

A66(T) TEES VALLEY GATEWAY STUDY

Final Report

North East Assembly

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Date				
Prepared by	Richard Jones	Richard Jones	Richard Jones	
Signature	Richard Jones	Richard Jones	Richard Jones	
Checked by	Paul Kirby	Paul Kirby	Paul Kirby	
Signature	Paul Kirby	Paul Kirby	Paul Kirby	
Authorised by	Mike D'Alton	Mike D'Alton	Mike D'Alton	
Signature	Mike D'Alton	Mike D'Alton	Mike D'Alton	
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WSP Civils
Weymouth House
Hampshire Court
Newcastle Business Park
Newcastle upon Tyne
NE4 7YG

Tel: +44(0)191 273 3123
Fax: +44(0)1912261791
<http://www.wspgroup.com>

Reg. No: 2430067



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Executive Summary

The North East Assembly, in May 2003, commissioned a consultancy team led by WSP and Carl Bro to undertake a study of the A66(T) Tees Valley Gateway. The aim of this study was:

“To identify potential options across all modes to provide better access to Tees Valley, reduce congestion on the A66(T) Darlington Bypass and to enable economic regeneration consistent with the Tees Valley Vision”

The Tees Valley Gateway Study has explored multi modal options that could be implemented to provide the necessary relief to Darlington Bypass, thus enabling the economic regeneration of east Darlington to take place.

The development of Darlington Great Park and associated development adjacent to the A66(T) is currently limited in order to comply with the Government’s development control policy in respect of motorways and trunk roads in relation to infrastructure capacity.

The study process has involved detailed consultation with key stakeholders as part of a Wider Reference Group involving up to 60 interest groups. The study has been steered by key local and regional representatives comprising of North East Assembly, Darlington Borough Council, Government Office for the North East, One North East, Campaign for the Protection of Rural England, North East Transport Activist Roundtable, Highways Agency (HA), Tees Valley Joint Strategy Unit and Freight Transport Association. The final report summarises the views and recommendations of the consultancy team.

The study has been carried out in accordance with Guidance on the Methodology for Multi-Modal Studies (GOMMMS) issued by the Department for Transport. The following detailed assessments of the proposals were carried out:

- Traffic Assessment
- Engineering Assessment
- Environmental Assessment
- Economic Assessment
- Regeneration and Development Impact Assessment

Three packages of transport improvements were put together comprising of the following:

■ **Package 1:**

A low cost approach designed to alleviate immediate congestion problems that are forecast by the traffic models, comprising of three identified schemes: junction capacity improvements on the A66; the implementation of a Park and Ride scheme at Morton Palms; and the implementation of a new rail halt at Morton Palms. These costs have been excluded from analysis subject to more detailed work. This package can be implemented within 3-5 years once funding is available; and

■ **Package 2:**

An intermediate approach, comprising of the upgrading of the A66 to dual carriageway with associated junction upgrades. This package could be implemented within 5-8 years once funding is available; and



■ **Package 3:**

A high level intervention approach, comprising of two major infrastructure schemes: the Northern and Eastern Bypasses as well as the dualling of much of A66 around Darlington. This package could be implemented within 10-15 years once funding is available.

Potential public transport improvements have been considered throughout the study process and these are detailed in the final report. It is important to emphasise that these predominantly highway based solutions were chosen given that other large scale public transport improvements within the sub-region were included in the parallel Tees Valley 2010 transport study.

PREFERRED STRATEGY

As part of the detailed option appraisal Package 1 was initially identified as being deliverable and consistent with the study objectives. Following feedback from the Highways Agency a hybrid 'Package 1B' was developed following design issues with Package 1 which proposed alterations to Great Burdon Roundabout and the proposed A66(T)/ Darlington Eastern Transport Corridor (DETC) roundabout.


Package 1B was developed to include an offline carriageway alignment to the east of the A66(T) between A67/A66(T) Yarm Road Junction and A66(T) east of Great Burdon Roundabout effectively bypassing the DETC junction and Great Burdon roundabout. Improvements to the size and geometry of the A67/A66(T) junction are proposed. Minor junction capacity improvements are proposed at junctions on A66(T) south of A67/A66(T) junction. The package of improvements also includes the implementation of a Park and Ride scheme at Morton Palms and a new Rail Halt at Morton Palms which form part of Package 1 proposals. These costs have been excluded from analysis subject to more detailed work. A schematic drawing on the proposals is contained in Appendix D. The package of measures assumes that the new DETC proposals are an integral part of the scheme.

At an estimated cost of £51.5M, this package is considered to be the lowest cost option that would reduce congestion sufficiently in order for all of the planned development in east Darlington to progress and hence satisfy the study objectives. The justification of a preferred package of improvements was derived from the detailed analysis based on GOMMMS, feedback derived for the Steering Group and Wider Reference Group and an operational assessment of the schemes using micro-simulation modelling techniques.

Package 2, with a scheme cost of £117.7M, was unlikely to be delivered within the timescales for the Tees Valley Vision and had a lower benefit to cost ratio than Package 1B. The scheme has potential environmental impacts particularly associated with the proposed new River Tees crossings and adjacent land. However, implementing package 1B could be a step towards the full dualling in package 2, should that be justified at a later stage.

