61/05: Guidance for undertaking Environmental Assessment of Air Quality for Sensitive Ecosystems in Internationally Designated Nature Conservation Sites and SSSIs.

2.16.7. The NWRR would lead to changes in NOx concentrations at Hencott Pool as set out in Table 38.

Table 38 - Impact of NWRR options on NOx concentration at Hencott Pool

		Annual mean NOx µg/m3	Change due to NWRR µg/m3	EU objective for protection of vegetation µg/m3
Existing	2003	15.7	-	30.0
Do minimum	2011	11.7	-	30.0
Green	2011	16.5	4.73	30.0
Red (Option 1)	2011	11.7	-	30.0
Black	2011	15.4	3.67	30.0

2.16.8. The **Green** and **Black** Routes would increase NOx concentrations at Hencott Pool by about 4 µg/m3. The **Red Route (Option 1)** would have no effect. However the overall concentration of NOx would still be less than the EU objective for the protection of vegetation (30 µg/m3).

2.16.9. All of the routes would lead to a net reduction of NOx concentrations at the Old River Bed, because they would all reduce traffic on existing roads nearby.

2.16.10. It has also been calculated that total deposition of nitrogen would increase by 0.9% at Hencott Pool and would reduce by up to 0.9% at the Old River Bed.

2.16.11. **Conclusion – air quality**: It is concluded that the increase in NOx emissions from road traffic due to the NWRR would not have a significant impact on designated nearby sensitive ecosystems, whichever route is chosen.

Landscape

2.16.12. Consultation with the CPRE and Friends of the Earth (FoE) have raised concerns about the impact of the NWRR on the landscape, particularly that of the Old River Bed. Consultation with the Countryside Agency stressed the importance of access to the countryside for recreation. There were general concerns about the effect of the NWRR on landscape character, loss of local green space, impacts on the rights of way network and on the risk of infill development.

2.16.13. A meeting was held with CPRE and FoE on 3 February 2006, at which CPRE presented their own Landscape Character Survey which has been taken into consideration in the Preferred Route Report. Account has also been taken of the County Council's draft Historic Landscape Characterisation.

2.16.14. The Landscape Assessment in the Stage 2 Environmental Report has been developed to take account of the issues raised, in order to compare the impact of each route option. The methodology follows the detailed guidance set out by the Department of Transport. This includes a structured appraisal of the sensitivity of landscape features and the size of likely impacts, for each section of the route.

2.16.15. The results, for each of the three routes under consideration are shown in Table 39.

Table 39 - Landscape impact assessment

	Green	Red (Option 1)	Black
Churncote to Holyhead Road	Slight adverse impact	Slight adverse impact	Slight adverse impact
Holyhead Road to Berwick Road	Moderate adverse impact	Moderate adverse impact	Moderate adverse impact
Berwick Road to Battlefield	Large adverse impact	Large adverse impact	Large adverse impact
Whole route (based on worst section)	**Large adverse impact**	**Large adverse impact**	**Large adverse impact**

2.16.16. This confirms what has previously been acknowledged: that the construction of a major road through open landscape would have a significant impact. However, the DfT methodology, which requires the overall assessment to be based on that for the worst section, is not very sensitive to differences between the routes.

2.16.17. A more detailed examination of the three routes does reveal significant differences between them (Table 40).

Table 40 - Landscape impacts by route section

Route section	Landscape impact
Churncote to Holyhead Road	All routes follow the same alignment
Holyhead Road to Berwick Road	The more southerly alignments of the **Red Route (Option 1)** and **Black** Route are preferable as they would take less mature vegetation and provide a better fit with the pattern of landscape
Berwick Road to Battlefield	The **Green** and **Black** routes would affect a shorter length of the Old River Bed and views would be better protected by cuttings and intervening high ground. With regard to rights of way, these routes would be less disruptive to views of the Old River Bed from Marches Way, and more easily screened by planting, earth shaping or landform.
Whole route	The **Black** Route would be least damaging to the landscape

2.16.18. More detail on landscape impacts is given in the Preferred Route Report.

2.16.19. **Conclusion – landscape**: It is concluded that whilst any of the routes would have a large adverse impact on landscape, the Black Route would be least damaging and most susceptible to mitigation.

Heritage

2.16.20. Aerial photographs taken in the last quarter of the 20th century revealed a number of archaeological features evidenced by cropmarks. The Stage 2 survey (2004) recommended a programme of further field evaluation, including a geophysical survey, to determine the extent and survival of these features.

2.16.21. The geophysical survey was undertaken in May and June 2006, and confirmed the survival of below-ground features previously identified by aerial photography, together with a number of other features.

2.16.22. The Berwick cropmark complex comprises ring ditches, enclosures and other linear forms and is one of several such groups in the Upper Severn Valley. It is regarded as being of national importance because of its date range (Neolithic to Mediaeval) and its complexity.

2.16.23. The Preferred Route Report also considers the impact of the routes on the built heritage.

2.16.24. **Conclusion – Heritage:** Each of the three road options under consideration would seriously affect components of the Berwick cropmark complex. The **Red Route (Option 1)** may have slightly less impact on this, and on the built heritage, but the Preferred Route Report concludes that any differences are slight and it would not be appropriate to discriminate between the different routes on this basis.

2.16.25. It therefore recommended that further site investigation be undertaken in the form of trial trenches, to determine the degree and quality of survival of the features and deposits within the major components affected by the preferred road option. The appropriate treatment could be either preservation in situ (requiring route realignment to avoid the remains) or by record (through full scale excavation, prior to construction). A watching brief should also be maintained to record any other archaeological features revealed during construction.

Biodiversity

2.16.26. Detailed consultation with English Nature (now Natural England) had been taking place since 2004. Concerns about the possible impact of the road were raised by the Shropshire Wildlife Trust in June 2005.

2.16.27. As part of the Stage 2 Environmental Assessment a detailed desk-top study was undertaken, together with a preliminary site survey. The main concerns about the possible impact of the NWRR upon biodiversity relate to the two Sites of Special Scientific Interest (SSSI) in the area:

- **Hencott Pool (SSSI and Ramsar site).**
  Hencott Pool is part of the Meres and Mosses of the north west Midlands and is of international importance. Despite its name, it contains little if any standing water but is a peat filled basin supporting a very rich flora of fen plants, including several uncommon species. These are completely intolerant of salt, require very damp to shallow water conditions and intermediate to richly fertile soils. The ecology is therefore very sensitive to the quality and quantity of water entering the wetland.
- **Old River Bed (SSSI).**
  The Old River Bed is an old meander of the River Severn and is important for its fen and swamp vegetation. The ecology is therefore sensitive to the quality and quantity of water feeding the site.

2.16.28. In addition, the routes would run close to the County Wildlife Site which includes the remaining area of the old river meander to the west of the SSSI. The routes would also all cross the River Severn and its floodplain.

2.16.29. The Preferred Route Report (2007) sets out the results of the studies and surveys in detail, focusing particularly on the differences between the three routes still under consideration. It takes account of additional guidance published since the Stage 2 Assessment was done, and draws on further detailed consultation with English Nature / Natural England.

2.16.30. The initial assessment concluded that each of the three routes would have a “moderate adverse” ecological impact. In other words, they were broadly similar in their effects, because they follow similar lines within a narrow corridor.

2.16.31. There are however more subtle differences between the routes which the Preferred Route Report demonstrates through more detailed analysis. The **Red Route (Option 1)** would be significantly further away from Hencott Pool (although it would intrude upon the flood plain of the Old River Bed). Because of the international significance of Hencott Pool, this emerges as the most important consideration.

2.16.32. Of the remaining two routes, the **Black** Route would be slightly more acceptable than the **Green** Route, as it would have less impact upon the Shelton Rough Shropshire Wildlife Site and the undesignated Willow Pool.

2.16.33. The **Red (Option 1)** and **Black** routes have the least impact, in terms of ecology, and the **Green** route the greatest, although the differences are judged to be small.

2.16.34. In 2006, further consultations with Natural England identified an alternative approach which could offer a positive ecological benefit for the scheme: The **Green** and **Black** routes pass closest to Hencott Pool. If the land between Hencott Pool and the road were acquired for the development of an ecological buffer strip, and if the Pool itself were acquired for permanent conservation management as part of the road scheme, there could be an overall positive impact on the ecology of the pool. By moving the **Green** and **Black** routes just 50m further from Hencott Pool, they could also be located behind an area of enhanced landform designed to ensure that surface water does not drain towards the pool, minimising the potential for chemical pollution of the site. This positive impact could be further enhanced by the inclusion of works to improve the habitat to a plan to be formulated and agreed with Natural England. This could include scrub clearance and control of water levels.

2.16.35. Such an approach would be similar to that taken by Shropshire County Council in relation to the A53 Hodnet Bypass, where wetland conservation and management was a key aspect of the scheme.

2.16.36. With such mitigation at Hencott Pool, the **Green** or **Black** Routes would become the preferred options, in terms of ecology, with no physical intrusion into the flood plain of the Old River Bed. The **Black** Route, having less impact on Shelton Rough and Willow Pool, offers the best solution overall.

2.16.37. **Conclusion – Biodiversity:** With mitigation as described above at Hencott Pool, the **Black** Route would have the least impact upon biodiversity. Discussions should continue with Natural England, especially regarding mitigation at Hencott Pool, and a detailed ecological survey should be undertaken as part of the full Environmental Assessment for the preferred route.

Flood risk and drainage

2.16.38. Without mitigation, the NWRR could have a substantial adverse impact on the local and regional water environment. However, through the use of controlled drainage systems, by routing the road away from or above areas prone to flood and through modifications to its vertical alignment these impacts can be minimised or avoided.

2.16.39. The Preferred Route Report examines in detail the impact of each of the route options upon:

- The loss of flood plain storage
- Obstruction of flow routes across flood plain
- Pollution entering watercourses or wetland
- Impact on sensitive sites
- Impact on the public water supply

2.16.40. For the purposes of selecting a preferred route, the impact on public water supply is a determining issue. The **Green** Route would cross the river upstream of the Severn Trent water intake and the risk of accidental spillage into the river at this point, however small, is considered unacceptable. As the water intake cannot be moved, this effectively rules out the **Green** Route.

2.16.41. Both the other routes would cross the river downstream of the water intake, and can be realigned to increase this distance by about 40m. They would still need to include measures to prevent contamination from run-off or errant vehicles. Other mitigating measures would include compensatory storage for loss of flood plain due to embankments. Embankments for the bridge would also need to be kept to the margins of the flood plain.

2.16.42. Through consideration of the other possible impacts, the **Black** Route is considered to be slightly better than the **Red (Option 1)** because of its lower impact upon the floodplain around the Old River Bed and, as previously mentioned, the potential for mitigation and enhancement at Hencott Pool.

2.16.43. **Conclusion – Flood risk and drainage:** With mitigation, the **Black** Route would have the least impact on flood risk and drainage. The **Green** Route is unlikely to be acceptable due to its crossing of the river above the abstraction point.

Groundwater

2.16.44. Several concerns have been raised about groundwater issues:

- The Environment Agency are concerned about the siting of a main road through the Source Protection Zone for their borehole at Shelton.
- Severn-Trent Water also have concerns about the borehole and other effects upon the aquifer
- English Nature and the Shropshire Wildlife Trust have concerns about the water balance and quality in Hencott Pool and the Old River Bed.

2.16.45. The Preferred Route Report notes that all of the routes lie within a sensitive groundwater setting. They are underlain at depth by the major aquifer from which drinking water is abstracted from boreholes. Cuttings could encounter a separate shallow groundwater table. Without mitigation, new road construction and operation could affect deep and shallow groundwater quality and impact on wetlands and surface water features.

2.16.46. The most sensitive issue with regard to groundwater is the proximity of all the routes to the Severn Trent borehole at Shelton. The full length of all of the routes lies within the Source Protection Zone, and the greatest part of this is classified as SPZ II, within which the Environment Agency only permit surface runoff from roads in exceptional circumstances. A short length of each route lies within SPZ I, within which the Environment Agency do not permit any surface runoff from roads.

2.16.47. The Preferred Route Report goes on to note that there are aspects of the local geology which suggest that the groundwater impacts may be less than would initially appear.

2.16.48. It also anticipates that all of the potential groundwater impacts could be mitigated and reduced to a neutral level by engineering measures, including:

- Installation of a sealed drainage system, with crash barriers and linings to prevent road run-off from accidents polluting groundwater in the most sensitive areas;
- Use of cut-off walls for cuttings, with an associated groundwater drainage system designed to maintain groundwater levels;
- Recharge of attenuated water to groundwater via soakaways situated outside the most sensitive areas

2.16.49. For the purposes of selecting a preferred route, the key point is that there is no significant overall difference between the three options under consideration with regard to groundwater.

2.16.50. **Conclusion – Groundwater:** It is not possible to discriminate between the three routes under consideration, on the basis of their impact upon groundwater.

2.16.51. Work done to date indicates that groundwater impacts can be mitigated by engineering measures. This includes impacts upon the Source Protection Zone for the Shelton Borehole.

2.16.52. A more detailed ground investigation and numerical model should be developed for the preferred route, to enable cost-effective mitigation measures to be designed.

OVERALL PREFERRED ROUTE

2.16.53. The results of the further investigations into the three possible routes are summarised below:

- **Traffic:** No significant difference
- **Air quality:** No significant difference

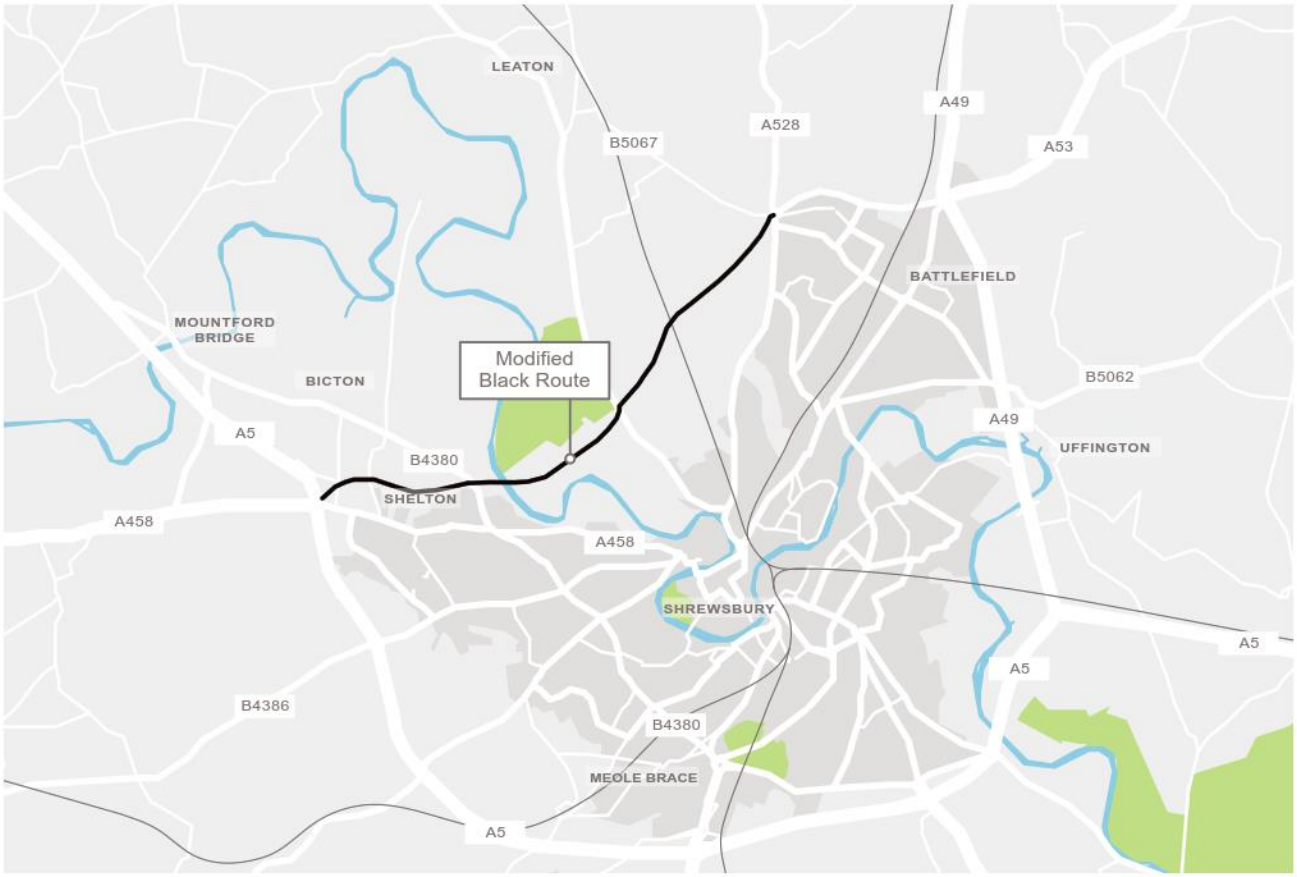
- **Landscape:** Black route preferred
- **Heritage:** No significant difference
- **Biodiversity:** Black route preferred
- **Flood risk and drainage** Black route preferred. Green route unacceptable
- **Groundwater:** No significant difference
- **Overall:** Black route preferred

2.16.54. The **Black** route is preferred overall, because it is better able to deal with the key local issues. A more detailed summary is included in the Preferred Route Report and this also points clearly the **Black** Route as the preferred option, in terms of its overall impact.

2.16.55. The **Black** route is the most expensive of the options considered. This may be regarded as the cost of selecting a route which has least impact on a very sensitive local environment. A similar value judgment was made when shorter (and cheaper) route alternatives were rejected in favour of an outer corridor of routes, on the basis that the inner routes could not command public support.

2.16.56. Work undertaken since publication of the Preferred Route Report indicated that some minor modifications should, however, be made to the **Black** Route, to minimise environmental impact on the Severn Trent water intake and water treatment works, and on Hencott Pool. The Modified **Black** Route (illustrated in Figure 38) was therefore identified as the preferred route option.

Figure 38 – Modified Black Route



Overview of the TIF study

2.16.57. Shropshire was one of ten local authorities which took part in the Government's "Transport Innovation Fund" (TIF) initiative, designed to encourage development of smarter and more innovative transport strategies which would tackle congestion, improve public transport, and introduce road pricing.

2.16.58. The County Council developed and tested a package of innovative measures for Shrewsbury which included:

- A North West Relief Road (based on the 2007 preferred route)
- A "first class public transport system" with new buses, improved services and new passenger facilities
- Flexible road pricing (tolling on town centre approaches and, as an option, on the NWRR)
- Environmental and other improvements, especially in the historic town centre

2.16.59. The overall concept is illustrated in Figure 39 below.

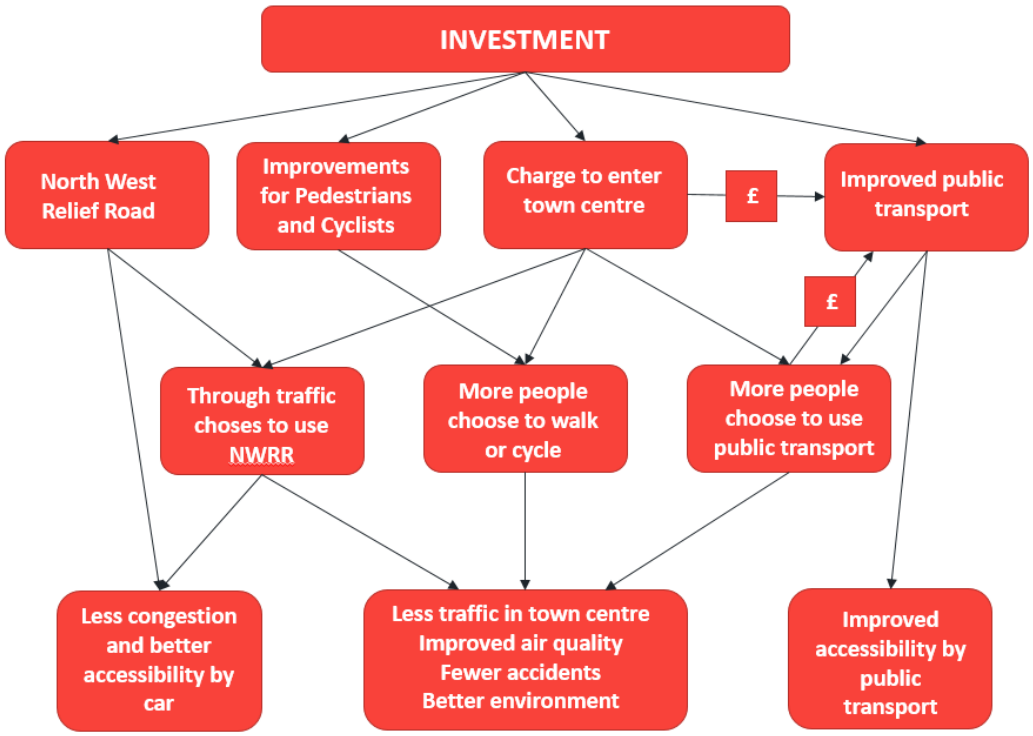


Figure 39 - Overview of potential TIF project for Shrewsbury

2.16.60. As part of the TIF study, a new multi-modal transport model was developed for Shrewsbury

2.16.61. The results of the investigations are set out in detail in the study report[62] and the conclusions in a report to the County Council in December 2007[63].

Estimated costs of TIF package

2.16.62. The study identified a potential package of improvements (including a NWRR) costing approximately £109 million at 2006 prices (Table 41).

Table 41 - Costs of potential TIF package

Cost estimates	Capital Cost	Revenue Cost per year
Shrewsbury NWRR (Q3 2006 prices)	£61.3m	-
Road pricing scheme and related improvements (e.g. variable car park signing)	£28.1m	£3.3m gross
Package of public transport and other transport/environmental improvements	£19.8m	£1.9m
TOTAL	£109.2m	£5.2m

2.16.63. In simple terms, the capital costs would have been the subject of a bid to the DfT's Transport Innovation Fund, whereas the ongoing revenue costs would need to be covered by the income from a road pricing scheme.

Road pricing options

2.16.64. Consultations had shown that people were unsure about road pricing, with only 18% in favour and 39% against it as a possible means of dealing with congestion. However, 37% answered "maybe", indicating a degree of open mindedness on the issue. If road pricing were to be introduced, people said they would expect the income to be reinvested in better transport.

2.16.65. From the initial traffic and economic model it was concluded that a road pricing scheme in Shrewsbury would need to be "low cost", with charges of around £1.00 or £1.50. Modelling showed that increasing charges beyond this level would produce very little extra revenue, as it would drive people away.

SCENARIO TESTS

2.16.66. A representative range of scenarios was tested with the traffic model:

- Do minimum
- NWRR only
- Town centre road pricing and transport package only
- Town centre road pricing and transport package + NWRR
- Town centre road pricing and transport package + NWRR + toll on NWRR

[62] TIF Study Final Report, (Mouchel for SCC, November 2007)

[63] SCC Cabinet Report: "Shrewsbury Transport Innovation Fund and North West Relief Road" (14 December 2007)

2.16.67. The results of the scenario tests are set out and discussed below.

Costs

2.16.68. The study identified a potential package of improvements (including a NWRR) costing approximately £109 million at 2006 prices.

2.16.69. The capital cost associated with each scenario is summarised in Table 42.

Table 42 - Capital costs of NWRR and road pricing scenarios (£ million, 2006 prices)

Scenario	Cost of NWRR	Cost of improvements to public transport etc.	Cost of road pricing and associated measures	Total cost
NWRR only	61.3	0	0	61.3
Town centre road pricing + transport package only	0	19.8	28.1	47.9
Town centre road pricing + transport package + NWRR	61.3	19.8	28.1	109.2
Town centre road pricing + transport package + NWRR + toll on NWRR	61.3	19.8	28.1	109.2

Traffic impacts

2.16.70. The study indicated that town centre road pricing in combination with a “free” NWRR would produce the biggest traffic reductions on key routes in the town centre (Table 43).

Table 43 - Traffic reductions with NWRR and road pricing scenarios

Scenario	Reduction in traffic on Smithfield Road
NWRR only	31%
Town centre road pricing + transport package only	41%
Town centre road pricing + transport package + NWRR	65%
Town centre road pricing + transport package + NWRR + toll on NWRR	57%

Economic impacts (transport)

2.16.71. The study indicated that all of the scenarios could have a positive BCR. However the ‘NWRR only’ scenario would produce a much higher economic benefit than any of the scenarios involving road pricing. Road pricing without a NWRR performed worst in simple economic terms (Table 44).

Table 44 - Economic impacts (BCR) of NWRR and road pricing scenarios

Scenario	Benefit- cost ratio (BCR)
NWRR only	8.7
Town centre road pricing + transport package only	1.8
Town centre road pricing + transport package + NWRR	4.0

Town centre road pricing + transport package + NWRR + toll on NWRR	3.8

Mode choice impacts

2.16.72. Any of the road pricing options would be effective in achieving a mode shift towards more sustainable means of accessing the town centre (Table 45).

Table 45 - Mode choice impacts of NWRR and road pricing scenarios

Scenario	Percentage of total trips to town centre made by car
Do minimum	38%
NWRR only	41%
Town centre road pricing + transport package only	27%
Town centre road pricing + transport package + NWRR	27%
Town centre road pricing + transport package + NWRR + toll on NWRR	27%

Revenue impacts (cash flow)

2.16.73. In the first five years of the scheme, all of the scenarios would cost more to operate than the level of income that could be generated. The lowest deficit would be with charges on the NWRR as well as the town centre (Table 46).

Table 46 - Revenue impacts of NWRR and road pricing scenarios (£ million)

Scenario	Projected income	Projected costs	Annual deficit
NWRR only	0	0	0
Town centre road pricing + transport package only	3.9	5.2	1.3
Town centre road pricing + transport package + NWRR	2.6	5.2	2.6
Town centre road pricing + transport package + NWRR + toll on NWRR	5.0	5.3	0.3

Road pricing – conclusions

2.16.74. The TIF study showed that a road pricing scheme could reduce traffic and congestion in the town centre, improve accessibility and encourage more people to use more sustainable forms of transport, but

- Any of the road pricing options would perform significantly less well than a NWRR, as measured by its BCR
- a scheme with town centre charging only could not be relied on to work in cash flow terms, either with or without a NWRR,
- a TIF package with town centre road pricing, a tolled NWRR and improved public transport would be marginal in cash-flow terms and there is a risk that projected surpluses might not be achieved.
- there is no evidence that a road pricing scheme, especially if it had to include a tolled NWRR would command public support.

2.16.75. For these reasons, Shropshire County Council concluded in January 2007 that:

- road pricing was not a viable alternative to a NWRR
- road pricing in combination with a NWRR would not be financially viable
- the preferred NWRR scheme should be progressed, alongside a broader package of measures (excluding pricing) to reduce congestion and encourage sustainable transport.

2.16.76. The last of the above decisions led to the development of a new Shrewsbury Integrated Transport Plan (ITP) which was the subject of a successful bid for Growth Deal funding in 2016, and is now being implemented.

2.17 OPTION ASSESSMENT – OVERALL CONCLUSIONS

2.17.1. By 2007, the Shrewsbury North West Road scheme had been subject to increasingly detailed engineering and environmental assessments over a very long period of time. A wide range of potential alternative or complementary measures had been identified and assessed to determine whether there was a viable alternative to a NWRR. Throughout this process, local people and stakeholders had been consulted both on road and non-road options. Traffic modelling and economic assessment had been undertaken in increasing detail.

2.17.2. As described above, this work demonstrated that:

- A north-west relief road is needed to address traffic problems in the north-west sector of Shrewsbury
- Alternative solutions would not have the same impact as a NWRR, or would not be deliverable
- The scheme has been developed as part of an wider transport strategy, other elements of which have been, or are being, delivered
- A north-west relief road would be supported by a majority of local people
- The preferred route (Modified Black Route) is feasible and would be most acceptable in terms of:
  - Its overall impact on the environment
  - its overall ability to reduce traffic on key congested routes in the town centre
  - its overall acceptability to local people
- The overall economic benefits of a NWRR would significantly exceed the cost of construction

2.18 THE PROPOSED SCHEME

2.18.1. The proposed scheme, based on the preferred route, has been developed in more detail and is illustrated in Appendix A.

2.18.2. In particular, the Oxon Link Road scheme, formerly part of the NWRR, is now being developed separately, and will be completed in advance of the NWRR, It is therefore not part of the proposed scheme for the purposes of this Business Case.

2.18.3. The scheme will comprise a new single carriageway all-purpose road to the north-west of Shrewsbury, from the eastern end of the proposed Oxon Link Road to the western end of the existing Battlefield Link Road, including a new single carriageway bridge over the River Severn and its floodplain, and a new bridge over the railway.

2.18.4. The NWRR, Oxon Link Road and Battlefield Link Road will form a complete route between the A5 trunk road at Churncote Roundabout and the A49/A53 Battlefield Roundabout, completing an orbital bypass for Shrewsbury.

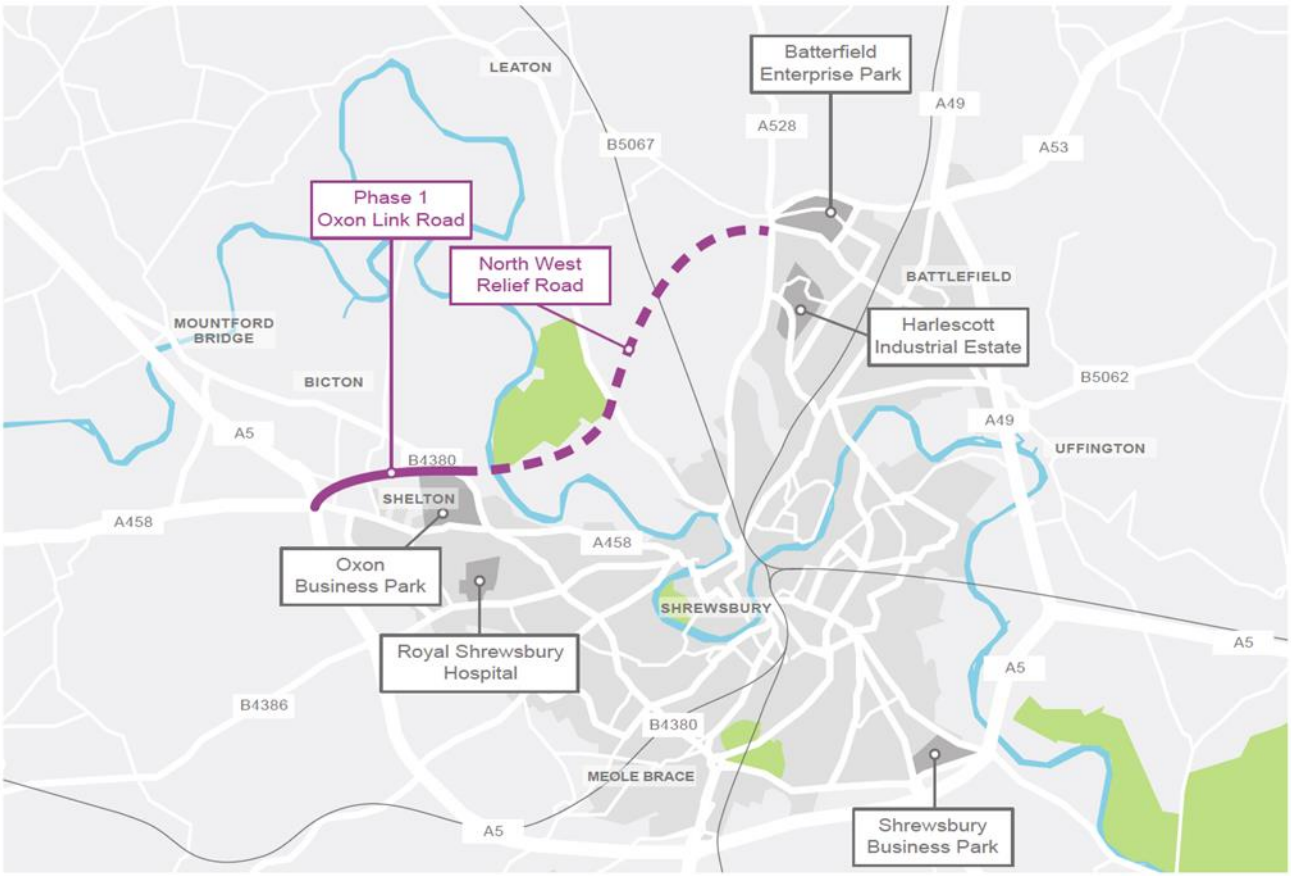


Figure 40 – Proposed scheme (diagrammatic)

Figure 41 – Visualisation of the proposed bridge over the River Severn

2.18.5. The scheme will include “at grade” roundabout junctions at Holyhead Road and Berwick Road and an enlarged roundabout at Ellesmere Road.

2.18.6. Huffley Lane will be diverted to a new junction with A528 Ellesmere Road, north of the roundabout.

2.18.7. The scheme will include:

- A 7.3m wide single carriageway with 1m hard strips
- A separate 3m wide combined footway, cycleway and bridleway
- Re-located rights of way and field paths as required

2.18.8. The scheme includes landscaping, planting, and environmental mitigation work including the acquisition of Hencott Pool to enable habitat improvements.

2.19 CONSULTATION WITH THE PUBLIC AND STAKEHOLDERS

SCOPE OF THE 2017 CONSULTATION

2.19.1. A further round of consultation was undertaken in 2017, with the aim of involving as many local people and stakeholders as possible. To this end a range of activities supported by press, posters and online publicity were carried out during October and early November, including public exhibitions, questionnaires, online surveys and stakeholder meetings. The target audience for the consultation included Shrewsbury residents and residents to the west and north of the town, local businesses, key stakeholders and Shropshire residents who visit, work and/or shop in Shrewsbury.

2.19.2. NWRR information and questionnaires were distributed to the public via:

- Public exhibitions held in and around Shrewsbury.
- Shrewsbury Community Hub, Castle Gates, Shrewsbury
- Online (Council website – get-involved consultation portal).
- The Shirehall reception

2.19.3. Local press, including the Shropshire Star, Shrewsbury Chronicle, Radio Shropshire and commercial Radio Stations covered the consultation extensively up to and during the consultation period, which ended 8 November 2017.

2.19.4. It is estimated that between 800 and 1,000 people came along to view and ask questions about the North West Relief Road at Shropshire Council’s exhibitions in and around Shrewsbury

2.19.5. Over 60 stakeholder groups, in addition to all Parish and Town Councils were included in the consultation.

2017 CONSULTATION REPORT

2.19.6. A full report of the 2017 consultation, including copies of the consultation materials and a full list of the stakeholders, is included at Appendix B. A summary of the key results is set out below.

RESULTS OF THE 2017 CONSULTATION

2.19.7. The questionnaire was based around six simple questions, designed to give people an opportunity to express their views on the scheme:

- How strongly do you agree with the statement “The North West Relief Road should be built”?
- If you agree that the NWRR should be built, what are the main reasons for this?

- If you disagree with the NWRR being built, what are the main reasons for this?
- If you do not know whether or not the NWRR should be built, please tell us the main reasons
- Is there anything else you would like to add?

2.19.8. The number of people responding was 633, including postal and online responses.

Should the NWRR be built?

2.19.9. The responses received from individuals and businesses showed that 67.5% agreed that the preferred route should be built, 30.3% disagreed and 2.2% didn't know. The detailed responses are set out below

Table 47 - Should the NWRR be built? - Responses

Response	Number	Percentage
Very strongly agree	321	50.71%
Strongly agree	58	9.16%
Agree	48	7.58%
Disagree	19	3.00%
Strongly disagree	35	5.53%
Very strongly disagree	138	21.80%
Don't know	14	2.21%
TOTAL	633	

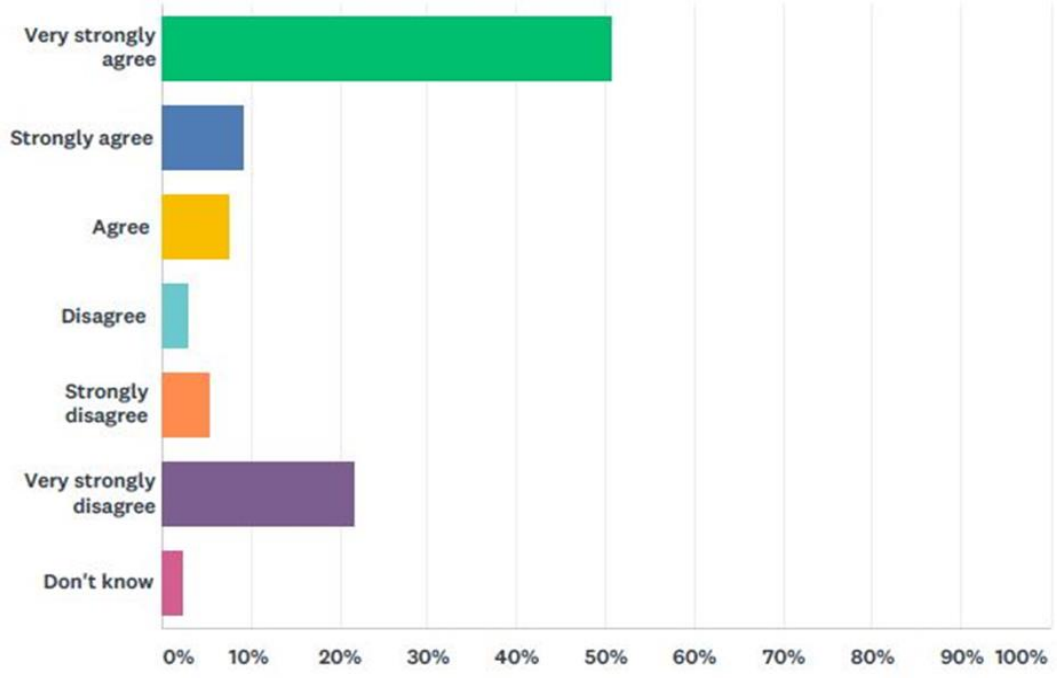


Figure 42 - Should the NWRR be built? - Responses

2.19.10. The proportion of people agreeing that the NWRR should be built in the form currently proposed is higher than in previous consultations, and clearly outweighs the number who oppose it, whilst the number of "don't knows" is very low.

