HIGHWAYS AGENCY

# A1 Newcastle Gateshead Western Bypass

# Stage 3 Report

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WSP

# Contents

# Executive Summary

The A1 Newcastle Gateshead Western Bypass (NGWB) is one of the most congested highway links in the North-East Region with more than 110,000 vehicles using the route every day on the busiest section. As a result of this travel demand on the route there are a number of issues relating to: journey time delays; journey time reliability; route resilience; safety; environmental impacts and development pressures.

Improvements to the A1 NGWB have long been acknowledged as a requirement for economic growth in the region within both local and national policy documents and reflected in the consensus of opinion amongst regional stakeholders that something needs to be done to address the issues. The route has been identified as a 'hot-spot' requiring Government investment to deliver infrastructure improvements.

Five improvement options for prioritisation were identified within Stage 2 of this feasibility study and Strategic Outline Business Cases (SOBCs) have been produced for them:

- Widening to three lanes between J65 – J67 including provision of new offline structure to replace Allerdene bridge and the new Coalhouse junction (case for this scheme assumes that Allerdene bridge would ultimately need to be replaced whether or not this scheme is delivered);
- Provision of three narrow lanes between J71 – J73 including closure of J72 (Swalwell slips);
- Provision of three narrow lanes between J74 – J79 including lane gain / lane drop arrangement between junctions on the J74 – J77 section. Requires 50mph speed limit over this portion of the route;
- Technology Option: Motorway Incident Detection and Automated Signalling (MIDAS), Variable Message Signs (VMS) and Closed Circuit Television Cameras (CCTV) provision for the whole route; and
- A set of smaller interventions at seven junctions including schemes such as widening of slip roads and signalisation.

The SOBCs for these schemes are summarised within this document.

In addition to assessing these individual options this report provides additional consideration of:

- the potential combined benefits of delivering more than one of the proposed schemes resulting from longer stretches of widening or improvements to both the A1 NGWB mainline and the junctions on the route;
- the incorporation of enhancements to non-motorised user provision and junctions on the local road network within the proposed scheme design; and
- the additional modelling and appraisal tasks which could be carried out subsequent to this study to improve the robustness of the assessment. These could include wider area modelling, assessment of variable demand effects, quantification of wider economic impacts, more detailed air quality and noise modelling and estimation of operating and maintenance cost changes.

The report indicates that the optimum combination of schemes for the A1 NGWB would be to deliver the J65 – J67 widening scheme and the J74 – J79 scheme together. There is potential for delivery of the junction interventions along these sections of the route in order to maintain the mainline benefits of the schemes. This scheme combination would lead to an A1 NGWB corridor with three traffic lanes on the most congested parts of the route and two lanes on the middle section which currently carries less traffic and experiences fewer issues.

# 1 Introduction and Purpose

## 1.1 Introduction

1.1.1 This report covers Stage 3 of the feasibility study into interventions aimed at tackling issues along the A1 Newcastle Gateshead Western Bypass (NGWB).

## 1.2 Stage 3 Objectives

1.2.1 The purpose of Stage 3 of the study is to set out how the short-listed options from Stage 2 of the feasibility study have been appraised and what the costs and benefits are for each one.

1.2.2 In addition to the SOBCs the additional benefits or impacts from considering the options in a corridor approach as compared to assessing the benefits of individual proposals should be assessed.

1.2.3 Finally, Stage 3 should include an assessment of the further work necessary to develop the proposals to the stage to which Government would be able to take an investment decision if SOBC level could not be reached in the time available.

## 1.3 Report Structure

1.3.1 This report is structured as follows:

- **Chapter 2: Strategic Outline Business Cases**: summarises the SOBCs for each of the interventions emerging from Stage 2;
- **Chapter 3: Scheme Combinations**: discusses the potential impacts of delivering more than one of the proposed schemes;
- **Chapter 4: Further Work - Design**: summarises additional design aspects of the schemes that should be considered if the schemes were to be progressed;
- **Chapter 5: Further Work - Assessment**: contains details of the additional assessment work that could be undertaken to strengthen the robustness of the SOBCs;
- **Chapter 6: Fulfilment of Scope**: compares the work undertaken with the feasibility study scope; and
- **Chapter 7: Conclusions**: summarises the conclusions reached throughout the report.

# 2 Strategic Outline Business Cases

## 2.1 Introduction

2.1.1 Chapter 2 of this report summarises the SOBCs that have been produced for this feasibility study.

## 2.2 SOBC Options

2.2.1 The option assessment report (OAR) produced at the end of Stage 2 of this feasibility study recommended that SOBCs should be produced for five options in total. These options are as follows:

### J65 – J67 WIDENING INCLUDING ALLERDENE REPLACEMENT (SCHEME LENGTH = 2.5 MILES)

- Full three lane widening between J65-J67;
- Lane gain/drop between junctions;
- New offline Allerdene Bridge; and
- New dumb-bell junction for Coalhouse.

### J71 – J73 PROVISION OF 3 NARROW LANES INCLUDING J72 CLOSURE (SCHEME LENGTH = 0.4 MILES)

- Provision of three narrow lanes northbound between J71 & J73;
- Provision of three narrow lanes southbound between Derwenthaugh Bridge & J71;
- Two narrow lanes southbound between J73 & Derwenthaugh Bridge;
- Closure of J72 (Swalwell) required to provide three lane provision;
- Northbound lane drop at J73; and
- Retain existing 50mph speed limit for narrow lanes section (for safety reasons)

### J74 – J79 PROVISION OF 3 NARROW LANES (SCHEME LENGTH = 4.5 MILES)

- Provision of three narrow lanes between J74 – J78;
- Widening to three full lanes between J78 – J79;
- Lane gain/drop between junctions; and
- 50mph speed limit for narrow lanes section (for safety reasons).

### TECHNOLOGY OPTION: MIDAS, VMS & CCTV (SCHEME LENGTH = 28 MILES + 20 MILES FIBRE OPTIC LINK TO REST OF NETWORK AT BARTON)

- Upgrade communications infrastructure to provide fully ducted longitudinal fibre system with associated infrastructure;
- Provide link into wider communications system at J56 (Barton);

- Extend/install MIDAS (Motorway Incident Detection and Automatic Signalling) to cover area between J61 (Bowburn) & J80 (Seaton Burn);
- Provide cantilever VMS (Variable Message Signs) to cover area between J61 (Bowburn) & J80 (Seaton Burn); and
- Upgrade existing CCTV coverage for area between J61 (Bowburn) & J80 (Seaton Burn).

**JUNCTION INTERVENTIONS (SEVEN MINOR SCHEMES TO BE EITHER TREATED INDIVIDUALLY OR AS A PACKAGE)**

- Junction 62 (Carrville): Widening of northbound diverge slip to three lanes;
- Junction 65 (Birtley): Extend existing three lanes at approach to stop/give way line on the southbound diverge slip onto A1231;
- Junction 66 (Eighton Lodge): Full signalisation of junction and additional lanes on slip roads;
- Junction 68 (Lobley Hill): Widening northbound off slip to three lanes;
- Junction 71 (Metrocentre): Widening of diverge slips to three lanes at southbound approach to Hollinside Road stop/give way line;
- Junction 72 (Swalwell): Closure of Swalwell slip roads (in absence of mainline option in this location); and
- Junction 79 (North Brunton): Widening of A1 northbound diverge slip road to three lanes at approach to stop line on nearside and offside. Extend A1 southbound diverge slip roads to three lanes at approach to stop line.

2.2.2 The 'Do Minimum' scenario against which these options are compared against in the SOBCs includes the following committed highway schemes:

- A1 Coalhouse to Metrocentre Improvement: provision of three narrow lanes between the Coalhouse and Metrocentre junctions and collector distributor lanes between the Lobley Hill and A184 junctions.
- Coalhouse Junction Improvements: widening of selected approaches to the roundabout and part time signalisation of the Kingsway South and A1 northbound off slip arms.
- Seaton Burn Pinch Point Scheme: improvements and signalisation of Fisher Lane roundabout and slip road widening works.

## 2.3 Introduction to SOBCs

2.3.1 For each of the schemes detailed in the previous section a full SOBC report and set of SOBC summary tables has been produced. These both follow the Treasury five case model:

- **Strategic Case**: determines whether or not investment is needed, either now or in the future.
- **Economic Case**: assesses the value for money of the scheme by looking at the economic, social, environmental and public accounts impacts.
- **Financial Case**: outlines the affordability and funding arrangements of the scheme.
- **Commercial Case**: provides evidence on the commercial viability of the proposal and the procurement strategy.
- **Management Case**: assesses whether the scheme is deliverable.

2.3.2 A summary of the five cases for each of the schemes is contained in the remainder of this section.

## 2.4 Strategic Case

*Problem Identification*

2.4.1 The A1 NGWB is a key linkage in the economy of the North East of England. It is also one of the most congested sections of the Strategic Road Network (SRN), with poor journey time reliability. The degraded operation of the corridor is considered to be a major barrier to future economic development of the area. Table 2.1 summarises the key issues identified on the sections of the route covered by the schemes.