Package 3, with a scheme cost of £223.3M, was not pursued further due to high scheme costs (and therefore low benefit to cost ratio), high environmental impact and did not fully meet the objectives of the study.

It is recommended that Package 1B is taken forward as the preferred option as part of the Tees Valley Gateway Study – Stage 2. The proposals are deemed to be in accordance with the study objectives to provide better access to Tees Valley, reduce congestion on the A66(T) Darlington Bypass and to enable economic regeneration



consistent with the Tees Valley Vision. The proposed package of measures would release land in the east of Darlington for development that is currently constrained by HA development control policies. Package 1B would not preclude further upgrades of the route, should the need be established. It is recommended that the performance of the section of the A66(T) at Blackwell Bridge is monitored as future traffic growth takes place as part of the delivery of the Tees Valley Vision.

It should be noted that the Tees Valley 2010 Transport Study has now been completed. The results showed that a number of large scale public transport improvements, in terms of heavy rail and light rail, were unviable given current DfT funding criteria and appraisal techniques. Tees Valley Regeneration, the urban regeneration company for the sub-region is taking forward plans to pursue funding for light rail.

The HA have stated that construction of Package 1B or Package 2 could be achieved through the Government's Targeted Programme of Improvements, but under current arrangements the scheme would have to compete for funding with others in the programme, which is already over subscribed. New proposals for funding regional transport are soon to be issued for consultation by the Department for Transport. There is some potential, within these proposed arrangements, to fund trunk road projects which are considered to be of regional importance.

Since the study commenced in May 2003 there has been a significant shift in the Governments view towards road tolling and congestion charging. Given the future year horizon of 2025 identified with in this study, future work in implementing the preferred package of measures will need to consider the appropriateness of road tolling and congestion charging mechanisms.

The above recommendations are based on the premise that the proposed Darlington Eastern Transport Corridor will be implemented. However, the estimated costs for this scheme have increased significantly since the TVGS began and its future progress is subject to financial approval by the DfT and satisfactory completion of the statutory procedures. Were the DETC not implemented, then further investigations would need to be undertaken to develop options that would satisfy the objectives prescribed for this study to allow the planned economic development of this part of the Tees Valley.

1 Introduction

1.1 PROJECT COMMISSION

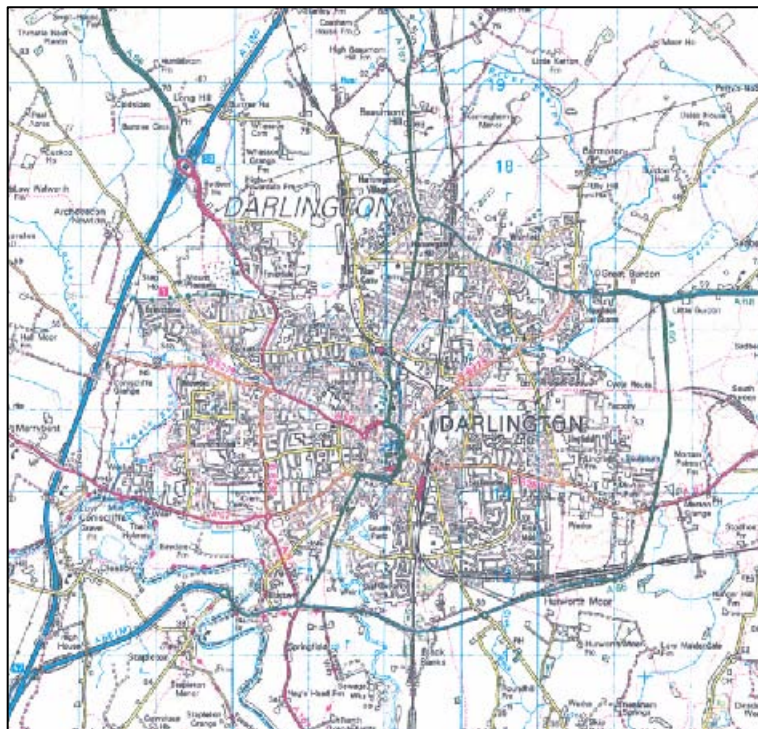
1.1.1 The North East Assembly, in May 2003, commissioned a consultancy team led by WSP and Carl Bro to undertake a study of the A66(T) Tees Valley Gateway. The aim of this study was:

“To identify potential options across all modes to provide better access to Tees Valley, reduce congestion on the A66(T) Darlington Bypass and to enable economic regeneration consistent with the Tees Valley Vision”

1.1.2 The Tees Valley Gateway Study explores the multi modal options that could be implemented to provide the necessary relief to Darlington Bypass, thus enabling the economic regeneration of east Darlington to take place.

1.1.3 The development of Darlington Great Park and associated development adjacent to the A66(T) is currently limited in order to comply with the Government’s development control policy in respect of motorways and trunk roads in relation to infrastructure capacity.