Reasons given for supporting construction of the NWRR

2.19.11. The most popular reasons given were:

- It will relieve congestion in the town centre and on the northern and western approaches to the town
- It will support the growth and development of Shrewsbury, support economic growth and improve accessibility, particularly to the employment areas in the north of the town
- It will complete the outer ring road and provide much needed traffic relief to the congested A5 bypass and other town roads
- It will reduce rat-running across the rural north of Shrewsbury
- It will reduce air pollution and improve the environment, enable better provision for pedestrians and cyclists and improve safety

Reasons given for not supporting construction of the NWRR

2.19.12. The most popular reasons given were:

- It would destroy valuable countryside, biodiversity and introduce noise, air pollution and visual intrusion
- New roads create more traffic, and an alternative, more sustainable approach is needed, including town centre restrictions and encouraging people to use the inner ring road or outer bypass.
- The cost is too high, there are cheaper alternatives, and other services should be given priority at times of austerity
- Do not believe it will achieve the level of traffic relief predicted, or do not consider that the traffic relief predicted justifies the scheme. Other things (e.g. electric cars) will provide relief.
- It will encourage more development leading to the loss of more green space, more traffic and more roads
- It is the wrong route and/or investment should be directed towards existing roads instead (e.g. the A5, rural routes in the north)

Reasons given for being undecided about construction of the NWRR

2.19.13. The most popular reasons given were:

- Understand arguments in favour but concerned that new roads just generate more traffic
- Not sure how much benefit to villages north of Shrewsbury
- Agree there are benefits, but the scale of the environmental impacts make it difficult to judge

Other comments

2.19.14. Most of the additional comments (which are detailed in full in the 2017 Consultation Report) reiterated points already made in response to questions 2, 3 and 4. The most common additional point was:

- The NWRR should be “future proofed” by making it a dual carriageway, or making provision for future dualling in the design of the bridges.

2.19.15. About 95% of the responses were from individuals, the remainder were from businesses or from an individual and a business. The vast majority were from Shrewsbury or the rural area to the north of the town, reflecting the expected area of interest in the scheme.

2.19.16. Ten letters were received with detailed comments. Five of these supported the NWRR, three raised objections and two provided other comments.

2.19.17. Responses were received from 30 stakeholder organisations. Full responses are appended to the 2017 Consultation Report, and summarised in the report.

2.19.18. Sixteen of the responding stakeholders supported construction of the NWRR, six were opposed, and eight highlighted issues that needed to be addressed should the scheme progress.

CONCLUSIONS FROM THE 2017 CONSULTATION

2.19.19. The 2017 consultation demonstrated that local people are aware of the potential benefits and dis-benefits of a NWRR and that many hold very strong views. Those who support the scheme believe it is strongly justified by the expected traffic relief, and benefits to the economy, the town centre and the urban environment. Those who are against it are not convinced by the traffic relief argument and believe there are alternative, more cost effective, ways of achieving traffic reduction, that the environmental impacts on the green wedge are too great and that the costs simply cannot be justified.

2.19.20. As in previous consultations there was strong feeling that the debate has gone on long enough and that a decision needs to be made.

2.19.21. The consultation concluded that the majority of the 633 local people and stakeholders who responded are in favour of building the NWRR and that support, at 67.5% has increased since previous consultations.

2.19.22. More detail in given in the 2017 Consultation Report.

2.19.23. Following the public consultation, Shropshire Council received letters of support for the NWRR scheme from:

- The Marches Local Enterprise Partnership
- Shrewsbury Business Improvement District
- Mr Daniel Kawczynski – MP for Shrewsbury and Atcham
- Midlands Connect
- Shrewsbury Town Council
- Local Businesses

2.19.24. Copies of these letters can be found in Appendix C.

2.20 EXPECTED IMPACTS OF THE PROPOSED SCHEME AND ACHIEVEMENT OF OBJECTIVES

2.20.1. Each of the five cases present just one aspect of the case for building a Shrewsbury North West Relief Road; the overall case depends on all of them. Whilst the Economic Case demonstrates that the proposed scheme offers the best value for money, and other cases demonstrate that it is affordable, deliverable and commercially viable, the **Strategic Case** rests upon the extent to which the proposed scheme will address the problems identified (Section 2.5 and 2.6) and achieve the scheme's objectives (Section 2.8).

2.20.2. The causal chain diagram, or logic map, (reproduced in Figure 43) shows how and why the Council believes the proposed NWRR will contribute towards the achievement of objectives, but it cannot by itself demonstrate the strength of each link in the causal chain.

2.20.3. All of the expected positive impacts of the proposed scheme will be a consequence of changes in the pattern of traffic movement, wherever they occur in the local road network. These changes have been forecast by the Shrewsbury Traffic Model, and can therefore be examined to help understand how effective the NWRR will be in delivering its objectives. This is complementary to the use of the model to calculate the economic benefits of the scheme.

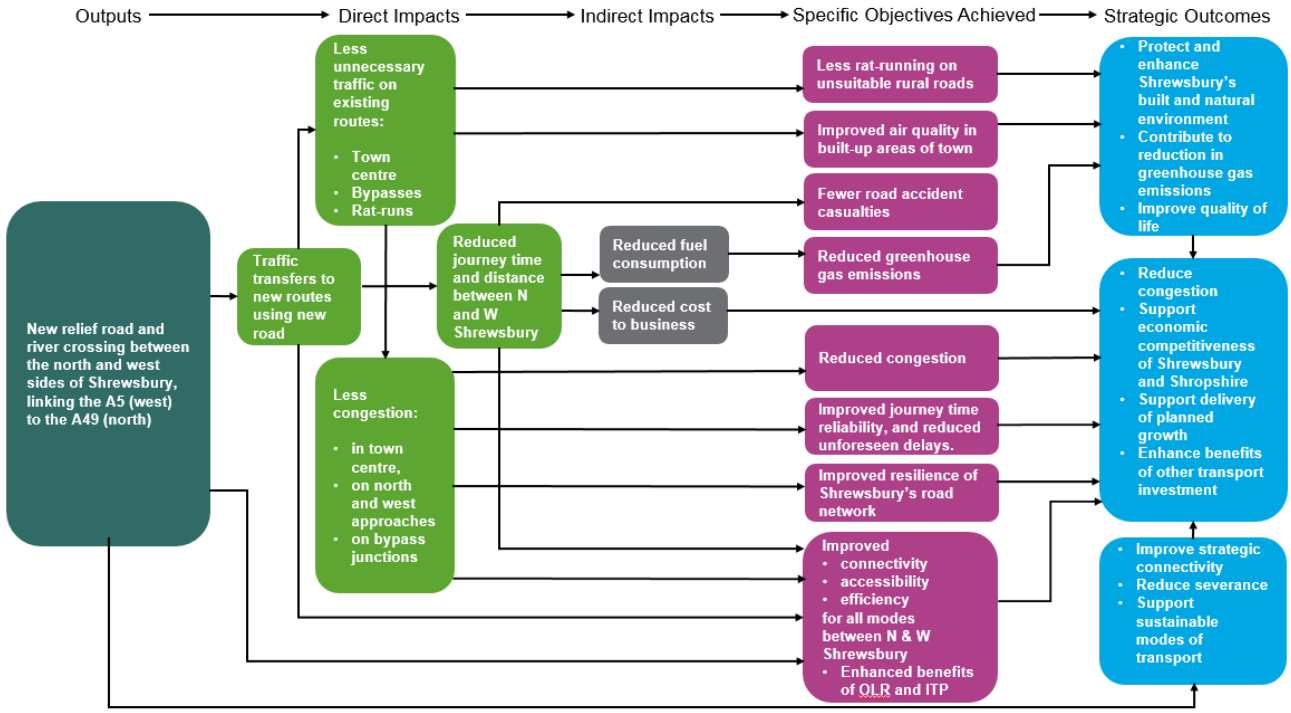


Figure 43 – Causal chain diagram (logic map)

Traffic impacts – overview

2.20.4. The expected overall impact of the NWRR on traffic on Shrewsbury's road network is illustrated in

2.20.5. Figure 44. This shows differences between forecast "Do Something" and "Do minimum" a.m. peak traffic flows in the design year (2037). Roads experiencing an increase in traffic (compared with the Do Minimum) are coloured green, and those experiencing a decrease are coloured blue, with the width of the band representing the amount of change in traffic volume. (Changes in traffic volume on the NWRR itself (which does not exist in the "Do Minimum" are not shown on the diagram).

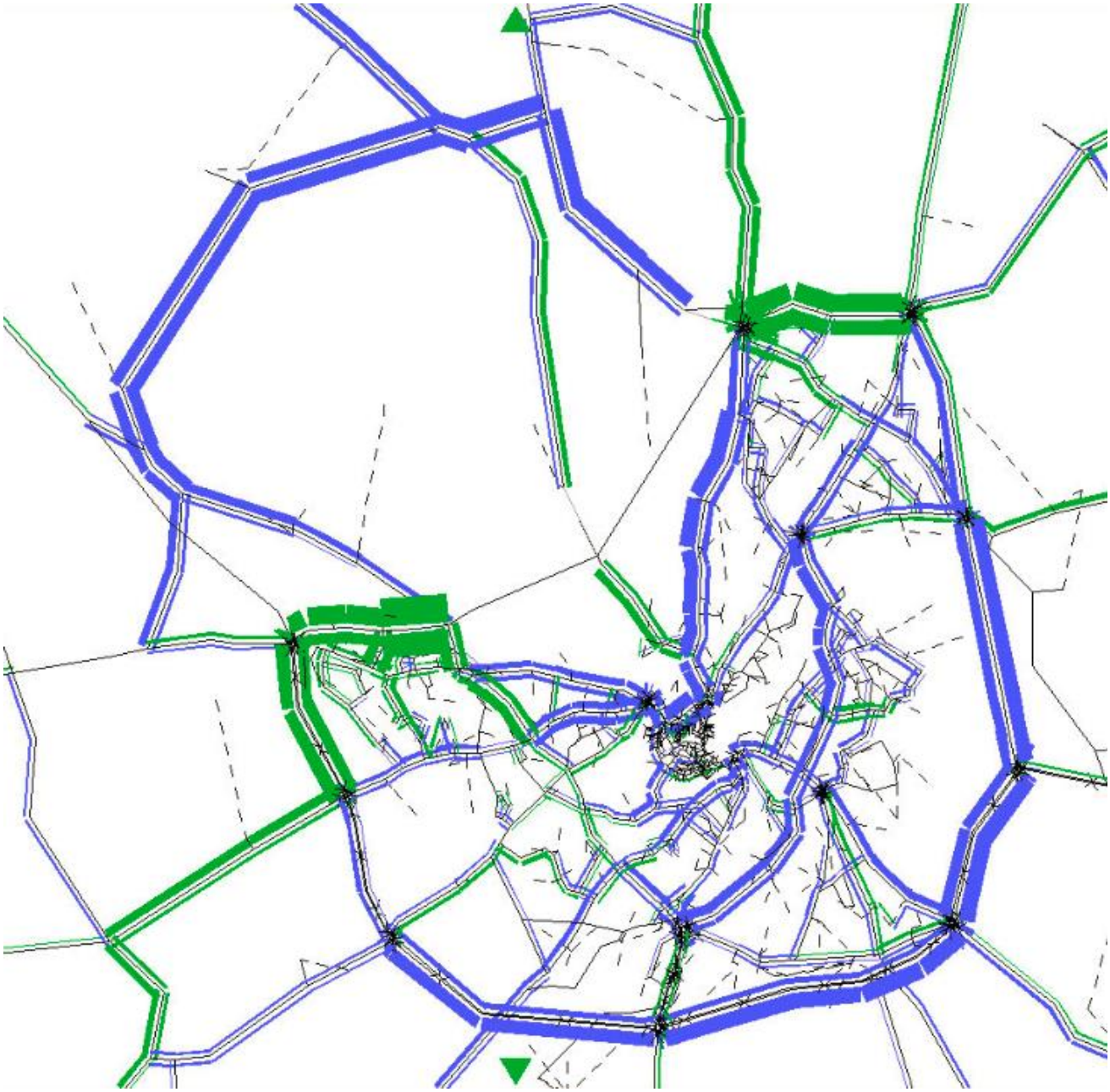


Figure 44 – Flow changes with NWRR (Design year a.m. peak, 2037 DS vs DM)

2.20.6. The diagram shows very clearly that the addition of a NWRR will have a significant impact on key roads throughout Shrewsbury's road network. Specifically:

- Traffic will **reduce** on the western and northern approaches to the town centre, and on the Smithfield Road route through the town centre
- Traffic will **reduce** on the rural lanes to the north-west of Shrewsbury (the rat run routes)
- Traffic will **reduce** on most sections of the A5 and A49 outer bypasses
- Traffic will **reduce** on several sections of the distributor ring road
- Traffic will **increase** on the Oxon Link Road and Battlefield Link Road
- Traffic will increase on local roads leading to and from the NWRR

2.20.7. The traffic impacts of the Shrewsbury NWRR will not just be on the north – west corridor through the town centre. Significant reductions will also occur on the other roads which, though less direct, presently carry traffic between the north and the west – the outer bypasses, the distributor road ring and the rural lanes.

2.20.8. These forecasts show that the NWRR will have exactly the sort of impact it has been intended to have. Moreover, the NWRR will lead to traffic reductions on most parts of the town's network, with many more routes experiencing a reduction in traffic than an increase.

2.20.9. The following sections describe in more detail the forecast impacts of the Shrewsbury NWRR on the specific sections of road highlighted earlier in the Strategic Case.

Traffic impact on town centre roads

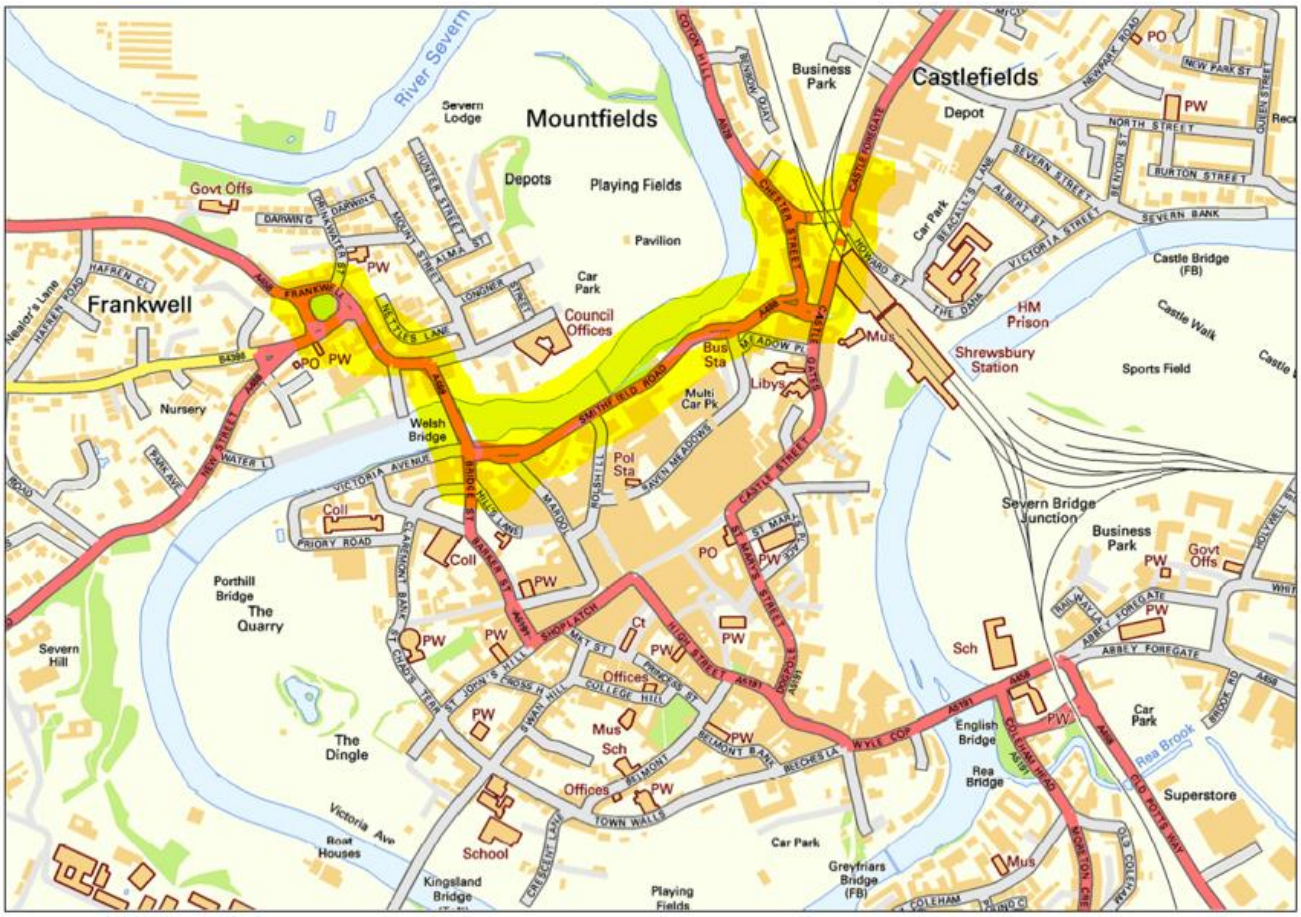


Figure 45 - Town centre highway network – NW corridor

2.20.10. The forecast impact of a NWRR on peak hour traffic levels on the Welsh Bridge, Mardol Quay, Smithfield Road, Chester Street and Castle Gates is set out in Table 48 and Table 49 below.

Table 48 – Town centre roads – impact of Shrewsbury NWRR (a.m. peak)

Modelled 2-way traffic flow (a.m. peak)	Frankwell	Welsh Bridge	Mardol Quay	Smithfield Road	Chester Street (part of gyratory)	Castle Foregate (part of gyratory)
2017	2,088	1,920	2,093	1,753	1,047	1,044

2037 Do Min	2,163	2,002	2,180	1,885	1,164	1,057
2037 With NWRR	1,822	1,612	1,865	1,401	925	893
Effect of NWRR	-16%	-19%	-14%	-26%	-21%	-16%

Table 49 – Town centre roads – impact of Shrewsbury NWRR (p.m. peak)

Modelled 2-way traffic flow (p.m. peak)	Frankwell	Welsh Bridge	Mardol Quay	Smithfield Road	Chester Street (part of gyratory)	Castle Foregate (part of gyratory)
2017	1,819	1,629	1,891	1,754	913	892
2037 Do Min	2,050	1,804	2,002	1,917	1,053	1,071
2037 With NWRR	1,504	1,260	1,494	1,373	848	922
Effect of NWRR	-27%	-30%	-25%	-28%	-19%	-14%

2.20.11. The Shrewsbury NWRR will produce very significant reductions in peak hour traffic and congestion on the Smithfield Road route through the town centre. The percentage reductions are shown relative to the "Do Minimum" forecast 2037 flows, which include traffic growth from 2017 to 2037. However it is worth noting that he forecast traffic in 2037 with a NWRR in place is also lower in almost every case than the modelled 2017 traffic – the addition of the NWRR more than compensating for 20 years of traffic growth on this part of the town centre road network.

Traffic impact on northern approaches to the town centre

2.20.12. The forecast impact of a NWRR on traffic levels on the northern approaches to the town centre (A528 and A5112) is set out below.

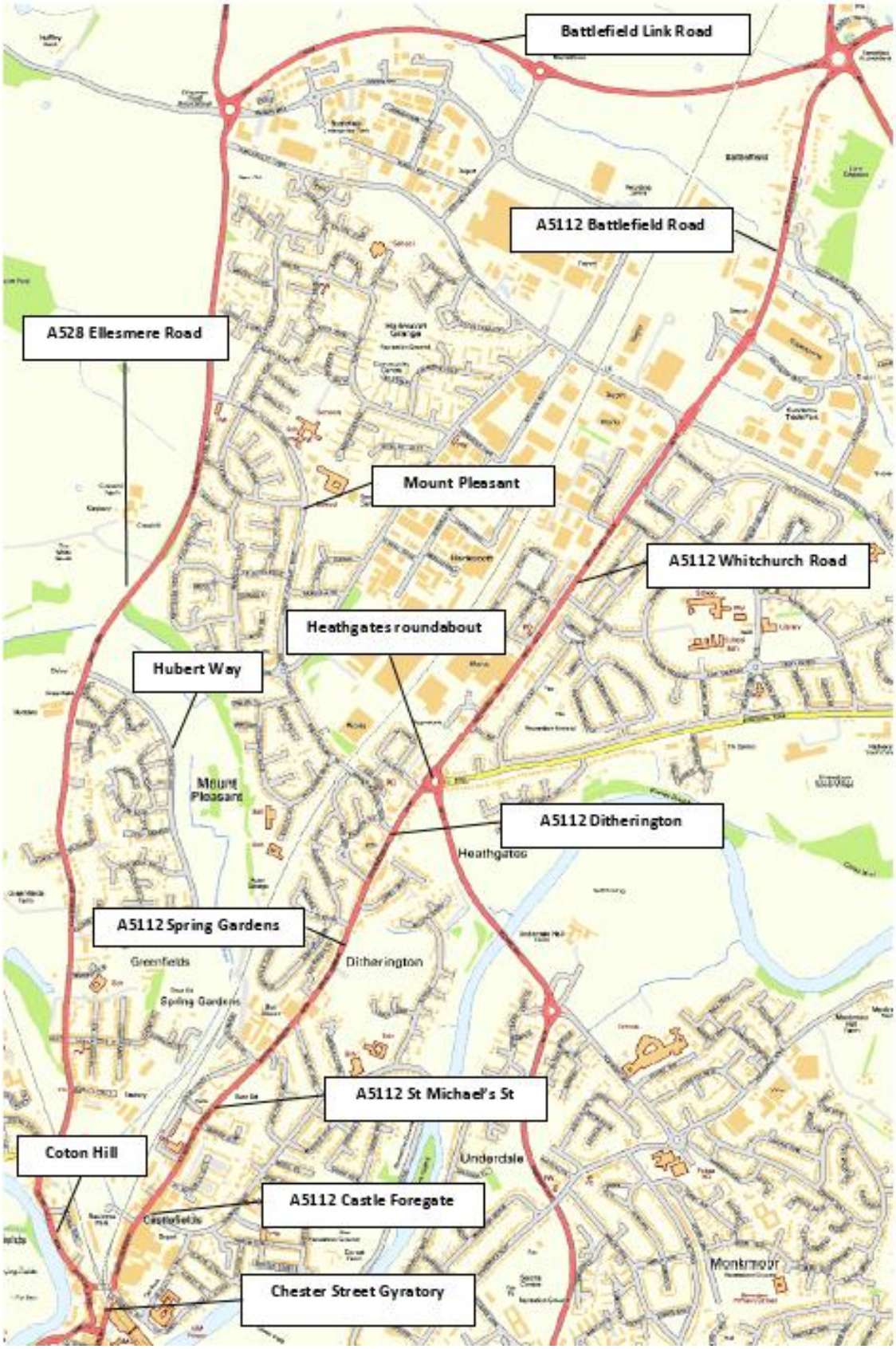


Figure 46 - Northern approaches to Shrewsbury Town Centre

Table 50 - Northern approaches (A528) – impact of Shrewsbury NWRR (a.m. peak)

Modelled 2-way traffic flow (a.m. peak)	Ellesmere Road (north of Mount Pleasant)	Ellesmere Road (Mt Pleasant to Hubert Way)	Ellesmere Road (South of Hubert Way)	Coton Hill
2017	1,188	1,087	1,040	1,228
2037 Do Min	1,338	1,232	1,105	1,295
2037 With NWRR	1,087	747	712	979
Effect of NWRR	-19%	-39%	-36%	-24%

Table 51 - Northern approaches (A528) – impact of Shrewsbury NWRR (p.m. peak)

Modelled 2-way traffic flow (p.m. peak)	Ellesmere Road (north of Mount Pleasant)	Ellesmere Road (Mt Pleasant to Hubert Way)	Ellesmere Road (South of Hubert Way)	Coton Hill
2017	1,162	983	905	978
2037 Do Min	1,398	1,231	1,142	1,194
2037 With NWRR	1,133	751	671	882
Effect of NWRR	-19%	-39%	-41%	-26%

Table 52 - Northern approaches (A5112) – impact of Shrewsbury NWRR (a.m. peak)

Modelled 2-way traffic flow (a.m. peak)	Whitchurch Road	Ditherington	Spring Gardens	St. Michael's Street	Castle Foregate
2017	919	1,288	1,169	604	790
2037 Do Min	1,192	1,671	1,537	756	916
2037 With NWRR	1,020	1,553	1,431	740	918
Effect of NWRR	-14%	-7%	-7%	-2%	-

Table 53 - Northern approaches (A5112) – impact of Shrewsbury NWRR (p.m. peak)

Modelled 2-way traffic flow (p.m. peak)	Whitchurch Road	Ditherington	Spring Gardens	St. Michael's Street	Castle Foregate
2017	836	1,351	1,245	685	781
2037 Do Min	1,134	1,515	1,417	784	896
2037 With NWRR	913	1,470	1,370	761	879
Effect of NWRR	-19%	-3%	-3%	-3%	-2%

2.20.13. The forecasts show that the Shrewsbury NWRR would have a large, but more complex, impact on traffic volumes on the northern approaches to Shrewsbury town centre. Very large reductions are forecast on the A528 Ellesmere Road route. On the A5112 Whitchurch Road route, traffic is also generally forecast to reduce, but by a smaller amount.

2.20.14. It seems likely that this apparent anomaly is because a large reduction in traffic on the A528 approach to the Chester Street gyratory (near Shrewsbury Station) would create more capacity for traffic entering the gyratory on the A5112. Some traffic that was previously using Battlefield Link Road and the A528 to avoid congestion on the A5112, could transfer to the A5112. The gyratory is traffic signal controlled, and there would be scope in practice to balance up the two routes, should that prove necessary. It is perhaps more important to note that the combined traffic on the A528 and A5112 approaches to the town centre is forecast to reduce significantly as a result of the Shrewsbury NWRR, as indicated in Table 54 below.

Table 54 - Combined A528 and A5112 flows north of Chester Street Gyratory (a.m. peak)

Modelled 2-way traffic flow (a.m. peak)	A528 Coton Hill	A5112 Castle Foregate	Total
2017	1,228	790	2,018
2037 Do Min	1,295	916	2,211
2037 With NWRR	979	918	1,897
Effect of NWRR	-24%	-	-14%

2.20.15. The Shrewsbury NWRR will produce very large reductions on the A528 Ellesmere Road route into the town centre. Overall, it will lead to a net reduction in the total amount of traffic using the northern approach roads, and this should reduce congestion, especially at Chester Street gyratory, where the two main northern approach roads (A528 and A5112) meet.

Traffic impact on western approaches to the town centre

2.20.16. The forecast impact of a NWRR on traffic levels on the western approaches to the town centre is set out below.

2.20.17.

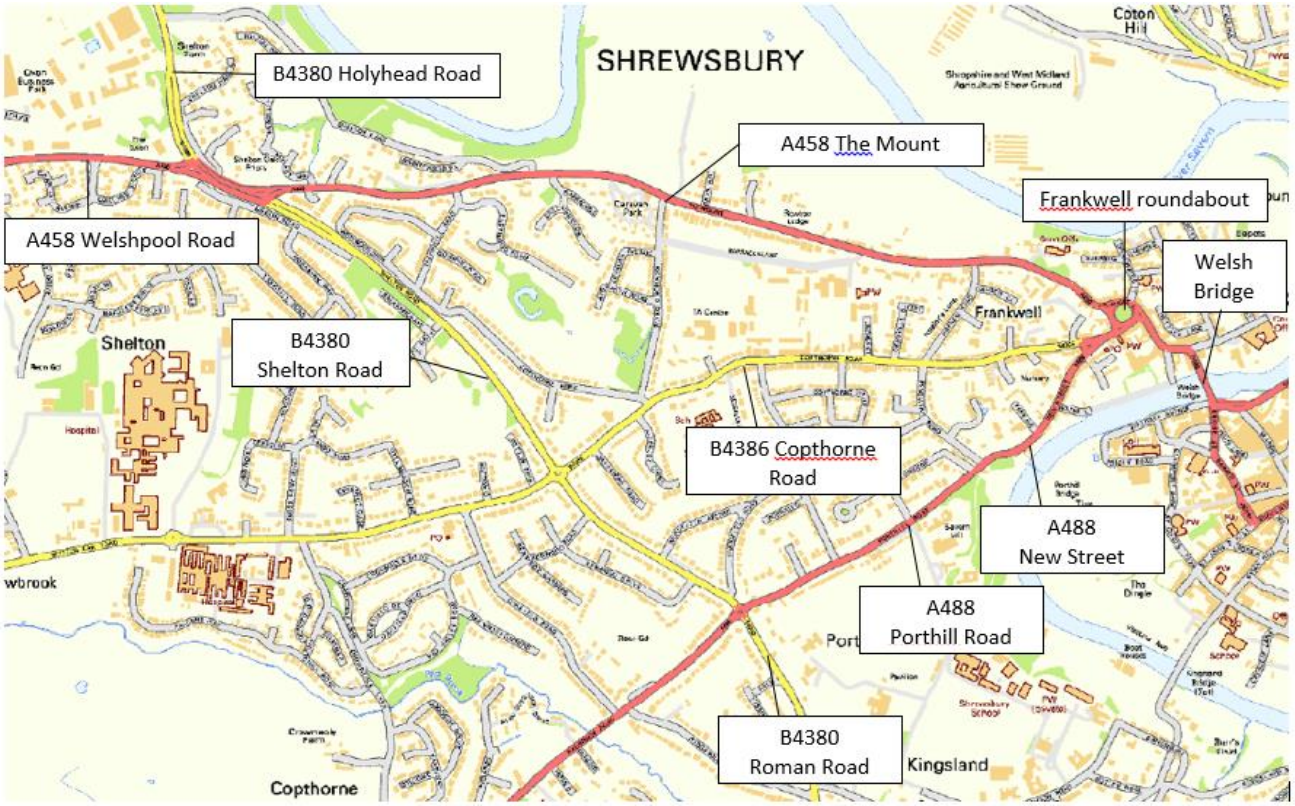


Figure 47 - Western approaches to Shrewsbury town centre

Table 55 - Western approaches – impact of Shrewsbury NWRR (a.m. peak)

Modelled 2-way traffic flow (a.m. peak)	A458 The Mount	B4386 Copthorne Road	A488 New Street	Combined western approaches
2017	670	839	631	2,140
2037 Do Min	819	881	646	2,346
2037 With NWRR	613	643	727	1,983
Effect of NWRR	-25%	-27%	+13%	-15%

Table 56 - Western approaches – impact of Shrewsbury NWRR (p.m. peak)

Modelled 2-way traffic flow (a.m. peak)	A458 The Mount	B4386 Copthorne Road	A488 New Street	Combined western approaches
2017	638	717	532	1,887
2037 Do Min	691	733	716	2,140
2037 With NWRR	586	377	678	1,641
Effect of NWRR	-15%	-49%	-5%	-23%

2.20.23. Overall, the Shrewsbury NWRR is forecast to reduce traffic on the western approaches to the town centre by 15% in the a.m. peak and 23% in the p.m. peak, and this is expected to reduce congestion, especially at the Frankwell Roundabout and adjacent junctions where the three routes converge.

2.20.24. There are differences in the impacts on the three approach roads, and the forecasts suggest that traffic could increase on New Street in the a.m. peak. This, however, can be attributed to the removal of congestion at the priority junction between New Street and Copthorne Road, since there will be much less traffic on Copthorne Road, making it easier to turn out of New Street onto Copthorne Road. Some A488 traffic which at present would divert via Copthorne Road to avoid existing delays on New Street, would return to the A488.

Traffic impacts on A5/A49 bypass and key bypass junctions

2.20.25. By providing an additional link in the NW sector of the town, the NWRR is forecast to attract some traffic which would otherwise use the existing outer bypass, reducing pressure on key junctions. The general impact can be seen in Figure 44 above which indicate reductions on the several sections of the outer bypass.

2.20.26. The forecast scale of these reductions is shown in Table 57 and Table 58 below.

Table 57 - Impact of Shrewsbury NWRR on A5/A49 bypasses (a.m. peak)

Link	Modelled 2-way traffic 2007 a.m.	Forecast 2037 Do Min	Forecast 2037 with NWRR	Effect of NWRR
A5 (Montford Bridge to Churncote)	1,655	1,930	1,942	+1%
A5 (Churncote to B3486)	2,282	2,742	3,220	+17%
A5 (B4386 to A488)	2,942	3,462	3,367	-3%
A5 (A488 to A49 Dobbies RB)	3,501	4,006	3,678	-8%
A5 (A49 Dobbies RB to A458 Weeping Cross)	4,006	4,671	4,266	-9%
A5 (A458 Weeping Cross to B4380 Emstrey)	3,164	3,466	3,056	-12%
A5 (B4380 Emstrey to Preston Boats)	3,754	4,360	3,790	-13%
A49 (A5 Preston Boats to B5062)	2,518	3,131	2,613	-17%
A49 (B5062 to Battlefield)	1,616	1,892	1,802	-5%

Table 58 - Impact of Shrewsbury NWRR on A5/A49 bypasses (p.m. peak)

Link	Modelled 2-way traffic 2007 p.m.	Forecast 2037 Do Min	Forecast 2037 with NWRR	Effect of NWRR
A5 (Montford Bridge to Churncote)	1,600	1,886	1,936	+3%
A5 (Churncote to B3486)	2,386	2,764	3,158	+14%
A5 (B4386 to A488)	2,912	3,467	3,378	-3%
A5 (A488 to A49 Dobbies RB)	3,422	3,988	3,360	-16%
A5 (A49 Dobbies RB to A458 Weeping Cross)	4,156	4,838	4,382	-9%

A5 (A458 Weeping Cross to B4380 Emstrey)	3,327	3,628	3,166	-13%
A5 (B4380 Emstrey to Preston Boats)	3,819	4,276	3,835	-10%
A49 (A5 Preston Boats to B5062)	2,667	3,113	2,853	-8%
A49 (B5062 to Battlefield)	1,780	2,028	1,912	-6%

2.20.27. The forecasts show that the Shrewsbury NWRR would generally reduce traffic on the A5 and A49 trunk road bypasses, except on the sections closest to the NWRR itself, where traffic would, as expected, increase.

2.20.28. Of particular significance are the forecast reductions on those sections of the A5 trunk road adjacent to the A5/A49 "Dobbies" roundabout, and the section which carries both A5 and A49 traffic between the Emstrey and Preston Boats roundabouts. By removing traffic from these busy sections of trunk road the NWRR is expected to help reduce congestion on the strategic road network.

2.20.29. In effect, the addition of the NWRR will give Shrewsbury a complete ring of high standard, purpose built roads. This will allow drivers to choose the most appropriate route for longer distance journeys, maximising the efficiency of the network and adding resilience.

Traffic impact of NWRR on Shrewsbury's distributor ring road

2.20.30. Shrewsbury's partial distributor road has a very important role for local traffic, as it links key residential and employment areas, as well as schools, hospitals and other key destinations. As noted, it is of varying standard, and parts of it have frontage access. The distributor ring has been added to and improved over a number of years, with the aim of ensuring it functions efficiently as a corridor for movement by both motorised and non-motorised traffic, yet does not itself become a barrier to movement, especially by pedestrians and cyclists. Maintaining this balance has been a key element of Shrewsbury's transport strategy for a long time.

2.20.31. The Shrewsbury NWRR will provide an alternative route for some of the traffic using the distributor ring road, leading to traffic reductions on several sections of the route. The forecast impacts are detailed in Table 59 and Table 60 below.