Table 2-1: Identified Issues

| Route Section | Issues |
|---|---|
| J65 – J67 | • The average monthly vehicle hour delays/ km are over 4000 hours/km on the A1 southbound between Junctions 65 and 67<br>• Heavy weaving currently occurs between Junctions 65 and 66 and accidents often lead to lane closures and associated reliability issues<br>• There are over 3 Killed or Serious Injured (KSI) accidents per km northbound between Junctions 65 and J66 which is higher than the rest of the route<br>• Allerdene Railway Bridge acts as a pinch point for traffic flow and this is likely to be heightened by the completion of the Coalhouse to Metrocentre scheme<br>• Allerdene Railway Bridge is in need of extensive maintenance and needs to be completely replaced in the medium term |
| J71 – J73 | • Delays in both directions between J71 & J73 (average of 2000-3000 monthly vehicle hour delay per km northbound, 4000+ average monthly vehicle hour delay per km southbound)<br>• Poor air quality<br>• Higher than average number of road traffic collisions<br>• Poor journey time reliability |
| J74 – J79 | • Extensive delays in both directions between J74 & J77 (average of 2000-3000 monthly vehicle hour delay per km northbound between J74-J76, similar level southbound between J79-J75 increasing to 3000 - 4000 monthly vehicle hour delay per km between J75 & J74)<br>• Poor air quality<br>• Higher than average number of road traffic collisions<br>• Poor journey time reliability |
| Whole Route Technology | • For North-South (through) traffic, the A1 NGWB has a parallel alternative option in the A19. However, the lack of variable message signs or the underlying data collection tools such as MIDAS and CCTV, particularly at key decision points such as J65 (northbound) and J80 (southbound), means that it is impossible to provide drivers with information which might help them to make informed route choice decisions |
| Junction Interventions | • **Junction 62**: AM peak queues on approaches<br>• **Junction 65**: Queues back onto Sunderland Highway in AM peak due to A1 mainline congestion. In PM peak queues from Lookout Lake roundabout impact junction<br>• **Junction 66**: Extensive queuing on Durham Road in AM peak<br>• **Junction 68**: Extensive queuing on A692 & B4126 during peaks. Queuing from Maingate roundabout extends to junction<br>• **Junction 71**: AM peak queuing on Hollinside Road NB<br>• **Junction 72**: No notable issues at junction itself, however the short distance between this junction and J71 leads to weaving and merging issues on the A1 mainline<br>• **Junction 79**: Queuing from A1056 impacts junction in PM peak. Some queues on other arms including slip roads |

*Economy*

2.4.2 As identified above, the A1 NGWB is one of the most congested highway links in the North-East Region. The route is of critical economic importance for the region as it strongly aids both internal and external connectivity. At a national level, the A1 provides the main north-south link connecting Scotland, North East England, Yorkshire & Humber, East England and London.

2.4.3 The A1 NGWB, by its very presence, has fostered patterns of activity, development and hence movement on the west side of the Tyne and Wear conurbation which rely upon the accessibility it alone provides. Although a relatively recent road, with the Newcastle Western Bypass only opening in 1990, these patterns are firmly entrenched. Cutting

through the urban area, it was always going to play a variety of roles, from strategic to local, and has come to act as a spine road for new development and largely as a local road (during peak periods survey data indicates that less than 5% of traffic is strategic travelling along the length of the A1 NGWB).

2.4.4 Population and economic growth in the region requires additional housing and economic land be identified. Access to the SRN is a key factor in investment decisions, hence the attractiveness of sites along the corridor. The locations which are available and most attractive for such development are located along, or to the west of the corridor, meaning that for many trips to access the key employment areas, and other facilities, people must use, or at least traverse, the corridor, increasing this cycle of dependence.

2.4.5 There are also significant development plans in Durham, Gateshead, Newcastle and Northumberland which enhancements to the A1 NGWB would support. Developments at Cramlington in Northumberland and in County Durham, particularly in the North of the City of Durham, are likely to load additional traffic at either end of the A1 NGWB corridor.

2.4.6 Given the importance of the A1 NGWB to the local and wider economy, congestion and delays on the route represent a threat to economic growth. The schemes aim at alleviating these issues and therefore contribute to economic growth.

2.4.7 In addition, improvement schemes on the route would also provide wider economic impacts for business users and freight. These would result from the improvement in linkages between locations of economic importance in the region such as the Team Valley Employment Zone, Metrocentre and Newcastle Airport.

*Policy*

2.4.8 Delivering improvement schemes on the A1 NGWB aligns well with both local and national policy which is focussed on improving the economic performance of the region and improving accessibility to jobs and services whilst supporting additional development in the area.

2.4.9 Previous studies have proposed a number of potential improvements to the highway network, and the Coalhouse to Metrocentre Scheme started construction in August 2014. Although that scheme will provide much needed relief to that section, without further intervention, conditions on the A1 NGWB will deteriorate, particularly south of Coalhouse to Birtley and between Scotswood and Ponteland Road to the north of the river.

2.4.10 The scheme also supports the North East Strategic Economic Plan (SEP) which was published by the North East Local Enterprise Partnership (LEP) on 9th April 2014. The title sets out the driving focus of the plan “More and Better Jobs”. The vision is that the North East economy will provide a million jobs by 2024 which represents 100,000 new jobs and 11% increase in employment. The SEP cites the 2013 North East Independent Economic Review, undertaken by Lord Adonis which reached the following conclusions:

- The North East has an absolute shortage of jobs;
- Productivity is a problem;
- Skill levels are not good enough; and
- Connectivity, locally nationally and internationally needs to be improved to help open and strengthen the North East’s economy.

2.4.11 The following are cited in the SEP as key priorities for action with Government:

- Ongoing investment in a reliable strategic road network with reduced congestion. Key priorities are known bottlenecks on the A1;
- Deliver a programme of improvements on the A1 including the Coalhouse to Metro Centre scheme, the renewal of Allerdene Bridge, and the A1/A19 Seaton Burn Interchange; and
- Secure a rolling programme for additional capacity along the whole length of the A1 Western Bypass, with the objective of dual three lanes along all of its length, excluding Blaydon Bridge.

2.4.12 The schemes would also support developments included in the Local Plans of Councils in the North East.

2.4.13 The improvements also align with the aim of the Highways Agency "to provide safe roads, reliable journeys and to inform travellers of the condition and flow of the road network". The schemes would support this aim through reducing the number of accidents, reducing congestion, improving journey times and journey time reliability.

2.4.14 Finally, improving the A1 NGWB would also support the aims of the most recent HM Treasury National Infrastructure Plan which was published in 2013. This states that road infrastructure is a key driver of economic growth and the Plan contains objectives to improve road quality, increase road capacity, tackle congestion and provide critical connections.

*Investment Aims*

2.4.15 The specific objectives of the schemes are as follows:

- **Economic Growth and Development**: The interventions are aimed at reducing delays and incidents impacting on reliability and therefore encourage economic growth and development. Furthermore they will improve access to employment opportunities.
- **Movement of Goods and Access to Transport Hubs**: The schemes will increase capacity which will lead to fewer incidents and reduce delays which will enhance the role of the A1 NGWB corridor for moving goods as well as improving access to transport hubs such as Newcastle Airport.
- **Accessibility**: The schemes will improve accessibility to employment opportunities across the region including those in Team Valley and to/from Neighbourhood Opportunity Areas such as Birtley.
- **Journey Times**: The increases in capacity or better use of existing capacity resulting from the schemes will reduce the number of incidents and delays which will lead to an improvement in journey times for users travelling currently at congested times.
- **Safety**: The schemes are designed to increase or better manage existing capacity and thereby reduce delays, impact of weaving and safety issues.
- **Resilience**: The schemes are likely to lead to a reduction in accidents and improvements to journey times and reliability. The provision of additional lanes or

technology to manage traffic improves resilience of the network when incidents do occur.

- **Environment**: Some reductions in carbon are likely to occur as a result of the schemes due to more freely flowing traffic.

## 2.5 Economic Case

2.5.1 For the scheme economic cases an economic appraisal was undertaken using scheme cost estimates and quantification of a number of scheme benefits in line with WebTAG guidance. In addition to the quantified scheme impacts the qualitative assessment undertaken within Stage 2 for a number of the other impacts have been considered within the economic case.

2.5.2 Table 2.2 contains a summary of which impacts have been quantified and which have been assessed qualitatively.

Table 2-2: Impact Assessment

| Type of Impact | Level of Assessment |
|---|---|
| Quantitative | • Travel time savings<br>• Air quality impacts<br>• Vehicle operating cost changes<br>• Greenhouse gas changes<br>• Accident impacts<br>• Indirect taxation impacts<br>• Scheme construction costs |
| Qualitative | • Reliability<br>• Regeneration<br>• Wider impacts<br>• Noise<br>• Journey quality<br>• Affordability<br>• Landscape<br>• Townscape<br>• Historic Environment<br>• Biodiversity<br>• Water Environment |

2.5.3 The quantification of impacts was undertaken using a pre-existent mesoscopic traffic model of the Tyne and Wear region that the Highways Agency has used for a number of other studies in the region. This model has the following characteristics:

- The model is the NE Mesoscopic Model (NESMM) which has been developed in Dynameq;
- It is a largely corridor based model covering the strategic road network (SRN);
- It models the AM (8-9) and PM (17-18) peaks, but not the Interpeak period;
- Demand is split into Cars and Trucks (no trip purposes are included in the model);
- The model is calibrated / validated to 2012 traffic count and journey time data. Validation is focussed on the strategic road network mainline and, therefore, junctions and local road network sections are not validated;
- Indicative inter peak model have been produced by factoring AM and PM peak flows;
- Future year models are available for 2020 and 2030, and include growth from committed development traffic (constrained to TEMPRO growth) and committed infrastructure changes (Coalhouse to Metrocentre scheme & Seaton Burn Pinch Point scheme); and
- No wider rerouting or variable demand effects are included in the model.