Figure 1 – Location Diagram



1.2 STUDY OBJECTIVES

1.2.1 The objectives of the A66(T) Tees Valley Gateway Study are to appraise the range of options identified in the report entitled “A66(T) Tees Valley Gateway Scoping Study, Identification of Options for Consideration”(October 2002) and the local objectives in the context of Government objectives as set out in the GOMMMS ‘New Approach to Appraisal’:



- Improve the operation of the A66 within the study area;
- Support existing economic activity;
- Promote economic regeneration;
- Improve transport links to Darlington so that identified developments can be facilitated; and
- Improve access between Darlington, the Tees Valley and the regional, national and international markets.

1.2.2 A facilitated workshop of Steering Group members was conducted on 6th June 2003, with the intention of establishing the aspirations and objectives of the study. The workshop re-confirmed the national and regional objectives as set out in the Scoping Study. The local objectives provided a source of discussion and the Steering Group team clarified and amended the objectives as set out in the Scoping study.

1.2.3 Options identified and amended in the Steering Group workshop were appraised against government objectives as well as regional and local objectives. Given below are the agreed national, regional and local objectives against which potential Stage 2 solutions would be assessed.

NATIONAL GOVERNMENT OBJECTIVES.

- To promote and enhance the environment, such that it encourages sustainable development.
- To promote safety.
- To promote adequate accessibility.
- To promote economic efficiency of transport and efficiency of economic activities.
- To undertake the above across all modes of transport within an integrated land use and transport planning framework.

REGIONAL OBJECTIVES¹

- Support economic development by tackling capacity limitations on strategic road and rail links and improve journey time reliability for freight movements in urban areas
- Support the growth of the region's airports and ports by improving access and developing operational infrastructure.
- Tackle major congestion 'hot spots' in Tyne and Wear and the Tees Valley through an integrated package of infrastructure and service improvements, to facilitate continued planned major growth and mitigate pollution and health impacts.
- Increase social inclusion, health and opportunity by improving public transport networks and services, particularly town and city centres and other major employment areas.
- Improve safety on the regions transport networks particularly through measures to tackle accident black spots.

LOCAL OBJECTIVES:

¹ Based on Draft Regional Transport Strategy 2002

Detailed information on the project inception is contained in the Study Inception Report



1.2.4 Contribute to the implementation of the wider Tees Valley Vision by:

- Tackling capacity limitations on the A66 Darlington Bypass
- Improving the operation of the A66 within the study area
- Supporting existing economic activity
- Promoting economic regeneration
- Improving transport links to Darlington so that identified developments can be facilitated
- Improving access between Darlington, the Tees Valley and the regional, national and international markets

1.3 PROJECT INCEPTION & MANAGEMENT

1.3.1 The initial work on the project identified areas of risk, refined the future work programme and reviewed the relevant policy context of the study.

1.3.2 A full review of policies affecting the study was carried out as part of the 'Stage 1 - Scoping Study' (conducted by Carl Bro in 2002). The inception phase considered changes to the policy context and developments that had occurred since the completion of the scoping study.

1.3.3 A Steering Group had already been set up to oversee the Scoping Study. As part of the Stage 2 Study regular meetings were held with the Steering Group to discuss progress and direction. The Steering Group was comprised of:

- North East Assembly (Chair)
- Government Office North East
- One North East
- Tees Valley Joint Strategy Unit
- Darlington Borough Council
- Highways Agency
- Council for the Protection of Rural England
- North East Combined Transport Activists Roundtable
- Freight Transport Association

1.3.4 As part of the project inception a Wider Reference Group (WRG) was set up to be involved in the key stages of the study. The WRG was able to participate in the process of choosing the preferred strategy through a number of seminars. The composition of the Wider Reference Group is detailed in Appendix B.

1.3.5 As part of the study a website was also set so that the WRG and general public could track the progress of the study.

1.4 REPORT STRUCTURE

1.4.1 This final report summarises the various components of work that have been undertaken as part of the study process. A bibliography of reports produced as part of the study is contained in Appendix A. The report has been divided up into the following sections:

Individual study reports
can be viewed or
downloaded from the
study website at:

www.tvgateway.org.uk



Section 2 – Describes the traffic surveys undertaken and outlines the process by which these data were used to develop and update a traffic model of the area to be used in option testing.

Section 3 – Provides an understanding of the future situation in terms of proposed future land use changes and their effects on traffic growth in the study area and planned and committed future transport schemes.

Section 4 – Outlines the results of the first, of two stages of consultation, with the WRG.

Section 5 – Details the results of Stage 1 Appraisal whereby a broad assessment of options put forward, as part of the scoping study and raised by the WRG, was carried out.

Section 6 – Describes the results of the detailed appraisal of 3 packages of improvements in line with GOMMMS.

Section 7 – Outlines the results of second stage of consultation with the WRG on the results from the Stage 2 Appraisal.

Section 8 – Summarises the consideration of public transport options as part of the study.

Section 9 – Discusses the development of a preferred package of improvements in line with the study objectives.

Section 10 – Describes further work carried out to validate the preferred strategy.

2 Traffic Surveys and Traffic Model Development

Traffic surveys were undertaken in June 2003.

2.1 INTRODUCTION

2.1.1 The scoping study, which preceded the main study, identified the need to update travel patterns on and around the A66(T). To assemble the data required for modelling purposes, information was collected by way of manual classified traffic counts, roadside interview surveys and journey time surveys.