Table 59 - Impact of Shrewsbury NWRR on traffic on the distributor ring road (a.m. peak)

Link	Modelled 2-way traffic 2007 a.m.	Forecast 2037 Do Min	Forecast 2037 with NWRR	Effect of NWRR
B4380 Shelton Road (The Mount to Mytton Oak Rd)	948	1,178	1,473	+25%
B4380 Shelton Road (Mytton Oak Rd to Radbrook Rd)	1,195	1,432	1,401	-2%
B4380 Roman Road (Radbrook Rd to Longden Rd)	1,484	1,773	1,830	+3%
B4380 Roman Road (Longden Rd to Meole Brace Isl)	1,423	1,834	1,677	-9%
A5112 Hazledine Way (Meole Brace to Reabroook RB	1,266	1,584	1,301	-18%
A5112 Pritchard Way (Reabrook RB to Old Potts Way)	1,394	1,699	1,438	-15%
A5112 Bage Way (Old Potts Way to Crowmere Rd)	1,563	1,931	1,712	-11%
A5112 Robertson Way (Crowmere Rd to Telford Way)	1,866	2,262	1,999	-11%
A5112 Telford Way	2,300	2,836	2,488	-12%

Table 60 - Impact of Shrewsbury NWRR on traffic on the distributor ring road (p.m. peak)

Link	Modelled 2-way traffic 2007 p.m.	Forecast 2037 Do Min	Forecast 2037 with NWRR	Effect of NWRR
B4380 Shelton Road (The Mount to Mytton Oak Rd)	977	1,043	1,276	+22%
B4380 Shelton Road (Mytton Oak Rd to Radbrook Rd)	1,129	1,342	1,368	+2%
B4380 Roman Road (Radbrook Rd to Longden Rd)	1,501	1,849	1,844	-
B4380 Roman Road (Longden Rd to Meole Brace Isl)	1,529	1,950	1,778	-9%
A5112 Hazledine Way (Meole Brace to Reabroook RB	1,271	1,643	1,330	-19%
A5112 Pritchard Way (Reabrook RB to Old Potts Way)	1,343	1,710	1,406	-18%
A5112 Bage Way (Old Potts Way to Crowmere Rd)	1,543	1,933	1,593	-18%
A5112 Robertson Way (Crowmere Rd to Telford Way)	1,821	2,287	1,860	-19%
A5112 Telford Way	2,276	2,801	2,365	-16%

2.20.32. The forecasts show that most parts of the distributor ring road (from Longden Road around to Telford Way will experience significant reductions in traffic as a result of the Shrewsbury NWRR, and this is expected to reduce congestion at peak times.

2.20.33. However, the section of the distributor ring road between The Mount and Mytton Oak Road, which is nearest to the NWRR, will experience a significant increase in traffic. Though residential, this section, has very little frontage development, as almost all the properties along it are set back and accessed from service roads.

Traffic impact of NWRR on minor roads (rat-runs)

2.20.34. By providing a new, purpose built link in the NW sector of the town, the NWRR is forecast to attract some traffic which would otherwise use the network of lanes in this sector. The general impact can be seen in Figure 44 above which indicates reductions on these roads. The forecast impacts are detailed above.

Table 61 - Impact of Shrewsbury NWRR on traffic on rural lanes in the NW sector (a.m. peak)

Link	Modelled 2-way traffic 2007 a.m.	Forecast 2037 Do Min	Forecast 2037 with NWRR	Effect of NWRR
B4473 Preston Montford Lane	119	301	83	-72%
North of Montford Bridge	346	545	66	-88%
West of Leaton	280	479	1	-99%
North of Leaton	506	599	338	-44%
East of Leaton	565	778	290	-63%
Berwick Road, south of Leaton	62	102	174	+70%

Huffley Lane	498	640	228	-64%

Table 62 - Impact of Shrewsbury NWRR on traffic on rural lanes in the NW sector (p.m. peak)

Link	Modelled 2-way traffic 2007 p.m.	Forecast 2037 Do Min	Forecast 2037 with NWRR	Effect of NWRR
B4473 Preston Montford Lane	149	246	74	-70%
North of Montford Bridge	299	453	73	-84%
West of Leaton	229	377	1	-99%
North of Leaton	636	666	432	-35%
East of Leaton	641	770	412	-46%
Berwick Road, south of Leaton	98	123	86	-30%
Huffley Lane	607	714	377	-47%

2.20.35. It is important to note that in absolute terms, the volumes of traffic (and the changes in volume) are fairly small, so the percentage changes due to the NWRR must be taken as indicative only. However, the picture is very clear. With the NWRR in place, the incentive to use these minor roads as a rat run in the north-west sector will be completely removed, and traffic levels will be significantly reduced on most of them.

2.20.36. Berwick Road will have a direct connection to the NWRR, and the model suggests that traffic could increase in the a.m. peak, albeit by a small volume in absolute terms.

2.20.37. Traffic is forecast to reduce on Huffley Lane.

Traffic impacts – summary

2.20.38. In simple terms, the traffic forecasts show that the Shrewsbury NWRR will address all of the traffic problems identified. It will lead to a general reduction in traffic volumes, and hence congestion, over a wide area including:

- On busy roads in the town centre (Welsh Bridge, Smithfield Road, Chester Street Gyratory)
- On the western and northern approaches to the town
- On the outer, trunk road bypasses
- On much of the distributor ring road
- On rural lanes which currently form rat runs.

2.20.39. There are a few places where the NWRR will increase traffic, including:

- On the Battlefield Link Road and propose Oxon Link Road (which were both planned as parts of a future NWRR
- On roads leading to and from the NWRR

2.20.40. The scale of these benefits can be judged from the detailed forecasts set out above.

Impact of NWRR on journey times and distances travelled

2.20.41. The impact of the Shrewsbury NWRR on journey times has also been determined from the traffic model. Table 63 below compares the journey times for a journey between the A5/A458 Churncote Roundabout to the west of Shrewsbury and the A49/A53 Battlefield Roundabout to the north, using different routes, both with and without the NWRR, in the design year, 2037:

- Via the outer bypasses
- Via the distributor ring road
- Via the town centre
- Via the rat-runs in the north-west sector
- Via the NWRR

Table 63 – Impact of NWRR on journey times between Churncote and Battlefield (2037)

Route	2037 a.m. Do Min	2037 a.m. with NWRR	Time saving (min) a.m.	2037 p.m. Do Min	2037 p.m. With NWRR	Time saving (min) p.m.
Bypasses (EB)	17.8	15.2	2.6	16.5	14.5	2.0
Bypasses (WB)	15.8	14.8	1.0	16.9	13.7	3.2
Distributor ring (EB)	23.1	22.1	1.0	21.9	21.1	0.8
Distributor ring (WB)	22.2	21.8	0.4	22.4	21.5	0.9
Town centre (EB)	23.7	20.9	2.8	22.5	21.1	1.4
Town centre (WB)	23.0	20.4	2.6	24.3	20.5	3.8
Rat runs (EB)	16.8	17.8	1.0	16.1	16.6	0.5
Rat runs (WB)	16.5	16.3	0.2	17.4	17.1	0.3
NWRR (EB)	-	6.8	-	-	5.7	-
NWRR (WB)	-	5.7	-	-	6.1	-

2.20.42. Two broad conclusions can be drawn:

2.20.43. Firstly, the above results demonstrate that the journey time between Churncote and Battlefield will be dramatically shorter on the Shrewsbury NWRR (typically 6 minutes) than on any of the alternative routes (about 16 minutes on the bypasses or rat-runs, and about 22 minutes on the distributor ring or town centre routes. People driving the full length of the NWRR will typically save at least 10 minutes on their journey – a very significant benefit, and one which cannot be achieved in any other way. This is the most direct benefit of the NWRR.

2.20.44. Secondly, with a NWRR in place, all of the existing routes will experience some reduction in journey times. The biggest reductions (between 1.4 and 3.8 minutes) are forecast on the routes leading into, through, and out of the town centre. On other routes – the distributor ring road, bypasses and rural lanes – the time savings range between 0.2 and 3.2 minutes.

2.20.45. Although these time savings are smaller than those experienced by traffic diverting to the NWRR, they are still significant because these benefits are available to all users of these roads – in total a greater number than those using the NWRR. These time savings, spread over a wider area and a larger number of trips, are an important indirect benefit of the NWRR.

2.20.46. It is clear that provision of the NWRR will deliver reduced journey times for both users and non-users of the new road.

Impact of NWRR on road safety

2.20.47. The COBALT analysis (as detailed in the Economic Case) indicates that 768 accidents will be saved over 60 years as a result of the scheme:

Table 64 - Accident Savings over 60 years

Accidents in 60 years		
Do minimum	Do something	Reduction in Accidents
35,214	34,446	768

2.20.48. COBALT also provides a summary of the number of casualties saved as a result of the scheme:

Table 65 - Casualty reduction over 60 years

Casualty reduction over 60 years	Do minimum	Do something	Reduction in Casualties
Fatal	630	628	2.3
Serious	5,082	4,990	91.9
Slight	46,244	45,386	858.9
Total	51,956	51,003	953.1

Impact of NWRR on greenhouse gas emissions

2.20.49. The TUBA analysis (detailed in the Economic Case) demonstrates that the Shrewsbury NWRR will lead to an overall reduction in greenhouse gas emissions, compared with the “Do Minimum” situation. The present value of these benefits has been calculated as £3,350,000

Conclusions: Achievement of objectives.

2.20.50. The tables below describes how the Shrewsbury NWRR will achieve its stated objectives.

Table 66 – Achievement of Objectives

Objective	Achieved	Rationale
Operational objectives		
To provide a new river crossing between the western and northern parts of the town,	✓ **Yes**	NWRR will provide a new purpose-built link connecting Oxon Link Road to Battlefield Link Road

linking the A5 (west) to the A49 (north)		
To significantly reduce journey times and distances between the north and west of Shrewsbury	✓ **Yes**	NWRR will reduce peak hour journey times between Churncote and Battlefield. See Table 63
To significantly reduce the amount of traffic unnecessarily crossing the town centre	✓ **Yes**	NWRR will provide a shorter route for many of these trips, and reduce peak hour traffic by between 14% and 30% on cross-town routes. See Table 48 and Table 49
To provide traffic relief to key junctions on the existing bypasses, including the A5/A49 Dobbies Island	✓ **Yes**	NWRR will reduce traffic on the existing bypasses. See Table 57 and Table 58
To reduce traffic congestion in Shrewsbury town centre, on the north and west approaches to the town, and on the bypasses	✓ **Yes**	NWRR will reduce traffic on the northern and western approaches. (See Table 50 to Table 56). Reduced demand at the key pinch points (Frankwell Roundabout and Chester Street Gyratory) will reduce congestion and delay. Journey times through the centre will be quicker. (See Table 63)
To significantly improve the accessibility of the Shrewsbury West Sustainable Urban Extension.	✓ **Yes**	The NWRR will provide a high standard route linking businesses in SUE (W) at Oxon to destinations in the north of Shrewsbury (including Battlefield Enterprise Park) and locations north of the town.)
Specific or intermediate objectives		
To improve connectivity and accessibility between the north and west of Shrewsbury for all modes of transport	✓ **Yes**	Journey times via NWRR will be much quicker than at present, and journey times will improve on other routes as well (See Table 63), including those used by buses. NWRR will include cycle and pedestrian paths.
To reduce traffic congestion	✓ **Yes**	NWRR will reduce traffic on routes which currently suffer congestion, including the northern and western approaches, Frankwell, Chester Street Gyratory, and sections of the A5 Trunk Road bypass (Table 48 to Table 60 inclusive), leading to a general reduction in congestion.
To improve the reliability of journey times and reduce unforeseen delays	✓ **Yes**	Journey times via NWRR will be much quicker than at present, and journey times will improve on other routes as well (See Table 63). Reliability will improve (see economic case, Page 142)
To reduce the amount of traffic rat-running on unsuitable rural roads	✓ **Yes**	NWRR will attract traffic which would otherwise use the network of lanes in the NW sector, leading to traffic reductions on these roads. (See Figure 44).
To improve the efficiency of Shrewsbury's transport network for all modes of transport.	✓ **Yes**	Improved journey times and reliability on key roads throughout Shrewsbury (as noted above) will benefit all modes of transport. New cycle paths provided as part of NWRR.
To improve the resilience of Shrewsbury's transport network.	✓ **Yes**	NWRR will, in effect, complete both the distributor road ring and the outer bypass, giving traffic greater choice of routes as well as significantly greater capacity overall
To enhance the benefits of the Oxon Link Road and Integrated Transport Plan schemes.	✓ **Yes**	NWRR will connect OLR to the north side of town, and connect the associated SUE (W) to suppliers, markets, employees and customers. NWRR removes traffic from the

		town centre and distributor ring, complementing ITP investment (including improvements for walking and cycling) in these areas.
To reduce the number of people killed or seriously injured on roads in Shrewsbury.	✓ Yes	NWRR will save an estimated 953 casualties over 60 years (See Table 65)
To improve air quality, especially in the built-up areas of Shrewsbury	✓ Yes	See Economic case
To reduce net emissions of CO_2 and other greenhouse gases.	✓ Yes	See Economic case

2.20.51. By achieving the above operational and specific objectives, Shropshire Council believes that the Shrewsbury NWRR will also deliver the desired high level, strategic objectives:

- To reduce congestion
- To support the economic competitiveness of Shrewsbury and Shropshire
- To support the delivery of planned growth and development in Shrewsbury
- To enhance the benefits of other transport investment
- To protect and enhance Shrewsbury's built and natural environment
- To contribute towards a reduction in greenhouse gas emissions
- To improve the quality of life for people in Shrewsbury
- To improve road safety
- To support sustainable modes of transport

3 THE ECONOMIC CASE

3.1 INTRODUCTION

3.1.1. The Economic Case identifies and assesses all the impacts of the scheme to determine its overall value for money. It takes account of the costs of developing, building, operating and maintaining the scheme, and a full range of its impacts. These include those impacts which can be monetised, as well as quantitative and qualitative impacts that cannot be monetised. The economic case considers the extent to which the scheme's benefits will outweigh its costs.

3.1.2. This section covers:

- Options appraised
- Overview of methodology and assumptions
- Scheme costs
- Transport economic efficiency (TEE)
- Safety impacts
- Reliability benefits
- Wider impacts
- Social and distributional impacts
- Environmental impacts
- Value for money statement
- Sensitivity testing
- Appraisal Summary Table (AST)
- Summary and conclusion.

3.2 OPTIONS APPRAISED

3.2.1. The scheme option development process and the appraisal of options was summarised in section 2.15 and described more fully in the Options Appraisal Report (OAR) in Appendix D. Over the decades of option development and assessment, the types of transport intervention considered to solve Shrewsbury's transport problems included:

- Highways options
- Light rail and guided bus options
- Improvements to existing bus services, waiting facilities, information and new bus lanes
- Improvements to rail services
- Enhancements to the cycle network, pavements and footpaths
- Increasing rail freight
- Higher car parking charges

3.2.2. This suite of options includes both non-highway and low cost options.

3.2.3. The assessment of these options, and the refinement of the preferred option, is also described OAR. At each stage of the assessment, use has been made of the analytical tools available at that time. The models used to determine scheme impacts have been progressively improved, giving increasing confidence in the results.

3.2.4. Within this OBC, only the preferred highway option has been appraised using the basket of economic appraisal tools and methods set out within the Appraisal Specification Report (ASR). These are described further below in this Economic Case, with more detail provided within the Economic Appraisal Report (OAR).

3.2.5. In order to confirm that the results and conclusions of previous option appraisal work are still valid and reliable, and that Shropshire Council are still pursuing the best option, a review of the previous work was undertaken. This review is described in a note provided within Appendix D.

3.2.6. The conclusions of that review confirm that the basic rationale for selection of a preferred route described in the OAR and supporting documents is found to be robust and logical. Furthermore, alternative route options previously assessed are now constrained by built development; the public have confirmed their preference for a NWRR route in this location (with support increasing in the 2017 public consultation – see section 2.19 compared to the previous consultation, which itself arrived at the same route choice); and the Council are committed to this route following recent ratification by Council Cabinet, following decades of decision-making and policy development.

3.2.7. The justification for only appraising one option is therefore considered to be strong. The appraisal of a single option was also specified within the ASR, which was not challenged by the DfT and therefore considered to be acceptable.

3.3 OVERVIEW OF METHODOLOGY AND ASSUMPTIONS

3.3.1. The economic appraisal methodology used to assess the NWRR scheme was set out within the ASR. This appraisal is underpinned by the use of a SATURN highway assignment model.

3.3.2. The development, validation and use of the new SATURN model are described in the following reports, provided as appendices to the OBC.

Table 67 - Modelling Reports

Appendix	Title
E	Data collection report
F	Local Model Validation Report (LMVR) (SATURN)
G	Forecasting Report (SATURN)

METHODOLOGY

3.3.3. A very brief summary of the approach to modelling is set out below.

Features Of The Model

3.3.4. The SATURN software employs an iterative process of assigning flows and simulating delay. Within the simulated model area, capacity is restrained at junctions.

3.3.5. In line with TAG Unit M2, variable demand modelling (VDM) has been used.

Model Study Area

3.3.6. The simulation model area covers the whole of the Shrewsbury conurbation, as shown in Figure 48 below.

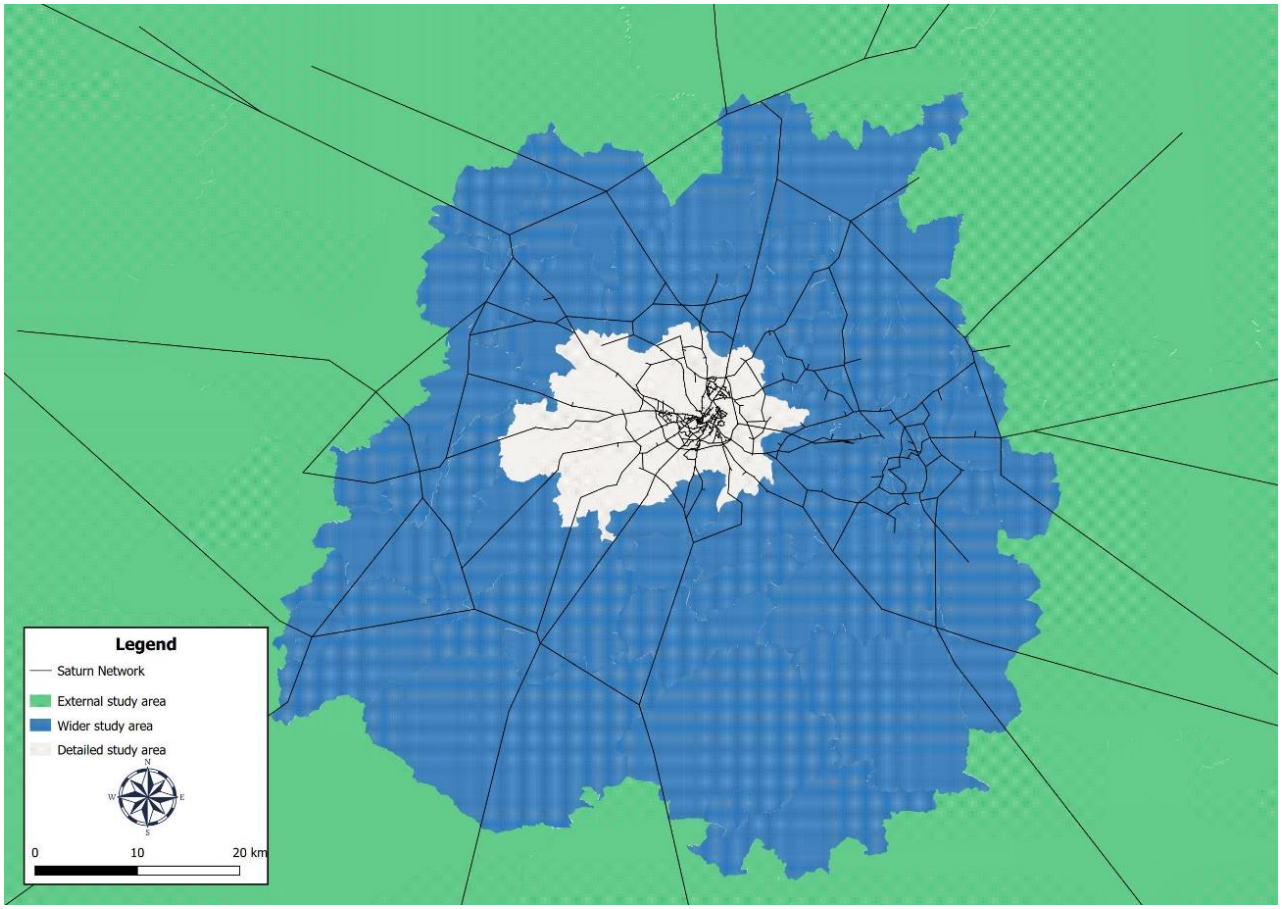


Figure 48 – Model Study Area

3.3.7. The simulation area is considered large enough to capture the biggest impacts expected due to the scheme and also includes an area where impacts are quite likely but are expected to be relatively small.

Zoning

3.3.8. The model comprises 416 zones, with the greatest level of detail being in the town centre and close to the proposed scheme. The zoning structure is illustrated in Figure 3 of the LMVR.

Highway Network

3.3.9. The simulation area is also described in more detail in the LMVR. All roads outside the core model area are coded as buffer links.

Traffic Data

3.3.10. Traffic data was obtained from:

- Existing data, including: ANPR, MCC, ATC, queue surveys, Trafficmaster
- Automatic traffic counts at 80 locations in 2017
- Manual classified counts at over 64 locations in 2017
- Car park surveys at 22 locations in 2017

- Journey time surveys with ANPR surveys at 5 sites in 2017
- RSIs at 3 locations in 2017
- Mobile phone data for the study area in 2017

3.3.11. The collection and processing of this data is detailed in the Data Collection Report (Appendix E).

MATRIX DEVELOPMENT

3.3.12. Base year trip matrices were developed for 2017. Three time periods were modelled in order to replicate trip patterns over a typical weekday:

- Average hour AM peak period (07:00-10:00)
- Average hour PM peak period (16:00-18:00)
- Average hour inter peak period (10:00-16:00)

3.3.13. Five user classes have been modelled:

- Cars – commute
- Cars – employer business
- Cars – other
- Light Goods Vehicles
- Heavy Goods Vehicles (OGV1, OGV2 and Coaches).

3.3.14. The development of the base year (2017) traffic model and its validation against observed traffic flows and journey times is fully documented in the LMVR.

FORECASTING

3.3.15. The modelled assessment years are:

- Base Year (2017)
- Opening Year (2022)
- Design Year (2037)

3.3.16. The forecasting process comprised the following stages:

- Define and develop future year travel demand (associated with land use and travel pattern changes)
- Define and develop future year supply (future highway network changes)
- undertake fixed matrix Do Minimum and Do Something forecasting
- undertake variable demand matrix Do Minimum and Do Something forecasting
- report model outputs

3.3.17. The Forecasting Report includes the 'uncertainty log' detailing the predicted land use changes, and describes the development of the future year trip matrices.

3.3.18. In accordance with TAG Unit M4, three demand growth scenarios were included within the appraisal:

- Core demand
- Low demand
- High demand

3.3.19. The following future networks were developed:

- Do Minimum – includes all planned highway network changes in 2022 and 2037
- Do Something – as the Do Minimum but with the addition of the NWRR scheme

3.3.20. Traffic demand in both the Do Minimum and Do Something models are identical.

3.3.21. The variable demand modelling (VDM) allows demand model matrices to change in response to changes in travel cost as predicted by the highway supply model. VDM has only been applied to car trips.

3.4 OVERVIEW OF ECONOMIC APPRAISAL METHODOLOGY AND ASSUMPTIONS

3.4.1. The economic assessment of the scheme has been undertaken in accordance with current WebTAG guidance, including:

- TAG Unit A1 cost-benefit analysis
- TAG Unit A2 economic impacts
- TAG Unit A4 social and distributional impacts

3.4.2. The methodology is based on the DfT Value for Money Framework (July, 2017) and is illustrated in Figure 49.

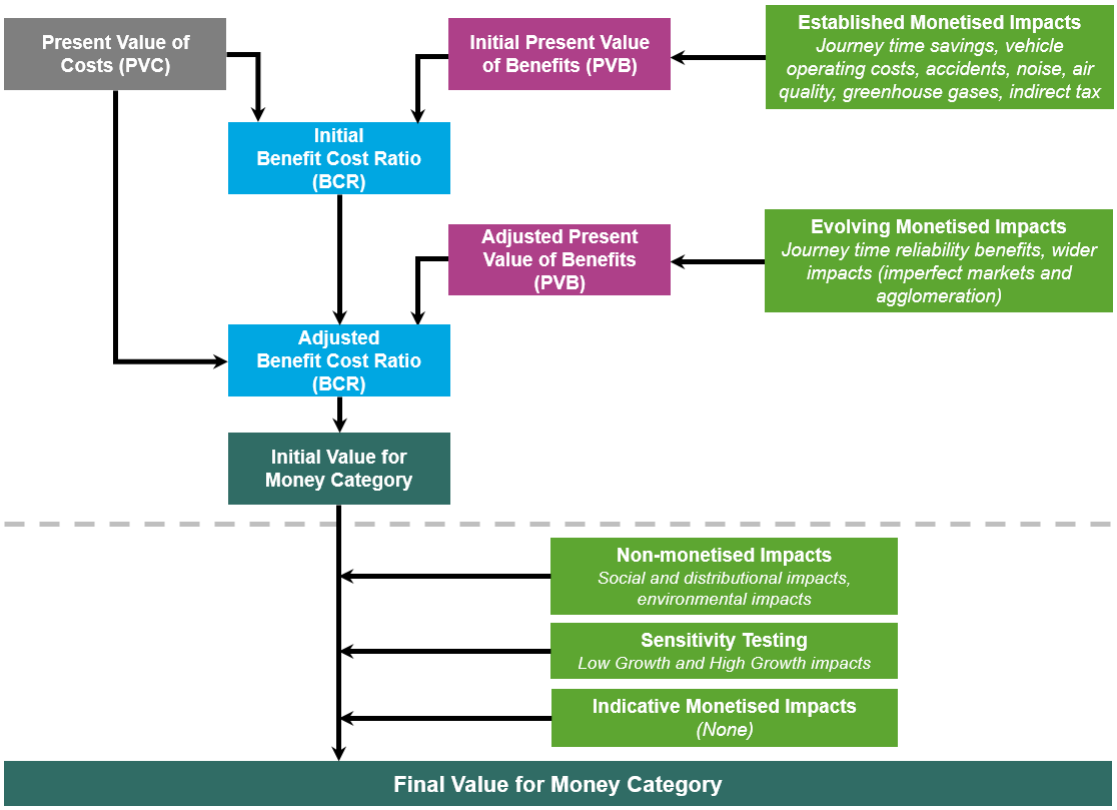


Figure 49 - Calculation of BCR and VfM score - methodology

3.4.3. The basic steps are summarised below:

- The present value of cost (PVC) is calculated using the discounted whole life costs of the scheme

- TUBA (Transport User Benefit Analysis) is used to calculate the user benefits from time and vehicle operating cost savings, and reductions in greenhouse gas emissions
- COBALT (Cost and Benefit to Accidents – Light Touch) is used to assess benefits arising from savings in accidents
- An initial benefit-cost ratio (BCR) is calculated
- Other monetised benefits – reliability and wider impacts – are then taken into consideration, producing an adjusted present value of benefit (PVB), which is used to calculate a final adjusted BCR
- Other impacts which are not capable of being fully monetised – social, distributional and environmental impacts – are then assessed qualitatively. These are not included in the BCR, but are used, together with the final BCR, to determine a final value for money category for the scheme.

3.4.4. An Economic Appraisal Report (EAR) describes in detail the methodology and outputs of the economic analysis employed in scheme appraisal. This is provided in Appendix H.

3.5 COSTS

3.5.1. Costs have been estimated under three broad headings:

- Investment costs (scheme preparation and construction)
- Operating costs
- Maintenance and renewal cost

SCHEME PREPARATION AND CONSTRUCTION

3.5.2. The risk-adjusted scheme preparation costs have been estimated following the principles set out in WebTAG Unit A1.2 'Scheme Costs'.

3.5.3. All costs were estimated at 2017 (Q4) prices, as set out in detail in Chapter 5, The Financial Case. The costs include an adjustment for quantified risk (QRA).

3.5.4. The estimated risk-adjusted cost of scheme preparation and construction is £66,011,000 at 2017 Q4 prices.

MAINTENANCE AND RENEWAL

3.5.5. The estimated costs of maintenance and renewal, over the 60 year period (2022 to 2081), are £12,476,501 at 2017 Q4 prices.

OPTIMISM BIAS (OB)

In line with the guidance in TAG Unit A1.2, an optimism bias (OB) uplift to scheme costs, which is necessary to counter the systematic tendency of appraisers to be overly optimistic (and underestimate scheme costs) has been applied. The recommended optimism bias uplifts for each stage of a transport project and type of scheme for Local Authority schemes are set out in Table 68 below.

Table 68 - Recommended optimism bias uplifts (Source: TAG Unit A1.2, Scheme Costs, Table 8)

Stage Category	Types of projects	Stage 1 Strategic Outline Business Case	Stage 2 Outline Business Case	Stage 3 Full Business Case
Road	Motorway, Trunk roads, Local roads	44%	15%	3%
Fixed links	Bridges and tunnels	66%	23%	6%

3.5.6. As funding is sought via the production of an Outline Business Case, and the scheme is comprised of both roads and structures, optimism bias has been applied at 15% for the road elements and 23% for the structural elements of the scheme. Overall this equates to an overall optimism bias of 19.18%.

RISK-ADJUSTMENT

3.5.7. Scheme costs have been risk-adjusted using the process of Quantified Risk Assessment (QRA), as mandated within TAG 2.1 when undertaking economic appraisal. The QRA approach adopted here included a risk identification workshop, use of a risk register to quantify risks in terms of likelihood and impact and then further statistical analysis to estimate the probability of risks occurring together to provide a cumulative risk-adjusted cost. The QRA method is described more fully within the Financial Case (section 4.2) and Management Case (section 6.10).

3.5.8. This QRA has been undertaken at the 80% level of certainty (P80), meaning that the costs are expected to be within the calculated risk allowance in all but 20% of cases. As noted in the Financial Case, the total quantified risk value that is added to scheme base costs is £7,658,500 at 2017 Q4 prices. This equates to 13.1% of base costs.

3.5.9. A sensitivity test has also been undertaken higher allowances for optimism bias (this analysis is summarised in section 3.17.

PRESENT VALUE OF COSTS (PVC)

3.5.10. For the purposes of the Economic Appraisal, all the costs have been adjusted to 2010 prices using WebTAG data book (July 2017) values as set out in Table 69.

Table 69 – Adjustment to 2010 prices

	2010	2011	2012	2013	2014	2015	2016	2017
Increase on 2010	100.00	102.01	103.58	105.55	107.29	107.88	109.75	111.72

3.5.11. A discount factor based on the HM Treasury “Green Book” is applied, to adjust costs occurring in different periods to a standard base year of 2010. An annual discount rate of 3.5% was applied for the first 30 years after opening and 3% for years 31 to 60. This reflects the lower weighting placed on costs (and benefits) incurred at a future date compared to those incurred in the present.

The Present Value of Costs (PVC) are presented in Table 66.

Table 70 - Present Value of Costs

Risk adjusted costs in £			
	Scheme Preparation and Construction Cost	Maintenance, Renewal and Operation (60 yrs)	Total
2017: Q4 price base (estimated cost at current prices)	66,011,000	12,476,501	78,487,501
Cost at 2010 prices	59,085,243	11,167,488	70,252,731
Optimism bias (19%)	70,418,934	13,309,629	83,728,563
Present Value of Costs (PVC)	**58,513,289**	**3,018,418**	**61,531,707**

3.5.12. The total discounted Present Value of Costs (PVC) is **£61.53 million.**

PUBLIC ACCOUNTS TABLES

3.5.13. The full Public Accounts (PA) Table in the format required by DfT is set out in Appendix I. The apportionment of costs between local and central government is discussed in the Financial Case.

3.6 BENEFITS

3.6.1. The benefits assessed are:

- Transport Economic Efficiency (user benefits)
- Safety benefits
- Environmental benefits (greenhouse gases)
- Wider public finances (indirect taxation revenues)

3.6.2. The assessment assumes that the opening year for the scheme will be 2022 with an appraisal period spanning 60 years from opening. The choice of appraisal period is informed by HM Treasury's Green Book and WebTAG which stipulates a 60 year appraisal for projects that are deemed to have an "indefinite life", including some major infrastructure schemes such as tunnels and bridges.

3.6.3. Annualisation factors for the three modelled time periods were based on values obtained from local traffic survey data, and are discussed in more detail in Economic Appraisal Report.

3.7 TRANSPORT ECONOMIC EFFICIENCY

3.7.1. The Transport Economic Efficiency (TEE) benefits are derived from travel time and vehicle operating cost benefits as a result of the scheme.

3.7.2. TEE benefits for the scheme were assessed using the DfT's Transport Users Benefit Appraisal (TUBA) software. TUBA calculates the benefits associated with journey time savings and vehicle operating cost savings using information taken from the traffic model, in accordance with the procedures and economic parameters in WebTAG Unit A1. The standard TUBA 1.9.8 economics file was used. The TUBA methodology is described in more detail in the Economic Appraisal Report.

3.7.3. The full Transport Economic Efficiency (TEE) Table is included at Appendix I, and summarised in Table 71.

Table 71 - Transport User Benefits

Transport Economic Efficiency (TEE) Benefits		£,000s 2010 prices, discounted to 2010
Consumer – commuting user benefits	Travel Time	72,556
	Vehicle operating costs	4,658
	Subtotal	77,214
Consumer – other user benefits	Travel Time	117,184
	Vehicle operating costs	9,321
	Subtotal	126,505
Business benefits	Travel Time	77,473
	Vehicle operating costs	9,755
	Subtotal	87,228
Total TEE benefit		290,947

3.7.30. The benefits by time period are summarised in Table 72. The figures in this table exclude wider public finances.

Table 72 - TUBA benefits by time period (excludes wider public finances)

Time Period	PV Benefits £,000
AM Peak	95,629
PM Peak	103,227
Inter Peak	84,724
*Excludes Wider Public Finances (£7,365)	

3.8 SAFETY BENEFITS

3.8.1. The assessment of safety benefits and costs was undertaken using COBALT (Cost Benefit Analysis Light Touch), the DfT's cost-benefit analysis software for accident savings, in line with the guidance set out in WebTAG Unit A4.1.

3.8.2. Five year accident data was obtained for Shrewsbury between 1st June 2012 and 31st May 2017. Default accident rates were used across the COBALT network, except for links within Shrewsbury for which the actual observed accidents were applied.

3.8.3. The safety benefits were assessed for a 60 year period (2022 to 2081) with an opening year of 2022, a design year of 2037.

3.8.4. The latest COBALT economic parameter file, 2017.1, (included in the Economic Appraisal Report) was used to calculate accident impacts in line with WebTAG guidance. The data tables provide the inputs required to calculate accident and casualty numbers and costs for each year of the appraisal period.

3.8.5. COBALT uses “Do Minimum” and “Do Something” outputs from the SATURN traffic model to forecast changes in the number of accidents as a result of the scheme, using details of link and junction characteristics, relevant accident rates and costs and forecast traffic volumes by link.

3.8.6. Separate links and junctions were assessed. As COBALT does not accept links with a 20mph speed limit, a speed of 30mph was assigned to any links in both the Do Minimum and Do Something networks which were below this threshold.

3.8.7. The COBALT analysis indicates that 768 accidents will be saved by 2081 as a result of the scheme, as shown in Table 73.

Table 73 - Accident Savings over 60 years

Accidents in 60 years		
Do minimum	Do something	Reduction in Accidents
35,214	34,446	768

3.8.8. COBALT also provides a summary of the number of casualties saved as a result of the scheme, as shown in Table 74.

Table 74 - Casualty reduction over 60 years

Casualty reduction over 60 years	Do minimum	Do something	Reduction in Casualties
Fatal	630	628	2.3
Serious	5,082	4,990	91.9
Slight	46,244	45,386	858.9
Total	51,956	51,003	953.1

3.8.9. The economic value of the accident savings is set out in Table 75.

Table 75 - Present value of accident savings over 60 years (2010 prices, discounted to 2010)

Accident savings over 60 years	Do minimum cost	Do something cost	Accident Savings
Accident costs (£,000)	1,838,142	1,807,505	30,637

3.8.10. Overall, the North West Relief Road is expected to generate accident benefits with a present value of £30.6 million (2010 prices, discounted to 2010).

3.9 INITIAL BENEFIT COST RATIO (BCR)

3.9.1. The Benefit-Cost Ratio (BCR) is defined by dividing the Present Value of Benefits (PVB) by the Present Value of Costs (PVC).

3.9.2. According to WebTAG, Value for Money categories are defined as follows:

- **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;
- **High VfM** - if the BCR is between 2.0 and 4.0; and
- **Very High VfM** - if the BCR is greater than 4.0.

3.9.3. Based on the AMCB (Appendix I) the total monetised benefits exceed the costs by **£256.037 million**. The initial BCR of the scheme is **5.16**. This means that the initial value for money category is **very high.**

3.9.4. The initial value of BCR includes monetised benefits of accident savings, greenhouse gas reductions and indirect taxation impacts, but does not include benefits accruing from reliability or wider impacts. The calculation of initial BCR is set out in Table 76.

Table 76 - Analysis of Monetised Costs and Benefits (AMCB)

Analysis of monetised costs and benefits (Initial BCR)	2010 prices discounted to 2010 £,000
Greenhouse Gases	3,350
Accidents	30,637
Economic Efficiency: Consumer Users (Commuting)	77,214
Economic Efficiency: Consumer Users (Other)	126,505
Economic Efficiency: Business Users and Providers	87,228
Wider Public Finances (Indirect Taxation Revenues)	-7,365
Present Value of Benefits (PVB)	**317,569**
Investment cost	58,513
Operating costs	3,018
Present Value of Costs (PVC)	**61,532**
Net Present Value (NPV)	**256,037**
Initial BCR	**5.161**

3.10 ADJUSTED BCR

3.10.1. Reliability impacts and wider transport appraisal impacts were considered for use in adjusting the PVB and BCR, as specified within the ASR. This analysis is described below.

3.11 RELIABILITY BENEFITS

3.11.1. Reliability has been assessed in line with WebTAG Unit A1.3, Section 6.3 (Reliability – urban roads) using the relationships shown in Figure 50, based on the calculation of the standard deviation of journey times from journey time and distance for each O-D (origin-destination) pair.