2.5.4 Outputs from this model in the form of traffic flows, speeds and journey times have been used within the economic and environmental impact assessments. The economic appraisal was generated using the following economic assumptions:

- The appraisal year is 2014;
- Scheme opening years between 2020 & 2022;
- Costs and benefits are appraised over the period from the current year (2014) to 60 years after scheme opening;
- Risk & uncertainty applied to investment costs;
- Investment costs distributed between year 1 (2014) and opening year;
- All costs and benefits converted to 2010 prices;
- All costs and benefits discounted to 2010 present values;
- The market price adjustment factor is assumed at 19.0% in line with WebTAG;
- Discounting is applied at 3.5% up to 30 years from scheme opening followed by 3.0% for the remainder of the appraisal period;
- Delays during construction have not been estimated or included at this stage;
- Benefits are modelled in 2020 and 2030 (these are the future years available in the mesoscopic model), interpolated for the interim years and assumed to remain constant after 2030;
- PV Benefits are calculated for travel time savings, air quality impacts, vehicle operating cost changes, greenhouse gases and accidents;

- Air quality impacts have been assessed based on model outputs using a hybrid approach combining both the damage cost and marginal abatement cost methodologies from WebTAG. This approach involves estimating the cost of the health & materials (e.g. buildings) impacts of air quality and the cost of mitigating changes in air quality. The changes in air quality resulting from the scheme are estimated based on outputs from the traffic model;
- Travel time savings, vehicle operating costs and changes in greenhouse gases are calculated using the values and formulas provided in WebTAG and outputs from the traffic model of journey times, distances and speeds;
- Accident benefits are calculated using the Cost and Benefit to Accidents – Light Touch software produced by the DfT (COBALT);
- Traffic growth is assumed to be zero after 2030; and,
- Indirect taxation impacts are estimated using the formulae in WebTAG.

2.5.5 Table 2.3 presents a summary of the economic case values for each scheme while the scoring of the non-quantified impacts is presented in Table 2.4.

Table 2-3: Economic Case Results

| Scheme | Outturn Cost Range | Range of Present Value of Cost (PVC) | Present Value of Benefits (PVB) | Benefit Cost Ratio (BCR) Range |
|---|---|---|---|---|
| J65 – J67 | £350m - £530m | Initial: £280m - £330m<br>Adjusted[1]: £70m – £110m | £350m - £500m | Initial: 1.0 to 2.0<br>Adjusted: >3.0 |
| J71 – J73 | £50m - £70m | £30m - £50m | No benefit | No BCR |
| J74 – J79 | £140m - £180m | £100m - £130m | Over £1,000m | >4.0 |
| Technology | £170m - £220m | £120m - £150m | £0m - £100m | 0.0 to 1.0 |
| Junction Interventions | £10m - £17m | £7m - £12m | Not calculated | >2.0 |

1 The adjusted case includes an estimate of the cost for replacing Allerdene Bridge in the Do Minimum scenario as this will ultimately be required whether or not the J65 – J67 scheme is delivered

Table 2-4: Qualitative Assessment Results

| Scheme | Reliability | Regeneration | Wider Impacts | Noise | Journey Quality | Affordability | Landscape | Townscape | Historic Environment | Biodiversity | Water Environment |
|---|---|---|---|---|---|---|---|---|---|---|---|
| J65 – J67 | 7 | 6 | 7 | 5 | 5 | 5 | 2 | 2 | 2 | 2 | 3 |
| J71 – J73 | 5 | 5 | 4 | 3 | 5 | 3 | 3 | 3 | 3 | 3 | 3 |
| J74 – J79 | 6 | 6 | 5 | 3 | 5 | 5 | 3 | 3 | 2 | 3 | 3 |
| Technology | 6 | 4 | 4 | 4 | 5 | 5 | 3 | 3 | 3 | 3 | 3 |
| Junction Interventions | 5 | 4 | 4 | 3 | 4 | 5 | 3 | 3 | 3 | 3 | 4 |
| *Impact Scale* | 1 = Large Adverse | 2 = Moderate Adverse | 3 = Slight Adverse | 4 = Neutral | 5 = Slight Beneficial | 6 = Moderate Beneficial | 7 = Large Beneficial | | | | |

## 2.6 Financial Case

2.6.1 The financial cases for the schemes consist of an estimate of the scheme costs and funding arrangements. The cost estimates presented in Table 2.3 have been developed by HA Commercials for use within the economic assessments. They have applied a risk based approach to developing these costs and therefore present a P10, P50 and P90 estimate (respectively 90%, 50% and 10% probability that the costs will exceed the values presented).

2.6.2 Within the SOBCs the P50 costs have been used as the central estimate with the P10 and P90 costs used to produce the cost ranges.

2.6.3 HA Commercials state that they apply 'project risk' rather than optimism bias to the cost estimates. The level of risk was appraised on a scheme by scheme basis but the typical values of project risk for the A1 NGWB schemes were around 20% of the base cost for the mainline schemes and 14% of the base cost for the junction improvements.

2.6.4 In addition to the base cost + 'project risk' additional contingencies were added as 'uncertainty' which was typically valued at 2% of the base cost for the mainline schemes and 16% of the base cost for the junction interventions.

2.6.5 Finally, on top of base cost + 'project risk' + 'uncertainty' programme risk was added. This equates to a value of approximately 10% of the cost of base cost + 'project risk' + 'uncertainty' across all schemes. In summary:

- Mainline scheme Total Risk, Uncertainty & Programme Risk value is approximately 34% of the base cost estimate; and

- Junction interventions Total Risk, Uncertainty & Programme Risk value is approximately 43% of the base cost estimate.

2.6.6 It should be noted that these risk levels are slightly lower than those recommended by WebTAG for optimism bias (44% for highway schemes and 66% for schemes involving fixed links such as bridges or tunnels).

2.6.7 It has been agreed across the feasibility studies that operating and maintenance (O+M) costs are not to be included in the scheme appraisal apart from where the options are likely to introduce significant additional costs due to the inclusion of infrastructure such as tunnels. HA Commercials have however estimated likely changes to O+M costs resulting from each of the schemes. These are shown in Table 2.5 for the A1 NGWB schemes.

Table 2-5: O+M Cost Estimates

| Scheme | Total O+M Costs (60 year total, Q2 2013 prices) | O+M Cost per year (Q2 2013 prices) |
|---|---|---|
| J65 – J67 | £20m - £30m | £330k - £500k |
| J71 – J73 | <£1m | <£17k |
| J74 – J79 | <£1m | <£17k |
| Technology | £50m - £60m | £830k - £1m |
| Junction Interventions | Total £1m - £5m | Total: £17k - £83k |

2.6.8 A sensitivity test on the BCR values of including these O+M costs within the assessment indicates that they are not of sufficient magnitude to significantly alter the values for any of the schemes.

2.6.9 Whilst the majority of scheme funding would be required to come from DfT budgets there is the opportunity to explore developer contributions towards the capital costs of the schemes where they are located in the vicinity of development proposals that require improvement to the SRN. This would reduce the level of funding required by the public sector. This is especially relevant between J74 – J79 where there are a number of large developments proposed in the vicinity.

## 2.7 Commercial Case

2.7.1 Those schemes which enter the next stage of assessment, will be managed by the Project Control Framework (PCF). Each of these schemes will be placed in PCF Stage 1 (Option Identification) of Options Phase.

2.7.2 Key outputs/ deliverables of this stage will be;

- To identify the options to be taken to public consultation;
- Assess options in terms of environmental impact, traffic forecasts and economic benefits;
- Refine the cost estimate of options (including an allowance for risk);
- Appraisal Specification Report;
- Options Estimate;
- Economic Assessment Report;
- Traffic Forecasting Report;
- Technical Appraisal Report;
- Statement of Intent;

- Public Consultation Strategy;
- Statutory Undertaker Estimates; and
- Departures from Standards Checklist.

2.7.3 Interim Stage Gate Assessment Review (SGAR) and SGAR 1 at the end of Stage 1 will measure the success of the scheme and will provide evidence for the SRO and key stakeholders to ensure the scheme remains viable.

2.7.4 The HA is currently in the process of developing a new procurement framework for the delivery of major highway schemes known as the Collaborative Delivery Framework (CDF). It will provide a procurement route for any project over £15m thus avoiding individual OJEU procurement events. The principles of the CDF are to achieve continuous improvement in health and safety, sustainability, quality, time and cost.

2.7.5 Due to the size and nature of schemes that may be procured, the HA has split the framework into 4 lots (1 design and 3 construction). The lot structure should stimulate development and provide opportunities to encourage entry by suppliers with a broad range of capabilities.

2.7.6 The Project Team would appoint suppliers through CDF to develop the schemes further. The contract will be managed through the HA contract Terms and Conditions and suppliers will be measured against the Measuring Success Toolkit (MST) and will be measured and evaluated on a bi-monthly basis. The HA project team will be supported by specialists to ensure contract compliance. Earned Value Management techniques will also be used at the end of each month to assess the contractor's performance against the cost and schedule forecasts.

2.7.7 Financial governance will be in accordance with the Highways Agency Investment Control Framework. Payment will be made in accordance with the terms and conditions of the contract and within the targets set out in the Governments Prompt Payment Initiative. Suppliers will be paid monthly interim accounts, based on work done, through a dedicated Project Bank Account.

## 2.8 Management Case

*Project Governance*

2.8.1 The project will be governed by a Project Board. The Project Board includes the SRO, Senior User and Senior Supplier. The board is supported by the Project Manager and various technical specialists from the Highways Agency and supply chain at the request of the SRO. The Project Board will be appointed as part of starting up the project.

2.8.2 Assurance for the project will be carried out under the Highways Agency ICF processes, Highways Investment Board, and internal Major Project procedures, such as the Project Control Framework. On entry to the Project Control Framework the scheme will be subject to peer reviews and audits such as OGC Gateway Reviews and Stage Gate Assessment Reviews.

*Risk Management*

2.8.3 A proportionate level of assessment has been undertaken to date, at an appropriate level of detail for a feasibility study. The key risks are:

1. The findings of the feasibility study are indicative; therefore there is a risk that the value for money assessments could change as a result of further assessment using a bespoke transport modelling tool in the next stage.