2.1.2 Survey contractors, Count on Us, were commissioned to carry out the surveys. Supervision was provided by the Assistant Project Manager to ensure the effective operation of the sites and that adequate sample rates were obtained.

2.2 JUNCTION BASED MANUAL CLASSIFIED COUNTS

2.2.1 Junction based Manual Classified Counts (MCCs) were undertaken at 5 roundabouts on two major roads around Darlington, the A1150 and the A66(T) Darlington Bypass.

- Site 1 - A1150/ A66(T) Great Burdon Roundabout
- Site 2 - A67/ A66(T) Yarm Road Roundabout
- Site 3 - A66(T)/ Neasham Road Roundabout
- Site 4 - A167/ A67/ A66(T) Roundabout
- Site 5 - A167/ A1150 Harrowgate Hill Roundabout

2.3 ROADSIDE INTERVIEW SURVEYS

2.3.1 Roadside interview (RSI) surveys were carried out to help establish the origin and destination of traffic using the A66(T) within the study area as part of their journey. Commercial vehicles, in particular HGVs, were perceived to constitute a significant proportion of traffic on the A66(T) and as such separate RSI surveys were developed for this user group. The results of both sets of RSI's are analysed individually below.

2.3.2 In the initial Stage 2 methodology outline four sites were identified for the RSI surveys:

- A167 in a southbound direction at Harrowgate Village
- A66(T) in a westbound direction east of Great Burdon Roundabout
- A67 in a westbound direction east of A66(T)/A67 Yarm Road Roundabout
- A66(T) in an eastbound direction between Blands corner and Neasham Road

2.3.3 However, due to police safety concerns Count on Us were advised to relocate two of the above sites and conduct the surveys at alternative locations. The surveys were carried out over a two-day period, from Tuesday 3rd to Wednesday 4th of June 2003. The final RSI survey locations were as follows:

- A167 in a southbound direction at Harrowgate Village – Tuesday 3rd
- A66(T) in a westbound direction west of Great Burdon Roundabout – Wednesday 4th
- A66(T) in a southbound direction south of Great Burdon Roundabout – Wednesday 4th

A TRIPS based traffic model was updated to replicate travel patterns in the study area

- A66(T) in an eastbound direction between Blands corner and Neasham Road – Tuesday 3rd

2.4 JOURNEY TIME SURVEYS

2.4.1 A series of moving observer journey time surveys were conducted along the key A66(T)/ A1150 area. They were carried out in order to provide an accurate and current account of journey times and delays, including frequency and duration, on this section of the network. The results were used to assist in the calibration of the updated traffic model.

2.5 TRAFFIC MODELLING

INTRODUCTION

2.5.1 Mott MacDonald, through the Tees Valley Joint Strategy Unit, supplied a TRIPS based strategic model of the Tees Valley for use in the study. This model had been developed as part of the Tees Valley 2010 study. The model was updated with in the Darlington area to provide a more accurate reflection of trip patterns, based upon specific surveys undertaken in the Spring of 2003.

STUDY AREA AND ZONING SYSTEM

2.5.2 The study area comprised of the Tees Valley sub region, including the Darlington and its surrounding settlements. A total of 630 zones were defined in the highway model.

TRIP MATRIX DEVELOPMENT

2.5.3 A database method was then used to apply appropriate expansion factors by vehicle type and time period and remove multiple counting in the RSI survey data. Matrices were constructed for the AM, Off peak and PM peak periods. The times associated with these respective periods are listed below. These time periods were chosen to be consistent with Tees Valley 2010 Model:

- AM Peak: 08:00 hours - 09:00 hours.
- Off Peak: 10:00 hours - 11:00 hours
- PM Peak: 17:00 hours - 18:00 hours.

NETWORK DEVELOPMENT


2.5.4 The TRIPS network program, MVNET, was used to undertake a thorough check of the connectivity of the network and of the coded data. All fatal and non-fatal errors were checked and the coding amended as necessary. All serious warnings and warnings were also checked. Some warnings remain in the final network, for example where banned turns are present.

MODEL CALIBRATION AND VALIDATION

2.5.5 Acceptability guidelines, as outlined in the Design Manual for Roads and Bridges (DMRB) (Table 4.3, Volume 12, Section 2, Part 1) were used to calibrate and validate the model.

2.5.6 The calibration results of the model showed a good match between assigned model flows. Statistical analysis showed that the aggregate match between traffic counts and the model was robust.

2.5.7 The validation of assigned flows is important as it represents not only the output of the assignment model, but also the final output by which the performance of the model can be judged. The purpose of validation is to ensure that modelled flows are compatible with observed independent counts, i.e. traffic counts that have not been used in the matrix building process. The model was validated against traffic counts on a network wide basis throughout the Darlington study area through the use



of turning movement comparisons and journey time comparisons. The majority of assigned flows fall within the validation criteria as stated in the DMRB. Model turning movements were validated against observed turning counts at key junctions critical to scheme assessment. The results obtained illustrated a good fit between observed and model flows. In all cases travel times produced by the model were close to those observed and fall within the DMRB criteria. Based on these results the model was deemed suitable for future year option testing.