Reliability benefit $= -\sum \Delta\sigma_{ij} \left(\frac{T_{ij2}+T_{ij1}}{2} \right) \times 0.4 \times VOT$

Where: Δ $= 0.0018 \left((t_{ij2})^{2.02} - (t_{ij1})^{2.02} \right) d_{ij}^{-1.41}$

VOT = value of time (£/sec)

t_{ij1} and t_{ij2} = the journey times, before and after the change, from i to j (seconds)

d_{ij} = the journey distance from i to j (km)

Figure 50 – Reliability Benefits

3.11.2. Further detail on the calculation of reliability benefits is included in the Economic Appraisal Report.

3.11.3. It is calculated that the present value of the reliability benefits for the North West Relief Road over the 60 year assessment period is £10.12 million (2010 prices discounted to 2010).

3.12 WIDER IMPACTS (WITA)

3.12.1. An assessment had been made of wider transport impacts as referred to in TAG unit A2-1 wider impacts (January 2014). The WITA assessment indicated very high transport benefits of **£282 million**. However, this value is not considered plausible[64], generating benefits on a similar scale to transport user benefits. These benefits have therefore **not been included** within adjusted BCR calculation (as they are not required to demonstrate high value for money).

3.13 ADJUSTED BENEFIT COST RATIO (BCR)

3.13.1. The adjusted BCR has been calculated as set out in Table 77.

Table 77 - Adjusted BCR Calculation

Adjusted BCR	(2010 prices discounted to 2010) £,000
Initial Present Value of Benefits (PVB)	317,659
Reliability Impacts	10,115
Adjusted Present Value of Benefits (PVB)	327,68
Investment Cost	58,513
Operating Costs	3,018
Present Value of Costs (PVC)	**61,532**
Initial Net Present Value (NPV)	**256,037**
Initial BCR	**5.16**
Adjusted Present Value of Benefits (PVB)	**327,684**

[64] The DfT Value for Money Assessment: Advice Note for Local Transport Decision Makers, (paragraph 3.19) stated that an indicative measure of the value of increased output in imperfectly competitive markets can be estimated using a 10% uplift to Business User Benefits.

Adjusted Net Present Value (NPV)	**266,152**
Adjusted BCR	**5.33**

3.13.2. Following this adjustment, the BCR increases to **5.33.** The scheme therefore remains in the **very high** value for money category. Given that improvements to journey time reliability are a scheme objective, confirmation of the reliability benefits further justifies the scheme. As noted above, the methodology set out within TAG to calculate reliability is based on calculation of the standard deviation of journey times from journey time and distance for each O-D (origin-destination) pair. This doesn't account for any 'resilience' benefits that the scheme would generate, where a high-quality, appropriately designed alternative route choice would be available, as provided by the scheme. As there are well documented[65] network resilience problems that occur when accidents arise on a section of the A5 (as noted by the town Council in Appendix C) the scheme would address this problem directly. These resilience / accident benefits are not included within either this TAG reliability analysis, nor in the safety benefits appraisal. The reliability benefits are therefore understated.

3.14 SOCIAL AND DISTRIBUTIONAL IMPACTS

3.14.1. Of the Social and Distributional Impact analysis that can be undertaken, as set out in TAG Unit A4-1 and A4-2, only User Benefits analysis has been undertaken to date, as this is where the vast majority of scheme benefits are derived.

DISTRIBUTIONAL ANALYSIS OF INCOME (INDICES OF DEPRIVATION)

3.14.2. The Indices of Deprivation (IoD) is a proxy for income used within the distributional analysis. The analysis which follows the guidance within TAG divides the UK population into IoD quintiles. The distribution of the study area population into these quintiles is spatially mapped in Figure 51 and reported numerically in Table 46.

[65] Appendix C – Shrewsbury Town Council letter of support

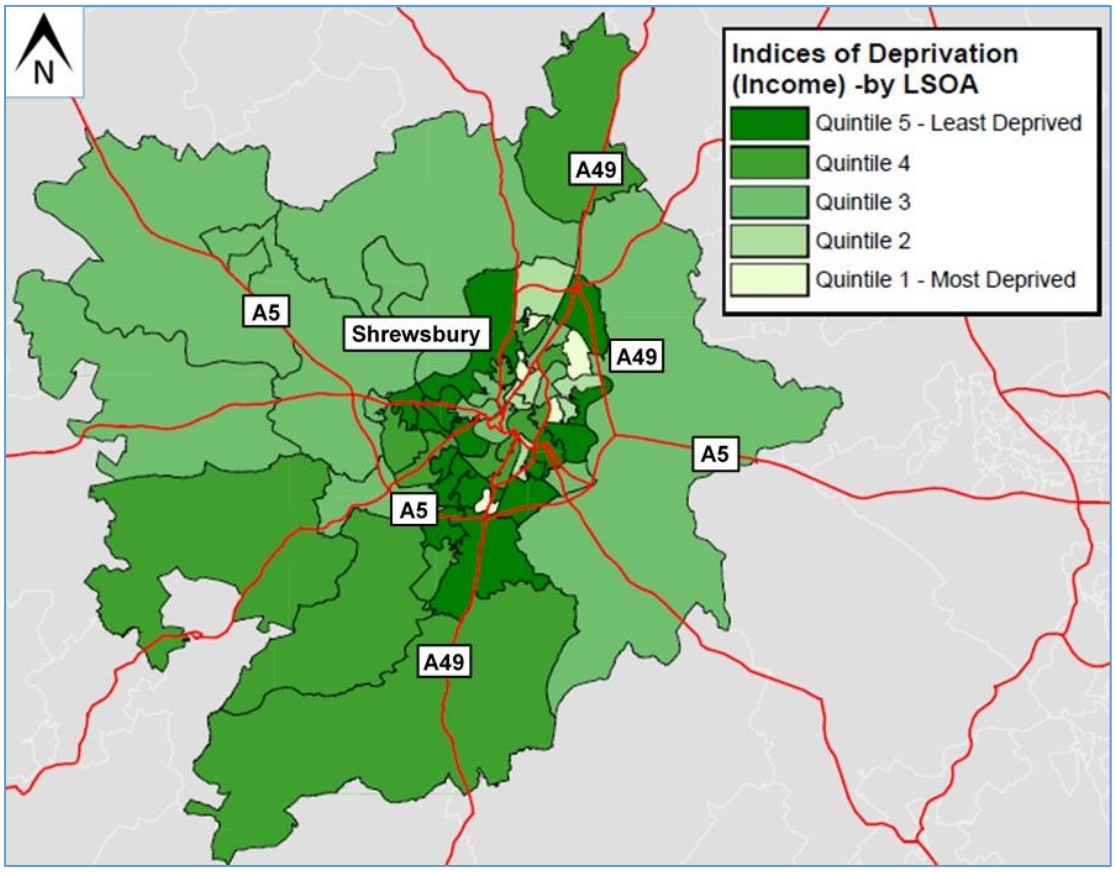


Figure 51 - Lower Super Output Area (LSOA) Categorised by Indices of Deprivation (Income)

Table 78 - Census 2011 Population by Indices of Deprivation Group in Study Area of Analysis

	Population	% population
Quintile	Census 2011	2011
Q1	8,501	9%
Q2	9,737	10%
Q3	24,580	26%
Q4	24,888	27%
Q5	25,473	27%
Total	93,179	100%

3.14.3. The majority of the population of Shrewsbury are contained in the three least deprived quintiles at national level. The most deprived areas are located within the A5 / A49 ring road, from the town centre to the north east around Battlefield (an area which will see benefits from the scheme).

3.14.4. In order to give a more in-depth analysis of income distribution by social group, this data is further disaggregated in Figure 52 to Figure 56. (The quintile distribution for these groups is based on data for the assessment area, unlike the national data for IoD).

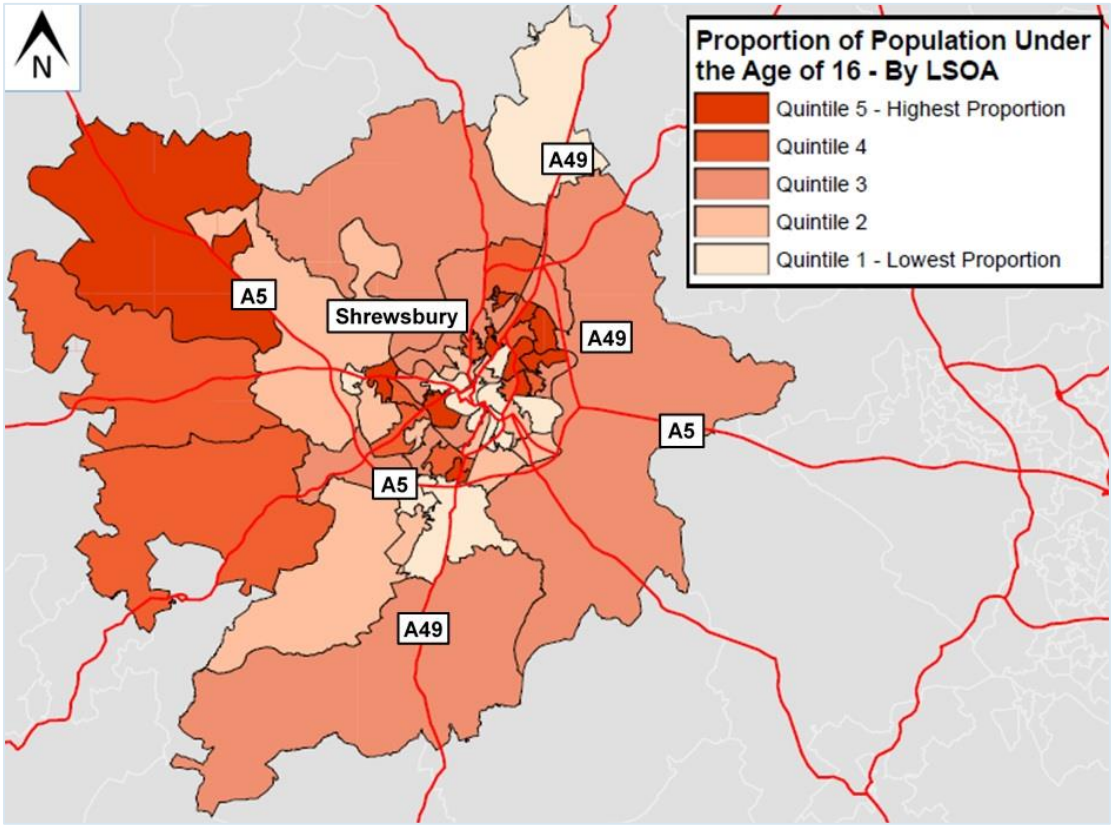


Figure 52 - Lower Super Output Area (LSOA) Categorised By Proportion of Children (<16 Years) Quintiles

3.14.5. Figure 52 shows the areas that amongst the two highest quintiles in terms of proportion of the population of under 16 years olds are generally located in the north east near Battlefield and to the west on the outskirts of Shrewsbury. Under 16 year olds form much lower proportions of the population on the southern, eastern and northern peripheries of Shrewsbury.

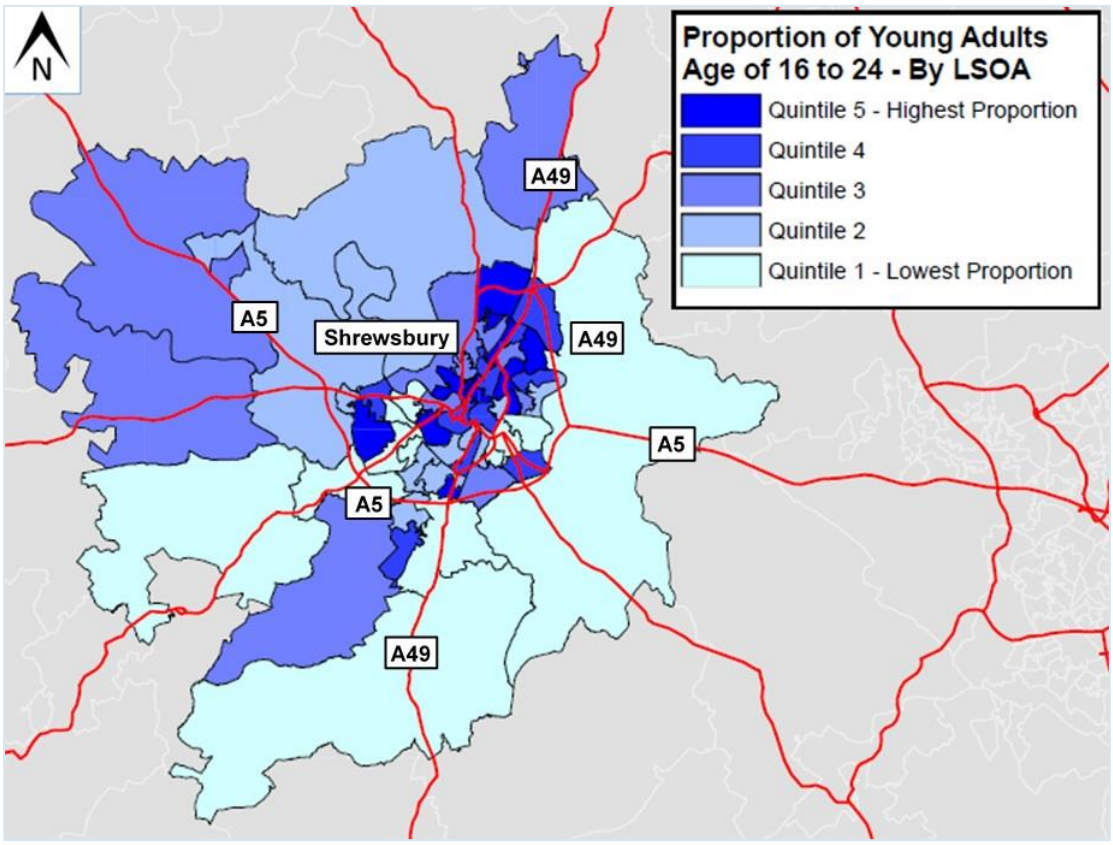


Figure 53 - Lower Super Output Area (LSOA) Categorised by Proportion of Young Adults (16 - 24 Years) Quintiles

3.14.6. Young adults make up a larger proportion of the population in some central areas within Shrewsbury and on the Northern and Western approaches to the town centre as shown by Figure 53. The areas with that are in the quintile of lowest proportion of the population that are young adults are located in south of the town outside the A5 corridor.

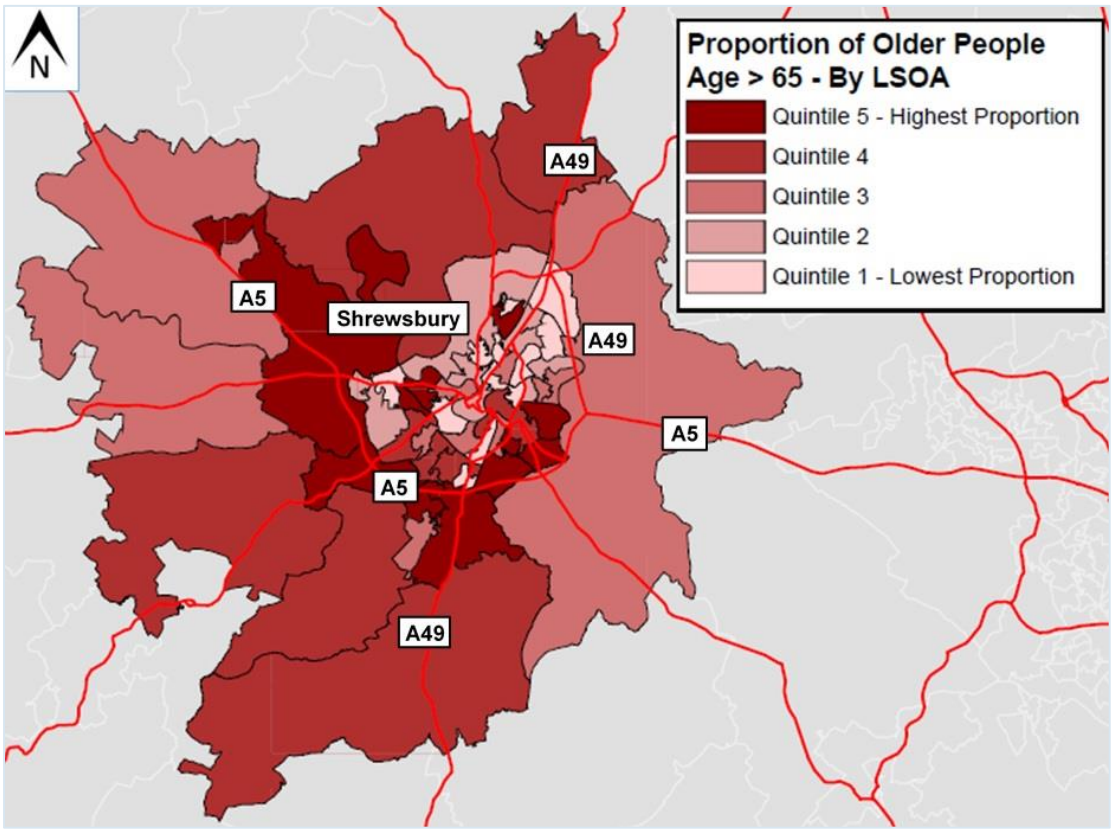


Figure 54 - Lower Super Output Area (LSOA) Categorised by Proportion of Older People (> 65 Years) Quintiles

3.14.7. Figure 54 shows the areas the highest proportion of the population are over 65 years old (nationally) are generally located in the north west and southern parts of Shrewsbury south of the A5 corridor. Older people form much lower proportions of the population in the north east Shrewsbury.

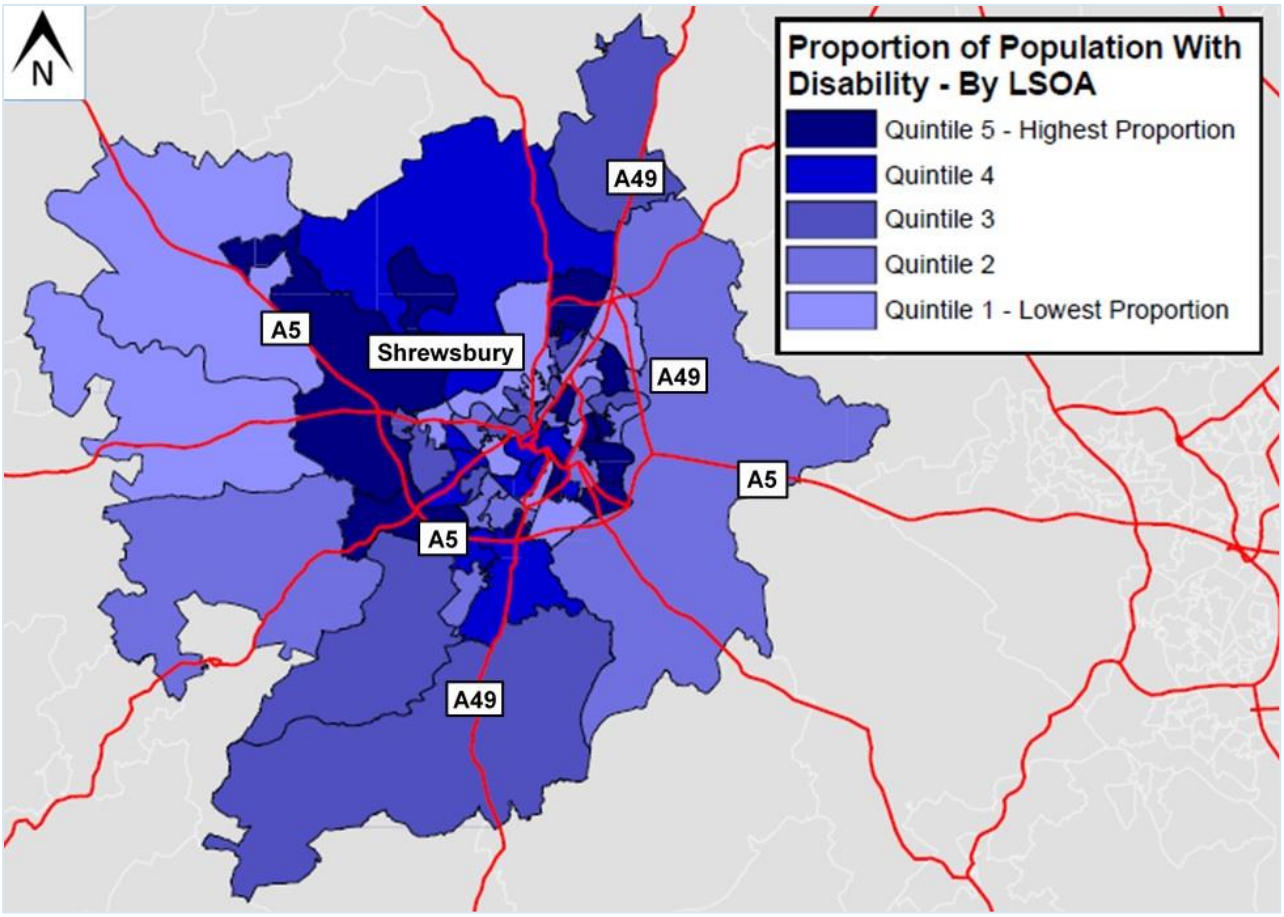


Figure 55 - Lower Super Output Area (LSOA) Categorised by Proportion of Population with Disability - Quintiles

3.14.8. Figure 55 shows that the areas in Shrewsbury that are amongst the highest quintile nationally in terms of proportion of the population with a disability are located in the north west of Shrewsbury.

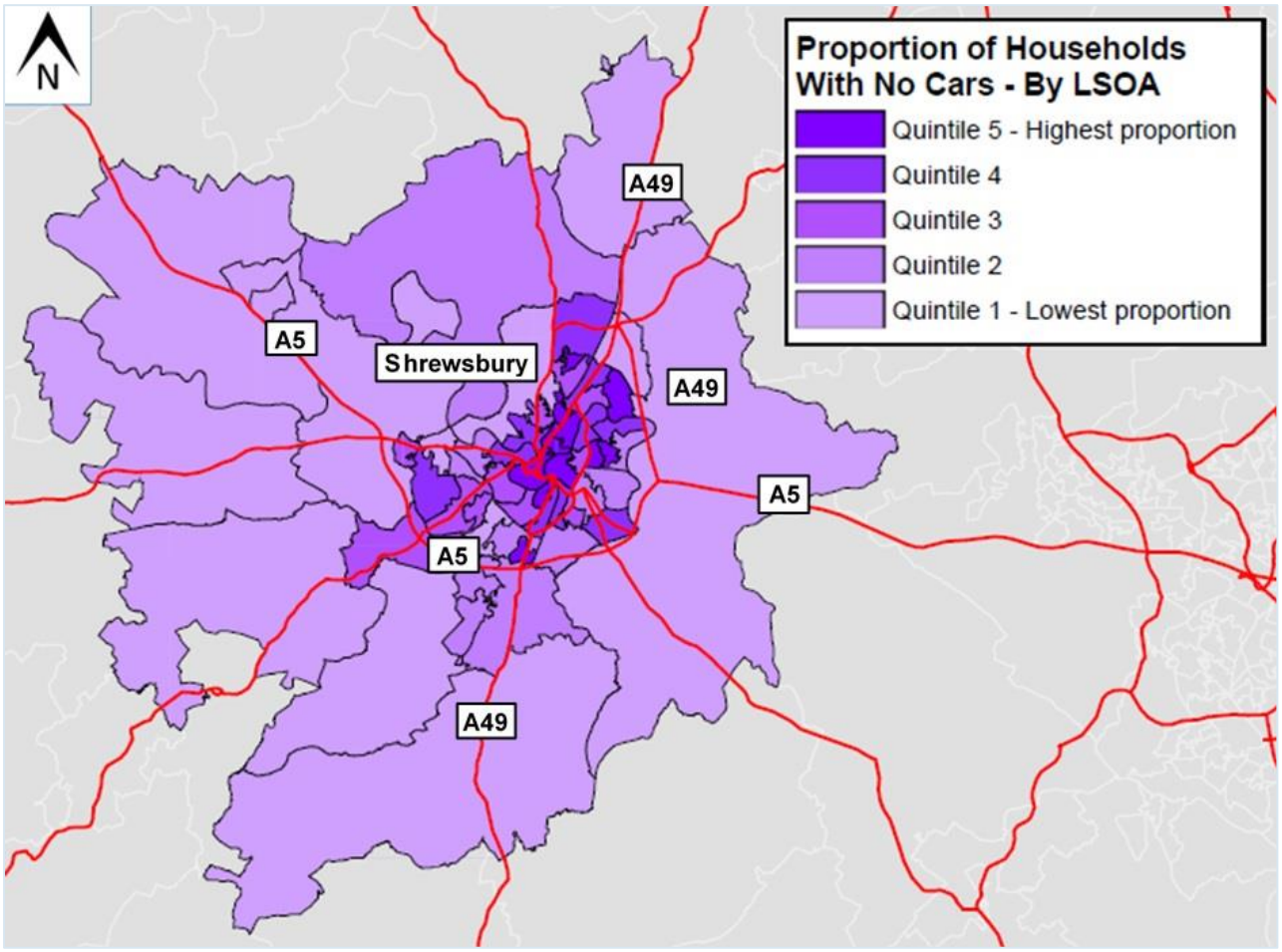


Figure 56 - Lower Super Output Area (LSOA) Categorised by Proportion of Households with No Cars Quintiles

3.14.9. Figure 56 shows that the areas in Shrewsbury that are in the highest 2 quintiles nationally in terms of proportion of households with no cars are located in centre of the town. The areas in the outskirts of Shrewsbury are in the lowest quintile nationally for proportion of households without a car.

DISTRIBUTIONAL ANALYSIS OF USER BENEFITS

3.14.10. The distributional analysis of user benefits has been undertaken and the results are provided in Table 79.

Table 79 - Distributional Analysis for Users Benefits

User Benefits (£M) - Distributional Analysis - NWRR						
	IMD Income Domains - Quintiles					
	Q1	Q2	Q3	Q4	Q5	
Benefits/ Disbenefits	(0% < 20%)	(20% < 40%)	(40% < 60%)	(60% < 80%)	(80% < 100%)	Total
Total User Benefits	22.1	81.2	194.5	102.7	193.8	594.4

Total User Disbenefits	0.0	0.0	0.0	0.0	0.0	0.0
Net User Benefit	22.1	81.2	194.5	102.7	193.8	594.4
Net User Disbenefit	0.0	0.0	0.0	0.0	0.0	0.0
Net User Benefit/Disbenefit	22.1	81.2	194.5	102.7	193.8	594.4
Share of Net User Benefits	4%	14%	33%	17%	33%	100%
Share of Net User Disbenefits	0%	0%	0%	0%	0%	0%
Share of Population	9%	10%	26%	27%	27%	100%
Assessment	✓	✓✓	✓✓✓	✓	✓✓✓	

3.14.11. The results show that in terms of distribution of user benefits, the most benefits are received by areas of moderate to less deprivation, but in terms of benefit per population share, benefits are only marginally in favour of the three least deprived quintiles. Quintiles 3 to 5 receive 82% of the total benefits and represent 80% of the population, with Q3 and Q5 receiving the most benefit per population percentage.

3.15 ENVIRONMENTAL IMPACTS

3.15.1. Within TAG environmental impact appraisal, environmental impacts in the context of road transport is divided into two main categories:

- Traffic related environmental impacts – those that arise from changes in traffic characteristics (three topics – noise, air pollution and greenhouse gases) and
- Non-traffic related environmental impacts – those that arise from physical changes to the environmental brought about by proposed transport infrastructure (five topics – landscape, townscape (scoped out of further appraisal, see paragraph 3.15.24), biodiversity, historic environment and water environment).

3.15.2. The appraisal of each topic is reported in a worksheet with a summary provided within an Appraisal Summary Table (AST) and detailed in the text below. The appraisal results for each relevant environment topic are presented in worksheets provided in Appendix J.

3.15.3. The location of identified environmental receptors are shown in Figure 57.

3.15.4.

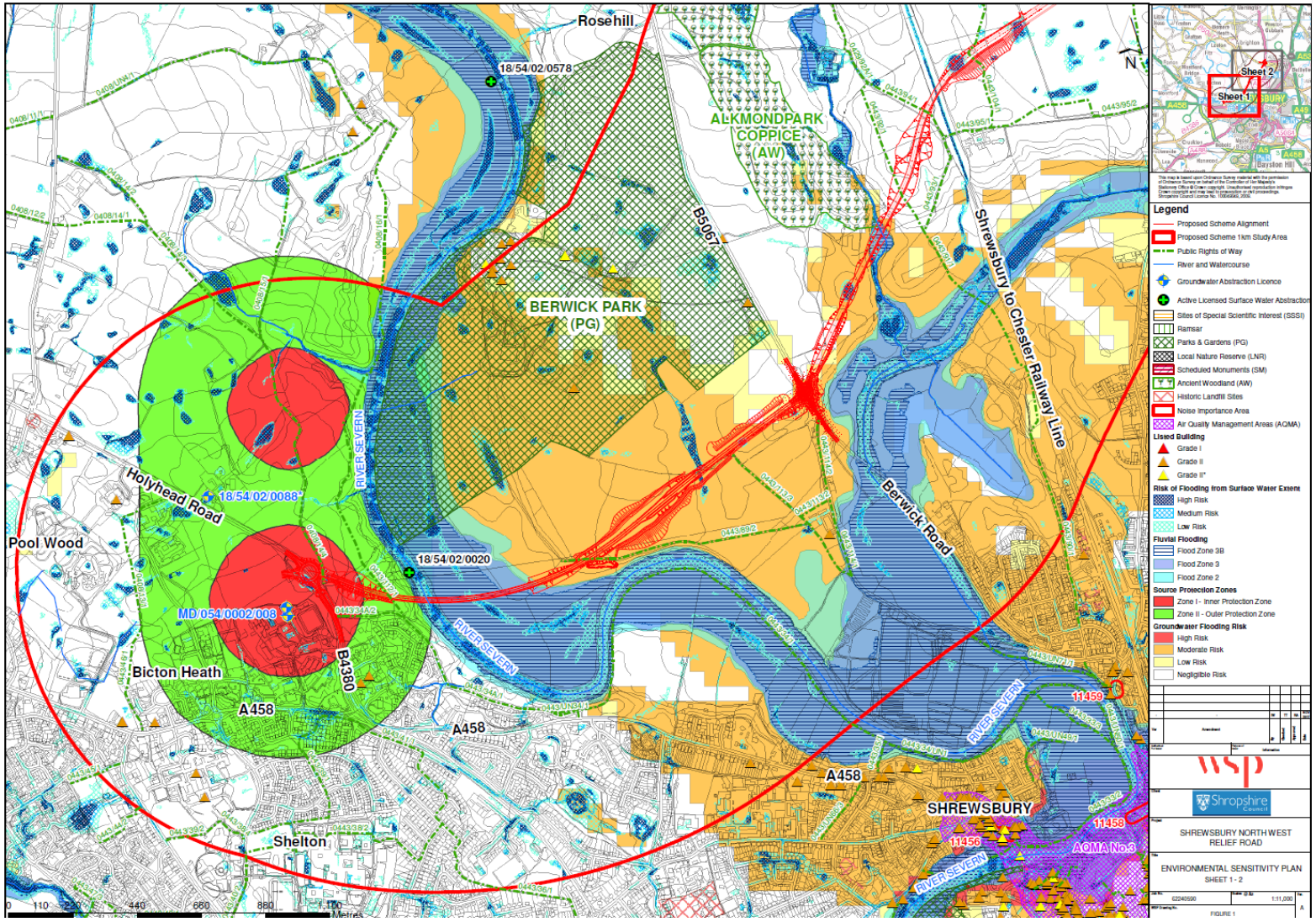


Figure 57 - Environmental Sensitivities Plan

GREENHOUSE GASES

3.15.5. Greenhouse gas impacts depend upon changes in traffic flows, composition, speeds and distance travelled as a result of the scheme. As such, the proposed scheme is expected to have an impact on levels of greenhouse gas emissions.

3.15.6. As defined by the Intergovernmental Panel on Climate Change, GHG emissions are expressed as tonnes of carbon dioxide equivalent (tCO2e) for the purposes of this appraisal.

3.15.7. The UK is legally bound by the Climate Change Act 2008 to achieve a target to reduce GHG emissions to at least 80% below base year (1990) levels by 2050.

3.15.8. For the purposes of the OBC, the Transport User Benefit Appraisal (TUBA) software program was used to assess the impacts of the scheme over a 60 year appraisal period (2020 – 2079). TUBA calculates and evaluates the discounted prevent value of changes in CO2e for non-traded (i.e. petrol, diesel, fuel oil) and traded (e.g. electricity) fuel consumption. The results are shown in Table 80 - Change in greenhouse gas emissions (TUBA outputs)below.

Emissions Class	Appraisal Period GHG Emissions (tCO2e)		Change (tCO2e)	Net Present Value (£000)
	Do Minimum	Do Something		
Non-traded	4,0019,412	39,945,075	-74,337	3,350
Traded	248,356	248,063	-293	12

Table 80 - Change in greenhouse gas emissions (TUBA outputs)

3.15.9. The proposed scheme is expected to reduce greenhouse gas emissions. The forecast reduction in non-traded emissions (74,337 tCO2e) equates to a NPV benefit of £3,350,000.

LANDSCAPE

BASELINE CONDITIONS

3.15.10. The proposed scheme runs through agricultural land to the north west of Shrewsbury. The gently rolling topography of the landscape limits long distance views. Fields are irregular in pattern and are medium to large in size, bounded by established hedgerows and mature trees. Field trees are common, whilst woodland is generally sparse, belts of woodland are found along water courses and around ponds which are a common feature, this gives the appearance of a well wooded landscape. There is an ancient woodland, known as Alkmund Park with a small section of the south-west corner of the woodland within the proposed scheme footprint.

3.15.11. Settlement is sparse, with small isolated farmsteads and properties. The registered parkland of Berwick Hall is a notable feature.

3.15.12. The River Severn meanders through this landscape, with steep wooded valley slopes contrasting the extensive floodplains, and forming one of the main physical barriers dividing the landscape.

3.15.13. The landscape has a number of minor roads which follow field boundaries. Energy transmission lines cross the landscape, which combined with roads reduces the sense of tranquillity when compared with areas to the north. Shrewsbury is perceptible to the south with a church spire being a prominent feature on the skyline, and building rooflines in the northern extents of Shrewsbury combined with the energy transmission lines in the foreground increases the awareness of the nearby urban area. The Shrewsbury to Chester railway line runs north through this landscape in cutting, disrupting field patterns immediately adjacent, it's strong linear form contrasting with this otherwise irregular patterned landscape.

METHODOLOGY

3.15.14. An appraisal of landscape impact has been undertaken for the proposed scheme. This has followed guidance contained in Chapter 5 – The Environmental Capital Approach and Chapter 6 – Impacts on Landscape in TAG Unit A3. Information on the pattern, tranquillity, cultural and land cover elements have been provided in a summary worksheet along with other key landscape environmental resources. An appraisal of how the proposed changes would fit within the landscape have been provided, along with an overall impact on landscape using the standard seven point scale defined in TAG Unit A3.

3.15.15. The appraisal has been carried out from existing design information, desk based research and an awareness of the existing landscape context from a review of Ordnance Survey (OS) mapping, aerial mapping and a site drive through. A brief review of National Character Area and Shropshire Landscape Typology has been undertaken but there has been no detailed study of local character. Until further, more detailed site based surveys and assessments of the potential landscape impacts of the scheme design are carried out, the level of uncertainty of this appraisal is medium.

IMPACT APPRAISAL

3.15.16. The proposed scheme is anticipated to introduce a major road into this medium scale landscape, which would cut through the landscape, disrupting field patterns, removing woodland and changing local land cover. This would likely result in a noticeable change in the landscape pattern. Whilst not a totally uncharacteristic feature, several roads cross the landscape albeit at a smaller scale, its scale would be at odds with similar existing landscape elements, such as the A528, B5067 and Shrewsbury to Chester railway line.

3.15.17. The proposed road will be visible to receptors within the landscape and is likely to have adverse effects on views from private and public receptors.

3.15.18. The proposed bridge over the River Severn is anticipated to introduce a highly visible, hard and linear feature into the landscape, dominating the River Severn corridor and uncharacteristic and out of proportion with the surrounding landscape.

3.15.19. The proposed scheme is not likely to directly impact on designated landscapes but is anticipated to have indirect effects on the setting of the Berwick Hall Parkland.

3.15.20. There would be the loss of agricultural land, ponds, a small section of Alkmund Park ancient woodland, field trees, sections of hedgerow and hedgerow trees. Some of this loss could be replaced through mitigation planting. There would also be fragmentation of agricultural fields. The loss existing landscape features would likely have an effect on the overall landscape character, and the likely scale of the proposed road would likely detract and increase the presence of man-made influences into this landscape at the local scale.

3.15.21. The overall impact on the landscape is anticipated to be **moderate adverse**. This is because of the scale of the proposed development, while not totally uncharacteristic of the surrounding landscape, is likely to be at a much larger scale. The proposed bridge crossing would be particularly uncharacteristic and out of proportion with the surrounding landscape.