2. The scheme concepts have been based on designs developed within previous studies of the route. Detailed design may identify issues which mean that the concepts are not deliverable as they stand.

3. The forecast cost of the schemes identified by the feasibility study are an order of magnitude estimate. Therefore there is a risk that the costs are likely to change when the solution is designed.

4. The assessment of the technical feasibility and deliverability of options undertaken as part of the feasibility study is heavily reliant on engineering judgement and may change as a result of further assessment in the future.

5. Lands cost estimates (where required) have been prepared as a desktop exercise as part of the feasibility study. There is a risk that the costs and time associated with acquiring land may change as a result of further consideration in the next stage.

6. Broad assumptions have been made about the time required for acquiring land and following statutory planning processes (where applicable). Therefore there is a risk that these processes will take longer and be more costly than have been assumed, once these issues are considered in more detail.

2.8.4 On entry to the Project Control Framework, a risk workshop will be held to identify the delivery risks to each scheme.

*Project Plan*

2.8.5 Indicative project plans for the delivery of each of the schemes have been developed in line with the PCF process. Table 2.6 provides an overview of these plans.

Table 2-6: Indicative Project Plan

| PCF Stage | Completion Date |
|---|---|
| PCF Stage 1: Options Identification | 2015 |
| PCF Stage 2: Options Selection | 2016 |
| PCF Stage 3: Preliminary design | 2018 |
| PCF Stage 4: Statutory Procedures and Powers | 2018 |
| PCF Stage 5: Construction Preparation (Start of Works) | 2019 |
| PCF Stage 6: Construction, Commissioning and Handover Open for Traffic (Open to Traffic) | 2020 – 2022 (depending on scale of scheme) |
| PCF Stage 7: Closeout | 2020 – 2022 (depending on scale of scheme) |

2.8.6 The programmes have been developed for the delivery of each of the schemes assuming they will go through the entire PCF process and are based on milestone dates provided by HA Commercials. There could be potential to reduce the duration of these programmes if the schemes could be delivered by another route. For instance, the junction interventions could be delivered as smaller scale schemes through the MAC and the schemes that fall entirely within the existing highway boundary (J71 – J73 and J74 – J79) could be delivered using an accelerated programme in a similar manner to the Coalhouse to Metrocentre scheme.

*Communications and stakeholder management*

2.8.7 A detailed communications and stakeholder management strategy has not been developed at this stage as the schemes are not currently within a forward delivery programme. A Communications Plan was developed for the feasibility study and this will be shared to inform the development of a Communications Plan during start-up of each scheme.

2.8.8 A Stakeholder Reference Group was established for the feasibility study which included representatives from the local authorities, combined authorities, local enterprise partnership, campaigners, and other statutory bodies. The Reference Group met at the end of each stage and enabled the stakeholders to input to the study and provide feedback on the emerging findings. This was supplemented by informal stakeholder engagement exercises with local highways authorities and others as appropriate. There will be a requirement to conduct formal consultation with the public to confirm the preferred route.

2.8.9 Further consultation with statutory bodies will also be required at key milestones in line with best practise and statutory procedures. Consultation with statutory undertakers has not been undertaken as part of the feasibility study and will be done in PCF stage 1.

*Benefits Realisation*

2.8.10 The main scheme benefits and how they can be measured and monitored are listed below:

- **Journey Time Savings**: can be measured through data collected by HA and stored within HATRIS journey time database.
- **Journey Time Reliability Improvements**: can be measured through data collected by the HA and stored within HATRIS journey time database allowing the level of day to day variations to be assessed.
- **Accidents**: can be measured through collection of accident statistics

## 2.9 SOBCs Comments and Conclusions

2.9.1 Commentary on the key conclusions of the SOBCs is provided below.

*J65 – J67 Scheme*

2.9.2 The scheme to provide widening between J65 – J67 of the A1 NGWB along with a replacement of Allerdene Bridge is shown to have a high BCR if an allowance is included in the Do Minimum for the required replacement of the bridge whether or not the wider scheme goes ahead.

2.9.3 Without the assumed replacement of the bridge in the Do Minimum, the scheme is shown to generate high levels of travel time benefits but overall the result is a low BCR due to the very high scheme costs.

2.9.4 At this stage no detailed estimate is available regarding when Allerdene Bridge would need to be replaced if this scheme was not delivered, and how much it would cost to do so. However, the view of the HA and the Managing Agent Contractor (MAC) is that it is highly probable that this would be required in the medium term by around 2030 (either a complete replacement or significant maintenance of the existing structure). In the meantime there will be ongoing costs to maintain the existing bridge which are likely to increase as time goes on.

*J71 – J73 Scheme*

2.9.5 The provision of three narrow lanes on the A1 NGWB between J71 and J73 requires the closure of J72 due to width constraints. The SOBC for this scheme indicates that the disbenefits due to delays associated with rerouting on the local road network caused by the closure of J72 outweigh the mainline benefits. The overall economic case is therefore negative.

2.9.6 Currently an average flow of around 8,000 vehicles either enter or exit the A1 at J72 each day. Closing J72 means that this traffic would have to use either the Metrocentre (J71) or Derwenthaugh (J73) junctions which both currently experience congestion during certain times of the day. Adding these additional vehicles to already busy junctions will inevitably increase delays at these locations. Depending on the subsequent routes taken on the local road network additional delays will also be generated away from the A1 and its junctions as a result of the closure of J72.

2.9.7 The case for the scheme is therefore very sensitive to the modelled impact on the local road network which is relatively coarse as a result of the modelling tool available for use within this study. However, even without undertaking modelling of the local road network it is intuitive that there will be additional delays caused by the closure of J72.

2.9.8 A key benefit of the scheme would be the reduction in accidents which is a result of the closure of J72 leading to fewer vehicles on the weaving / merging section between J72 and J71. The monetary value of the accident saving is not significant enough to alter the BCR of the scheme.

*J74 – J79 Scheme*

2.9.9 Providing three narrow lanes between J74 – J79 is shown within the SOBC to have a high BCR. This is therefore the best performing of the schemes. The very high benefits

are driven by a very high level of journey time savings which are much greater than those generated by the J65 – J67 scheme and the scheme cost is just over a third of that for J65 – J67.

2.9.10 The magnitude of the journey time savings generated by this scheme is a result of the very large delays along this section of the A1 NGWB in the Do Minimum scenario caused by traffic growth generated by the high level of committed development in this area.

2.9.11 The modelling work undertaken did not include any variable demand modelling (VDM) due to constraints with the software used. If VDM had been applied it is likely that the Do Minimum delays would be lower than those predicted by the modelling undertaken as VDM would reduce the number of vehicles travelling in the very congested peak hours to represent drivers choosing to travel at different times of day or by other modes. A reduction in Do Minimum delays would likely cause a reduction in overall scheme benefits, however, given the very high level of benefits predicted this would be unlikely to alter the BCR value of this scheme.

2.9.12 The key risk to this scheme is the disbenefit caused in non-congested time periods by the reduction in speed limit from 70mph to 50mph. The extent to which this offsets the benefits accrued during the congested time periods is critical for the scheme BCR value. In the modelling undertaken for the feasibility study, the benefits were found to far outweigh the disbenefits, with even the inter peak experiencing congestion by 2030, however, more detailed modelling would be required in the future to test this impact.

2.9.13 The accident impacts for each of the schemes have been calculated using the standard COBALT approach which is based on outputs from the traffic model used to quantify the other scheme benefits. For the other schemes this approach is sufficient, however for the J74 – J79 scheme the estimated increase in accidents forecast by COBALT was considered unrealistic. COBALT does not consider a speed limit of 50mph to be safer than a speed limit of 70mph which is counter-intuitive especially as a 50mph speed limit would be introduced as part of this scheme for safety reasons.

2.9.14 As a sensitivity test, the impact on accidents of the reduction in speed limit from 70mph to 50mph on the Birtley to Derwenthaugh section of the A1 in 2010 was investigated. This change in speed limit was found to lead to a reduction in the number of accidents on the route. A bespoke accident rate was therefore calculated from this data and used within the assessment of accidents for the J74 – J79 scheme leading to a forecast accident saving.

*Technology Scheme*

2.9.15 The scheme to deliver technology (MIDAS, CCTV & VMS) along the corridor is aimed at providing better management of traffic on the route and reducing the impact of incidents when they do occur. However, using the current guidance for appraisal of technology schemes this option is found to have a low BCR value with the large scheme costs outweighing the quantifiable benefits that are generated.

2.9.16 Key benefits of the technology scheme are strategic rather than quantifiable with potential linkage of the system with similar local technology provision such as the Tyne and Wear UTMC system to manage traffic across the region as a whole. Linkage with the local road network system is especially strategic given the high proportion of local trips using the A1 in this area. Future uses of the technology could include integrating the system with local public transport such as P&R sites to direct drivers onto alternative modes to avoid highway congestion. As a consequence there is significant stakeholder support in the

local authorities for a technology scheme and although it is difficult to assess the strategic benefits it is intuitive that driver information, MIDAS and CCTV coverage would provide benefits to the management of the network and accidents.

2.9.17 The risk to the case presented in the SOBCs for this option is that the current approach to quantifying benefits of technology schemes is relatively high level in its scope. Post Opening Project Evaluation (POPE) carried out on a recently installed technology scheme on the A14 indicated that the benefits are 43% higher than the initial business case predicted. The level of benefit forecast within the SOBC may well be conservative and the case for the scheme better than that presented.

*Junction Interventions Schemes*

2.9.18 A series of smaller scale junction interventions are included in the SOBC for this scheme. Given time constraints and lack of availability of a modelling tool suitable to assess these schemes the assessment in the SOBC is entirely qualitative with indicative BCR values assigned to each of the seven interventions.