2.5.8 A full summary of the calibration and validation of the model is detailed in the Local Model Validation Report. This report was sent to the Highways Agency (HA) – Traffic Appraisal Modelling and Economics (TAME) Division for comment. The HA confirmed model was deemed suitable for feasibility testing.

3 Understanding the Future Situation

3.1 FORECASTING PROCEDURE

Detailed information on the adopted future year forecasting procedure is contained in the Future Year Forecasting Report.

3.1.1 Through discussion with in the Steering Group, it was necessary to produce a bespoke forecasting procedure for the purposes of the Tees Valley Gateway Study. This was largely due to the forecasting procedure adopted in the Tees Valley Transport 2010 Study (TVT2010) which assumed an optimistic level of regeneration led development consistent with the Tees Valley Vision. The adopted procedure is detailed in the Future Year Forecasting Report.

3.1.2 As part of the forecasting procedure 16 development sites were identified as being likely to impact upon the study area. The developments (which are listed in Tables 3.1 and 3.2 below) are a mixture of employment, residential, retail and leisure developments. This was considered as a realistic level of development capable of being delivered over the study time scales.

TABLE 3.1: SELECTED EMPLOYMENT DEVELOPMENT SITES

Employment Developments	Site Area	Suggested Development Horizon	Likely Land Use
Faverdale	122	By 2025	All B2
Faverdale Reserve	49	By 2010	B2/B8 (40%/60%)
Yarm Road North (inc. Great Park)	47	By 2010	B1/B2/B8 (50/10/40)
Yarm Road South	53.3	By 2010	B1/B2/B8 (50/10/40)
Durham Tees Valley Airport	226	15% by 2010 40% by 2025	All B8 by 2010 B8/B1/B2 (50/10/40)
Durham Lane Business Park	50.3	By 2010	B1/B2/B8 (50/10/40)
Wynyard Business Park	215	50% by 2010 100% by 2025	All B1 (25% plot ratio)
Queen's Meadow Business Park	61.5	50% by 2010 100% by 2025	B1/B2/B8 (50/10/40) B1/B2/B8 (50/10/40)
Houghton Road (Central Park)	15	By 2010	All B1
Middlehaven Office	26*	60% by 2010 100% by 2025	All B1
Retail and Leisure			
Middlehaven	26*	60% by 2010 100% by 2025	Retail and Leisure

* This figure applies to the combined Middlehaven development including office, retail and leisure

N.B. 40% footprint size assumed for all sites except where specifically mentioned.

TABLE 3.2: SELECTED RESIDENTIAL DEVELOPMENT SITES

Residential Developments	Planned Dwellings
Aycliffe Hospital	223
West Park	550
Firth Moor Redevelopment	356
Middlehaven	400 by 2010/ 1,100 by 2025

3.1.3 It was decided to include these developments as either major developments within the Darlington boundary or strategic sites such as Tees Valley Durham Airport, Queen's Meadow Business Park or Wynyard Business Park. The developments that were not included in the analysis were either small developments or located in Redcar and Cleveland. It was felt that these developments would have little impact on the traffic in the study area. The person trip rates for these new developments were calculated supplied by Mott MacDonald as part of the Tees Valley 2010 study. The number of development trips was approximately half that used for the TVT2010 study as shown by Table 3.3 below.

TABLE 3.3: COMPARISON OF DEVELOPMENT TRAFFIC BETWEEN TEES VALLEY 2010 STUDY AND TEES VALLEY GATEWAY STUDY

Forecast Year		Tees Valley 2010 Model	Tees Valley Gateway Study	% of 2010 Study Development Traffic Included in TVGS
2010	AM	35255	18392	52%
	OFF	18525	10324	56%
	PM	31248	17355	56%
2025	AM	63040	33444	53%
	OFF	28148	14843	53%
	PM	50384	27522	55%

3.1.4 A spreadsheet based Gravity Spatial Interaction Model was used to distribute the traffic generated by the chosen new development sites. The model distributes a proportion of the total development trips to each origin and destination zone, based upon a number of factors including, distance relative to the development zone, and demographic information such as population or employment data.

3.1.5 The impact of major development sites external to the Darlington study area were assessed on an individual development site basis to ensure trip numbers destined for/ or originating in Darlington were of an appropriate magnitude. A reduction in car based trips due to the implementation of Company Travel Plans was also included with in the do-minimum model forecasting procedure.

3.1.6 It can be seen in information contained in Table 3.4 that (for the different years and time periods) trips originating in or destined for Darlington account for between only 29% and 37% of trips created by the new developments included in the future year forecasting. Therefore whilst high levels of traffic growth have been predicted for the highway model as a whole, it can be seen that trip growth in the Darlington area will be of a lesser magnitude.