POTENTIAL MITIGATION

3.15.22. Potential mitigation measures to adverse landscape and visual effects are in general, replacing vegetation lost through construction of the proposed road and to restore and enhance landscape character. The broad principles are set out below:

- Tree and shrub species to reflect the immediate local character along the route and layout to reflect local form
- Avoid long lengths of screening planting, mounding or road in cutting where it would be at odds with the surrounding landscape

- Consider planting outside of the boundary where mitigation would be more effective and in keeping with the landscape character
- Create habitats of value, where possible grassland habitats within the highway would be developed on low nutrient soils to encourage species diversity and would provide visual interest to users of the cycleway and road
- Drainage ponds should provide wetland habitat and layout should reflect local character. Consider enhancement of existing watercourses and ponds where practical to improve ecological value and restore landscape character
- Where possible create or enhance views and interest for road users and local receptors.

TOWNSCAPE

3.15.23. The proposed scheme is wholly located within agricultural land, where the overriding character is of agricultural fields with sparse settlement. There is a lack of built environment that would warrant a townscape appraisal of the study area, other than that identified within a landscape appraisal.

3.15.24. It has been concluded that this environmental topic area is not relevant to the decision making process and an appraisal of this topic area has not been undertaken for the proposed scheme.

THE HISTORIC ENVIRONMENT

BASELINE CONDITION

3.15.25. The historic resource of the study area is characterised predominately by agricultural land used for both arable and pasture. There is one Scheduled Monument (Harlescott Grange moated site), one Grade II Registered Park and Garden (Berwick Park), one Registered Battlefield (Battle of Shrewsbury 1403) and 27 Listed Buildings (3 Grade II* and 24 Grade II) in a 1km buffer zone around the proposed works. The designated built heritage assets are mainly associated with domestic and/or agricultural uses and relate to rural occupation activity on the outskirts of Shrewsbury. It includes some assets associated with comparatively high status domestic activity, such as Albright Hussey. Seven of the Listed Buildings are within Berwick Park (Grade II Registered Park and Garden).

3.15.26. No conservation areas or World Heritage Sites have been identified in the 1km buffer zone.

3.15.27. There are four non-designated built heritage assets in proximity to the proposed scheme, these include agricultural buildings of potential 18th to early 20th century date (Shropshire Historic Environment Record numbers: 40448, 40454, 40453, and 26994), recorded during the 1982-3 Farm Buildings Survey and/or the Historic Farmsteads Characterisation Project, 2008-2010. Three of the buildings lie within Alkmund Park farm complex, approximately 400m north-west of the proposed scheme, to the south of the Shrewsbury to Chester railway line. The fourth lies at the northern end of the proposed scheme, approximately 400m to the south-west.

3.15.28. Due to the land being agricultural there is a potential for buried archaeological remains from prehistoric to modern date to survive along the proposed scheme due to the lack of disturbance. At the south-eastern end, the proposed scheme crosses through an area which contains cropmarks of circular and sub-rectangular features (the ‘Berwick cropmark site’) and which could be the remains of a prehistoric or Romano-British settlement site and/or funerary activity. The Berwick cropmark site was subject to a geophysical survey in 2007 which confirmed the presence of sub-surface anomalies, however a subsequent targeted trial trench evaluation failed to identify archaeological remains where predicted from the geophysical survey. It is important to note, however, that the trial trench evaluation only examined a small percentage of the area to be impacted upon and the results should be seen as inconclusive at this stage.

3.15.29. Others identified assets comprise previously identified (and then removed) remains during previous excavations and isolated findspots.

METHODOLOGY

3.15.30. The impact of the proposed scheme on the historic environment has been appraised using guidance contained in TAG Unit A3 (Chapter 5 and 8). Key historic environmental resources have been identified from Historic England's National Heritage List within a 1km buffer study area of the proposed scheme, through the Historic England web portal. An assessment score has been ascribed to each identified historic resource or group of resources, and an overall assessment score given based on the definition in Table 8 of TAG Unit A3.

3.15.31. Conservation area data was obtained from the relevant Local Core Strategy documents for Shropshire Council, available through the Shropshire Council website. No conservation areas were identified within 1km study area.

3.15.32. A review of non-designated heritage assets recorded on the Shropshire Historic Environment Record (via Heritage Gateway) within a 500m buffer study area has also been undertaken.

IMPACT APPRAISAL

3.15.33. No designated heritage assets are located within the footprint of the proposed scheme and therefore will not be directly impacted upon.

3.15.34. The proposed scheme has the potential for moderate to slight adverse impact on the setting of the Listed Buildings, the Registered Park and Garden and the non-designated built heritage assets as the current setting is judged to contribute to the significance of these assets. The introduction of a new road within this predominately rural landscape has the potential to result in a change in character and views to and from the assets. There is also the potential impact on designated assets from an increase in noise, lighting and air pollution. The impact could be mitigated to some degree through design measures, such as screening.

3.15.35. The proposed scheme is expected to have a **neutral impact** on the setting of Harlescott Grange Scheduled Monument as the current setting does not make a positive contribution to the significance of the asset, being surrounded by dense, modern urban development, and which also likely will screen the asset visibly from the proposed scheme.

3.15.36. The proposed scheme is expected to have a **neutral impact** on the setting of the Registered Battlefield given the distance from and the likelihood for limited intervisibility of the proposed scheme

3.15.37. The impact of the proposed scheme on the buried archaeological resource is not quantifiable at this stage due to the unknown extent and significance of any remains. It is anticipated to have, based on current evidence, a **moderate adverse** impact. This is based on the assumption that any remains present will be of local and regional significance. However, in the absence of a full assessment and evaluation along the length of the proposed scheme, there remains a potential for buried archaeological assets of national significance and therefore the impact could be of a higher magnitude. Any adverse impact could be reduced through mitigation by design to allow remains to be preserved in-situ or through preservation by record (i.e archaeological excavation and recording).

POTENTIAL MITIGATION AND FURTHER WORK

3.15.38. Further, more detailed assessment is needed to assess the impact on the settings of the designated heritage assets in relation to the proposed scheme. It is also recommended that all the Listed Buildings within the Registered Park and Garden be included in any further assessment as they likely share a group value with other assets in the study area. There is also a potential that the Scheduled Monument 'College of St Mary Magdalene at Battlefield', located within the registered Battlefield but outside of the study area, may need to be scoped in for further assessment as its location and setting contributes to its significance.

3.15.39. An assessment is required to inform the evidence for and significance of below ground remains along the route of the proposed scheme. This should include in the first instance:

- A walkover survey of the proposed scheme

- A review of the data from the Shropshire Historic Environment Record
- A review of the relevant archive material, documents and historic maps from the Shropshire Archive

3.15.40. Where any potential adverse effects resulting from the proposed scheme are identified, strategies to reduce the impact of the scheme should be examined. Where the effects are on the setting of heritage assets, and where the setting is judged to contribute the significance of the asset, the impacts may be mitigated by design, such as the introduction of screening. For below ground remains, the impacts can be reduced through either mitigation by design, allowing remains to be preserved in-situ, or through preservation by record (i.e. archaeological excavation).

3.15.41. The Natural and Historic Environment Manager for Shropshire and the Historic England regional office for the West Midlands should be approached for an opinion, as well as the relevant conservation officers for the area. Following best practice, this should be undertaken in addition to and preferably before the formal scoping process.

3.15.42. Following further assessment and consultation, recommendations for archaeological investigations will be made where required. The results of the assessment, investigations and informal and formal consultations should enable the formulation of appropriate mitigation through design considerations, archaeological techniques or other methods.

BIODIVERSITY

BASELINE CONDITIONS

3.15.43. A study area of 2km from the boundary of the proposed scheme has been considered for designated nature conservation sites and ancient woodland habitats.

3.15.44. There are three internationally or statutory designated sites within the study area. Hencott Pool is a Site of Special Scientific Interest (SSSI) and part of the Midland Meres and Mosses (Phase 2) Ramsar site. These designated sites are located approximately 100m north of the relief road alignment and Hencott Wood watercourse flows south-east from Hencott Pool crossing the proposed scheme alignment. As part of the proposed scheme, it is proposed that Hencott Pool, along with a topographical buffer, comes under the direct ownership and management of Shropshire Council so that the site would be monitored and maintained for the benefit of biodiversity in perpetuity. However, detailed management plans for this site have not been prepared at this stage and therefore are not considered as part of this appraisal.

3.15.45. The Old River Bed, Shrewsbury SSSI lies approximately 800m north-west of the proposed scheme.

3.15.46. There are five locally designated non-statutory sites: Old River Bed Shrewsbury Local Wildlife Site (LWS), River Severn (Montford Shrewsbury) LWS, Shelton Rough LWS, and Alkmund Park Pool LWS. These sites receive no statutory protection. The proposed scheme crosses the River Severn (Montford Shrewsbury) LWS and crosses the southern end of the Alkmund Park Pool LWS.

3.15.47. There are two areas of ancient woodland within the study area. Kesters Coppice Ancient Replanted Woodland is approximately 1.9km of the proposed scheme. The proposed scheme crosses the southern end of Alkmondpark Coppice Planted Ancient Woodland Site (PAWS).

3.15.48. There are several hedgerows that cross the proposed scheme. There is the potential that these may be ‘important’ hedgerows that receive protection through legislation.

METHODOLOGY

3.15.49. The appraisal of the likely impacts on biodiversity has been undertaken in accordance with TAG Unit A3 Chapters 5 and 9. The appraisal highlights the importance of identified key resources, using guidance contained in Table 9 and 10 of TAG Unit A3, to ascribe biodiversity value. The magnitude of impact of the proposals on key identified biodiversity resources or group of resources has been assessed and an overall assessment score has been determined.

3.15.50. The following sources were consulted to collate historical ecological records within 2km of the proposed scheme. Records were limited to statutory and non-statutory designated sites and species records from 2007.

- Ordnance Survey (OS) website (www.ordnancesurvey.co.uk);
- Online photographic resources, including aerial photography (Bing Aerials) and Google Streetview;
- The Multi-agency Geographic Information for the Countryside (MAGIC) service; and,
- Shrewsbury North West Relief Road – Environmental Scoping Report (Mouchelparkman, 2007).

IMPACT APPRAISAL AND POTENTIAL MITIGATION

Statutory and Non-Statutory Designated Sites

3.15.51. The road alignment is located approximately 100m south of the designated site Hencott Pool, which is part of the Midland Meres and Mosses (Phase 2) Ramsar site and Hencott Pool SSSI. There are no hydrological pathways to Hencott Pool, as the road would be located downstream of the site along the Hencott Wood watercourse. Proposed embankments on either side of the road along this section would also limit surface water runoff to the surrounding landscape. Groundwater levels at Hencott Pool are not anticipated to be affected by the proposed scheme. The air quality impact of the proposed scheme is not expected to be significant. Overall, effects on Hencott Pool are expected to be neutral.

3.15.52. The proposed scheme will cross the River Severn (Montford Shrewsbury) LWS which will result in a **slight adverse** effect on this site.

3.15.53. The proposed scheme will result in the loss of a corner of Alkmund Park Pool LWS. Effects on this site will be **slight adverse**.

3.15.54. All other non-statutory designations within the study area lie outside of the footprint of the proposed scheme and will not be directly affected by the works. Effects on these sites will be **neutral**.

Habitats

3.15.55. There are two areas of ancient woodland within the study area. Kesters Coppice Ancient Replanted Woodland is approximately 1.9km north-east and lies outside of the footprint of the proposed scheme and will not be directly affected by the works. Effects on this site will be **neutral**.

3.15.56. The proposed scheme will result in the loss of a small area of the Alkmondpark Coppice PAWS. Effects on this site will be **moderate adverse**.

3.15.57. There are several hedgerows that could be lost due to the construction of the proposed scheme. Effects on hedgerows are expected to be **slight adverse**.

Fauna including Protected Species

3.15.58. Trees or buildings within the footprint of the proposed scheme with features suitable to support roosting bats may be present. Hedgerows and woodland cross the proposed scheme may provide commuting and foraging lines for bats in a landscape predominantly dominated by arable fields.

3.15.59. Following further bat surveys, should bats be found to be roosting in any trees or buildings, licensing may be required to facilitate the works, along with a suitable mitigation strategy. The proposed scheme will create a barrier and divide existing habitats and commuting and foraging corridors (e.g. hedgerows). Smaller areas of land may be more vulnerable to loss, damage or change and measures to increase connectivity of remaining habitats should be recommended. Following implementation of any necessary mitigation measures, the effect on foraging and roosting bats is anticipated to be **slight adverse**.

3.15.60. There are habitats including woodland and hedgerows within the footprint of the proposed scheme that are suitable for supporting hazel dormice *Muscardinus avellanarius* but there are no existing records of this species from the existing Scoping Report (MouchelParkman, 2007). Following presence/ absence surveys, licensing may be required to facilitate the works, along with a suitable mitigation strategy. Following implementation of any necessary mitigation measures, the effect on hazel dormouse is anticipated to be **slight adverse**.

3.15.61. There are habitats including the River Severn and surrounding wet ditches within the footprint of the proposed scheme that are suitable for supporting commuting, foraging and resting otter *Lutra lutra* and there are records of otter within 1km of the proposed scheme (Mouchelparkman, 2007). Following surveys, licensing may be required to facilitate the works, along with a suitable mitigation strategy. Following implementation of any necessary mitigation measures, the effect on otter is anticipated to be **slight adverse**.

3.15.62. There are habitats including the River Severn and surrounding wet ditches within the footprint of the proposed scheme that are suitable for supporting water vole *Arvicola amphibious* and there are records of water vole within 1km of the proposed scheme (MouchelParkman, 2007). Following surveys, licensing may be required to facilitate the works, along with a suitable mitigation strategy. Following implementation of any necessary mitigation measures, the effect on water vole is anticipated to be **slight adverse**.

3.15.63. There are habitats including the woodland within the footprint of the proposed scheme that are suitable for supporting badger *Meles meles*. Following surveys for badger setts, licensing may be required to facilitate the works, along with a suitable mitigation strategy. Following implementation of any necessary mitigation measures, the effect on badger is anticipated to be **slight adverse**.

3.15.64. Breeding birds have been identified using habitats within the study area and may be at risk of disturbance should any vegetation clearance be required during the nesting season. However, with the implementation of mitigation measures, breeding birds are unlikely to be directly affected. Any temporary or permanent loss of breeding bird habitat is likely to represent a relatively minor effect, given the small scale of habitat to be lost and the presence of other suitable habitat within the wider area. The overall effect on breeding birds is therefore anticipated to be **neutral**.

3.15.65. There are habitats including ponds and woodland within the footprint of the proposed scheme that are suitable for breeding and terrestrial great crested newt *Triturus cristatus*. Following presence/absence surveys and population surveys, licensing may be required to facilitate the works, along with a suitable mitigation strategy. Following implementation of any necessary mitigation measures, the effect on great crested newt is anticipated to be **slight adverse**.

3.15.66. There are habitats including grassland within the footprint of the proposed scheme that are suitable for supporting reptiles: slow worm *Anguis fragilis* and common lizard *Zootoca vivipara*. Following presence/absence surveys, a suitable mitigation strategy may be required to facilitate the works. Following implementation of any necessary mitigation measures, the effect on reptiles is anticipated to be **slight adverse**.

3.15.67. The River Severn within the footprint of the proposed scheme is suitable for supporting white clawed crayfish *Austropotamobius pallipes*. Following presence/absence surveys, licensing may be required to facilitate the works, along with a suitable mitigation strategy. Following implementation of any necessary mitigation measures, the effect on white clawed crayfish is anticipated to be **slight adverse**.

Surface water and Groundwater

3.15.68. The proposed scheme is within the catchment of the River Severn and crosses a number of unnamed tributary watercourses including watercourses referred to as Alkmund Park Wood watercourse and Hencott Wood watercourse.

3.15.69. The majority of the proposed scheme falls within the Morda and Severn North operational catchment under the Water Framework Directive (WFD) which in turn falls within the Severn Upper management catchment. Most of the proposed scheme, from the Holyhead Road roundabout to within approximately 200m of the Ellesmere Road roundabout, feeds into a stretch of the River Severn forming the most downstream component of the above operational catchment. This is the River Severn from the Bele Brook confluence to Sundorne Brook confluence and is referenced GB109054049142 under the WFD. This stretch of river:

- Supports Severn Trent Water's public water supply intake at Shelton. This intake is located approximately 75m upstream of the proposed scheme river crossing.
- Receives tributaries draining all the noteworthy water dependant nature conservation sites in close proximity to the proposed scheme. West to east along the proposed scheme these include:

1. Alkmund Park Pool
2. Hencott Pool SSSI (and Ramsar site)
3. Old River Bed SSSI

3.15.70. The remaining section of the proposed scheme, approaching Ellesmere Road roundabout and just beyond (including the Ghost Island junction), falls within the Perry, Roden and Tern – North Shropshire operational catchment under the WFD. This stretch of the proposed scheme drains into the River Severn, immediately below the stretch referred to above, from the Sundorne Brook confluence to the Much Wenlock-Farley Brook confluence and is referenced GB109054049141 under the WFD. This stretch of river falls within the Shropshire West operational catchment and the Severn Middle Worcestershire management catchment under the WFD.

3.15.71. The proposed scheme overlies superficial (drift) deposits with secondary undifferentiated and Secondary A Aquifer designations and these are underlain by bedrock, the Permo-Triassic Sandstone, with a principal aquifer designation. A small area of the proposed scheme footprint in the vicinity of Holyhead Road roundabout (and to the west of the River Severn) falls into Source Protection Zone 1 (SPZ1) extending into SPZ2 in the vicinity of the River Severn to the east. These SPZ designations are associated with two adjacent groundwater abstractions operated by Severn Trent Water serving public water supply. To the east there is no corresponding area designated as SPZ3 and this probably relates to the juxta-position of the River Severn and its influence on the interpretation of SPZ extents associated with abstraction sources in this locality.

3.15.72. The major aquifer underlying the proposed scheme forms part of the Shropshire Middle Severn – Permo-Triassic Sandstone East Shropshire groundwater body referenced GB40901G300100 under the WFD. The groundwater regime associated with the minor superficial drift aquifers referred to above is likely to sustain the hydrological condition needed to support the water dependant nature conservation sites listed in paragraph 1.9.2.

3.15.73. Both groundwater abstractions and groundwater dependant nature conservation sites in close proximity to the proposed scheme are potentially vulnerable to hydrological impacts as a result of the proposed scheme.

3.15.74. There is a low probability of flooding from rivers across the majority of the proposed scheme, which is located in the Environment Agency (EA) Flood Zone 1 (land having a less than 1 in 1,000 annual probability of river flooding). However, the proposed scheme crosses three watercourses, the River Severn and two unnamed smaller watercourses referred to as the Alkmund Park Wood watercourse and the Hencott Wood watercourse. The River Severn and Alkmund Park Wood watercourse have associated floodplain area designated by the EA as being Flood Zone 2 (land having between a 1 in 100 and 1 in 1,000 annual probability of river flooding) and Flood Zone 3 (land having a 1 in 100 or greater annual probability of river flooding).

3.15.75. In the rural area to the east of the River Severn there are two locations along the proposed scheme alignment that are in areas at high risk of surface water flooding (land having a 1 in 30 annual probability of flooding), these areas are:

- Area south of Willow Pool, just west of the railway line crossing
- Area in the vicinity of the Severn Trent Water access track, south east of Hencott Wood, west of the Ellesmere Road roundabout.

3.15.76. The proposed scheme overlies superficial deposits with Secondary Undifferentiated and Secondary A Aquifer designations and bedrock with a Principal Aquifer designation. The entirety of the proposed scheme footprint to the west of the River Severn falls into Source Protection Zones 1, 2 and 3. Based on the information available the flood risk from groundwater is considered to be low.

3.15.77. The proposed scheme crosses an area indicated by EA mapping as being the maximum extent of flooding from reservoirs along the course of the River Severn.

3.15.78. Based on the information currently available the proposed scheme is considered to not be at risk of flooding from other artificial sources such as canals or pumped systems.

METHODOLOGY

3.15.79. Following guidance in TAG Unit A3 – Chapters 5 and 10, an appraisal of the potential impact of the proposal on the water environment has been undertaken. This has involved information available from the following sources:

- TAG Unit A3 – Environmental Impact Appraisal, Department for Transport, Dec 2105.
- Geology of Britain Viewer, British Geological Survey, 2017
- Catchment Data Explorer, Environment Agency 2017
- Designated Sites View, Natural England, 2017
- Transport Analysis Guidance (TAG), Department of Transport, 2015
- Shrewsbury North West Relief Road, Environmental Scoping Report, Shropshire County Council, 2007
- North West Relief Road, Preliminary Sources Study Report (Vols 1 and 2), Shropshire County Council, March 2007
- Magic Map, Defra, 2017
- Environment Agency's online interactive maps, which hold flood risk environment data for features including flood risk from rivers, surface water and reservoirs and aquifer and groundwater vulnerability mapping.

3.15.80. To appraise the magnitude and significance of the proposed scheme, guidance in TAG Unit A3 – Environmental Impact Appraisal has been followed using best judgement for the most likely impact on each feature or group of features.

3.15.81. The data available online on the EA's interactive maps will only be accurate to when the maps and datasets were last updated by the EA. The maps are designed to be viewed at different scales, for example, groundwater, where data will be collated and interpreted at a higher level and therefore may not reflect local ground conditions at a location.

Study Area

3.15.82. The study area consists of surface water and groundwater resources which may be impacted. These include, in particular, the River Severn, its tributaries including the Alkmund Park Wood watercourse, Hencott Wood watercourse, standing water such as Hencott Pool, the major (Permo-Triassic Sandstone) aquifer underlying the area, and any minor perched aquifers (within drift deposits) which may support a significant water resource function and/or water dependent feature.

3.15.83. The River Severn meanders through the study area running approximately north-west to south east. The main tributaries of interest are the Alkmund Park Wood watercourse and the Hencott Wood watercourse. The Alkmund Wood watercourse flows from Alkmund Pool south and is joined by another watercourse, flowing west from Hencott, the watercourse then travels further south and discharges into the River Severn. Hencott Wood watercourse flows south east from Hencott Wood and disappears from OS mapping just before reaching the A528. The Hencott Wood watercourse may discharge into the Bagley Brook, the Alkmund Wood watercourse catchment or by other means to the River Severn. As the Hencott Wood watercourse probably flows into the Old River Bed (SSSI) all effects on this watercourse will also apply to the Old River Bed and the Bagley Brook.

IMPACT APPRAISAL

SURFACE WATER and Groundwater

3.15.84. A full appraisal of potential impacts to surface water and groundwater is provided in the Water Environment Impacts worksheet in Appendix J, a summary of potentially significant impacts is given below.

3.15.85. A potentially significant impact predicted to the River Severn concerns its use as a key Public Water Supply abstraction source (deemed to have a very high importance) and being only a short distance upstream of the proposed river crossing under the proposed scheme. The cumulative risk (from various pollution threats) to this source, during operation, poses the threat of a magnitude of impact of Slight Adverse, with a significance of significant to the source.

3.15.86. No other aspects of the proposed scheme directly impact the River Severn and the only other impacts to the river are introduced indirectly via minor watercourses which flow into the River Severn as tributaries or via groundwater. The appraisal considers potential impacts to both groundwater and minor water courses directly. In respect of the latter the most important related receptors (or features) are water dependant SSSIs (deemed to have a very high importance) and therefore it is not considered necessary to individually consider every possible feature related to the minor watercourses (such as water quality, geomorphology and abstractions etc) as these have significantly lesser importance and do not trigger any significant issues outside those related specifically to water dependant SSSIs.

3.15.87. The Old River Bed forms a tributary to the River Severn and along part of its length it is designated a SSSI with wetland extensions into its adjacent flood plain. This feature is deemed to have a very high importance and is considered vulnerable to accidental pollution events, during operation, associated with the proposed scheme posing a threat of magnitude of impact of **slight adverse** and significance significant to this feature.

3.15.88. It is expected that collectively these impacts would give rise to an overall Moderate Adverse impact to surface water and groundwater based on the scoring criteria detailed in Table 17 of the TAG Unit A3 guidance.

3.15.89. The proposed scheme crosses the main channel of the River Severn with potential effects on increasing flood risk through displacement of water. Where possible, piers should be designed outside of the river channel to avoid afflux from the new structure crossing the River Severn which is expected to result in a magnitude of impact to be **negligible** with a significance of insignificant.

3.15.90. The proposed scheme crosses the main channel of the Alkmund Park Wood watercourse with potential effects on increasing flood risk as a result of constricting flows. With mitigation of the opening being of sufficient size to convey the design standard flows without undue afflux the impact is considered to be **negligible** with a significance of insignificant.

3.15.91. The proposed scheme crosses the main channel of the Hencott Wood watercourse with the potential to increase the risk of flooding as a result of constricting flows in the watercourse. Watercourse structure openings should be designed with sufficient size to convey the design standard flows without undue afflux, which is expected to result in a magnitude of impact of **negligible** with a significance of low significance.

3.15.92. The proposed scheme crosses areas identified as Flood Zones 2 and 3 associated with the River Severn with the potential to increase the risk of flooding through displacement of floodplain. It is expected that this potential impact would be mitigated with the volume of floodplain displaced compensated for on a level for level basis. Therefore the magnitude of impact is considered to be **slight adverse** with a significance of low significance.

3.15.93. The proposed scheme crosses areas identified as Flood Zones 2 and 3 associated with the Alkmund Park Wood watercourse with potential effects on increasing the risk of flooding through displacement of floodplain. It is expected that this potential impact would be mitigated with the volume of floodplain displaced compensated for on a level for level basis, therefore the magnitude of impact is considered to be **negligible** with a significance of insignificant.

3.15.94. Damage to foul, surface and potable water services during construction of the proposed scheme could result in flooding (and potential contamination). Utility asset plans and service clashes should be reviewed and the proposed scheme designed to reduce the risk of potential impacts. A Construction Environmental Management Plan (CEMP) should be adhered to during construction of the proposed scheme, to reduce the risk of contamination to the water environment. With the above mitigation measure sin place the magnitude of impact is considered to be **negligible** with a significance of low significance.

3.15.95. The potential effects of increasing surface runoff from increased impermeable surfaces is an increase in flood risk in the receiving watercourse catchment. It is expected that sustainable drainage systems would be included within the prosed scheme to attenuate runoff to an agreed runoff rate. Therefore magnitude of impact is considered to be **negligible** with a significance of low significance.

3.15.96. The potential effects of displacement of high surface water flood risk areas is an increase in flood risk elsewhere. With mitigation of storage provision for the displaced volume the magnitude of impact is considered to be negligible with a significance of insignificant.

3.15.97. The potential effects of the roads foundations interfering with the flow of the aquifer is a potential increase in groundwater flood risk the impact is considered to be **slight adverse** with a significance of insignificant.

3.15.98. The proposed scheme crosses an area identified on the EA mapping as being within the maximum extent of flooding from reservoirs along the course of the River Severn with potential effects on increasing flood risk through constricting flows. The crossing structure piers should be designed to minimise flow constriction. The magnitude of impact is considered to be **negligible** with a significance of insignificant.

DESIGN MITIGATION AND FURTHER WORK

Surface Water and hydrogeology

3.15.99. The proposed scheme has only been designed to a preliminary stage and additional design details require formulation should the proposed scheme be further advanced. Standard good practice measures will be applied to all associated construction works including application of all relevant Pollution Prevention Guidelines (PPGs) and formulation/adherence to a robust CEMP.

3.15.100. Initial design works propose a crossing over the River Severn approximately 75m downstream of the river intake at Shelton. The expectation being that the crossing is located sufficiently downstream so as not to impact the river intake in the event of a pollution event associated with an accidental spillage into the river. However, more detailed studies are required to ensure that possible in-river mixing regimes do not threaten the intake in the event of a conceivable pollution incident related to an accident and occurring in combination with a particular mixing regime which may ensue under low-flow conditions and such a scenario requires further consideration to confidently predict impacts on the source abstraction.

Flood risk

3.15.101. Potential mitigation measures include:

- Where possible, piers should be designed out of the river channel to avoid afflux from the new structure crossing the River Severn;
- The proposed new structures crossing the Alkmund Park Wood watercourse and Hencott Wood watercourse being designed with openings of sufficient size to convey the design standard flows without undue afflux;
- Where works are required in the floodplain there is the potential to increase the risk of flooding. The volume of floodplain displaced by the proposed scheme should be compensated for on a level for level basis;
- The potential effects of damage to foul, surface and potable water services could result in flooding (and potential contamination). Utility asset plans and service clashes should be reviewed and the proposed scheme designed to minimise this risk. Implementation of a Construction Environmental Management Plan (CEMP) will reduce this risk during construction.

3.16 VALUE FOR MONEY STATEMENT

3.16.1. An analysis of the monetised benefits of the proposed scheme demonstrates that it offers a **very high** value for money.

PRESENT VALUE OF COSTS AND BENEFITS

3.16.2. The monetised costs and benefits assessed are set out in Table 81.

Table 81 - Present value of costs and benefits assessed

Analysis of monetised costs and benefits	£,000 (2010 prices discounted to 2010)
Greenhouse Gases	3,350
Accidents	30,637
Economic Efficiency: Consumer Users (Commuting)	77,214
Economic Efficiency: Consumer Users (Other)	126,505

Economic Efficiency: Business Users and Providers	87,228
Wider Public Finances (Indirect Taxation Revenues)	-7,365
Initial Present Value of Benefits (PVB)	**317,569**
Investment cost	58,513
Operating costs	3,018
Present Value of Costs (PVC)	**61,532**
Net Present Value of Costs (NPV)	**256,037**
Initial BCR	**5.16**
Reliability	**10,115**
Adjusted Present Value of Benefits (PVB)	**327,684**
Adjusted Net Present Value (NPV)	**266,152**
Adjusted BCR	**5.33**

BENEFIT COST RATIO (BCR)

3.16.3. The value for money category is based on the Benefit Cost Ratio (BCR). The initial BCR is 5.16. Inclusion of reliability benefits gives an adjusted BCR of 5.33.

3.16.4. Business will benefit from reduced congestion, faster journeys and improved journey time reliability, with reduced costs and better access to markets, whilst commuters will similarly benefit from shorter, more reliable, journeys to work. These benefits, which are included in the BCR calculations will support local development and the regeneration of Shrewsbury's economy.

3.16.5. The scheme is expected to lead to a reduction in greenhouse gas emissions; these have been monetised and included in the BCR.

SOCIAL AND DISTRIBUTIONAL IMPACTS

3.16.6. Social and distributional analysis has been performed on user benefits as this is where the vast majority of scheme benefits are derived. The results of that analysis are not considered to be sufficient to alter the value for money category.

3.17 SENSITIVITY TESTING

3.17.1. In order to understand how sensitive the benefits described above are to a range of alternative parameters, a number of tests have been performed.

- Alternative growth scenarios
- Alternative levels of Optimism Bias allowance
- Alternative levels of benefit

3.17.2. The results of these tests are summarised below, and set out in more detail in the Economic Appraisal Report (Supporting document 9).

ALTERNATIVE GROWTH SCENARIOS

3.17.3. The first sensitivity test undertaken was a standard high and low growth scenario sensitivity test. These sensitivity tests are provided in Table 82.

Table 82 - High, Core and Low Growth scenario TUBA benefits sensitivity tests (£, 000s, 2010 prices, discounted to 2010)

Analysis of monetised costs and benefits (Initial BCR)	2010 prices discounted to 2010 (£,000)		
	Core	High	Low
Greenhouse Gases	3,350	4,252	2,612
Accidents	30,637	46,892	27,206
Economic Efficiency: Consumer Users (Commuting)	77,214	101,974	58,737
Economic Efficiency: Consumer Users (Other)	126,505	155,763	92,094
Economic Efficiency: Business Users and Providers	87,228	108,196	68,350
Wider Public Finances (Indirect Taxation Revenues)	-7,365	-9,270	-5,822
Present Value of Benefits (PVB)	317,569	393,915	243,177
Investment cost	58,513	58,513	58,513
Operating costs	3,018	3,018	3,018
Present Value of Costs (PVC)	61,532	61,532	61,532
Net Present Value (NPV)	256,037	332,383	181,645
Initial BCR	5.16	6.40	3.95

3.17.4. Although the alternative growth scenarios (low and high) have a significant impact on the total benefits forecast, these remain well above the costs even for the low growth forecast, indicating that the value for money is very robust.

ALTERNATIVE OPTIMISM BIAS SENSITIVITY TESTING

3.17.5. As noted in paragraph 3.5.6, an allowance of 19.18% for optimism bias (OB) is considered appropriate for this scheme, given the level of development and scope of the Quantified Risk Assessment (QRA). The effect on PVC, BCR and value for money for the core scenario of changing OB to 15%, 23% and 66% is set out in Table 83.

Table 83 - Alternative optimism bias sensitivity tests

Allowance for Optimism Bias	Adjusted PVB (£,000)	PVC (£,000)	BCR	VfM category
15%	317,569	59,479	5.34	Very High
23%	317,569	63,406	5.01	Very High
66%	317,569	84,517	3.76	High

3.17.6. As may be seen, whilst a higher allowance for optimism bias reduces the scheme BCR, the value for money category remains robustly high, even with the highest uplift of 66%.

IMPACT OF REDUCED BENEFITS SENSITIVITY TEST

3.17.7. It is acknowledged that the inclusion of variable demand forecasts could result in a reduction in economic benefits, since there is likely to be more traffic on the network as a result of traffic induced by the scheme. However, given the very high BCR, it is calculated that benefits would need to reduce by 25% for the BCR to fall below 4, thereby dropping into the high value for money category.

3.18 APPRAISAL SUMMARY TABLE (AST)

3.18.1. The AST presents in a single table of all the evidence from the economic appraisal. It records all the impacts which have been assessed and described above – economic, fiscal, social distributional and environmental impacts – assessed using monetised, quantitative or qualitative information as appropriate. The AST for the scheme, in line with WebTAG requirements, is included in Appendix K.

3.19 SUMMARY OF THE ECONOMIC CASE

3.19.1. The Economic Case identifies and assesses all the impacts of the scheme to determine its overall value for money. It takes account of the costs of developing, building, operating and maintaining the scheme, and a full range of its impacts, including those impacts which can be monetised.

BENEFIT COST RATIO

3.19.2. The value for money category is based on the Benefit Cost Ratio (BCR). The initial BCR is **5.16**. Inclusion of reliability benefits gives an adjusted BCR of **5.33**.

VALUE FOR MONEY CATEGORY

3.19.3. An analysis of the monetised benefits of the proposed scheme demonstrates that it offers very **high value** for money.

SENSITIVITY TESTING

3.19.4. Sensitivity tests applied to costs (increased via the application of greater optimism bias), reduced benefits (reducing the PVB) and low growth, reduce the BCR, but value for money category remains robustly high in each case.

4 THE FINANCIAL CASE

4.1 INTRODUCTION

4.1.1. This chapter sets out the financial case for the proposed scheme to demonstrate its affordability.

4.1.2. This chapter describes:

- How much the proposed scheme is expected to cost, and how this has been calculated;
- Risks that could affect the cost of the scheme;
- How the scheme will be paid for and by whom; and
- The anticipated profile of expenditure over time (whole life costs).

4.1.3. This chapter deals with costs and accounting issues. The question of value for money is dealt with separately in the Economic Case.

4.2 COSTS

4.2.1. The estimated cost of the scheme, at out-turn prices excluding non-recoverable VAT, is **£71,399,500**. The build-up of the cost estimate is demonstrated in Table 84.

Table 84 - Breakdown of scheme costs for the NWRR

Scheme Element	Cost in £						
	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	Total
Construction Contracts	£0	£0	£0	£8,969,400	£31,392,900	£4,484,700	£44,847,000
Design Investigations, Surveys, Procurement, Supervision and Client Costs	£465,950	£1,863,800	£1,863,800	£1,224,200	£1,819,800	£454,950	£7,692,500
Statutory Undertakers Works	£0	£0	£1,210,400	£302,600	£0	£0	£1,513,000
Land and Compensation	£0	£3,440,000	£860,000	£0	£0	£0	£4,300,000
Total Cost (Excluding quantified risk and optimum bias)	**£465,950**	**£5,303,800**	**£3,934,200**	**£10,496,200**	**£33,212,700**	**£4,939,650**	**£58,352,500**
Quantified Risk	£76,585	£689,265	£612,680	£1,378,530	£4,288,760	£612,680	£7,658,500
Risk-adjusted total Cost (Excluding optimum bias)	**£542,535**	**£5,993,065**	**£4,546,880**	**£11,874,730**	**£37,501,460**	**£5,552,330**	**£66,011,000**
Total Cost @2017:Q4 prices	**£542,535**	**£5,993,065**	**£4,546,880**	**£11,874,730**	**£37,501,460**	**£5,552,330**	**£66,011,000**
Adjustment to out-turn (inflation)	£0	£150,000	£217,500	£837,500	£3,527,500	£656,000	£5,388,500
Scheme Cost (out-turn prices)	£542,535	£6,143,065	£4,764,380	£12,712,230	£41,028,960	£6,208,330	£71,399,500

SCHEME PREPARATION AND CONSTRUCTION

4.2.2. The cost of scheme preparation and construction has been estimated by WSP term delivery staff with input from Shropshire Council staff (on land costs). These costs have been verified by an independent Quantity Surveyor (included within Appendix L).

RISK BUDGET

4.2.3. The cost of delivering the scheme will not be known until the detailed design has been completed, land purchased, and tender prices have been received. To reflect the uncertainty associated with known risks, a quantified risk assessment (QRA) has been undertaken. Details of the QRA is presented in Section 6.10.