2.9.19 The key benefit of these options is to reduce delay at the junctions off the A1 NGWB corridor and mitigate the potential for queuing traffic to block back onto the A1 mainline. Based on experience of similar junction improvement schemes elsewhere these kind of improvements typically result in BCR values greater than 2 due to the relatively small cost of delivery. The main risk to this assumption is the lack of any traffic modelling to determine whether the suggested improvements will actually tackle the problems sufficiently and also whether the problems are of sufficient magnitude to warrant the interventions.

# 3 Scheme Combinations

## 3.1 Introduction

3.1.1 The SOBCs that have been produced present the cases for delivering each of the schemes in isolation. It may be that more than one of the schemes could be delivered on the A1 NGWB. This chapter discusses the potential impacts of delivering more than one of the schemes together.

## 3.2 Effect of Scheme Combinations on Impacts

3.2.1 There is potential that the delivery of more than one of the schemes presented in the SOBCs could result in impacts that are greater (or smaller) than the sum of the individual scheme impacts.

3.2.2 The feasibility study has not included detailed modelling or assessment of the different available combinations of schemes. Rather, the following sections provide an indicative and qualitative discussion of the potential effects on scheme impacts of delivering more than one of the proposed schemes.

### J65 – J67 WIDENING INCLUDING ALLERDENE REPLACEMENT PLUS…

- *…J71 – J73 provision of 3 narrow lanes including J72 closure*
    - As the Stage 1 evidence suggested that a significant amount of traffic on the A1 NGWB remains entirely to the north or south of the River Tyne (Blaydon Bridge) it is unlikely that significant traffic volumes from the J65 – J67 section also pass through J71 – J73 which is just prior to Blaydon Bridge so any combined impact is likely to be relatively small.
    - Additional capacity at J65 – J67 will release some extra northbound traffic which may impact on J71 – J73 especially at the J73 end of the scheme where the A1 NGWB would reduce from three to two lanes. Without the J71 – J73 scheme this impact would potentially be more significant and occur at the current point where the route reduces to two lanes (J72) rather than further north.
    - Similarly in the southbound direction any southbound traffic released by the J71 – J73 scheme may have a minor impact on the J65 – J67 section. Without the J65 – J67 scheme this impact would potentially be more significant.
    - Provision of both schemes together would mean that the A1 NGWB would be three lanes all the way from J63 to J73 albeit with varying lane widths and speed limits. This would have the positive effect of increased capacity along the whole stretch. Negative effects might be an additional bottleneck where the route drops back to two lanes (J73) which could be exacerbated by additional traffic being attracted to the route by the capacity increases further south.

- *…J74 – J79 provision of 3 narrow lanes*
    - As noted above, the Stage 1 evidence suggested that a significant amount of traffic on the A1 NGWB remains entirely to the north or south of the River Tyne (Blaydon Bridge) so it is unlikely that significant traffic volumes from the J65 – J67 section also pass through J74 – J79 and therefore any combined impact is likely to be relatively small.
    - The modelling suggests that without the J74 – J79 scheme in place there will be significant congestion in this section, especially by 2030. This means that the proportion of traffic travelling from here down to J65 – J67 would be constrained if the J74 – J79 scheme is not constructed and therefore there may be suppression of some of the benefits of the J65 – J67 scheme.
    - Delivery of this scheme as well as the J65 – J67 scheme would mean that a significant proportion of the A1 NGWB would be three lanes. However there would continue to be a two lane section in the middle, either from J71 – J74 or across Blaydon Bridge (J73 – J74) if the J71 – J73 scheme was also delivered. Whilst the Blaydon Bridge section is not a significant issue at present and traffic volumes are lower here than on surrounding sections of the route, improvements both north and south may lead to increased flows here along with associated congestion issues.
- *…Technology Option: MIDAS, VMS & CCTV*
    - See comments below
- *…Junction Interventions*
    - Two of the junction interventions sit within the extents of the J65 – J67 scheme: J65 – Birtley; and J66 – Eighton Lodge. The delivery of these schemes will safeguard the benefits delivered by the J65 – J67 mainline improvements by reducing the potential for queues from offline junctions impacting on the mainline.
    - Given that the junction improvements are all relatively small scale, the impact of delivering any of those outside of J65 – J67 is unlikely to lead to any significant combined impacts with the J65 – J67 scheme.

### J71 – J73 PROVISION OF 3 NARROW LANES INCLUDING J72 CLOSURE PLUS…

- *…J65 – J67 widening including Allerdene Replacement*
    - See comments above
- *…J74 – J79 provision of 3 narrow lanes*
    - It is not forecast that the J71 – J73 will release a lot of additional traffic as it is a relatively small scale scheme with a small level of benefit on the A1. Furthermore between this scheme and the J74 – J79 scheme there is Blaydon Bridge which is remaining as two lanes so any combined impacts due to delivering both of these schemes are likely to be small in scale.
- *…Technology Option: MIDAS, VMS & CCTV*
    - See comments below
- *…Junction Interventions*
    - Two of the junction interventions sit within the extents of the J71 – J73 scheme: J71 – Metrocentre; and J72 – Swalwell. The delivery of the J71 scheme will help to safeguard the A1 mainline benefits delivered by the J71 – J73 mainline improvements by reducing the potential for queues from this offline junction impacting on the mainline.
    - As the closure of J72 is part of the J71 – J73 scheme this would no longer need to be considered as an individual junction intervention if the J71 – J73 scheme was delivered.
    - Given that the junction improvements are all relatively small scale, the impact of delivering any of those outside of J71 – J73 is unlikely to lead to any significant combined impacts with the J71 – J73 scheme.

### J74 – J79 PROVISION OF 3 NARROW LANES PLUS…

- *…J65 – J67 widening including Allerdene Replacement*
    - See comments above
- *… J71 – J73 provision of 3 narrow lanes including J72 closure*
    - See comments above
- *…Technology Option: MIDAS, VMS & CCTV*
    - See comments below
- *…Junction Interventions*
    - One of the junction interventions sits within the extents of the J74 – J79 scheme: J79 – North Brunton. The delivery of the J79 scheme will help to safeguard the A1 mainline benefits delivered by the J74 – J79 mainline improvements by reducing the potential for queues from this offline junction impacting on the mainline.

- Given that the junction improvements are all relatively small scale, the impact of delivering any of those outside of J74 – J79 is unlikely to lead to any significant combined impacts with the J74 – J79 scheme.

#### TECHNOLOGY OPTION: MIDAS, VMS & CCTV PLUS…

- *…mainline schemes*
  - The technology option covers the whole of the A1 NGWB route and would work in tandem with the mainline schemes to improve journey time reliability along the route.
  - Given that the benefits of the technology option are based on assumed reductions in delays and reliability issues resulting from the option, any other scheme along the route that delivers similar benefits such as widening schemes may erode the level of benefit that can be delivered by the technology option.
  - In the situation where the technology option is not delivered at the same time as the mainline schemes there is potential for including some of the required technology infrastructure within these schemes such as suitable ducting for the cables. This will reduce the costs of any future scheme to install technology.
- *…Junction Interventions*
  - The technology option covers the whole of the A1 NGWB and therefore would work in parallel with the junction interventions to maintain reliable journey times. However it is considered unlikely that the scale of impact of delivering these two schemes together will be greater or less than the sum of the individual impacts given the relatively small scale of these impacts.

#### JUNCTION INTERVENTIONS PLUS…

- The impact of delivering this scheme in combination with the other four schemes is covered by the sections above.

### 3.3 Corridor-wide Intervention

3.3.1 The section above details some of the potential impacts of delivering more than one of the proposed schemes along the A1 NGWB corridor. The final combination to consider is a corridor-wide set of interventions where all or nearly all of the schemes are delivered in tandem.

3.3.2 If all the schemes presented within the SOBCs were delivered, the A1 NGWB corridor would have at least three lanes in each direction between J65 (Birtley) and J80 (Seaton Burn) except for a short section over the River Tyne (Blaydon Bridge) between J73 and J74. In addition, technology would be provided along the length of the route and junctions where queues may start to impact on the mainline would have been improved to mitigate this potential issue.

3.3.3 It should be noted that the three lane provision resulting from corridor-wide intervention would be of different standards (narrow / standard width lanes) with different speed limits (50mph or 70mph) at different points of the corridor. However, it would be fairly consistent with the southernmost part up to J67 consisting of full width lanes and 70mph speed limit and the rest of the corridor operating at 50mph with narrow lanes.

3.3.4 Given that the middle section covering Blaydon Bridge will remain at two lanes even if all the interventions are delivered, the argument for delivering all the schemes in order to provide three lanes consistently across the corridor is not considered to be a valid one (especially as some locations include lane gain / lane drop arrangements and therefore effectively four lanes between some junctions). The best approach is therefore deemed to be to consider each intervention on its own merits, whilst accounting for the potential combined impacts detailed in the section above, rather than treating the schemes as a corridor-wide package to be delivered together. Alternatively a further scheme to provide three lanes for the whole middle section including Blaydon Bridge could be considered, although the sifting process indicated that this is not currently a priority especially given deliverability challenges and the cost of such a scheme.

### 3.4 Effect of Scheme Combinations on Costs & Delivery

3.4.1 The major benefit of constructing multiple improvement schemes on the A1 NGWB would be the reduction of the overall construction programme and therefore disruption to road users and local residents. Due to high traffic levels on the A1, works would be restricted to night time working due to the need to maintain 2 lanes of traffic during the peak periods and throughout the day. As such, due to restrictions which would be imposed on the contractor, disruption through the day should be similar to the current situation. Undertaking multiple improvement schemes at the same time, would also remove the negative publicity of completing one set of works and then immediately moving further up the route and commencing further works.