Traffic growth forecasts for 2010 and 2025 are detailed in Table 3.4

TABLE 3.4 - SUMMARY OF TRAFFIC GROWTH

		Base Year 2003	% Natural Growth	Total Development Trips Darlington	Total % Growth	%Development Traffic Originating/Destined in/for Darlington
2010	AM	125147	10.79%	6473	25.52%	35%
	OFF	93930	12.91%	3860	23.96%	37%
	PM	119699	12.58%	5061	27.23%	29%
2025	AM	125147	32.63%	10076	59.27%	30%
	OFF	93930	36.63%	4110	52.28%	28%
	PM	119699	37.24%	7953	60.01%	29%

3.2 FUTURE TRANSPORT SYSTEM

PUBLIC TRANSPORT

3.2.1 The TVJSU published a Rail Strategy Timetable and Capacity Study for the Tees Valley area in May 2003. The report gives details of the rail networks capacity to accommodate future demand for rail travel in the Tees Valley based on The Tees Valley Rail Strategy.

3.2.2 The Rail Strategy states that the key to delivery of the Tees Valley Rail Strategy will be securing support for the funding of both infrastructure investments and revenue support for the operation of additional services. The pursuit for funding of these schemes has been significantly set back by the withdrawal of SRA Rail Passenger Partnership funding. These initiatives will be taken forward in the Tees Valley 2010 Study and have not been included as part of the modelling procedure as part of the Tees Valley Gateway Study. The results from the study showed heavy rail improvements in the study area were unlikely to be progressed given high scheme costs and limited funding for regional rail schemes.

3.2.3 As part of the Local Transport Plan process, other public transport initiatives were also included such as improvements to the local bus network. These schemes include the Urban Bus Challenge scheme as well as schemes to be delivered as part of the 'Corridors of Certainty' initiative. A reduction in car based trips is assumed to take place in a number of corridors as part of the do-minimum situation in the modelling procedure.


3.2.4 These corridors include:

- North Road (A167) – from Harrowgate Hill to Darlington Town Centre
- Yarm Road (B6280) – from Morton Retail/Business Park to Darlington Town Centre
- A68 – from Faverdale Industrial Estate to Darlington Town Centre
- Circular route via Albert Hill, Red Hall Estate, Yarm Road Business Park & Firthmoor
- Route between Whinfield, Red Hall, Yarm Road Business and Morton Park.

HIGHWAYS

3.2.5 Fourteen "do minimum" highway infrastructure changes were included in the TVGateway study highway model and are listed below:

- Long Newton Interchange
- South Stockton Link

- 
-
- South Stockton Link A66 Widening
 - Stockton Eastern Interchange
 - Eastern Interchange (Northern Approach)
 - Hartington Interchange
 - Cargo Fleet Interchange
 - Darlington Eastern Transport Corridor²
 - Haughton Road Widening
 - Yarm Road Widening
 - A66 Slip – A66/A67/B6280
 - A66 Slip – A66/A1150
 - Middlehaven Development - Highway Additions

3.3 SUMMARY

3.3.1 This section of the report provides an understanding of the future situation in the study area of the Tees Valley Gateway. It also describes the future year forecasting methodology adopted for the Tees Valley Gateway Study and compares this with the procedure being used for the Tees Valley Transport 2010 study. The adopted procedure used the Governments local forecasts for traffic growth (TEMPRO) and the added in selected new development related trips which were deemed to be over and above background traffic growth.

² Whilst DETC has been included in the 'Do-Minimum' scenario, the estimated costs for this scheme have increased significantly since the TVGS began and that it's future progress is subject to financial approval by the DfT and satisfactory completion of the statutory procedures.

4 Consultation, Participation & Information (Pre- Appraisal)

4.1 INTRODUCTION

A detailed account of the main findings from the WRG Stakeholder Seminar can be found on the study website

4.1.1 A one-day Wider Reference Group stakeholder seminar was held on 14 July 2003. The Seminar was held at the Blackwell Meadows Business and Conference Centre in Darlington.

4.1.2 The main objective of the seminar day was to involve various interested stakeholders, known as the Wider Reference Group, in the initial stages of the study process, and to listen, discuss, and share views on problems/issues and potential solutions that Darlington and the Tees Valley currently face in terms of tackling congestion and promoting greater economic prosperity.

4.1.3 More specifically the intention of the seminar was to:

- Inform and raise awareness of the TVGS to the Wider Reference Group
- Involve the Wider Reference Group in helping to identify the problems and issues in the Tees Valley Gateway area
- Engage with stakeholders in identifying and assessing potential solutions to the problems identified

4.1.4 The seminar considered a wide range of issues, problems and opportunities including highways and transport, environmental issues, integration and social inclusion.

4.1.5 The seminar and workshop provided a framework of issues and potential measures which would then guide the development of options for addressing the transport issues in the area of the Tees Valley Gateway.

4.1.6 The seminar was split into five separate workshop groups tasked with considering the above issues and identifying potential improvement measures. The outputs from this seminar were an important part in the development of the TVGS. Full details of the discussions and assessment carried out at the seminar are provided in the report "Wider Reference Group Stakeholder Seminar"..

4.1.7 Key issues raised were:

- Consideration of a new Bypass to the east of the A66(T)
- Consideration of Bus/ Rail Interchange at Morton Palms (Park & Ride/ Rail)
- Dual carriageway northern bypass (Junction 59) to Great Burdon
- Dualling the existing A66 bypass
- Northern access to A1 (Junction 57)
- Improve rail transport: connections to the south of Darlington
- Promotion of sustainable forms of transport

5 Options for Solutions – Stage 1 Appraisal

Detailed information on the Stage 1 Appraisal Process is contained in the Stage 1 Appraisal Report located on the study website.