SPEND PROFILE

4.2.4. The assumed annual profile of expenditure is shown in Table 85.

Table 85 - Annual spend profile

Scheme Element	Annual Spend Profile by Financial Year					
	2017-18	2018-19	2019-20	2020-21	2021-22	2022-23
Construction Contracts	0%	0%	0%	20%	70%	10%
Design Investigations, Surveys, Procurement, Supervision	6%	24%	24%	16%	24%	6%
Statutory Undertakers Works	0%	0%	80%	20%	0%	0%
Land and Compensation	0%	80%	20%	0%	0%	0%

OUT-TURN PRICE ADJUSTMENT

The cost estimates assume a price base of 2017 Q4. An allowance is therefore made for expected inflation between the date of the estimate and the date when the expenditure is expected to occur. This depends on the profile of expenditure, as set out in Table 85. The uplift factors to reflect price inflation have been estimated based on the GDP deflator methodology recommended by WebTAG.

4.3 BUDGETS AND FUNDING COVER

FUNDING

BUDGETARY IMPACT

4.3.1. An estimated funding profile is outlined in Table 86, split by the financial year. The assumed Large Local Majors Fund (LLMF) spend profile aligns with the drawdown profile agreed with the DfT. The profile ensures that LLMF funds will be spent by 2022/2023.

Table 86 - Budgetary Impact Summary

	Budgetary Impact Summary						
	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	2022-2023	Total
Government/ DfT Funding	£192,535	£5,151,574	£3,995,409	£10,660,476	£34,406,425	£0	£54,406,419
SC Contribution	£350,000	£991,491	£768,971	£2,051,754	£6,622,535	£6,208,330	£16,993,081
Total	£542,535	£6,143,065	£4,764,380	£12,712,230	£41,028,960	£6,208,330	£71,399,500

4.3.31. The overall funding package for the scheme can be summarised as:

- Estimated scheme cost £71,399,500
- DfT Funding £54,406,419
- Balance funded by the Shropshire Council £16,993,081

4.4 WHOLE LIFE COSTS

4.4.1. The NWRR scheme will give rise to additional revenue liabilities for capital renewals and maintenance, when compared to a future scenario in which the NWRR does not exist. All maintenance obligations will fall under the purview of Shropshire Council and, as such, will be fulfilled as part of the maintenance regime operated by the council. The following allowances will need to be made by the Council towards maintaining the NWRR.

CAPITAL RENEWAL COSTS

4.4.2. Approximately **£10,864,641** in 2017:Q4 prices will be required for the purposes of resurfacing / renewing the new highway infrastructure over a 60 year period.

ANNUAL MAINTENANCE AND OPERATING COSTS

4.4.3. Approximately **£26,864** in 2017:Q4 prices will be needed to meet annual maintenance liabilities including drainage clearance, lighting operation, infrastructural and safety inspections.

4.4.4. The whole life costs identified above have been factored into the economic appraisal and have therefore had an impact on the estimated BCR and NPV. In financial assessment terms, these costs would be covered by the Shropshire Council's annual maintenance budget.

4.5 ACCOUNTING IMPLICATIONS: CASH FLOW STATEMENT

4.5.1. The preferred option is expected to have the following implications on public accounts:

- Devolved funding is sought to fund £54,406,419 (76.2%) of the scheme implementation costs, with majority of the funds being spent during the financial years 2021-22;
- A local contribution of £16,993,081 (23.8%) of the scheme implementation costs is required;
- The maintenance costs for the scheme are expected to average £26,864 in 2017:Q4 prices per annum, the funding for which will be sourced from the annual maintenance budget; and

- Capital renewal costs over 60 years are expected to be approximately £10,864,641 in 2017:Q4 prices. Funding for the works will be ring-fenced from the maintenance budget.

4.5.2. As a commitment of support, Shropshire Council's Section 151 Officer has provided a Letter of Intent (LOI) to reinstate and reinforce the Council's financial obligations in ensuring compliance with the Marches Assurance Framework requirements and the Growth Deal requirements (see Appendix M).

4.6 SUMMARY OF THE FINANCIAL CASE

4.6.1. The estimated cost of the scheme is £71,399,500 at out-turn prices, including an allowance for Quantified Risk. A fixed sum of £54,406,419 is being sought from the DfT's Large Local Majors Fund, which represents 76.2% of the scheme outturn costs. The rest of the balance £16,993,081, which accounts for 23.8% of the scheme outturn costs, will be funded by Shropshire Council.

5 THE COMMERCIAL CASE

5.1 INTRODUCTION

5.1.1. This chapter outlines the commercial viability of the scheme, and the procurement strategy which has been developed to achieve the procurement objectives. It also provides:

- The intended approach to risk allocation and transfer;
- Contract and implementation timescales; and
- How the capability and technical expertise of the team delivering the project will be secured.

5.1.2. Shropshire Council has determined that a combination of procurement routes are required for the design, planning and engineering services needed to successfully complete the NWRR scheme. These form a traditional approach to procurement and include the following:

- 'In-house' design delivery through the existing consultancy contract; and
- Construction works tendered through an OJEU restricted tender process.

5.1.3. The procurement strategy developed for the NWRR scheme has similarities with that of the Oxon Link Road (OLR) scheme (a Growth Deal-funded scheme, which is also Phase 1 of the NWRR scheme). Any experience, efficiencies and best practice from the OLR scheme has been used to optimise the procurement strategy for the NWRR. , land

5.1.4. The following information was taken into consideration when developing the procurement strategy and form of contract:

- The current construction estimate for the scheme is £44.8m, £58 million (when including design services, land costs and statutory undertaker costs) and £59 million at outturn costs, which means the contract will need to be procured through the OJEU (described below), or via frameworks which themselves have gone through the OJEU process.
- The current programme for the scheme, which includes detailed design being completed by May 2019, the appointment of a contractor by September 2020, with a construction period from October 2020 to May 2022.This timeline has had an influence on the type of procurement route selected.
- The type of procurement options and contracts which provide the greatest degree of 'cost certainty'.

5.1.5. The identified procurement strategy also aligns with WebTAG requirements which include:

- Provision of a robust contracting and procurement strategy;
- Risk Transfer supported by incentives;
- A developed market for proposed procurement approach; and
- A mechanism to incentivise performance, efficiency and innovation.

5.2 PROCUREMENT STRATEGY

5.2.1. This section outlines the procurement strategy for the NWRR. The strategy has been developed addressing the following considerations in turn:

- Form of Contract – the standard suite of documents which will be used to deliver the scheme;
- Form of Procurement – the fundamental procurement type and delivery model;
- Contract Strategy – within the selected Form of Contract, the contractual mechanism for delivering the scheme;

- Procurement Route – the mechanism used to procure the works, aligned to the procurement strategy objectives.

5.3 FORM OF CONTRACT

5.3.1. For civil engineering works in the UK, there are two main forms of contract: the Institution of Civil Engineers Conditions of Contract (ICE), which since August 2011 has been rebadged as the Infrastructure Conditions of Contract (ICC) and is sponsored by the Association for Consultancy and Engineering (ACE) and Civil Engineering Contractors Association (CECA); or the New Engineering and Construction Contract NEC suite of contracts. These two options are discussed in more detail below.

FORM OF CONTRACT OPTIONS

Infrastructure Conditions of Contract

5.3.2. The Infrastructure Conditions of Contract (ICC) suite of contracts is one of the main forms of standard contracts for UK civil engineering and infrastructure work. ICC provides a clear and standardised contract specifically tailored for civil engineering and infrastructure projects. It is endorsed by the sponsoring bodies, Association for Consultancy and Engineering and the Civil Engineering Contractors Association.

5.3.3. Separate versions of the ICC Conditions of Contract cater for a variety of types of contract strategy including measurement, target cost and design and construction. The different conditions provide options for delivery with each offering a comprehensive and clear set of conditions with clear risk allocation between Employer and Contractor. The contract is administered by an independent engineer.

5.3.4. The procedures set out in the Contract provide a co-operative form of contract that should prevent or reduce delays and allow control of costs at any stage of a Contract.

NEC Engineering and Construction Contract

5.3.5. The NEC Engineering and Construction Contract suite of contracts, originally known as New Engineering Contract, has been used to deliver building and engineering schemes globally since its first publication in 1993. The NEC suite uses plain language and promotes good communication and management to deliver projects. The NEC3 suite has been endorsed by governments and industry with the current revision, NEC4, being published in 2017.

5.3.6. The NEC offers five Conditions of Contract options for delivery of engineering projects including priced, target cost and cost reimbursable contracts. The difference conditions, based around common core clauses, seek to allocate risk management to the appropriate party and promote non-adversarial working. The Contract is administered by an appointed Project Manager.

5.3.7. The NEC suite encourages a collaborative approach to deliver schemes and promotes proactive management of risks to deliver schemes on programme and budget.

FORM OF CONTRACT DISCUSSION

5.3.8. The ICC and NEC contract suites both provide a robust contracting framework through which the NWRR could be delivered. They have proven track records for the delivery of infrastructure scheme and are widely accepted within the UK civil engineering industry. The NEC is considered a less adversarial form of contract although the most recent revisions of the ICC have attempted to promote collaboration.

5.3.9. Both the ICC and NEC offer a range of Conditions of Contract which would enable Shropshire Council to select conditions that best aligns to the NWRR procurement objectives. The procurement strategy will be reviewed throughout the delivery of the NWRR and will consider cost certainty, risk and programme at key milestones. The factors affecting the strategy may alter as the scheme progresses and the preferred Conditions of Contract may need to be reconsidered. The NEC suite of documents offers a common set of core clauses across its contract suite making it more flexibility should the procurement strategy change.

5.3.10. Shropshire Council's "Contract Procurement Rules" allow for either the ICC or NEC standard form to be adopted for the delivery of major projects. In practise Shropshire Council has adopted NEC for tendered civil engineering, maintenance and professional services contracts. As a result, Shropshire Council's internal support services and "in-house" term consultant, WSP, have greater experience and capability procuring works under the NEC suite.

5.3.11. The NEC4 Contract suite has been introduced during 2017 but it is too early to determine whether NEC4 offers specific additional benefits compared to NEC3. The NEC3 suite of contracts is therefore considered the most appropriate for administration of the NWRR scheme.

PREFERRED FORM OF CONTRACT

5.3.12. Shropshire Council has selected the New Engineering and Construction Contract NEC Form of Contract for the NWRR. The additional flexibility and existing in-house familiarity with NEC suite makes it the preferred option for the delivery of the NWRR.

5.3.13. The NEC suite offers flexibility in both the form of procurement and Conditions of Contract, these are discussed in more detail in the following sections.

5.4 FORM OF PROCUREMENT

5.4.1. The form of procurement defines the procurement type and delivery model for the scheme. There are three main forms of procurement for the NWRR delivery - Traditional, Design and Build and Early Contractor Involvement (ECI). A further option, making use of Shropshire Council's Term Service Contract has also been explored. Each procurement type offers advantages and disadvantages which are described in more detail below.

5.4.2. The preferred form of procurement for the NWRR is the option that best achieves the specific procurement objectives and accommodates the other scheme constraints. Shropshire Council has assessed the relative importance of the following considerations to inform its preference:

- Time – time for overall delivery, time for procurement, consideration of key milestones;
- Complexity of arrangements – dependency on third parties, separate contracts and sub-contractors;
- Complexity and scope of the scheme – extent of unique or unusual features, scale of the project;
- Potential for change – fixity of design achievable prior to procurement;
- Cost certainty – requirement for cost certainty and most economically advantageous delivery;
- Design responsibility – expertise and capacity for design delivery existing within different parties;
- Risk appetite – appetite to retain risk or incentivise contractor to manage project risk; and
- Control – desire to retain control over the final scheme details.

5.4.3. The consideration of these factors against each of the procurement options is outlined below.

Traditional Contract

5.4.4. Traditional contracts are the most commonly used method of procurement and are suitable for complex projects where functionality is a prime objective, especially those that require specialist services for design and construction. This method provides time predictability and cost certainty, although it is not always suitable for fast-track projects where time is a key consideration.

5.4.5. Traditional contracts typically require certainty of detailed design input, which inevitably warrants the allocation of adequate time to provide the contractor with sufficient buildable design information. Efficacy of this tendering approach is therefore dependant on full design documentation being in place before the contractor can be invited to tender.

Design and Build

5.4.6. This method of procurement involves the contractor being responsible for the design as well as construction. It can be suitable for cost certainty and fast track construction. This approach is not suitable where the client brief is developing or for very complex projects. The main contractor takes responsibility for both design and construction and will use either in-house designers or employ consultants to carry out the design. The main contractor has a direct influence over the design process and as such takes on the associated risks.

5.4.7. Although it is not necessary for full documentation (including the design) to be in place before the contractor can be invited to tender for carrying out the work, it is important that the client's brief and requirements are clearly set out. The final scheme design is then produced by the contractor's designer in accordance with the client's brief.

Early Contractor Involvement

5.4.8. Early contractor involvement (ECI) is a derivative of design and build but is used when engaging the contractor at an earlier time.

5.4.9. This form of procurement allows supplier engagement at an early stage of a project in order to draw in industry experience at the design and preparation stages. ECI contracts remain an option for major highways schemes where there is significant scope for input from the supply chain. Suppliers' engagement will be on a partnering basis. Their knowledge and abilities to influence project decisions will have maximum impact in terms of project timing, quality and cost.

5.4.10. The timing of the appointment of the contractor in the project development is important; the design should be sufficiently developed to enable estimates and assumptions to be prepared and the client brief sufficiently developed.

5.4.11. An ECI contract is generally split into two phases. Phase 1 is the planning and design development, through the Statutory Planning process up to Notice to Proceed to Construction. Phase 1 is further divided into two sub-phases:

- Phase 1A – design development up to publication of Draft Orders, or submission of Planning Application; and
- Phase 1B – the project team would take the scheme through the Statutory Process, including Public Inquiry if necessary.

5.4.12. Phase 2 is from the Notice to Proceed to Construction through detail design, construction of the scheme and potentially through to and including the aftercare and maintenance. Phase 2 is further divided into three sections:

- Section 1 – is the Detail Design development similar to that of a Design and Build form of procurement;

- Section 2 – comprises the Construction stage. Detail design will have been programmed at a much earlier time to enable fast and efficient construction to commence; and
- Section 3 – is the landscaping and general aftercare stage of the project delivery.

Term Service Contract

5.4.13. Shropshire Council currently has a term contractor who undertakes all civil engineering works below £150,000. For works above this threshold, such as the NWRR, Shropshire Council reserves the option to procure schemes from other suppliers.

5.4.14. The Term Service Contract was tendered to provide highway maintenance services making specific reference to “maintenance, repair, renewal, construction and cleansing of the highway network”. The NWRR could fall within this description.

FORM OF PROCUREMENT DISCUSSION

5.4.15. All three main forms of procurement, Traditional, Design and Build and ECI, are initially considered viable delivery models for the NWRR.

5.4.16. The Term Service Contract is considered a possible form of procurement for the scheme however it is principally intended as a vehicle to deliver maintenance activities. The tender evaluation for the contract was based on the provision of these services and not construction of major new infrastructure such as the NWRR. The value for money demonstrated through tender process is therefore not directly transferable to the NWRR delivery. Further work would be necessary to ensure transparency and demonstrate that the Term Services Contract is the most economically advantageous procurement type and delivery model. The Term Services Contract is therefore an uncertain form of procurement and, at this time, is therefore not preferred.

5.4.17. The remaining procurement options have been assessed against the time constraints of the NWRR project specifically the overall programme duration, the planning process and the statutory processes including the Public Inquiry. The funding window for the NWRR requires the scheme be substantially completed in financial year 2021-22. This requires advanced design development and condensed early programme activity, achieved through overlapping tasks.

5.4.18. The ECI model, whereby the Design and Build team can have greatest influence over the scheme proposals, is most effective when procurement is undertaken pre-planning. However, to achieve the overall NWRR delivery programme, early commencement of the planning preparation is essential. The planning application is programmed for submission in later 2018 and to achieve this pre-application planning discussions have already commenced. Shropshire Council would have been exposed to significant cost risk to engage a Design and Build contractor sufficiently early to prepare the planning application in line with the overall programme.

5.4.19. The Design and Build and ECI models offer advantages in the delivery of logistically complex works where the contractor and his designer work closely to provide an optimum solution. The River Severn Viaduct and the Shrewsbury to Chester Railway bridge would both benefit from this approach. Where schemes become significantly complex a Traditional model become preferable but the NWRR is not considered to fall into this category.

5.4.20. The Design and Build model requires clearly defined brief and requirements. If engaged prior to planning the contractor would retain the risk of change resulting from the planning process. However, as noted above, to achieve the overall programme, a contractor will not be in place prior to planning application. The risk of scheme changes resulting from the planning process would therefore be held by Shropshire Council. If the contract is awarded based on pre-planning requirements which are subsequently changes, Shropshire Council would be subject to potential additional costs and programme delays.

5.4.21. The procurement process would therefore logically commence following the planning decision, once the risk of change is reduced.

5.4.22. The Design and Build model will generally require a reduced design period compared to a traditional form of procurement as design and construction activities can overlap. However, to achieve the overall programme it has been necessary to overlap pre-construction activities. It is intended that further design will be completed in parallel with the planning determination period. Clearly this cannot be delivered under a Design and Build model procured post-planning.

5.4.23. The Design and Build model is therefore considered to offer two options. Firstly, the contract is procured based on pre-planning requirements and the contractor's designer is able to undertake further design in parallel to the determination period. Secondly, the contract is tendered post-planning and the overall programme is extended to facilitate design post-planning but prior to the Public Inquiry. In both options knowledge transfer will be critical between the pre-planning designer and the contractor's team who will manage the scheme through Public Inquiry. Most procurement strategies would seek to retain the parties involved in preparing the planning application and the draft Orders through a Public Inquiry.

5.4.24. In order to pursue a Design and Build model, Shropshire Council would need to accept either the risk of change through the planning process or a delay to the programme. A delay to the overall delivery programme is not considered acceptable based on the available funding window. Therefore the preferred Design and Build model would require acceptance of the planning risk by Shropshire Council.

5.4.25. This programme constraint would not impact the delivery of a Traditional contract in the same way. Under a Traditional form of procurement, Shropshire Council would deliver the scheme through planning and Public Inquiry. The main works contract would therefore be tendered later in the overall programme when the scheme design is fully matured. Under the Traditional option, Shropshire Council would therefore retain design responsibility and have more control over the final scheme design. Whilst Shropshire Council retain more risk to the point of contract award, the risk of change post-contract award is significantly reduced. This leads to increased cost certainty under a Traditional model compared to the other forms of procurement.

5.4.26. A significant constraint of the Traditional model is that detailed design must be completed prior to commencement the procurement process. Where the programme allows for pre-tendering activities to be undertaken in sequence this would extend the overall programme. However, the funding window available for the NWRR dictates that detailed design is undertaken in parallel with planning determination. The necessity for detailed design prior to tendering is therefore not critical to the overall programme duration.

PREFERRED FORM OF PROCUREMENT

5.4.27. The condensed programme and early commencement of the planning process means that procurement under a Design and Build ECI form of procurement is not feasible if the funding window is to be met.

5.4.28. A Design and Build model is feasible for the delivery of the NWRR but the condensed programme causes issues with timing of the procurement. The NWRR contract cannot be awarded early enough that planning risk is passed to the contractor. Equally the contractor would need to be appointed sufficiently early for further design work and scheme knowledge to be transferred ahead of the Public Inquiry. Awarding a Design and Build contract post-Public Inquiry would limit the opportunity for the main contractor to influence the design process and manage the design risks. Essentially, a late award would negate the benefits of the Design and Build form of procurement. Therefore to retain the benefits of a Design and Build delivery, Shropshire Council would have to accept the risk of change stemming from the planning process.

5.4.29. The Traditional form of procurement is feasible for the delivery of the NWRR and is more compatible with the condensed programme. The option does not offer some of the benefits of the Design and Build model but does provide greater cost and programme certainty at the point of procuring the main works. The existing consultancy framework with WSP provides the Council with access to the necessary skills and experience to produce the detailed design required for a Traditional procurement.

5.4.30. Without likely benefit from a Design and Build approach and increased risk at the planning and Public Inquiry stage, a Traditional contract with improved time and cost predictability is a more attractive option and is the preferred form of procurement for the NWRR.

5.5 CONTRACT STRATEGY

5.5.1. The preferred form of contract, NEC3 Engineering and Construction Contract suite, offers five Conditions of Contract options for scheme delivery including priced, target cost and cost reimbursable contracts. The contract strategy considers which contractual mechanism aligns best with the procurement objectives.

5.5.2. The five main options within the NEC3 suite are set out below. They all stimulate best practice management and encourage relationships between the two parties to the contract and hence the work involved in the contract.

- Option A: Priced contract with activity schedule;
- Option B: Priced contract with bill of quantities;
- Option C: Target cost with activity schedule;
- Option D: Target cost with bill of quantities; and
- Option E: Cost reimbursable.

CONTRACT STRATEGY OPTIONS

5.5.3. Option A is a priced contract with an activity schedule where the risk of carrying out the work at the agreed price is largely borne by the contractor. Contractors tender for an Option A contract based on lump sum prices for each activity based on his own assessment of the requirements of the activities.

5.5.4. Option B is a priced contract with a bill of quantities where the risk of carrying out the work at the agreed prices is largely borne by the contractor. Contractors tender for an Option B contract by completing a bill of quantities prepared by the employer, Shropshire Council in the case of the NWRR. The quantities required to complete the NWRR works are therefore specified by Shropshire Council.

5.5.5. Option C is a target cost contract with an activity schedule where the out-turn financial risks are shared between the client and the contractor in an agreed proportion. Contractors tender a target price based on a list of activities which is then adjusted through the delivery to reflect agreed changes. The contractor is then paid for completed works and a percentage any savings made during the delivery.

5.5.6. Option D is a target cost contract with a bill of quantities where the out-turn financial risks are shared between the Client and the Contractor in an agreed proportion. Contractors tender and are paid similar to Option C but based on a bill of quantities rather that an activity schedule.

5.5.7. Option E is a cost reimbursable type contract where the financial risk is taken largely by the client. Under Option E the contractor is paid for works completed plus a fee.

CONTRACT STRATEGY DISCUSSION

5.5.8. The Options, A to E, offer varying levels of risk exposure, incentivisation and flexibility depending on the procurement objectives and the level of design undertaken prior to tender.

5.5.9. The chart below indicates the overall characteristics of the different NEC3 Options:

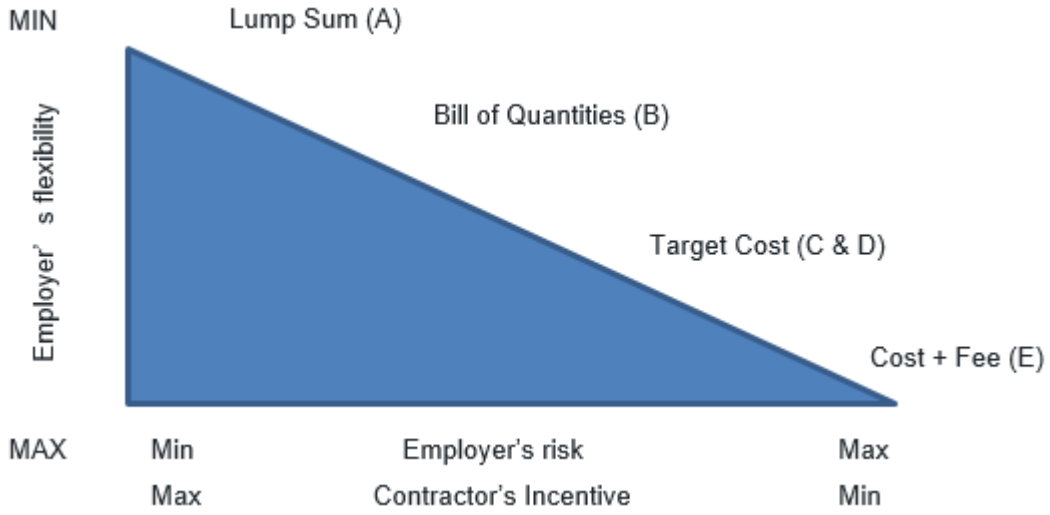


Figure 58 – Comparison of NEC3 Options

5.5.10. As a result of the overall programme constraints, as noted in the previous section, a high degree of design maturity will be achieved prior to procurement. This makes the fixed-price contracts offered by Options A and B feasible contract strategies. Option A and, to a lesser extent, Option B minimise Shropshire Council's risk exposure following contract award and incentivise the contractor to deliver the NWRR in the most efficient manner. This results in increased cost and programme certainty. As a high degree of design fixity is assumed at the point of tendering scope for post-award amendment to the scheme is limited.

5.5.11. A target cost contract strategy, through Option C or D, provides a more balanced allocation of risk between the client and contractor and incentivises both parties to work together to achieve an efficient delivery. In practice target cost contracts are usually tendered with activity schedules, Option C, rather than with a bill of quantity, Options D. This is because the contract strategy looks to take programme benefit from the reduced need for design maturity, and the contractors input in to the final scheme proposals.

5.5.12. The cost reimbursable strategy offered by Option E places maximum risk with Shropshire Council and little incentive for the contractor to deliver works efficiently. A cost reimbursable contract would not generally be considered an appropriate delivery strategy for the main contract works of a large civil engineering infrastructure scheme.

PREFERRED CONTRACT STRATEGY

5.5.13. A target cost contact, Option C, would offer potentially delivery benefits especially if the more complex elements of the NWRR, such as the River Severn Viaduct and the Shrewsbury to Chester Railway bridge, are not fully developed ahead of procurement. However, these benefits are offset by the increased risk retained by Shropshire Council.

5.5.14. Achieving sufficient design maturity prior to tender is often the most significant obstacle to tendering a fixed price contract. However, adopting a Traditional form of procurement and post-planning tender will lead to a high level of design maturity at the point of tender. As a result NEC3 Option A, with the benefit of increase price and programme certainty, is the preferred contract strategy and delivery mechanism for the NWRR.

5.6 MARKET ENGAGEMENT

5.6.1. The preferred procurement method, NEC Option A, was also validated through market engagement with several major contractors capable and interested in delivering the NWRR. Whilst in principle there were differing views of the relative merits of Design and Build versus Traditional contracts, once the contractors were appraised of the scheme details and constraints, their preferred option was a Traditional contract over Design and Build. Use of the traditional contact would not discourage any of the contractors from submitting a tender.

5.6.2. A summary of the market engagement responses can be found in Table 87.

Table 87 – Market Engagement Response to Procurement Method

Contractor	Feedback
Galliford Try	None received to date
Kier	Have been tracking this scheme and would be interested in tendering under the proposed procurement route
Vinci	None received to date
Skanska	Have been tracking this scheme and would be interested in tendering. Very supportive of the restricted tender option, would prefer to tender against an Option C NEC Contract but would still be interested in the Option A route.
Carillion	Have been tracking this scheme and would be interested in tendering under the proposed procurement route
HOCHTIEF	Have been tracking this scheme and would be interested in tendering under the proposed procurement route

5.7 PROCUREMENT ROUTE

5.7.1. Procurement route options, the mechanism used to procure the works, have been reviewed based on the preferred form of contract, form of procurement and contract strategy. The following procurement route options were considered for the NWRR:

- Midlands Highways Alliance; and
- OJEU Competitive Tender Process.

5.7.2. The construction cost estimate of the NWRR exceeds the current threshold of the Official Journal of the European Union (OJEU) for which the awarding of public sector tenders must be advertised (£4,104,394). There were two procurement routes considered by Shropshire Council identified as being appropriate solutions in procuring the NWRR.

5.7.3. These methods of procurement and the advantages and disadvantages associated with using each of them is described below.

Midlands Highways Alliance

5.7.4. The Midlands Highway Alliance (MHA) is an alliance of over twenty Local Authorities. The MHA is set up to procure highways schemes through a framework in order to create efficiencies through greater purchasing power and simplifying the procurement process for Local Authorities. The member organisations are supported by a MHA Manager.

5.7.5. The MHA is bound together by a Deed of Agreement and its legal entity is an Unincorporated Association by Agreement. The agreement covers fees, data protection and executive governance.

5.7.6. The Midlands Highways Alliance has already been tendered through OJEU and has a maximum framework value of £261 million, and hence was identified as a potential procurement route under which the NWRR could be delivered.

5.7.7. The MHA is a three year framework contract with a one year extension. The original MHA Framework Contract concluded in 2014 having delivered 60 projects with an anticipated value of £250m. The second MHA Framework (MSF2) was tendered again in June 2014 with three contracting joint venture organisations being appointed to the Framework following a competitive tender process. The MSF2 framework has been extended until June 2018 at which point it will be replaced by a third MHA Framework (MSF3) which is currently being tendered with an increased maximum value of £500m.

5.7.8. The appointed joint venture contractors under MSF2 are:

- Lafarge Tarmac / Carillion;
- Balfour Beatty Civil Engineering; and
- Galliford Try / Aggregate Industries.

5.7.9. During the framework tender process, the contractors had to price five model schemes of varying complexity, location and size. The MHA then assessed which contractor had submitted the best price for each model scheme option. It has been determined by the MHA that the quality submissions made by the contracting joint ventures were all of equally high standard, so that any subsequent decisions made regarding recommendations for the most suitable contractor to be used will be based on price only.

5.7.10. The MHA has adopted the NEC3 Option C Target Contract with activity schedule as its default Form of Contract.

5.7.11. There are significant costs associated with becoming a member of the MHA. An initial joining fee of £15,000 is required and in addition, there is an on-going membership fee of £10,000 per annum. A contract levy equivalent to 0.35% of the contract value is also payable, although this contract levy can be set off against the annual fee.

5.7.12. The process for appointing a contractor through the MHA is as follows. Shropshire Council would provide a description and details of the NWRR scheme to MHA. The MHA would then assess the NWRR scheme to determine which of the five model schemes has the most similarity to the NWRR scheme. MHA will discuss with Shropshire Council how they conclude which of the model schemes is most closely matched to the NWRR scheme. It may be the case that the NWRR scheme shares elements of more than one model scheme in which case, the MHA advise what proportional split between model schemes should be used.

5.7.13. There are then three options:

Direct Call Off 1

5.7.14. If the MHA determines that the NWRR scheme closely matches one of the five model schemes they advise which of the joint venture contractors submitted the lowest price for that model scheme. Shropshire Council can then either choose to enter into target price negotiations with the recommended contractor, ask MHA to inform them who was the next lowest joint venture contractor and enter into negotiations with them, or decide not to award a contract through the MHA and use an alternative means of procurement.

Direct Call Off 2

5.7.15. The MHA concludes that the Local Authority's scheme does not specifically match one model scheme only, but may include elements of two or more of the model schemes. The MHA will assess the proportional split between two or more model schemes and then calculate which would be the most economically advantageous contractor to enter into negotiations with. As with Call Off route 1, Shropshire Council can ask for the next best contractor, or again choose not to proceed through the MHA route.

Mini Competition

5.7.16. A mini competition between the three framework contractors is held, where a mini tender pack is prepared, which has new discreet contract data, works information, drawings, pricing schedules and a new quality price assessment based on details of the NWRR scheme. Tender prices are submitted and Shropshire Council can then assess tenders and appoint the joint venture contractor of their choice.

5.7.17. The benefits of using Call Off methods 1 and 2 are that overall procurement timescales are reduced as there is no need for Shropshire Council to have to prepare tender documentation or to carry out tender assessments. If the mini competition method is adopted, these benefits are lost as timescales are increased in line with standard competitive tendering timescales. Additional resources would be required to prepare the mini tender and the project does not gain from an Early Contractor Involvement (ECI).

5.7.18. If Call Off routes 1 or 2 are used, then MHA provide the cost information for the appropriate model scheme which Shropshire Council can then use as the basis of any subsequent target price negotiation stage.

5.7.19. It should be reiterated that the MHA make a recommendation regarding the most suitable joint venture contractor. It remains Shropshire Council's decision whether to proceed with target cost negotiations with the recommended contractor or to seek alternative means of appointing a contractor.

5.7.20. An indicative programme for awarding the NWRR scheme to a contractor through the MHA framework is estimated to be:

▪ MHA submit a Deed of Agreement for SC Approval	5 days
▪ SC seeks financial and legal approval of the MHA deed	14 days
▪ SC obtains an authorised counter signatory	5 days
▪ HC raises a purchase order for joining fee and levy	5 days
▪ MHA raises an invoice for joining fee	3 days
▪ SC processes invoice and arranges a BACS transfer	28 days
▪ NWRR team produce works information, specification	
▪ and tender drawings for MHA	7 days
▪ MHA recommends preferred contractor through	
▪ call-off process	7 days
▪ Preferred contractor prepares priced activity schedule	21 days

Note: Preferred contractor advises on buildability issues and programme (this activity can actually take place as soon as MHA recommend a preferred contractor)

- Negotiation of risk ownership 7 days
- Negotiation of target cost 14 days
- Estimated number of days required to reach Contract Award 121 days

5.7.21. In addition to the minimum periods to reach contract award, the final programme will need to incorporate additional time for Shropshire Council to undertaken various governance processes including final document approvals and decision validation. Shropshire Council also wish to retain the possibility of an earlier contract award to facilitate detailed discussions, principally concerning the viaduct and railway overbridge, during an extended mobilisation period. This could add a further 25-30 weeks to the procurement exercise but could be reduced should it be required by the overall scheme programme.

5.7.22. The advantages and disadvantages of using the MHA procurement route are described in Table 88.

Table 88 – Advantages and disadvantages of using the MHA procurement route

Advantages	Disadvantages
There is the potential to gain scheme benefits through Early Contractor Involvement (ECI) due to reduced procurement timescales required and the opportunity to engage with potential contractor prior to agreement of target price and subsequent contract award	There are significant costs associated with joining the MHA, and currently Shropshire are not members: ▪ £15,000 joining fee; ▪ £10,000 annual membership; and ▪ Contract Levy which will be 0.35% of construction costs
MHA has significant experience and track record of procuring infrastructure schemes through its framework	There is no guarantee that a target price agreement will be reached between Shropshire Council and the recommended MHA contractor
There is a clearly defined audit trail in terms of contractor selection	The default Form of Contract is Option C Target Cost. As noted early in this section Option A Fixed Price is Shropshire Councils preferred strategy for the NWRR.
The appointed framework joint venture contractors represent some of the key infrastructure contractors in the UK	
There are potential time savings in the procurement process if Call Off 1 or 2 routes are adopted	
Once a member, Shropshire Council can use this procurement route to award further schemes with the only additional cost being the specific contract levy	
MHA's annual report claims that schemes completed in 2014 achieved an average cost saving of 11.2% against traditionally procured contracts	

The early involvement of a contractor in the planning and phasing of the works may mitigate the potential impact on the remainder of the NWRR scheme	

OJEU Competitive Tender Process

5.7.23. The European Public Contracts Directive applies to public sector contracts and sets out detailed procedures for the award of contracts whose value equals or exceeds £4,104,394. The NWRR scheme would fall within this category.

5.7.24. The OJEU process was made straightforward by the implementation of the Public Contracts Regulations (PCR) 2015 which took effect on contracts from 26th February 2015. The PCR 2015 meant that procurements can be run faster, with greater focus on getting the right supplier and best tender in accordance with sound commercial practices.

5.7.25. Under PCR 2015 there are five options within the OJEU procurement process:

- Open Tender (Regulation 27);
- Restricted Tender (Regulation 28);
- Competitive with Negotiation (Regulation 29);
- Competitive Dialogue (Regulation 30); and
- Innovation Partnership (Regulation 31).

5.7.26. Each of these options is described below.

Open Tender (Regulation 27)

5.7.27. This procedure is often used for the procurement of commodity products which do not require a complex tender process in order to be purchased. This process is open to all companies who submit a tender for the works and there is no limit or restriction on the number or type of companies who can submit tenders. This makes the resultant selection process very onerous.

Restricted Tender (Regulation 28)

5.7.28. All interested parties may express an interest in tendering for the contract but only those meeting the selection criteria will be invited to tender. A Prior Information Notice (PIN) is issued to advertise the contract. When responding to the OJEU notice, candidates submit any information required by the Authority as part of its selection stage. Only candidates who get through the selection process will then be invited to submit a tender.

5.7.29. The estimated timescale based on the minimum number of days required for the restricted procurement process is set out below:

- Preparation of Pre-Qualification Questionnaire (PQQ) 20 days
- Preparation of tender documents 35 days
- Prior Information Notice (PIN) period (if sent electronically) 30 days
- Note: PQQ can be sent at the same time as the Notice and run parallel with the Notice Period
- Evaluation of PQQ responses and short-listing 21 days
- Invitation To Tender (if a prior PIN notice has been sent out) 30 days
- Evaluation of Tender 28 days
- Interview of Tenderers (if required) and final reporting 14 days

- Stand-still period 10 days
- Estimated number of days required to reach Contract Award 188 days

5.7.30. If it becomes necessary in the future, the PCR 2015 allows for this timescale to be shortened from 188 days to 168 days, so long as:

- Where contracting authorities have published a PIN which was not itself used as a means of calling for competition, the minimum time limit for the receipt of tenders may be shortened to 10 days, provided that both of the following conditions are fulfilled:
- The PIN included all the information required in Section I of part B of Annex V to the Public Contracts Directive insofar as that information was available at the time the PIN was published; and
- The PIN was sent for publication between 35 days and 12 months before the date on which the contract notice was sent.

5.7.31. In addition to the minimum periods to reach contract award, the final programme will need to incorporate additional time for Shropshire Council to undertake governance processes and tasks, including final document approvals and decision validation. Shropshire Council also wish to retain the possibility of an earlier contract award to facilitate detailed discussions, principally concerning the viaduct and railway overbridge, during an extended mobilisation period. This could add a further 30-35 weeks to the procurement exercise but could be reduced should it be required by the overall scheme programme.