3.4.2 Combining a number of improvement schemes would also provide the advantage of the project attracting only one set of preliminary costs and site set up costs. Overall, this should provide a reduction in overall construction costs.

3.4.3 The current traffic model indicates that during the peak periods, less than 5% of traffic on the A1 NGWB travels the full length of the route. As such, there is only a small proportion of traffic that would be affected by construction works both to the north and south of the River Tyne.

3.4.4 One large site potentially offers more opportunities for the recycling of excavated materials within the permanent works, therefore reducing the materials that would need to be removed from site to landfill resulting in a more sustainable design and an overall reduction in construction costs. Disruption caused to local residents by the delivery of materials to site would also be reduced, as although there will be more deliveries throughout the construction period, the disruption would be for a shorter period of time.

3.4.5 Completing multiple improvements concurrently would result in the additional capacity on the A1 being delivered earlier than if the schemes were completed individually. This would also allow the local authorities to pursue their development aspirations at an earlier stage thereby allowing the region to benefit at the earliest opportunity from the positive impact the infrastructure improvements would have on the economy.

### 3.5 Conclusions

3.5.1 Based on the discussion within this chapter of the report, and the SOBC conclusions, it is considered that the optimum combination of schemes for the A1 NGWB would be to deliver the J65 – J67 widening scheme and the J74 – J79 scheme together. As part of the delivery of these schemes the junction interventions along these sections of the route could be investigated in more detail to understand whether these are required in order to maintain the mainline benefits of the schemes.

3.5.2 Based on the current BCR for the technology scheme it does not form part of the optimum combination of schemes, however, the provision of technology has wider strategic benefits for the whole route rather than just being focused on specific sections so has a strong strategic case. Including elements of the technology scheme within any mainline options that are delivered will reduce the cost of delivering the technology option in the future. The mainline schemes could therefore be constructed with the necessary ducting in place to enable the provision of a technology scheme at a later date. It should be noted however that the mainline schemes would tackle a number of the issues that the technology scheme aims to deal with which might erode some of the technology scheme benefits along the specific sections that are improved.

3.5.3 As the whole of the technology option is required in order to deliver the scheme benefits it is not possible to deliver a reduced scale technology option on certain sections of the route. It is therefore not feasible to add the technology improvements into the delivery of individual mainline schemes without reducing the overall BCR of these schemes.

3.5.4 The J71 – J73 scheme is shown to lead to an overall disbenefit and so is not considered to form part of the optimum scheme combination.

3.5.5 The optimum scheme combination suggested here would lead to an A1 NGWB corridor with three traffic lanes on the most congested parts of the route and two lanes on the middle section which currently carries less traffic and experiences fewer issues.

# 4 Further Work - Design

## 4.1 Introduction

4.1.1 This section outlines enhancements to the scheme designs that could be considered should they be progressed beyond this feasibility study. The two main areas of focus are:

- **Non-Motorised User (NMU) enhancements**: any improvements to existing NMU provision that could be delivered along with the scheme to reduce severance caused by the A1 NGWB; and
- **Junction enhancements**: any improvements to the A1 junctions that sit within each scheme extent that could be delivered alongside the mainline intervention or any changes to junctions on the local road network (LRN) that would complement the mainline schemes.

## 4.2 NMU Enhancements

4.2.1 The current NMU facilities along the extent of each of the schemes have been reviewed and potential enhancements that could be delivered alongside the improvement schemes have been identified. Tables 4.1 to 4.4 contain the results of this analysis for each of the four location specific schemes (it is considered unlikely that NMU provision could be improved as part of the delivery of the technology option).

Table 4-1: Potential NMU enhancements to include with J65 – J67 scheme

| Location | Facility | Current Provision | Comments |
|---|---|---|---|
| J65 Birtley (A1231) | Road over-bridge | A narrow pedestrian footway is provided on the road bridge that passes over the A1 (M) at J65 Birtley. This provides access between residential developments located to the west and east of the A1(M). | Pedestrian use possibly limited. Pavement condition and footway widening to standard will improve provision. |
| North of J65 Birtley | Footbridge | A pedestrian footbridge is provided to allow access between residential development on the west and the largely undeveloped area to the north east of J65 Birtley. Disabled access to the bridge is not provided. | Improve ramps leading to the footbridge on the east of the A1 to accommodate disabled access. |
| J66 Eighton Lodge | Grade separated road underbridge junction (roundabout) | Cycle and pedestrian provisions provided under the A1(M) road bridges leading towards Gateshead to the east of the A1 and A167 on the west. Uncontrolled crossings at the junction. The junction is part signalised. Cyclists and pedestrians use the same footway which is not sufficiently wide to accommodate both.<br>The Angel of The North is also located in close proximity on the east of the A1 with a pedestrian footway provided from J66. | Provide Toucan crossing at the junction to accommodate pedestrian movement between Birtley and Gateshead (Durham Road and B1296). Also, widen footway to accommodate both pedestrian and cycle use. |
| J67 Coalhouse | Grade separated road underbridge junction (roundabout) | Pedestrian footways are provided under the A1 (M) road bridges but with no drop-down kerbs. Team Valley Trading Estate is located on the east of the A1 with little development to the west. | Possibly little use by pedestrians as most of the development is on the east of A1. Drop-down kerbs can be provided to improve pedestrian movement at the junction. |

Table 4-2: Potential NMU enhancements to include with J71 – J73 scheme

| Location | Facility | Current Provision | Comments |
|---|---|---|---|
| J73 Derwenthaugh | Cycle track under road bridge | A **Sustrans National Route (C2C number 14)** passes underneath the highways bridge. The cycleway is in a relatively poor condition. A pedestrian footway is also provided along one side of the road which terminates on the east of the A1. | General improvement to Sustrans route to the east of the A1 in terms of cycleway pavement. Industrial estate on the east, the pedestrian movement across the A1 at this location is likely to be limited. There is no footway provided to the industrial estate from the residential area to the west. |

Table 4-3: Potential NMU enhancements to include with junction intervention schemes

| Location | Facility | Current Provision | Comments |
|---|---|---|---|
| J62 Carrville | Grade separated road over-bridge junction (roundabout) | Pedestrian footway provided along one side of the bridge for access from a housing estate located to the east of the A1(M) and an industrial unit/caravan site located to the west. Footway leading to/from the bridge in relatively poor condition and is narrow in width with uncontrolled pedestrian crossing at the junction. | Improve condition of existing poor footway pavement, relocate traffic sign located in the middle of the footway and widen footway to standard width. The use of the footway is likely to be limited due to little development on the west of the A1(M). |
| J65 Birtley (A1231) | Road over-bridge | A narrow pedestrian footway is provided on the road bridge that passes over the A1 (M) at J65 Birtley. This provide access between residential developments located to the west and east of the A1(M). | Pedestrian use possibly limited. Pavement condition and footway widening to standard will improve provision. |
| J66 Eighton Lodge | Grade separated road underbridge junction (roundabout) | Cycle and pedestrian provisions provided under the A1(M) road bridges leading towards Gateshead to the east of the A1 and A167 on the west. Uncontrolled crossings at the junction. The junction is part signalised. Cyclists and pedestrians use the same footway which is not sufficiently wide to accommodate both.<br>The Angel of The North is also located in close proximity on the east of the A1 with a pedestrian footway provided from J66. | Provide Toucan crossing at the junction to accommodate pedestrian movement between Birtley and Gateshead (Durham Road and B1296). Also, widen footway to accommodate both pedestrian and cycle use. |
| J79 North Brunton | Grade separated road underbridge junction (roundabout) | A wide pedestrian and cycle footway provided on one side of the road underbridge allowing pedestrians and cyclists to travel from Great Parkway and access Rotary Way to the east of the A1. Uncontrolled crossings are provided. This is part of a **Sustrans Local Route.** | Provide Toucan crossing on the north side of the junction. |

Table 4-4: Potential NMU enhancements to include with J74 – J79 scheme

| Location | Facility | Current Provision | Comments |
|---|---|---|---|
| South of J75 Denton Burn (Broadwood Road) | Footbridge | A pedestrian footbridge is provided over the A1 with residential areas located on both sides. This footbridge is also a **Sustrans local route (Tyneside Cycling).** Disabled access is **not** possible. | Footbridge appears to be narrow for pedestrian and cycle use, approx. 1.9m. Ramps to the bridges do not accommodate cyclists or provide disabled access. Replace footbridge. |
| North of J75 (Tebay Drive) | Footbridge | A pedestrian footbridge is provided over the A1 connecting the two residential areas located on both sides of the A1. The footbridge is approx. 2m in width and only suitable for pedestrian use. Disabled access is not possible. | Disabled access not provided, improve ramps leading to the footbridge to provide disabled access. No provisions for cyclists – footbridge would need to be replaced to accommodate both pedestrians and cyclists. |
| North of J76 (Chessar Ave) | Footbridge | A footbridge is provided over the A1 connecting the two residential areas located on both sides of the A1. The footbridge is approx. 2m in width and only suitable for pedestrian use. Disabled access is not fully possible. | Provide ramp on the west side of the footbridge for disabled access. No cyclist provisions are provided, however nearby J76 provides sufficient access for cyclists. |
| J77 Kenton Bar | Road over-bridge | Pedestrian footways are provided along one side of the road bridge over the A1 connecting the two residential areas located on both sides of the A1. Only uncontrolled crossings are provided. Junction part signalised. | Limited pedestrian access only on one side of the bridge, potential to provide a toucan crossing. |
| South of J78 (Warwick Ct) | Footbridge | A footbridge is provided over the A1 which is a **Sustrans local route (Tyneside Cycling).** The footbridge connects two residential areas that are located on both sides of the A1. The footbridge is approx. 2m in width. Disabled access is possible. | Footbridge not suitable for both pedestrians and cyclists. Restrict cycle access as nearby bridge has sufficient access for cyclists. |
| J78 Kingston Park | Grade separated road over-bridge junction (roundabout) | Pedestrian footways are provided along one side of the road bridge providing access to both sides of the A1. This is also part of the **Sustrans local route (Tyneside Cycling).** Junction not currently signalised. | Provide toucan crossing. At present pedestrian provisions are uncontrolled. |
| J79 North Brunton | Grade separated road underbridge junction (roundabout) | A wide pedestrian and cycle footway provided on one side of the road underbridge allowing pedestrians and cyclists to travel from Great Parkway and access Rotary Way to the east of the A1. Uncontrolled crossings are provided. This is part of a **Sustrans Local Route.** | Provide Toucan crossing on the north side of the junction. |

## 4.3 Junction Enhancements

4.3.1 As part of the delivery of any of the three A1 NGWB mainline improvement schemes there is potential for the junctions along the associated section of the route to also be improved. Detailed development of designs for these junction enhancements has not been undertaken as part of this feasibility study so these would need to be looked at subsequently should any of the mainline improvement schemes be progressed.