5.1 INTRODUCTION

5.1.1 The Stage 1 Appraisal process took the long list of potential options identified in the Options for Solutions phase (Section 5) and provided an initial sift of options based on a common assessment framework, thus determining which options should be considered in detail.

5.1.2 This section summarises the options appraised, methodology used to undertake the appraisal, based on national and local objectives, and the recommendations on the options to be carried forward for further analysis.

5.2 OPTIONS CONSIDERED

5.2.1 The “Options for Solutions” Report identified a number of options for solutions to the existing problems. Several options are considered to address the issues in the corridor, ranging from public transport improvements, major road construction to demand management and Green Travel Planning.

5.2.2 The following provides a list of potential options for consideration denoting the conclusions of the Options for Solutions Report.

TABLE 5.1 OPTIONS TO BE CONSIDERED IN STAGE 1 APPRAISAL

Option	Conclusion of Options for Solutions Report
Land Use Measures:	
Urban Development in Transport Corridors	To be considered in context of other options
Protection of rail freight sites	To be considered in context of other options
Company Travel Plans	Option for consideration
Infrastructure Measures:	
Junction Capacity Improvements on the A66	Option for consideration
Upgrading of the A66(T) to Dual Carriageway with associated upgrades	Option for consideration
Northern Bypass of Darlington	Option for consideration
North Facing Slip Roads at A1(M)/A66(M)	Option for consideration
A New Darlington Eastern Bypass	Option for consideration
Improved Heavy Rail Links	To be considered in the light of TVT2010 study
New Station at Morton Palms	To be considered in the light of TVT2010 study

(Continued)	
Option	Conclusion of Options for Solutions Report
Light Rail / Guided Bus	Not to be considered further in this study
Park and Ride	Option for consideration
Terminals and Interchanges	To be considered in the light of TVT2010 study
Recast Bus Service in East Darlington	To be considered in the light of TVT2010 study
Road / Rail and Inter-modal freight facilities	To be considered in context of other options
Management Measures:	
Parking controls / Parking Standards	Option for consideration
Road Speed Restrictions	Option for consideration
Public Transport Management Measures	Option for consideration
Information Provision	
Information Provision – Car	Option for consideration
Information provision – Public Transport	Option for consideration
Pricing Measures	
Congestion charging / Road tolling	Not to be considered further in this study
Public Transport Fare levels / Fare Structures	Not to be considered further in this study

5.3 METHODOLOGY

5.3.1 An initial sift of options was undertaken using a structured methodology agreed by the Study Steering Group with care taken to rule in and rule out potential options in a manner that was demonstrably fair, even handed and related to the study objectives agreed at the outset.

5.3.2 It was agreed that the framework should be based on the national, regional and local objectives established at the beginning of the study and outlined in the Inception Report. Options were rated according to local, regional and national objectives with ratings given according to their likely impact. The following ratings were used to test options:

- Strong positive impact
- Some positive impact
- No Impact
- Some negative Impact



- Strong negative impact

5.3.3 Options were tested against local objectives in the first instance. A negative rating for more than one local objective resulted in elimination from further consideration. The following local objectives were assessed:

- Tackling capacity limitations on the A66 – Based on the contribution of the option to facilitating lifting of HA Article 14 directive and allowing further development in the Gateway Corridor.
- Improving the operation of the A66 – Based on the contribution to improving journey reliability and maintaining the route's strategic function in the Tees Valley Gateway.
- Support Existing Economic Activity - In the Tees Valley Gateway and across the rest of the Tees Valley.
- Promote Economic Regeneration – Across the whole of the Tees Valley.

5.3.4 Options satisfying local objectives were assessed against regional and national objectives. A negative rating on more than two regional or national objectives resulted in elimination from further consideration. The following regional and national objectives were assessed:


- Support the Region's Airports and Ports – Improving access to and the viability of Durham Tees Valley Airport and Teesport.
- The Impact on the built and natural environment - Assessing impacts on environmental designations such as: Special Protection Areas (SPAs), Special Areas of Conservation (SACs), Sites of Special Scientific Interest (SSSIs), Areas of Outstanding Natural Beauty (AONBs), Scheduled monuments and Listed Buildings.
- Improve air and noise environments – An assessment of the size of population who's quality of air and noise environment is likely to be affected by a scheme.
- Improve public transport networks – In Darlington and across the Tees Valley region.
- Improve safety for all travellers – In Darlington and across the Tees Valley region.
- Practicality and Affordability – Assessing if the scheme can be delivered in the future, given the current national policy context and level of technological advancement.
- Facilitate greater integration and interchange – In Darlington and across the Tees Valley region.

5.3.5 Options passing both stages of the appraisal were taken forward to the Stage 2 Appraisal.

5.3.6 In addition to testing local, regional and national objectives, an important aspect of the appraisal is to ensure that options were feasible, in terms of funding and delivery. Options that are opposed to current and likely future Government policy are unlikely to attract funding. A pragmatic approach has been adopted which assesses a range of options.