Competitive with Negotiation (Regulation 29)

5.7.32. This procedure can only be used in the very limited circumstances described in the Regulations, generally where it is not possible to use either the Open or Restricted Tender route and would not be applicable to the award of the NWRR scheme. It may be appropriate where:

- the contracting authority is unable to produce an ITT / specification without discussing its needs in detail with suppliers (but iterative discussions with bidders should allow a detailed solution to be specified); and
- where the solution is likely to be particularly complex and will require dialogue with bidders to conclude. The competitive dialogue procedure is generally used for complex procurements such as PFI / PPP projects.

Competitive Dialogue (Regulation 30)

5.7.33. This procedure can only be used in the very limited circumstances described in the Regulations and would not be applicable to the award of the NWRR scheme.

Innovation Partnership (Regulation 31)

5.7.34. This procedure allows for the Research & Development and subsequent purchase of a product or service within the same single procurement process. This option is not applicable to the award of the NWRR scheme.

5.7.35. The advantages and disadvantages of the OJEU procurement process are shown in **Table 89.**

Table 89 – Advantages and disadvantages of the OJEU procurement process

Advantages	Disadvantages
The OJEU process provides a robust procurement route that follows legal regulations	Potentially longer procurement period required compared to alternative procurement route options

There is a clearly auditable procurement and award process	Increased level of resources required to carry out the procurement process
Competition is open to a wide range of contractors, so competitive prices should be received	
Shropshire Council can choose which form of contract the NWRR scheme is awarded under	

PROCUREMENT ROUTE DISCUSSION

5.7.36. Both the MHA framework and OJEU competitive tender offer viable procurement routes for the NWRR. The table below summarises the advantages and disadvantages of the OJEU competitive tender process and MHA Framework.

Table 90 – Advantages and disadvantages of using the OJEU Competitive Tender Process and Midlands Highways Alliance (MHA) Framework

Procurement Option	Advantages	Disadvantages	Timescale	Cost
OJEU Competitive Tender Process	▪ Fully compliant with EU procurement legislation ▪ Clear audit trail to demonstrate award to most economically advantageous tender ▪ Ability to select list of tendering contractors ▪ Opportunity for Early Contractor Involvement	▪ Highest level of pre-tender administration required ▪ Highest level of direct Shropshire Council procurement costs	▪ Procurement timescale is the longest of the possible options. However the required timescales still fit within the overall programme requirements ▪ Approximate timescale is 188 days	▪ Higher direct procurement costs due to the increased level of resources required to carry out tender process. (Approx. £80-£90k) ▪ No additional joining Fees or Contract Levies
Midlands Highways Alliance (MHA)	▪ Established process ▪ Infrastructure contractors ▪ NEC3 Form of Contract ▪ Opportunity for Early Contractor Involvement	▪ Additional resource required for Shropshire Council to become member of MHA ▪ No guarantee that agreement on Target Price will be reached ▪ Restricts Shropshire Council to a Target Cost contract	▪ Timescales required are shorter than OJEU Process, once Shropshire Council have become a member of Alliance ▪ Approximate timescale is 121 days	▪ Direct costs to Shropshire Council for tender process lower than OJEU, but increased costs for Joining Fee, Annual membership and Contract Levy (0.35%)

5.7.37. The required timescales associated with both the OJEU Competitive Tender route and the MHA Framework would both allow the procurement process to be completed within the overall requirements of the NWRR programme. Therefore, the procurement timescale is not the deciding factor when selecting the most suitable procurement route.

5.7.38. The remaining key objectives would be sourcing a wider pool of potential tenderers and ensuring a clearly visible audit trail to demonstrate award having been made to the most economically advantageous tender. Accordingly, the OJEU competitive restricted tender process would become the most suitable procurement route.

5.7.39. The benefits of using the OJEU competitive restricted tender route are as follows:

- It is fully compliant with EU procurement legislation;
- It provides a clear audit trail to demonstrate award to the most economically advantageous tender;
- It provides the widest selection choice of potential contractors;
- Procurement costs are comparable with alternative framework procurement route options;
- It allows flexibility of choice of contract form and option; and
- Timescales to complete contract award are compatible with the NWRR scheme delivery programme requirements.

5.7.40. Shropshire Council currently uses the restricted tender for procuring highway engineering schemes and is well-practised in its use. There is also a well-developed market for the proposed procurement strategy. The Council has confidence that the contractual and commercial arrangements proposed are appropriate and workable, having applied the arrangements in previous schemes. The Council is currently procuring the Oxon Link Road scheme in the same manner.

PREFERRED PROCUREMENT ROUTE

5.7.41. Due to the increased tendering costs and restricted contract options of the Midlands Highway Alliance Framework the preferred procurement route for the NWRR is an OJEU Restricted Tender.

5.8 SELECTED PROCUREMENT STRATEGY

5.8.1. Shropshire Council has selected a traditional procurement model of an NEC3 Form of Contract with Option A Fixed Price conditions for delivery of the NWRR works. The Council will adopted an OJEU Restricted Tender as the mechanism for procuring this contract.

5.8.2. The overall procurement strategy balances Shropshire Council's attitude to numerous delivery factors including risk appetite, programme constraints and need for cost certainty. The strategy incorporates a robust contracting platform demonstrated through successful delivery of similar schemes over many years. The transfer of risk between Shropshire Council and the contractor has been assessed based on scheme maturity at the point of tender with the selected strategy incentivising efficient delivery,

5.8.3. The preferred model has been market tested with contractors capable and interest in delivering the scheme. As well as confirming market appetite for the NWRR generally, Shropshire Council's preferred strategy is seen as appropriate and would not discourage any contractor from tendering for the scheme.

5.9 DESIGN ORGANISATION

5.9.1. The preferred Traditional form of procurement adopted for the NWRR requires that design in undertaken by, or on behalf of Shropshire Council. Shropshire Council will utilise its existing term consultant, WSP, to progress the NWRR through detail design including the planning process and public Inquiry. Once the main works contract has been tendered, the term consultant will provide contract administration and construction supervision support to the Council.

5.9.2. As already noted it is beneficial and normal practice in major road schemes for the parties involved in preparing the planning application and the draft Orders (Compulsory Purchase, Side Road and Stopping-Up Orders) to continue with the preparation for the expected Public Inquiry. This ensures continuity of approach and that the invested knowledge of the scheme produces the most robust defence against objectors at the inquiry. WSP has the capability, capacity and experience to deliver the design, contract administration and supervision functions required of the design organisation under a Traditional form of procurement.

5.10 PAYMENT MECHANISMS

5.10.1. Shropshire Council will tender the works contract based upon a fixed price. Control of costs throughout the scheme development will be achieved through the use of the NEC3 Option A (Priced Contract with Activity Schedule) contract whereby the contactor will be paid following the submission of monthly accounts. Payment would be made to the contractor by monthly valuation with a BACS payment within 28 days of issue of the initial valuation.

5.11 PRICING FRAMEWORK AND CHARGING MECHANISMS

5.11.1. An NEC3 contact will be used for the NWRR Scheme, agreed at a fixed price. The contract provides for specified risks which, if realised, will result in the lump sum being adjusted to account for compensation events.

5.12 RISK ALLOCATION AND TRANSFER

5.12.1. Shropshire Council will seek tenders for a construction contract. This will facilitate the transfer to the contractor of some risk associated with costs increasing above those predicted in the financial case. The scheme costs currently include optimism bias (in the economic case alone) and risk-adjustment (in both the economic case and financial case), following the risk assessment. The risk of costs being higher than currently predicted remains until the tendering process is complete.

At this stage of design and prior to the appointment of contractors, the scheme cost estimate contain a greater proportion of risk borne by Shropshire Council than will remain after the contractor appointment. Some of the risk is captured and quantified within the QRA process (a requirement of the DfT transport business case guidance). The detailed description of this process is outlined with Section 6.10 in the Management Case. Once the tendering process is complete, and through use of NEC3 Option A, some of the risk (such as scheme cost increases associated with the design and construction) can be transferred to the contractor. Other risks, such as the identification of statutory undertaker equipment, and mitigation costs associated with these, can be removed from the “risk pot” completely if they do not materialise, or transferred to “actual” scheme costs if they do materialise, rather than remaining as risk.

5.13 CONTRACT LENGTH

5.13.1. The tender invitations will assume a construction period of 18 months. It is however possible that tender submissions will propose a shorter period than this, as the programme contains elements of contingency following the risk assessment.

5.13.2. The contract programme is considered in further detail within the Management Case, Section 0. The key contract dates are included in Table 91.

Table 91 - Key Contract Dates

Programme Activity	Start Date	End Date
Prequalification period	9th August 2019	4th October 2019
Tender period	25th October 2019	17th January 2020
SC approve award of Contract (Preferred Bidder)	21st August 2020	
Appointment of Contractor	4th September 2020	
SC give contractor Notice to Proceed to construction	8th January 2021	
Construction period including construction completion period	8th January 2021	27th May 2022
Road Opening	1st April 2022	

5.14 HUMAN RESOURCE ISSUES

5.14.1. No significant human resources issues have been identified that could affect the deliverability of the project. Further details of the required capabilities and assigned resources are set out in the Management Case (Section 6.4).

5.15 CONTRACT MANAGEMENT

5.15.1. Design, procurement, and construction supervision will be managed by Shropshire Council's Consultants WSP. The Consultant has experience in delivering major schemes including the Shrewsbury Northern Gateway Enhancement scheme, construction of the Hodnet Bypass and Shrewsbury town centre enhancement works.

5.15.2. As Project Manager, Kirsteen Clare will be named within Contract Data as the individual who will administer the contract on behalf of the Employer. The Project Manager will have the designated authority to issue all instructions, notifications and other communications required under the contract. As well as providing general management support and advice to the Project Manager, WSP will undertake the role of Supervisor under the contract with responsibility to check for compliance to the Works Information. Under the contract the responsibilities of the Project Manager or the Supervisor may be delegated but this is not anticipated at this stage.

5.16 SUMMARY OF THE COMMERCIAL CASE

5.16.1. The preferred procurement option is a Traditional construction contract as it offers increased cost and programme certainty. The programme contraints do not permit Early Contractor Involvment and restrict the benefits and increase risk of a Design and Build model. Shropshire Council also has ready access, through its term consultant, to the design resouirces necessary procure under a Tradtional model.

5.16.2. In line with the council's adopted approach, the preference is to procure the works for NWRR using NEC3 and a fixed price contract.

6 THE MANAGEMENT CASE

6.1 INTRODUCTION

6.1.1. This chapter forms the management case for the North West Relief Road scheme. It describes how the scheme will be delivered through project management best practice, confirming that the timescales are realistic, and demonstrating that an appropriate governance structure is in place to oversee the project.

6.1.2. Specifically the section provides and sets out:

- evidence of similar projects;
- the project plan;
- the governance structure (management framework);
- how the project will avoid conflict of interests between consultants and Council officers;
- the project scheduling (i.e. the project programme, and the process for monitoring progress against the milestones within the programme);
- the financial plan;
- the stakeholder management process (how stakeholders have been identified, and their influence on the project managed);
- the risk management process; and
- how the benefits set out in the economic case will be monitored and realised.

6.2 EVIDENCE OF SIMILAR PROJECTS

6.2.1. The delivery of the scheme will build upon the experiences from a number of major highways schemes undertaken by Shropshire Council in recent times, and also current schemes WSP (the delivery team) have secured Local Majors Funding for and are taking through the planning process.

6.2.2. A selection of key schemes have been listed in Table 92, summarising the scope of works, capital costs, time scales for implementation and the procurement strategy employed.

Table 92 - Evidence of Similar Projects

No.	Contract	Description	Works Date	Contract Form	Approx. Value	Comments
1	A53 Hodnet Bypass	Single carriageway bypass, 4 miles with two structures over the River Tern and two roundabouts	April 2002 – September 2003	Design and Build	£14,000,000	Construction by Alfred McAlpine and Parkman acted as Employers Agent
2	Shrewsbury Northern Gateway	Signalised Gyratory improvement, pedestrian/cycleway enhancements	November 2012 – March 2013	NEC 2 Option B	£1,200,000	IHE Award Winner 2014
3	A525 Redbrook, Whitchurch	Carriageway re-alignment	April – September 2006	NEC 2 Option B	£1,500,000	-
4	A41 Cosford	Signalised junction with highway and footway improvements	July – November 2014	NEC 2 Option B	£450,000	-
5	A458 Harley Bank	Carriageway re-alignment and rock face remediation	July 2008	NEC 2 Option B	£400,000	-
6	Fiveways, Whitchurch	Signalised junction with highway and footway improvements	July – October 2014	NEC 2 Option B	£370,000	-
7	Raven Meadows, Shrewsbury	Signalised junction with highway, footway and cycleway improvs	September 2012 – February 2013	NEC 2 Option B	£350,000	-
8	Ludford Bridge, Ludlow	Pedestrian crossing and carriageway re-alignment	August – October 2013	Shropshire Council Term	£85,000	ICE Small Safety & Innovation Winner 2014
9	Shrewsbury Town Centre Enhancement	New carriageway surfacing and footway improvements	April – August 20 08	NEC 2 Option B	£2,300,000	
10	Harlescott Crossroads	Signalised junction upgrade, highway, pedestrian and drainage improvements, inc STATS diversion	April – September 2010	NEC 2 Option B	£2,200,000	Award winner CIHT Small Scheme of the Year 2011
11	Cleobury Mortimer Town Centre Regeneration	New carriageway surfacing and footway improvements	March – September 2009	NEC2 Option B	£800,000	CIHT Urban Design 2010 Commended

DELIVERY TEAM EXPERIENCE

6.2.3. Shropshire Council's term contract services provider WSP has significant experience in taking large infrastructure schemes through the planning process. Since 2016, WSP have been providing multi-disciplinary services to Suffolk County Council to deliver transport infrastructure including highways and bridge structures totalling £151 million. The source of this funding was also the Large Local Majors Fund.

6.2.4. The teams are comprised of designers: highways, structures, urban designers and landscape architects, planners and transport planners, environmental consultants, land referencers, and a dedicated project management team responsible for ensuring the technical delivery team hit key milestones and programme tasks to achieve timely delivery.

6.2.5. Profiles summarising the WSP delivery team's experience can be found in Appendix N.

6.2.6. A portfolio of relevant project case studies is included in Appendix O to demonstrate WSP's experience and technical skills to deliver a project such as the NWRR.

CONTRACTOR EXPERIENCE

6.2.7. As important as the promoter's experience in delivering the scheme will be the selection of a contractor with significant experience of delivering similar large-scale, highway construction projects. The selection, procurement and management of the contractor is summarised in the Commercial Case.

6.3 THE PROJECT PLAN

6.3.1. The Association of Project Managers (APM) defines the Project Plan as the "plan of plans". It is a series of plans setting out the objectives, methods, deliverables, programme and resources of a project. The purpose of the Project Plan is to document the outcomes of the entire planning process and to provide the reference document for managing the project. It will include the following plans:

- The organisational structure / resource plan
- The project programme
- Assurance and approvals plans
- A cost / financial plan
- A communication plan (strategy)
- A risk management plan (strategy)
- Benefits realisation plan

6.3.2. Each of these plan will be discussed in further details below.

6.4 PROJECT GOVERNANCE, ORGANISATION STRUCTURE AND ROLES

PROJECT DELIVERY BOARD

6.4.1. An appropriate governance structure is essential to the delivery the scheme. The Shropshire Council has therefore established a Project Board aligned with best practice guidance on project management. The Project Board is the decision-making body for the project. It provides overall direction to the project and is accountable for its success. It approves all major plans and authorises any significant deviations from agreed plans. The Board ensures that the required resources are committed and arbitrates on any conflicts in the project.

6.4.2. The Project Board's primary function is decision-making and review. The Board will be responsible for:

- Approval of project / scheme objectives and scope
- Authorisation of expenditure on the project in line with the Project Plan
- Briefing senior officials and other executives on the status of the project
- Communication of information about the project to other parts of Shropshire Council and key stakeholder groups
- Project assurance
- Signing off any changes to the Project Plan, Business Case or project budget
- Monitoring quality control
- Managing key risks highlighted in the Risk Register
- Signing off key stages of the project and approval to proceed to the next phase
- Monitoring the project as it develops to ensure that it meets the scheme objectives

6.4.3. Figure 59 illustrates a high-level governance structure, depicting how the Project Board fits within the overall delivery framework, and the inter-relationship between various entities and their strategic roles in the delivery of the scheme.

6.4.4. Project reporting to the Project Board will include the necessary detail to inform the Board's primary function of decision-making and review. The reporting will be delivered through the Project Delivery Team in advance of the Project Board meetings. The reporting will provide updates on scheme progress including programme review, financial matters, Health and Safety, environmental issues, risks and opportunities, partnering and consultation. Particular emphasis will be given to change controls and highlighting any key decision or actions required by the Board.

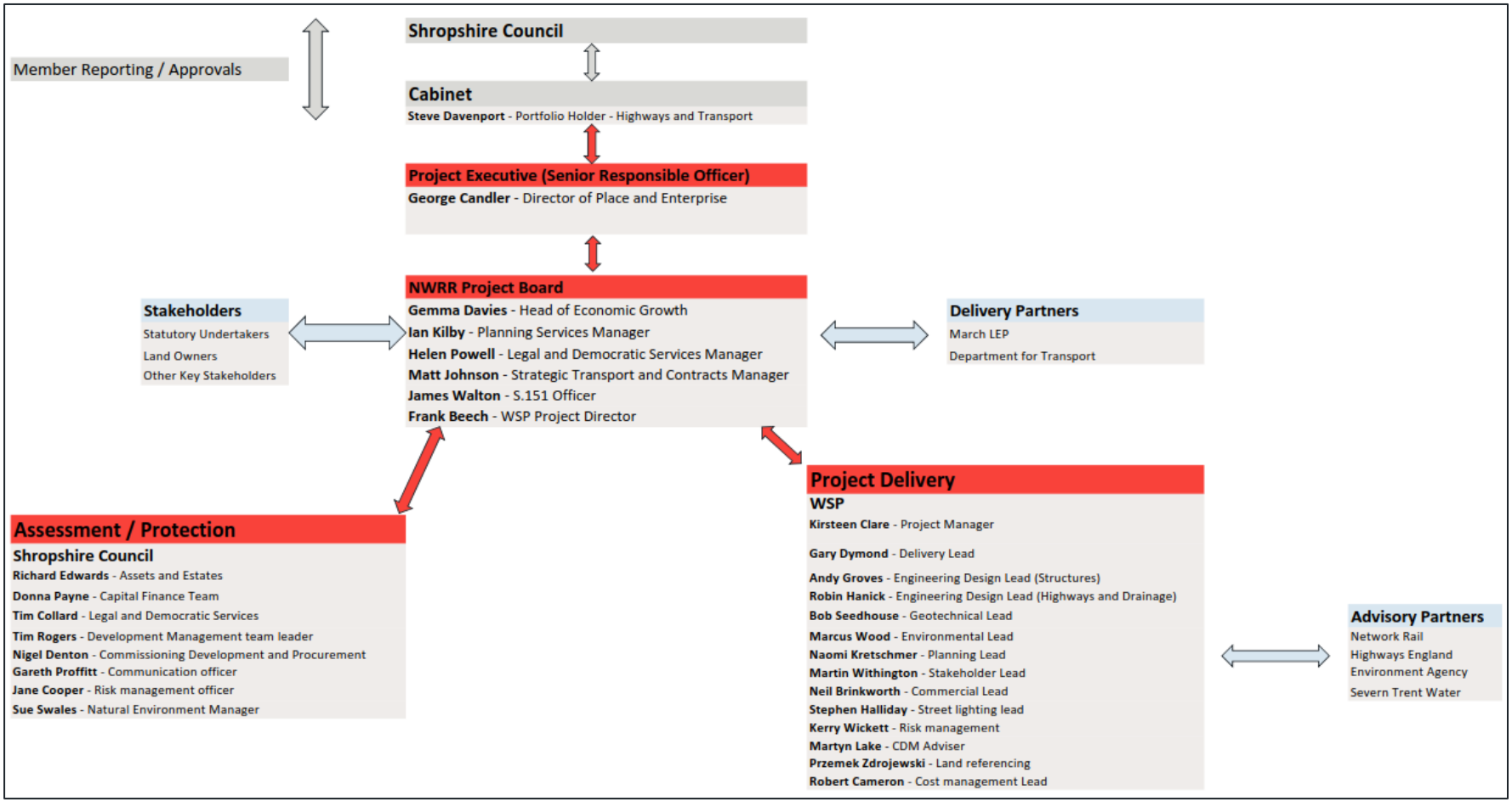


Figure 59 - High level governance structure

6.4.5. The Senior Responsible Officer (SRO) will be George Candler, Director of Commissioning. The SRO will be responsible for chairing Project Board meetings and providing guidance and support to the Project Manager as required. The SRO will ensure that the scheme is progressing in line with the originally envisaged project programme and that key deliverables and milestones agreed by the Project Board are achieved.

6.4.6. The Project Board will consist of key Shropshire Council staff, in addition to the Delivery Team Project Director. The roles and those responsible for those roles are presented in Table 93.

Table 93 - The Project Board

Roles	Responsible Person
Project Executive (Senior Responsible Officer)	George Candler – Director of Place and Enterprise
Project Leader (Strategic Transport and Contracts Manager - Shropshire Council)	Matt Johnson
Head of Economic Growth (Shropshire Council)	Gemma Davies
Planning Services Manager (Shropshire Council)	Ian Kilby
Legal and Democratic Services Manager (Shropshire Council)	Helen Powell
S151 Officer	James Walton
WSP Project Director	Frank Beech

6.4.7. The Project Board will meet on a regular basis, to review project progress against the project programme, identifying if milestones have been met, make decisions at gateway review points, and to review project risks and opportunities.

6.4.8. Profiles of the members on the Project Board are located in Appendix N and Appendix P.

WSP PROJECT DELIVERY TEAM

6.4.9. The WSP Project Delivery Team will be tasked with a number of roles including:

- Project management of the project delivery team
- Progressing the technical designs
- Negotiating with the key stakeholders and partners where the scheme impacts upon their assets, and incorporating any feedback (and developing statements of common ground)
- Managing risk
- Preparing for and taking the project through the planning process from the promoter side of the scheme

6.4.10. The Project Delivery Team responsible for the delivery of this project is set out in Table 94.

6.4.11. Profiles summarising the WSP delivery team's experience can be found in Appendix N.

Table 94 – WSP Project Delivery Team

Name	Role
Kirsteen Clare	Project Manager
Gary Dymond	Delivery Lead
Andy Groves	Engineering Design Lead (Structures)
Robin Hanick	Engineering Design Lead (Highways)
Bob Seedhouse	Geotechnical Lead
Marcus Wood	Environmental Lead
Ian Baker	Transport lead
Naomi Kretschmer	Planning Lead
Martin Withington	Stakeholder Lead
Neil Brinkworth	Commercial Lead
Stephen Halliday	Street lighting lead
Kerry Wickett	Risk management
Martyn Lake	CDM Adviser
Przemek Zdrojewski	Land referencing

AVOIDING CONFLICTS OF INTEREST

6.4.42. So as to avoid conflict of interests between consultants and Council officers on the promoter side of the scheme, and those Council officers undertaking statutory duties in assessing the impact on the scheme, such as highway and transport development control officers, or environmental protection officers, the Council will implement an 'organisational wall' to maintain clear separation of roles. All Council officers or term contract consultants will be assigned either to the promoter / delivery arm of the scheme, or the assessment / protection arm of the scheme. Individuals working on one side, will not be able to work on the other.

SHROPSHIRE COUNCIL ASSESSMENT TEAM

6.4.43. This team comprises Council officers undertaking statutory duties in assessing the impact on the scheme, protecting Council assets, and protecting the interests of the public and the environment. This team is summarised in Table 95, with further profiles found in Appendix P.

Table 95 – Shropshire Council Assessment Team

Name	Role
Richard Edwards	Assets and Estates
Donna Payne	Capital Finance Team
Tim Collard	Legal and Democratic Services
Tim Rogers	Planning Services
Nigel Denton	Commissioning Development and Procurement
Gareth Proffitt	Communication officer
Jane Cooper	Risk management officer
Sue Swales	Natural Environment Manager

6.5 THE PROJECT PROGRAMME

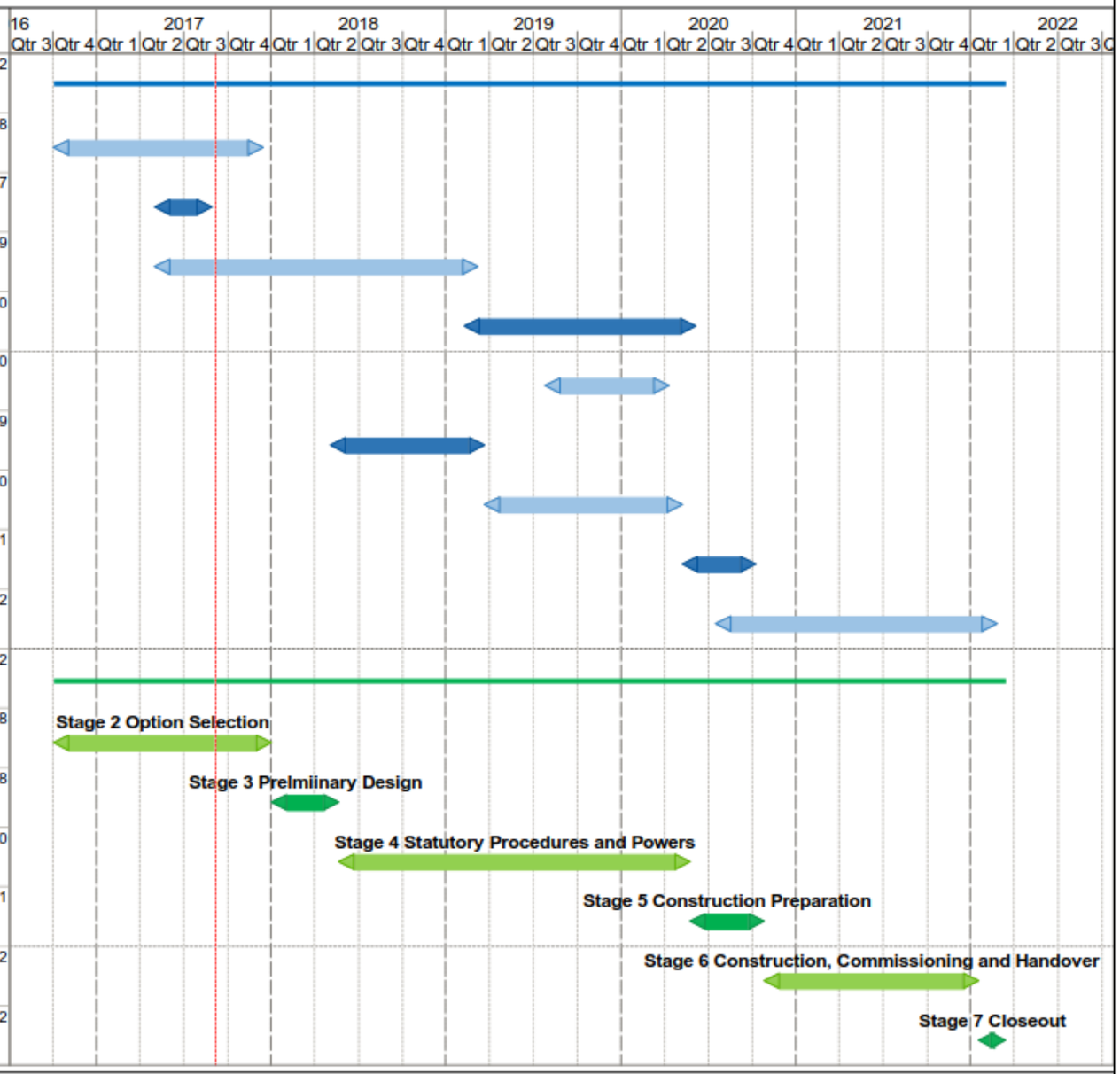
6.5.1. A project programme has been developed for this Outline Business Case setting out all the key project tasks and their duration, the interdependencies between each of the tasks, and key milestones and gateways. Certain elements of the programme have built in tolerance / contingency to account for risks identified within the risk register (which could have an impact upon the programme).

6.5.2. The programme will be a live document, with progress on planned task completion being monitored against actual progress on a weekly basis by the project manager. The Project Manager will report progress against plan to the Project Board.

6.5.3. Construction is programmed to commence in January 2021 and will be completed in May 2022. A summary of the programme key stages, developed in MS Project, is illustrated in Figure 60. A more detailed project programme is located in Appendix Q.

Shrewsbury North West Relief Road

ID	Task Name	Duration	Start	Finish
1	Shrewsbury North West Relief Road	1420 days	Mon 02/01/17	Mon 13/06/22
2	Outline Business Case	314 days	Mon 02/01/17	Fri 16/03/18
13	Public and Stakeholder Consultations	86 days	Tue 01/08/17	Wed 29/11/17
21	Planning Application	483 days	Tue 01/08/17	Fri 07/06/19
42	Contractor Procurement	345 days	Fri 10/05/19	Fri 04/09/20
56	Full Business Case	185 days	Fri 25/10/19	Fri 10/07/20
65	Orders	230 days	Fri 03/08/18	Fri 21/06/19
75	Public Inquiry	295 days	Fri 21/06/19	Fri 07/08/20
82	Final Approvals	110 days	Fri 07/08/20	Fri 08/01/21
89	Construction	420 days	Fri 16/10/20	Fri 27/05/22
95	Stage Gate and Gateway Reviews	1420 days	Mon 02/01/17	Mon 13/06/22
96	Stage 2 Option Selection	325 days	Mon 02/01/17	Mon 02/04/18
100	Stage 3 Prelmiinary Design	100 days	Mon 02/04/18	Mon 20/08/18
104	Stage 4 Statutory Procedures and Powers	525 days	Mon 20/08/18	Mon 24/08/20
108	Stage 5 Construction Preparation	110 days	Mon 24/08/20	Mon 25/01/21
112	Stage 6 Construction, Commissioning and Handover	320 days	Mon 25/01/21	Mon 18/04/22
116	Stage 7 Closeout	40 days	Mon 18/04/22	Mon 13/06/22



Project: NWRR OBC - Delivery Programme
Date: December 2017

Scheme Delivery Activity | Scheme Lifecycle Stage | Progress Line

Figure 60 – Project Programme Summary

6.6 PROGRAMME DEPENDENCIES

6.6.1. Approval of the planning application and completion of the Oxon Link Road, which essentially acts as Phase 1 of the scheme (having been part of the scheme in earlier guises before funding for it was secured through the Growth Deal), is the biggest interdependency of the scheme. If the Oxon Link Road scheme were not to achieve planning approval this could delay the NWRR. The project could still go ahead without the Oxon Link Road however the potential benefits may not be fully realised without it.

6.6.2. The scheme is, however, dependent upon a number of other activities (outlined within the Section 2.12 and the Project Programme) and stakeholders and is subject to risks (as set out in the Risk Register). The scheme is also dependent upon the receipt of Government Funding, sought from the Large Local Majors Fund. If the value for money, deliverability, and affordability of the scheme cannot be demonstrated, it will not proceed past gateway points at Outline Business Case Stage (Conditional Approval), or Full Business Case Stage (Full Approval), as discussed in Section 6.7).

6.7 ASSURANCE AND APPROVALS PLAN

GATEWAY REVIEWS

6.7.1. A gateway review is an independent, peer-reviewed assessment of a project carried out at crucial stages of its development so as to focus on whether the project can progress successfully to the next stage and was recommended by the former Office for Government Commerce (OGC) for schemes with a total cost of £50 million or more. Highways England also continues to require gateway reviews as part of their Project Control Framework (PCF) and it is generally considered good practice for large infrastructure schemes seeking Government funding.

6.7.2. Midlands Connect has agreed to act as an independent gateway reviwer for the NWRR scheme.

6.7.3. Gateway reviews can be broadly linked to the DfT's three stage approval process with Gateway 1 and 2 being carried out between Strategic Outline Business Case (Programme Entry) and Outline Business Case (Conditional Approval), with Gateway 3 being carried out prior to Full Business Case (Full Approval). However, in the case of Shrewsbury NWRR, procurement of the contract has resulted in a change from the usual programme of reviews as discussed below.

PROGRAMME FOR GATEWAY REVIEWS

6.7.4. Gateway reviews are held at key development stages of a project. For Shrewsbury NW Relief Road the timings of proposed gateway reviews are shown in Table 96.

Table 96 - Proposed Timings for Reviews

Key Decision Point	Project Timing	Anticipated Date
1 and 2	Option identification and selection stage	Carried out previously
3	Preliminary design stage	August 2018
4	Completion of Statutory process and Full Approval of DfT funding	August 2020

5	Construction Preparation	
6	At end of construction contract	April 2022
7	C12 months after road opening	April 2023

FUNDING ASSURANCE

6.7.5. The local funding contribution is discussed within the Financial Case. However, to confirm, Shropshire Council's Section 151 Officer has confirmed a maximum local contribution value of £25 million. This is in excess of the projected local contribution costs of £16,993,081. Within the LLMF cover sheet / application form the Section 151 Officer also declared that Shropshire Council accepts responsibility for meeting any costs of delivering the scheme over and above the DfT contribution requested, including potential cost overruns, and the underwriting of any third party contributions. The Section 151 Officer will approve the release of local funding, when satisfied and appropriate to do so.

6.8 FINANCIAL PLAN

6.8.1. The financial plan is set out within the financial case in section 4. The project manager will monitor projects costs, cash flow, funding draw down on a weekly basis against the provided in the financial plan.

6.9 COMMUNICATIONS AND STAKEHOLDERS MANAGEMENT PLAN

6.9.1. Shropshire Council has engaged with local stakeholders as part of the preparation of the Outline Business Case as outlined in section 2.19.

6.9.2. The stakeholder management plan is closely linked with the risk management strategy outlined within section 6.10.

COMMUNICATION AND ENGAGEMENT STRATEGY

6.9.3. Shropshire Council will develop a robust Communication and Engagement Strategy for the scheme.

6.9.4. This will make it clear how and when information will be placed in the public domain, and how the Council will communicate with stakeholders throughout the development and delivery of the scheme. It will include well established protocols to ensure that enquiries from the press, members of the public, elected councillors, stakeholders and other interested parties are dealt with in the right way. It is essential that the information provided is accurate, timely and informative.

6.9.5. As the design for the NWRR is developed in more detail and the project progresses in terms of key milestones of the programme achieved, it will be shared with stakeholders, together with information about the wider infrastructure improvements and investment being planned for Shrewsbury.

STAKEHOLDER MANAGEMENT PLAN

6.9.6. Stakeholders have a crucial role in the successful delivery of the scheme. Engagement and consultation gives all stakeholder groups a voice that is heard, and allows concerns to be addressed at an early stage to ensure a successful outcome.

6.9.7. The stakeholder engagement process will provide further evidence of the strong local and political support for a NWRR.

6.9.8. Shropshire will build upon the stakeholder engagement undertaken for the Outline Business Case, and on the relationships developed with businesses, residents and all other interested parties. Stakeholders will continue to be involved throughout the delivery phase. A Stakeholder Management Plan will be developed as part of the wider Communication and Engagement strategy for the scheme.

KEY STAKEHOLDER GROUPS

6.9.9. All stakeholders are important to the scheme's success, and communications with each group of stakeholders will be tailored to their specific needs and interests. The Stakeholder Lead, with support from the Shropshire's Communications Team and the Council's consultants, will make use of a wide range of communications tools, including a project website, mailings, face-to-face meetings, social media and workshops to engage with stakeholders.

6.9.10. The key stakeholder groups with very specific interests in the delivery of the scheme are identified in the consultation report included at Appendix B.

6.9.11. A list of key stakeholders is presented in the strategic case in Table 97.

Table 97 - Engagement with key stakeholder groups

Key group	Approach to stakeholder communication and engagement
Political	▪ Continue to set out a clear case with key information sharing with District and County politicians as to why the NWRR is essential to the growth of the area and how we can accelerate financial investment. ▪ Reassurance to political members that processes are inclusive. ▪ Continued high level engagement with local MPs to update on scheme delivery.
Businesses	▪ Reassurance that the NWRR is sensitive to the needs of local businesses, with economic growth not only bringing new business to the area but working for the benefit of those already there. ▪ Regular information to key businesses on the progress of the scheme. Close liaison with the businesses directly and indirectly affected by the relief road. ▪ Specially targeted consultation events and one to one meetings with key businesses.
Residents	▪ Reassurance that Shropshire are working on the NWRR to ensure growth works in the best interests of local people.

	▪ A number of public engagement events throughout the development of the scheme engaging residents on the progress, design and delivery.

6.9.12. The Council will continue to build on the relationships established with these audiences, through regular liaison, information sharing, technical workshops, face-to-face meetings and presentations. A detailed timetable of events will be set out in the Stakeholder Management Plan and shared with stakeholders. The Council will also take advantage of other opportunities that may arise to ensure that audiences are fully engaged in the scheme.

6.10 RISK MANAGEMENT STRATEGY

6.10.1. Risk management is methodical approach to identifying, quantifying and managing risks that occur during the lifecycle of a project. Key to effectively mitigating risks is to develop a series of well-defined steps to support better decision-making through an in-depth comprehension of the potential risks inherent in a scheme and their likely impact. Annex 4 of the HM Treasury Green Book emphasises that “effective risk management helps the achievement of wider aims, such as: effective change management; the efficient use of resources; better project management; minimising waste and fraud; and supporting innovation”.

It also recommends a four-stage process which is broadly cyclical (plan-do-review) requiring on-going review and update of risks to ensure that effective controls are implemented during scheme development and delivery. The risk management strategy is illustrated in Figure 61.