4.3.2 Two types of junction enhancement should be considered:

- **Junctions adversely impacted by mainline scheme delivery**: if the mainline scheme is predicted to have an adverse impact on any LRN junctions through release of additional traffic, improvements to these junctions should be considered; and
- **A1 Junctions with existing or predicted issues**: if any of the junctions off the A1 have existing or predicted issues improvements should be considered.

4.3.3 To identify the need for any junction enhancements in the first category a wider area model would be required to fully reflect the conditions on the LRN and the impact of improvements on the A1 NGWB mainline.

4.3.4 Discussions were had with stakeholders to understand if there are any areas on the LRN that would be of concern if the mainline schemes were delivered. The result of this consultation was that the LRN around Swalwell would be of concern if J72 was shut as part of the J71 – J73 scheme. It was also stated that a number of improvements to the LRN in Newcastle have already been made, or are committed, which are aimed at dealing with the impact of any A1 NGWB mainline improvements between J74 – J79.

4.3.5 Stakeholders reiterated the importance of undertaking wider area modelling to fully investigate the LRN impact of the schemes.

4.3.6 Stakeholders were also asked which of the A1 junctions are considered to be an issue and are not the subject of a committed improvement scheme. The following junctions were identified:

- **J68 Lobley Hill**: there are a number of ongoing issues at this junction with queuing in peak periods. The stakeholders felt that there is also uncertainty around how the Coalhouse to Metrocentre scheme will impact this junction especially in light of the recent Maingate roundabout scheme.
- **J75 Denton Burn**: there are a number of ongoing issues at this junction with queuing in peak periods. The recent signalisation scheme may not be sufficient to deal with the impact of forecast additional traffic generated by development sites in the area.
- **J77 Ponteland Road**: there are a number of ongoing issues at this junction with queuing in peak periods. There might be potential to fully signalise this junction.
- **J79 North Brunton and A1056 Sandy Lane roundabout**: there are significant queues at the A1056 Sandy Lane roundabout which impact on the operation of J79. This is predicted to worsen in the future with potential for impacts on the A1 NGWB mainline.

4.3.7 It is recommended that improvements to these junctions are considered as part of any A1 NGWB mainline scheme in the area.

# 5 Further Work - Assessment

## 5.1 Introduction

5.1.1 WebTAG guidance does not prescribe the exact level of assessment to be undertaken for a feasibility study. Rather, the guidance recommends the use of existing transport models and data and that the assessment should be predominantly desk based.

5.1.2 It is therefore considered that the assessment undertaken within this feasibility study is at the required level and that the SOBCs produced are sufficient for scheme investment decisions to be reached in all cases apart from the junction interventions scheme (where no modelling or quantification of benefits has been undertaken).

5.1.3 However, there is always scope to further improve the robustness of a scheme assessment and so this section covers the additional assessment work that could be undertaken to provide additional confidence in the scheme assessments presented within the SOBCs. This is split into four main areas:

- **Traffic Modelling**: refinements that could be made to the traffic modelling undertaken to assess the scheme benefits and any additional modelling that could be done;
- **Environmental Impacts**: further quantification of environmental impacts;
- **Other impacts:** suggested approach to quantifying other scheme impacts or increasing detail of current quantification; and
- **Costs:** cost impacts that could be quantified.

## 5.2 Traffic Modelling

5.2.1 The impacts on traffic forecasts in this feasibility study were undertaken using the Dynameq mesoscopic highway model of the Tyne & Wear region (known as NESMM). This model covers the AM and PM peak periods and is validated to 2012 base year data. Future year versions of the model representing 2020 and 2030 were used for the forecasting.

5.2.2 Due to the corridor nature of the model there are no geographically defined zones with demand being loaded on to the model network at fixed locations. The demand matrices are fixed with no demand responsiveness mechanism and only a limited representation of the LRN, and therefore no significant reflection of route choice impacts.

5.2.3 Whilst the use of this model is sufficient for feasibility study stage (and in line with the guidance to use available modelling tools) there are a number of traffic modelling elements that could be considered to add further robustness to the forecasts produced in this feasibility study. The majority of these would be a requirement if schemes were progressed beyond this study. The additional elements are as follows:

- **Wider Area Modelling**: a highways assignment model covering the wider area around the A1 NGWB would provide a number of improvements to the benefit forecasting process. Such a model would fully reflect the impacts on the LRN of any of the schemes, this is especially pertinent to the J71 – J73 scheme where the balance between mainline benefits and LRN disbenefits is crucial to the BCR value of the

scheme. A further benefit of wider area modelling would be to enable identification of LRN junctions that may need to be improved to mitigate the impact of the mainline schemes. Finally, a wider area model would also account for the potential attraction of additional traffic onto the A1 mainline if additional capacity was provided here.

- **Variable Demand Modelling (VDM)**: VDM allows an assessment of likely changes in overall traffic levels in the modelled periods due to changes in cost of travel. For instance, in the Do Minimum situation traffic demand may be suppressed due to large delays in the network and therefore additional traffic induced by the schemes. The current fixed demand approach does not account for these impacts.

- **Inter Peak Modelling:** the current model does not have a validated Interpeak but rather an indicative Interpeak based on factoring the AM and PM peaks. The Interpeak impacts are significant for the BCR value of the J74 – J79 scheme due to the potential that this scheme has for causing increased journey times in non-peak conditions as a result of the reduction in speed limit. Development of a fully validated Interpeak model would add robustness to the assessment of this scheme.

- **Multi-Modal Assessment:** the existing model covers highways only. There are a number of potential public transport schemes that are proposed which could have a complementary impact on the A1 NGWB by resulting in mode shift away from car. To fully understand the likely level of mode shift and the interaction between the A1 NGWB schemes and public transport use multi-modal modelling would be required.

- **Junction Modelling:** the mesoscopic model is not a suitable tool for assessing the benefits of the junction interventions due to the lack of detail and validation of the offline junctions. To robustly quantify the benefits of these interventions local junction models would need to be developed (either using micro-simulation or junction modelling software such as LINSIG and Transyt).

- **Modelling of Combined Schemes:** to date no modelling has been undertaken of the impacts of delivering more than one of the schemes. If more than one scheme is being considered then modelling should be undertaken of the likely combined impacts of the schemes.

- **Forecast Ranges:** the forecasting undertaken is based on a single core scenario rather than a range of forecasts using optimistic and pessimistic assumptions. To provide an assessment of the sensitivity of the results this range of forecasts could be produced.

## 5.3 Environmental Impacts

5.3.1 The environmental impact assessment undertaken for this feasibility study has been desk based and no surveys have been carried out on site. To further refine the environmental impact assessment more detailed surveys would be required which moves the assessment away from the desk based study recommended by the guidance for the feasibility study stage.

5.3.2 The assessment of air quality impacts has been carried out using the WebTAG air quality valuation workbook. This produces a regional air quality impact assessment rather than a local air quality impact assessment accounting for specific receptors. To refine the assessment more detailed traffic modelling outputs could be used (see above) and local air quality modelling should be undertaken, based on the collection of observed air quality data.

5.3.3 No noise impact modelling has been carried out to date and this would need to be carried out to provide more confidence in the assessment of noise impacts.

### 5.4 Other Impacts

5.4.1 A key impact that has not been explicitly quantified as part of the feasibility study is the wider economic impact of the schemes. Wider impacts relate to the effects of a transport intervention on markets outside transport such as those for labour, product and land. The impacts result from imperfect competition in these markets which means transport user benefits do not capture the full economic welfare impacts of an intervention.

5.4.2 The wider economic impacts capture effects which are not included in user benefits and can be significant. There are four potential categories of wider impacts for schemes in the UK:

- Output change in imperfectly competitive markets;
- Labour market supply impacts on tax revenues;
- Workers moving between more and less productive jobs; and,
- Agglomeration impacts.

5.4.3 WebTAG contains a methodology for quantifying these impacts based on examination of generalised cost changes and the socio-economic make-up of the area. This kind of assessment would need to be undertaken using an area wide model as the geographical origins and destinations of the trips are required to follow the guidance.

5.4.4 A negative impact of the schemes that has not been quantified is the cost of delay during construction. DfT's QUADRO software could be used to undertake this assessment based on proposed construction phasing and traffic management measures.

5.4.5 The Transport Users Benefit Appraisal (TUBA) software has not been utilised to carry out the economic appraisal of the schemes within the feasibility study. This was due to issues of non-compatibility with the skim files from the Dynameq model. A spreadsheet based appraisal tool was used instead. However, if wider area strategic modelling was done as part of further scheme assessment then TUBA should be used to undertake the scheme appraisal.

5.4.6 There are also WebTAG methodologies for monetising a number of other impacts as follows:

- Physical Activity;
- Noise;
- Regeneration
- Reliability; and,
- Journey Quality.

5.4.7 Whilst including these is unlikely to lead to a significant change to the BCR value of each scheme they can be quantified to provide further robustness to the economic assessment.

## 5.5 Costs

5.5.1 Construction cost estimates have been developed by HA Commercials for the A1 NGWB schemes. However, the impact on operating and maintenance costs has not been included in the assessment.

5.5.2 As indicated by the sensitivity test in Chapter 2 the maintenance cost impact of most of the schemes will be relatively small as there is not a significant amount of additional infrastructure proposed. The scheme where there will be the biggest impact is J65 – J67 where the replacement of Allerdene Bridge as part of the scheme will lead to a significant saving in maintenance costs due to ongoing issues with the existing bridge.

5.5.3 To add robustness to the economic assessments in the SOBCs more detailed analysis of the likely ongoing maintenance cost for Allerdene Bridge and the likely point at which a full replacement of this bridge becomes essential should be undertaken. HA Commercials would be required to develop a cost estimate for the replacement of the existing bridge.

5.5.4 The interim advice note produced by the HA detailing the method of assessment for technology schemes states that the assessment should include a scheme renewal cost after 15 years. At the current stage this has not been quantified and HA Commercials input would be required on this.

## 5.6 Further Feasibility Study Requirements

5.6.1 As noted in the introduction the assessment work undertaken to develop the SOBCs for the A1 NGWB schemes is at the level anticipated by WebTAG guidance for a feasibility study. A number of additional assessment areas have been identified in this chapter which would add robustness to the economic appraisal but most of these would be undertaken at a later date should any of the schemes be progressed. The remainder of this section details the additional work that could be undertaken at feasibility study stage if time were available and an estimate of the time inputs required to do so.

5.6.2 One area of assessment required at this feasibility study stage that has not been undertaken due to time constraints is the modelling of the junction interventions. The mesoscopic model used to assess the mainline schemes is not suitable for assessing these smaller scale schemes and no other models exist for each of the junctions. The assessment of these interventions done to date is therefore entirely qualitative.

5.6.3 To develop junction based models for each of the seven junction interventions would require data collection and typically around 3-4 weeks' staff time input per junction to develop the models and assess the interventions.

5.6.4 If more time were available then modelling of combined scheme impacts could be undertaken to provide evidence to back up the qualitative assessment provided in this report. To develop and run a combined scenario model typically 2 weeks' staff time input would be required per scenario.

5.6.5 Finally, on the benefit modelling side, forecast range models could be developed to provide more detailed BCR ranges for the schemes assessed using the traffic model (J65 – J67, J71 – J73 & J74 – J79). To develop high and low growth forecast matrices for three time periods and two future years and run the resultant 48 model scenarios it would require around one month of staff time input.

5.6.6 In terms of costs, the two assessments that have not been undertaken in detail that would add robustness to the SOBCs are assessment of the maintenance and renewal costs of

the existing Allerdene Bridge and the renewal cost of the technology option. For HA Commercials to develop these costs and for the SOBCs to be revised would take of the order of two months.

5.6.7 It is considered fairly unlikely that any of the additional analyses described above will significantly alter the BCR values of the schemes presented in the SOBCs.

# 6 Fulfilment of Scope

## 6.1 Introduction

6.1.1 This section contains a review of the original feasibility study scope and details how the questions raised by the scope have been answered by the work undertaken.

## 6.2 Summary of Scope

6.2.1 The overall aim of the study set out in the scope is as follows:

*"Identify the opportunities and understand the case for future investment solutions on the A1 NGWB that are deliverable, affordable & offer value for money"*

6.2.2 The specific objectives of the study were defined to be:

- Identify & assess the case, deliverability & timing of specific road investments that address existing problems on the A1 NGWB;
- Identify & assess the case, deliverability & timing of specific complementary investment on local transport modes that improve the performance of the A1 NGWB;
- Understand the balance of benefits & impacts from potential individual investment proposals and any additional benefits or impacts from investment on a corridor basis; and
- Evidence where possible, the wider economic benefits from the transport investment in the corridor.

6.2.3 By completing the study objectives the scope anticipated that the following questions would be answered:

1. Given the assessment of current and future performance of the A1 Western Bypass, and the surrounding local transport network, are there specific priority locations/problems that should be addressed?
2. Are there viable potential solutions to these problems which are deliverable, affordable and offer value for money?
3. What are the potential timescales for the delivery of identified potential solutions?
4. Are there additional benefits or impacts from combinations of potential solutions over and above those for individual solutions?
5. Is there evidence of the impact of investment in potential solutions on the resilience of the road network?
6. Have the potential solutions identified fully considered and optimised the environmental opportunities and mitigation that the potential transport investment could bring?
7. Is further work/analysis required for Government to be able to make specific investment decisions, and if so what are the timescales of such work?

### 6.3 Fulfilment of Scope

6.3.1 The answers to each of the seven scope questions are summarised in Table 6.1.

Table 6-1: Answers to Scope Questions

| Question in Scope | Response |
|---|---|
| **1.** Given the assessment of current and future performance of the A1 Western Bypass, and the surrounding local transport network, are there specific priority locations/problems that should be addressed? | • The Stage 1 report covered identification of problems<br>• From Stage 2: OAR the priority areas for intervention were identified as being:<br>➢ J65 – J67 (including Allerdene Bridge)<br>➢ J71 – J73<br>➢ J74 – J79<br>➢ Route technology provision |
| **2.** Are there viable potential solutions to these problems which are deliverable, affordable and offer value for money? | • A set of interventions were generated within Stage 2 and assessed using the option assessment framework<br>• More detailed assessment of deliverability, affordability & economic case of prioritised schemes was undertaken in Stage 3 & presented in SOBCs. The schemes were:<br>➢ J65 – J67 widening (including Allerdene Bridge replacement)<br>➢ J71 – J73 three narrow lanes (plus closure of J72)<br>➢ J74 – J79 three narrow lanes<br>➢ Technology: MIDAS, CCTV, VMS<br>➢ Junction Interventions |
| **3.** What are the potential timescales for the delivery of identified potential solutions? | • Delivery programmes were developed for the prioritised schemes<br>• Construction estimated to start by 2020<br>• Schemes fully open by 2022 |
| **4.** Are there additional benefits or impacts from combinations of potential solutions over and above those for individual solutions? | • This Stage 3 report contains a qualitative assessment of the combined impacts of delivering more than one scheme. The key findings are:<br>➢ There are wider strategic benefits of delivering multiple schemes<br>➢ There is limited direct interaction between schemes as they are non-adjacent<br>➢ Delivery benefits and efficiencies of constructing multiple schemes exist |
| **5.** Is there evidence of the impact of investment in potential solutions on the resilience of the road network? | • Resilience has been assessed within the SOBCs<br>• Through provision of additional capacity or better management of existing capacity all schemes are predicted to improve resilience |
| **6.** Have the potential solutions identified fully considered and optimised the environmental opportunities and mitigation that the potential transport investment could bring? | • The full range of environmental impacts have been assessed in Stages 2 & 3.<br>• Schemes are designed to lead to more free flow traffic thereby reducing emissions, however there is potential for improvements to be offset by increased traffic flows |
| **7.** Is further work/analysis required for Government to be able to make specific investment decisions, and if so what are the timescales of such work? | • This Stage 3 report discusses the potential for further work, however the level of assessment within the SOBCs is commensurate with the requirements for this feasibility study stage |

6.3.2 The SOBCs developed as a part of this feasibility study meet the overall aim of the study by presenting a number of schemes on the A1 NGWB that are “deliverable, affordable & offer value for money”.

# 7 Conclusions

7.1.1 The results contained within the SOBCs indicate that the schemes to provide three narrow lanes between J74 – J79 and the widening of the A1 NGWB between J65 – J67 (with replacement of Allerdene Bridge) would be the optimum combination of schemes for the A1 NGWB.

7.1.2 The provision of technology has a very strong strategic case but does not have a very good economic case and the provision of three narrow lanes between J71 – J73 is shown to be poor value for money leading to an overall disbenefit. Finally, there is potential to deliver smaller scale interventions at junctions in conjunction with the mainline schemes but it is likely that by themselves these junction interventions are not sufficient to tackle the issues on the A1 NGWB.

7.1.3 In addition to junction interventions a number of enhancements to NMU provision have been identified along the extents of each of the schemes. These enhancements could be delivered alongside the mainline schemes thereby providing benefits to those not using the A1 NGWB.

7.1.4 The assessment undertaken within this feasibility study is at the level required by WebTAG and the SOBCs are sufficient for scheme investment decisions to be reached in all cases apart from the junction interventions scheme (where modelling is required to quantify the scheme benefits).

7.1.5 An area of cost not considered within the SOBCs is the cost of operating and maintaining the schemes. However a sensitivity analysis undertaken indicates that the inclusion of estimates of these costs does not significantly affect the BCR values of the schemes.

7.1.6 Chapter 6 of this report demonstrates that the original feasibility study scope has been fulfilled by the work undertaken and the study has identified and assessed schemes aimed at tackling the issues on the A1 NGWB.

7.1.7 The key findings of the SOBCs were presented to the study Stakeholder Reference Group (SRG) on 4th November 2014. The group was largely supportive of the emerging options and conclusions. A key message coming from the SRG was the desire amongst stakeholders to see the delivery of technology along the route to link with the local road network UTMC system and therefore provide management of traffic across the region. The SRG reiterated the importance of ongoing close working between the HA and stakeholders especially if junction interventions were to be delivered or if schemes were to be constructed in areas of environmental sensitivity (such as flood risk areas).