Figure 61 – Risk management strategy

RISK MANAGEMENT PROCESS

6.10.2. Risk management is seen as a key process underpinning good scheme governance and achievement of scheme objectives in a cost effective manner. TAG Unit A1.2 requires all project related risks, which may impact on the scheme costs, to be identified and quantified in a Quantified Risk Assessment (QRA) to produce a risk-adjusted cost estimate.

6.10.3. The outcome of the QRA process is the prediction of an 'expected' risk value which provides confidence levels of the risk outcomes, factoring in the various probabilities of these risks materialising. The confidence levels are reviewed to notice any trends with the P80 confidence level used here to provide the 'expected' risk value. This effectively informs the 'risk adjusted cost estimate'. The risk assessment has been undertaken using the following four-stage process:

- Risk identification
- Risk quantification
- Assessing the impacts of risk
- Assessing the likelihood of risk
- Managing risk

RISK IDENTIFICATION

6.10.4. For this scheme, risks have been identified during multi-disciplinary discussions, including inputs from technical experts in highway and structural engineering, geotechnical, planning, transport planning, quantity surveyors and environmental disciplines.

6.10.1. Risk workshops were held in October 2017 to review and align the risks to the latest information available. A risk identification session was held to ensure new risks were captured and existing risk information was reviewed ensuring completeness, integrity and accuracy of data during the review. Likelihood and impact of each risk to the project were assessed in terms of its possible monetary, programme and reputational effects. Owners have been assigned to each risk, based on the type of risk and the team member best placed to manage the risk as the project is developed. The risk register has since been maintained as a live document with regular updates during project design review meetings.

6.10.2. The most recent version of the project risk register can be found in Appendix R.

6.10.3. The scheme risks can largely be grouped into the following categories:

- Client
- Design
- Construction
- Environmental
- Financial
- Land
- Stakeholders
- Statutory processes
- Statutory Undertakers
- Strategic

6.10.4. The risk register then evaluates the impacts to highlight:

- Risks to the project programme
- Political risks
- Risks to scheme cost
- Risks to scheme funding
- Health and safety risks
- Reputational risks
- The risk to impact on existing highway network

QUANTIFICATION OF RISKS

Assessing the impact of risk (costs)

6.10.5. Each risk has been evaluated in terms of the cost outcomes of the risk. Whilst DfT recommends[66] the use of empirical evidence to estimate a range of cost outcomes, wherever possible, it is noted that 'common sense approximations' should be used when such empirical data is not available, rather than aiming for unrealistic levels of accuracy. At this stage, the cost range associated with the consequences of each risk was estimated, where the 80th percentile is the most likely value (the P80). The estimates have been derived following input from each discipline specialist working alongside the Quantity Surveyor and risk management team, to ensure estimates of cost (and probability, discussed within the next section) are complete and accurate, and consistent with the basis of the base cost estimate.

Estimating the likelihood of the outcomes occurring

6.10.6. Having estimated the likely impact (in cost terms), the likelihood (probability) of the risk occurring also needs to be estimated. Assigning probabilities is not an exact science[67] and therefore the scheme team technical specialists, including Quantity Surveyors, have had to apply a degree of judgement based experience gained from working on other similar projects.

6.10.7. Once the 'impacts' and 'probabilities' have been estimated, the risks are mapped onto a 5-point risk matrix to generate an overall 'risk score' (Table 98).

6.10.8. Each risk has been assigned a likelihood rating, which is expressed in terms of a percentage. This has been multiplied by the estimated financial value of the risk occurring, to give an expected value. The sum of these expected values forms the total included in the financial case as the 'cost of risks identified in quantified risk assessment'.

[66] TAG Unit A1.2, p8, para 3.2.10
[67] TAG Unit A1.2 Scheme Costs, p8, para 3.2.14

Figure 62 – Risk Criteria

	1	2	3	4	5
Likelihood Criteria	Very Low (VL) <5%	Low (L) 6-20%	Medium (M) - 21-50-%	High (H) 51-80%	Very High (VH) >80%
Impact Criteria	Very Low(VL)	Low (L)	Medium (M)	High (H)	Very High (VH)
COST	0- £25K	£25k- £250k	£250k- £2.5m	£2.5m- £5m	>£5m
Programme/ Budget	Negligible impact.	Minor fluctuation in project costs Minor delays not impacting on critical path.	Fluctuation in project costs requiring application for further funding Programme overrun that impacts critical path	Significant and non-recoverable impacts in project cost Programme overrun that results in loss of linkage to TIF programme	Overrun in Client's Budget affecting affordability Programme overrun that results in significant delays to statutory process Stakeholder interests severely damaged.
Relationship Management	Negligible impact.	Relationships with key suppliers, Client or strategic partners are strained at a project discipline level	Day-to-day working relationships with key stakeholders, Client or strategic partners damaged Damaged relationships have been escalated by Project level staff	The relationship between stakeholders, the Client or our strategic partners is threatened	Relationships with client officers or Members, key stakeholders or strategic partners breakdown affecting project delivery.
Reputation	Negligible impact.	Client and stakeholder relationships strained Some negative reporting in media on project	Client dissatisfaction and damage to stakeholder relationships Negative effect on Shropshire Council / WSP reputation	Threat to core project objectives Significant impact Shropshire Council / WSP credibility	Threat to projects survival and the Shropshire Council/ WSP credibility Catastrophic impact on TIF project
SHE	Negligible impact.	Minor injury to worker or third party. Environmental impact requiring management response to recover.	Major injury to worker or third party. Sensitive combination of operation and location likely to trigger damage and/or complaint of nuisance.	Worker/Public fatality. Environmental incident leading to breach. Criminal liability and compensation costs.	Multiple fatality Major environmental incident involving threat to public safety or health Criminal liability

Table 98 – Risk Matrix

The Risk Matrix

	HIGH RISK MEDIUM RISK LOW RISK	**Overall Risk = Impact x Probability**				**PROBABILITY** □				
						Negligible	Unlikely	Possible	Probable	Almost Certain
						Very Low	Low	Medium	High	Very High
						<5%	6-20%	21-50%	51-80%	>80%
						□	□	□	□	□
IMPACT □	> 5%	> 20%	Major	Very High / Showstopper	□	**5**	**10**	**15**	**20**	**25**
	3 to 5%	10 to 20%	Large	High	□	**4**	**8**	**12**	**16**	**20**
	1 to 3%	5 to 10%	Moderate	Medium	□	**3**	**6**	**9**	**12**	**15**
	0.5 to 1%	1 to 5%	Minor	Low	□	**2**	**4**	**6**	**8**	**10**
	< 0.5%	< 1%	Minimal	Very Low	□	**1**	**2**	**3**	**4**	**5**
	Cost as % of Project cost (not just fees)	Time	Quality	Overall IMPACT	Score	Cost / time and quality may be affected differently by a single risk. If overall risk is required, use the most severe affected component or give consideration to managing each separately.				

MANAGING RISKS (RESPONSE PLANS AND MITIGATION)

6.10.9. Following the initial assessment of scheme risks, a systematic approach was adopted to respond to risks and allocate responsibility to the most appropriate party in line with governance arrangements set out in section 6.4. One of the following four strategies is been adopted for each risk when developing a suitable response plan.

- Accept or tolerate consequences in the event that the risk occurs – In the event that a) the cost of taking any action exceeds the potential benefit gained; or b) there are no alternative courses of action available
- Treating the risk – Continuing with the activity that caused the risk by employing four different types of control including preventative, corrective, directive and detective controls[68]
- Transferring the risk – Risks could be transferred to a third party e.g. insurer or contractor
- Terminating the activity that gives rise to the risk

6.10.10. Development of the response plans to manage risks has been undertaken only where the likelihood of risk occurrence and impact can be cost effectively managed.

IMPLEMENTATION AND REVIEW

6.10.11. Effectiveness of the response plan is dependent on the proper implementation and review of the residual risk (including any secondary risk associated with implementation). Reviews of the status of scheme risk assessments and their related response plans (as part of project reporting) will be an integral part of progress meetings (and at the Project Board) during progression of detailed design and the construction period. All key risks will be formally reviewed at key decision points in the scheme lifecycle.

SIGNIFICANT PROJECT RISKS IDENTIFIED

6.10.12. A total of 61 risks have been identified in the project risk register (see Appendix L). Table 99 shows the five pre-mitigation project risks with the highest risk rating in the risk register. The risks and the potential impacts are described below along with any proposed mitigation:

1. An unfavourable result at Public Inquiry could result in delays in the scheme being brought forward and or potentially the scheme being lost. If the project is delayed for resubmission of more acceptable alternative, a judicial review would be required and if successful, it would result in planning application having to be redone. These delays will put a strain on project resources which could lead to the scheme running out of funds and the project being dropped. To mitigate this risk Shropshire will ensure robust and comprehensive witness statements will be presented at Public Inquiry and statements of common ground agreed with key stakeholders early in the planning process. Any witnesses will need to be trained and have experience in Public Inquiries. Shropshire Council will appoint Counsel well in advance of Public Inquiry to ensure evidence can be reviewed prior to the inquiry.

[68] The Orange Book, HM Treasury (2004)

2. Price inflation could lead to increases in the real cost of the project and variation in material cost. If more funding is required to cover any cost increases, this will need to be approved, which could result in delays to the project. The project team will maintain up to date cost estimates using experienced quantity surveyors teams. Additional funds from Shropshire Council corporate resources are in place in case of an increase in costs. The Council will continue to have discussions with DfT throughout the project to mitigate any cost increases.
3. The planning authority object to the preparation of an Environmental Statement and planning submission without a full 12 months investigation of protected species at the location of the scheme. This would result in delays to the planning decision while further surveys are undertaken which would delay project delivery. To mitigate this risk environmental issues have been accommodated within the scheme designs to date. Early on during the planning process the project delivery team will engage with statutory bodies to understand any environmental issues and ensure that these have been considered during detailed design.
4. Stakeholders such as Campaign to Protect Rural England (CPRE) object to the scheme due to the proximity of the relief road to areas of environmental importance. Any objections the scheme on environmental grounds will require an extended Public Inquiry and additional accommodation works. It could also lead to more money being spent on environmental mitigation such as shielding increasing costs of the scheme. To manage this risk Shropshire Council have accommodated environmental issues within the design and will engage with statutory bodies during the planning process
5. A delay in agreement with Network Rail to gain track side access to railway during the construction of bridge over the Shrewsbury to Chester railway line could result in project delays and cost increases. The project delivery team will maintain close liaison with Network Rail throughout design period to ensure of their concerns are addressed to reduce the likelihood of delay. The project will use WSP Rail structures staff for the bridge design, which has experience of dealing with Network Rail to deliver schemes.

Table 99 - Top 5 project risks in terms of risk rating post mitigation

Risk ID	Category	Risk Cause	Risk Event	Risk Impact	Risk Owner	Risk Scoring Pre-Mitigation						Risk Rating
						Likelihood	Cost Impact	Programme Impact	Relationship Impact	Reputation Impact	SHE Impact	
R001	Strategic/ Programme	Unfavourable result at Public Inquiry	Unfavourable result at Public Inquiry leads to project delays	Project Lost	Matt Johnson	2	3	3	2	5	1	**7**
R002	Strategic/ Programme	Inflation leads to increased scheme cost	Inflation increases real cost of scheme & variation in material costs.	Cost increase on project; potential delays for approval of increased cost	Gary Dymond	3	4	1	2	3	1	**7**
R010	Project	Environmental	Objection to ES and planning submission	Planning Authority object to preparation of ES and planning submission without full 12 months investigation of protected species	Planning authority rejects planning submission and ES; delay to planning decision while further surveys undertaken; delay to project delivery	1	1	5	3	4	1	**6**
R031	Environmental	Objection to the scheme due to proximity to areas of environmental importance	Campaign Protection Rural England (CPRE) objections on environmental issues	Additional accommodation works. Extended Public Inquiry. Spend more money on mitigation such as shielding.	Chris Middleton	4	3	3	2	2	1	**7**
R033	Project	Land	Delay in agreement with NR	Delays experienced due to requirement for of track side access to railway bridge (NR)	Project delays and cost increases.	4	3	5	1	1	1	**9**

6.11 BENEFITS REALISATION PLAN

6.11.1. A Benefits Realisation Plan will be prepared for the North West Relief Road scheme. The plan is designed to enable benefits, and disbenefits, that are expected to be derived from the project, to be planned for, managed, tracked and realised. The plan will help demonstrate whether the scheme objectives identified in are able to generate the desired 'measures for success'. This can be assessed by tracking and realising the desired outputs and outcomes of the project.

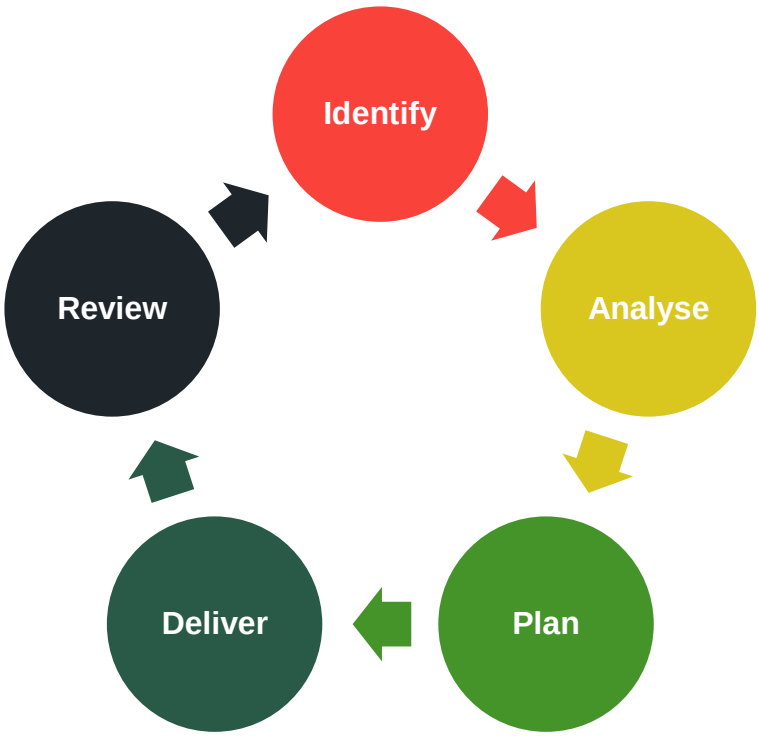
6.11.2. Desired outputs are those tangible effects that are funded and produced directly as a result of the scheme. Desired outcomes are the final impacts brought about by the scheme in the short, medium and long-term. The scheme objectives, together with the desired outputs and outcomes, are summarised in Table 100.

Table 100 – Scheme objectives, outputs and outcomes

Strategic Scheme Objectives	Desired Outputs	Desired Outcomes	Scheme Target	Timing of Review
To support the economic growth in Shrewsbury and Shropshire by unlocking planned development of new jobs and homes	A scheme which contributes to local and regional economic growth by improving traffic issues currently experienced by business users and residents A scheme which supports the economic competitiveness of Shrewsbury and Shropshire and the delivery of planned growth	A more efficient road network, which reduces congestion, improves journey times and reduces fuel consumption and emissions, and therefore, running costs for private, commercial and public service operators Improved perceptions of accessibility to areas of land in and around Shrewsbury identified for commercial and residential development	All of the below targets	**1** year post-scheme opening **5** years post-scheme opening
To reduce congestion in the town centre and on the northern and western approaches and providing a more reliable and efficient transport network for Shrewsbury	A scheme which improves traffic flows at congestion hotspots on the northern and western approaches to, as well as in, Shrewsbury town centre, where journey times can be unpredictable due to congestion	Reduced incidences of congestion on the northern and western approaches to, as well as in, Shrewsbury town centre Journey time savings for road users in and around Shrewsbury.	10% reduction in peak hour journey times through the town centre on the existing route between Oxon and Battlefield with and without the NWRR in place	i. **1** year post-scheme opening ii. **5** years post-scheme opening
To improve the quality of life for people in Shrewsbury by removing unnecessary through traffic from the centre of the town	A scheme which enhances the quality of life for local residents, workers and visitors in Shrewsbury by re-routing though traffic onto the NWRR and around the town centre A scheme which protects and enhances Shrewsbury's built and natural environment, encouraging local people to visit the town centre on a regular basis and attract more visitors	Provision of a reliable and high-quality alternate traffic route between the west and north of Shrewsbury which discourages through-movements in the town centre	20% reduction in peak hour traffic flows on the Welsh Bridge – Smithfield Road – Chester Street route through Shrewsbury in the year after opening compared with the 2021 siutaion without the NWRR in place	i. **1** year post-scheme opening ii. **5** years post-scheme opening
To reduce the number of road accidents in Shrewsbury	A scheme which reduces road accidents at hotspots with high accident rates A scheme which has been designed to minimise the risk of road accidents	Reduced number of fatalities and severe or slight injuries to road accidents on the NWRR and routes feeding the NWRR	**5**% reduction in casualties in the 5 years after full-scheme opening in the study area compared with the previous 5 years	**5** years post-scheme opening
To improve the reliability of journey times for commuters travelling in and out of Shrewsbury. This would serve to promote confidence in Shrewsbury's highway network and perhaps encourage an influx of business and inward investment	A scheme which improves traffic issues currently experienced by commuters travelling to and from places of work in Shrewsbury A scheme which integrates the surrounding transport network and delivers an overall improvement to reliability, resilience, accessibility and safety	Reduced incidences of congestion on the northern and western approaches to Shrewsbury Journey time savings for commuters travelling to and from Shrewsbury	50% reduction in peak hour journey time between Oxon and Battlefield, compared to the situation without the NWRR.	**1** year post-scheme opening **5** years post-scheme opening

To improve air quality in the town centre by encouraging north-west through traffic currently using the town centre onto the improved outer ring road	A scheme which contributes to an enhancement in local air quality, particularly in the Shrewsbury Town Centre Air Quality Management Area (03A)	Reduced concentrations of nitrogen dioxide in Shrewsbury, particularly at Castle Foregate and Castle Gates	Compared to the situation without the NWRR: Reduction in nitrogen dioxide concentrations in Town Centre diffusion tube monitoring locations Reduction in nitrogen dioxide concentrations at Castle Foregate Reduction in nitrogen dioxide concentrations at Castle Gates	**1** year post-scheme opening **5** years post-scheme opening

6.11.52. The Project Manager will develop a Benefits Realisation Plan, intrinsically linked to the Monitoring and Evaluation Plan set out in below. The DfT guidance sets out a five-stage cycle for the evolution of benefits, their maintenance and monitoring during the lifecycle of a programme, highlighted in Figure 63.



6.11.53.

Figure 63 - The Benefits Management Cycle (Source: DfT Programme and Project Management Portal)

6.11.54. The owner and partners will undertake a full assessment of potential benefits, in accordance with the DfT guidance set out above. Therefore, the process that should be upheld can be based on the following:

- Identify – the stakeholders impacted by the North West Relief Road, and the beneficiaries of each benefit; any additional enablers required over-and-above the proposed scheme; the responsible body or individual for delivering the benefits; target dates for the achievement of the anticipated benefits.
- Analyse – once the potential benefits have been identified, they need to be systematically analysed to calculate their financial value and the level of risk associated with the calculations.
- Plan – implement a clear timetable for delivering the scheme. The timetable will be a live document throughout the delivery process and will be informed of any necessary steps that are planned to maximise the benefits.
- Deliver – the programme will ensure that the identified benefits are delivered by working closely with stakeholders and delivery partners.
- Review – the benefits will be reviewed at pre-determined stages that fit into the wider programme delivery. This part of the process is where the monitoring and evaluation most clearly overlaps with the benefits realisation.

6.11.55. The owners will be responsible for tracking the identified benefits and for reporting any exceptions to the Project Manager. This will allow early identification of any expected benefits that may become unrealised to be remedied.

6.12 MONITORING AND EVALUATION PLAN

6.12.1. The HM Treasury Magenta Book provides the following definition of Monitoring and Evaluation[69]:

- Monitoring – seeks to check progress against planned targets and can be defined as the formal reporting and evidencing that spend and outputs are successfully delivered and milestones met
- Evaluation – is the assessment of the initiatives effectiveness and efficiency during and after implementation. It seeks to measure the causal effect of the scheme on planned outcomes and impacts and assessing whether the anticipated benefits have been realised, how this was achieved, or if not, why not.

6.12.2. The DfT has also published a document entitled, 'Monitoring and Evaluation Framework for Local Authority Major Schemes' (2012), designed to make the process as consistent and proportionate as possible. It also aimed to be complementary with the devolution of decision-making. The document sets out three levels of monitoring and evaluation:

- Standard monitoring
- Enhanced monitoring
- Fuller evaluation

6.12.3. All schemes are required to conduct the 'standard monitoring' approach, whereas schemes costing more than £50 million are expected to follow the 'enhanced' guidance. Only selected schemes, identified by the DfT are expected to conduct 'fuller' evaluation. As the relief road scheme will have an expected outturn cost of above £50 million, it will follow the DfT's enhanced monitoring guidance. It is expected that the scheme will undertake enhanced monitoring in addition to the standard measures. The measures that fall into the 'enhanced monitoring' category are summarised in Table 101.

Table 101 - Enhanced monitoring measures

Item	Stage	Collection Timing	Rationale	Information Required
Noise	Impact	Pre or during delivery / post opening (up to 5 years)	Accountability / Knowledge	Effect of the scheme on noise levels at important receptor locations and analysis of the difference between outturn results and scheme forecasts
Local Air Quality	Impact	Pre or during delivery / post opening (up to 5 years)	Accountability / Knowledge	Effect of the scheme on local air quality in the area of interest and analysis of the difference between outturn results and scheme forecasts
Accidents	Impact	Pre or during delivery / post opening (up to 5 years)	Accountability / Knowledge	Effect of the scheme on traffic accidents in the area of interest and analysis of the difference between outturn results and scheme forecasts

6.12.4. The Monitoring and Evaluation Plan for the North West Relief Road scheme is set out below.

[69] The Magenta Book, HM Treasury (2011)

DESCRIPTION

6.12.5. A full description of the scheme has been provided in section 21.2.5.

LOGIC MODEL

6.12.6. A logic model is shown in Figure 64. It provides an illustrative overview of the inputs and activities of the scheme, and refers to its outcome measures of performance.

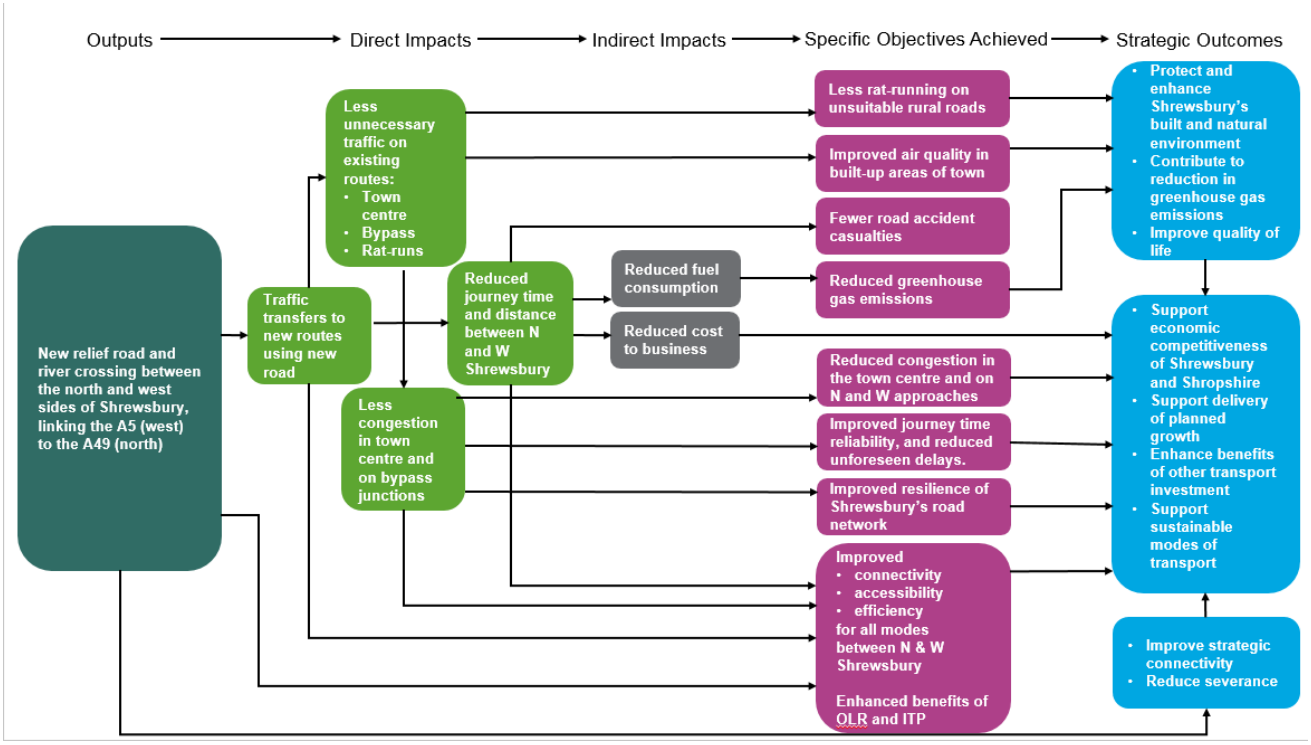


Figure 64 – Logic Model

TYPE OF EVALUATION

6.12.7. The type of evaluation method proposed to evaluate the scheme will be an 'outcome evaluation'. Outcome evaluations compare the existing situation, i.e. before the intervention (the North West Relief Road) has been introduced, against the situation with the intervention in place. Any observed changes (in the metrics described in Table 102. below) are assumed to be the result of the intervention.

DATA REQUIREMENTS

6.12.8. The metrics proposed to evaluate the North West Relief Road scheme, associated data collection requirements and frequency of data collection are presented in Table 102.

Table 102 – Data collection metrics

Metric	Frequency	Data
INPUTS		
Expenditure	Post Opening	Financial monitoring of project
Funding Breakdown	Post Opening	Financial monitoring of project

In kind resources provided	During delivery	Monitoring of resources delivering the project (use of project diary)
OUTPUTS		
Delivered scheme	Post Opening	Full description of implemented scheme outputs including design changes post funding approval with reasons for such changes, post scheme as built drawings of works completed
OUTCOMES		
Air quality	Pre and post construction, Annual up to 5 years post opening	Data from Shropshire Council's review and assessment of Local Air Quality (statutory duty)
Average daily traffic and by peak / non-peak periods	Pre and post construction, Years 1 and 5 post opening	Annual ATCs and turning counts, collected at junctions where interventions are and wider ATCs across the network
Accident and casualty rates	Pre and post construction, Years 1 and 5 post opening	Annual monitoring of collisions (STATS 19)
Average AM and PM peak journey time on key routes (journey time measurement)	Pre and post construction, Years 1 and 5 post opening	Journey time surveys and DfT Congestions Statistics on LA A Roads
Average annual CO_2 emissions	Pre and post construction, Years 1 and 5 post opening	DfT's Local Authority Carbon Toolkit

SOURCES OF DATA

6.12.9. The following surveys will be undertaken by Shropshire Council:

- Automatic Traffic Counts (ATCs) and Manual Classified turning Counts (MCCs) to obtain volumetric and classified traffic count data
- Trafficmaster data / or ANPR data, to obtain journey time data
- STATS19 accident data;
- Air quality data from roadside diffusion tubes; and
- Annual expenditure on construction, land, maintenance, design fees and monitoring and evaluation surveys

IMPLEMENTATION

Resourcing

6.12.10. The monitoring and evaluation for the North West Relief Road scheme will be undertaken by Shropshire Council, being brought into the current traffic survey and environmental monitoring programmes.

Traffic Monitoring Programme

6.12.11. Shropshire's current annual traffic monitoring programme comprises 3 different sets of data. The data is collected during the last two weeks of September.

- LOT A – 15 Outer cordon ATC's (two weeks duration)

- LOT B – 5 Inner Cordon turning counts (biennial basis)
- LOT C – 12 “M Counts” (all modes counts at the river loop)

6.12.12. Figure 65 shows the locations of sites that are included in the annual traffic monitoring programme. The traffic survey programme will be expanded to capture traffic on the NWRR once the scheme is finished.

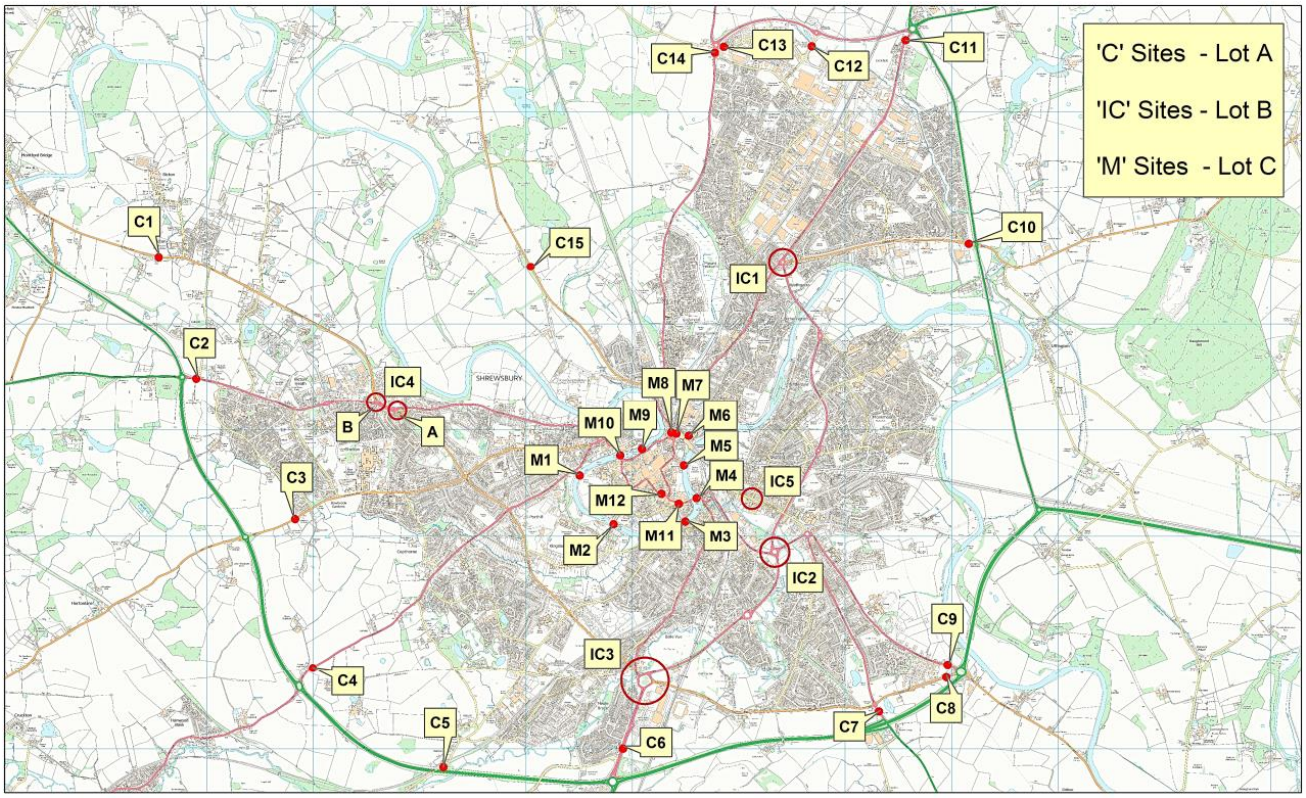


Figure 65 – Shrewsbury Traffic Count Sites

6.12.13. The current cost of the above traffic monitoring is approximately £15,000 per year. Shropshire will allow for an additional £2,000 p.a of costs to expand the programme to capture the NWRR. The exact survey costs will be calculated at Full Business Case stage and will be funded through Shropshire Council’s monitoring budget.

Air Quality Monitoring Programme

6.12.14. The Council’s air quality monitoring network in 2018 will consist of 80 diffusion tubes across the Shropshire and a continuous air quality monitor located in Battlefield to the north-east of Shrewsbury.

6.12.15. Shropshire council’s current air quality monitoring costs are approximately £7,000 annually however this will be reduced as of January 2018 to £5.5k as result of a reduction in the diffusion tube network (from 99 to 80 tubes) and a continuous monitor being turned off. The air quality monitoring programme will be expanded to capture the NWRR once the scheme opens. Shropshire will allow for an additional £1,000 of costs to expand the programme to capture the relief road.

Timing

6.12.16. Prior to starting on site, any gaps in the required baseline evidence will be collected. A baseline evidence report will be completed, prior to construction of the NWRR. Regular monitoring reports will be provided on a quarterly basis to the Marches LEP / DfT in terms of progress against programme, costs and risks. In addition, an annual monitoring summary will be undertaken.

6.12.17. The monitoring and evaluation process for the scheme will use baseline data to be collected from 2016, which will include journey times, traffic flows, traffic speeds and accidents alongside planning data. Data will then be collected one year prior to opening and then one year and five years post opening (2023 and 2030), which will be compared against the baseline data to quantify the extent of benefits realised. '1 year after' and '5 year after' evaluation reports will be produced, highlighting any interesting and emerging trends.

RESPONSIBILITY

6.12.18. Details of the individual responsible for implementing the monitoring and evaluation plan, at Shropshire Council, are set out Table 103.

Table 103 – Responsibility of Monitoring and Evaluation Plan

	Traffic Monitoring	**Environmental Monitoring**
Name	Martin Withington	Matthew Clark
Address	Shirehall, Abbey Foregate Shrewsbury SY2 6ND	Shirehall, Abbey Foregate Shrewsbury SY2 6ND
Telephone	01743 501144	01743 251708
Email	Martin.Withington@wsp.com	matthew.clark@shropshire.gov.uk

Setting targets

6.12.19. The Council recognises the importance of setting specific indicators and targets. These targets are set out in Table 100.

SUMMARY OF ANALYSIS

6.12.20. The monitoring and evaluation will be used to answer the following key questions:

1. Have the anticipated outcomes and impacts been achieved?
   - To what extent are the observed changes additional to what would have happened in the absence of the intervention?
   - Were there any unanticipated impacts / displacement effects?
   - Which elements of the scheme were particularly influential in achieving the overall goals?
   - What lessons can be learnt for future scheme / policy development?
   - What is the contribution of the policy to the LEPs strategic goals?
2. To what extent did the anticipated costs and benefits match the actual outcome?
3. Has the scheme been successful? If not, why not?

6.12.21. The evaluation of the scheme will:

- Measure the level of traffic congestion on the existing network
- Measure the level of traffic congestion on the improved network
- Measure the levels of accidents on the existing and improved network

6.12.22. Impact assessments will be undertaken in year 1 and year 5 after opening.

LINKING INDICATORS TO OUTCOMES

6.12.23. It is important to demonstrate how the proposed indicators relate to the desired outcomes. The Monitoring and Evaluation Plan will therefore be updated in the Full Business Case. The logic map / causal chain diagram (Figure 64) shows the expected relationship between the outputs of the scheme, the achievement of objectives, and the delivery of the strategic outcomes.

6.12.24. It is generally easier to measure achievement of the objectives than the strategic outcomes because the latter often take time to achieve and could be influenced by factors other than the relief road.

6.12.25. A full Monitoring and Evaluation plan will be developed and updated in the Full Business Case. It will consider attribution of outcomes to the intervention and whether a clear link between the delivery of the scheme and the wider economic benefits can be achieved. Shropshire Council's partners will work with the DfT to consider any additional longer term evaluation work to undertake case studies or meta-analysis in order to further understand the economic benefits arising from the North West Relief Road, subject to availability of resources.

6.13 SUMMARY OF THE MANAGEMENT CASE

6.13.1. An appropriate governance structure is essential to the delivery the scheme. Shropshire Council has therefore established a Project Board and a Project Delivery Board aligned with best practice guidance on project management. The Project Board's primary function is decision-making and review. A Project Delivery Team will be established to deal with day to day planning and delivery of the project.

6.13.2. A project programme has been developed for this Business Case setting out all the key project tasks and their duration and interdependencies, key milestones and gateways. It will act as a live document, with progress being monitored on a weekly basis by the project manager.

6.13.3. Key stakeholders have been identified and a stakeholder management plan will be adopted, following the practice used in previous projects. Details of recent experience with the delivery of similar projects are set out.

Appendix A

NWRR SCHEME DRAWINGS

Appendix B

CONSULTATION REPORT

Appendix C

LETTERS OF SUPPORT

Appendix D

OPTIONS ASSESSMENT REPORT

Appendix E

DATA COLLECTION REPORT

Appendix F

LOCAL MODEL VALIDATION REPORT

(LMVR)

Appendix G

FORECAST REPORT

Appendix H

ECONOMIC APPRAISAL REPORT

Appendix I

AMCB, TEE, PA TABLES

Appendix J

ENVIRONMENTAL IMPACTS

WORKSHEETS

Appendix K

APPRAISAL SUMMARY TABLE

Appendix L

INDEPENDENT QUANTITY SURVEYOR SCHEME COSTS

Appendix M

SHROPSHIRE COUNCIL SECTION

151 OFFICER LETTER (DEC 2017)

Appendix N

WSP DELIVERY TEAM PROFILES

Appendix O

WSP PROJECT PORTFOLIO

Appendix P

SHROPSHIRE COUNCIL STAFF

PROFILES

Appendix Q

PROGRAMME PLAN

Appendix R

RISK REGISTER

Export House
Cawsey Way
Woking, Surrey
GU21 6QX

wsp.com