5.4 RESULTS OF STAGE 1 APPRAISAL

5.4.1 The results of the Stage 1 Appraisal of Options are detailed in the Stage 1 Appraisal Report. In some cases, where the assessment ratings were identical, it was decided that the option of providing information for the car and information for public transport should be combined to form one option. As one scheme would be



unlikely to occur without the other, it was decided to combine the option of improved heavy rail links on the Saltburn to Bishop Auckland route with the option of providing additional bay platforms at Darlington Railway Station.

5.4.2 Eight out of fourteen options passed the appraisal and were taken forward to the Stage 2 Appraisal. Three options passed the appraisal and are to be considered as part of the Tees Valley Transport 2010 study. Two options were identified to be taken forward by the Tees Valley Joint Strategy Unit.

5.4.3 As a result of the initial sift, the following options were carried forward for further analysis in the Stage 2 Appraisal:

- Company Travel Plans
- A66 Junction Capacity Improvements
- Upgrading of the A66(T) to Dual Carriageway
- Darlington Northern Bypass
- North facing slip roads at A1(M)/A66(M) junction
- New Darlington Eastern Bypass
- Park and Ride (Rail or Bus at the Morton Palms)
- Network based bus improvements (Corridors of Certainty)

5.4.4 The following measures were identified to be taken forward in other ongoing studies or initiatives:

- Improved Heavy Rail Links and Terminals (To be considered using TVT2010 model)
- New Station at Morton Palms (To be considered using TVT2010 model)
- Recast Bus Service Provision in East Darlington (To be considered using TVT2010 model)
- Public Transport Management Measures (To be taken forward by the Tees Valley Joint Strategy Unit)
- Information Provision (Car and Public Transport) to be taken forward by Bus Quality Partnership (Tees Valley Joint Strategy Unit).



6 Detailed Option Appraisal - Stage 2 Appraisal

Information on the Stage 2 Appraisal Process can be found in the Detailed Option Appraisal Report located on the study website.

6.1 INTRODUCTION

6.1.1 Phase 6 of the study identified a number of options to be taken forward as part of a Stage 1 Appraisal of potential solutions. As part of sifting process based on local, sub-regional and national objectives a short list of potential solutions were identified.

6.1.2 In order to provide a meaningful appraisal of the proposals, various options were included in one of three packages for more detailed examination. Phase 7 of the study then looked in detail at each of these packages in respect to a number of disciplines including the environment, engineering feasibility and costings, regeneration and development impacts and cost benefit analysis.

6.1.3 As part of Phase 8 a detailed option appraisal aimed to identify the salient issues highlighted in the previous phase of the study. The results are summarised in the form of Appraisal Summary Tables in line with DfT Guidance on the Methodology for Multi-Modal Studies (GOMMMS).

6.2 DESCRIPTION OF OPTIONS

6.2.1 Initially the construction of north facing slip roads at the A1(M)/A66(M) junction was considered in isolation, as an option which could be implemented in conjunction with all three scenarios. The merits of the scheme were assessed at the outset of option testing work. Results showed that the scheme would not attract significant traffic to warrant further development.

6.2.2 The three packages of measures were put together comprising of the following:

■ Package 1:

A low cost approach designed to alleviate immediate congestion problems that are forecast by the traffic models, comprising of three identified schemes: junction capacity improvements on the A66; the implementation of a Park and Ride scheme at Morton Palms; and the implementation of a new rail halt at Morton Palms. This package can be implemented within 3-5 years once funding is available; and

■ Package 2:

An intermediate approach, comprising of the upgrading of the A66 to dual carriageway with associated junction upgrades. This package can be implemented within 5-8 years once funding is available; and

■ Package 3:

A high level intervention approach, comprising of two major infrastructure schemes: the Northern and Eastern Bypasses as well as the dualling of much of A66 around Darlington. This package can be implemented within 10-15 years once funding is available.

6.2.3 It is important to emphasise that these predominantly highway based solutions were chosen given that other large scale public transport improvements within the sub-region were included in the parallel Tees Valley 2010 Transport Study.

6.2.4 The packages of measures were compared to a "Do Minimum" situation which included certain committed highway infrastructure improvements as well as a number of demand management interventions. These are discussed in detail in the following section.



6.2.5 A schematic representation of each of the packages is located in Appendix D.

6.2.6 The following detailed assessments of the packages of proposals were carried out:

- Traffic Assessment
- Environmental Assessment
- Engineering Assessment
- Economic Assessment
- Regeneration and Development Impact Assessment

6.3 TRAFFIC

Predicted traffic flows for the do minimum and proposed packages for 2010 and 2025 can be seen in the Option Appraisal Report on the study website.

6.3.1 In order to examine the impact on traffic of the proposed A66 and Darlington improvement schemes, a TRIPS highway model was developed. The model was used to examine the effect of the proposed new schemes on traffic travelling on the road network through and around the Darlington area, as well as the wider Tees Valley sub region.

6.3.2 This section of the report describes the testing of a number of different highway and demand restraint options proposed in the Darlington area. The options include a number of schemes and initiatives scheduled for completion by 2010. These were coded into the model for option testing as part of the 'do-minimum' situation.

PACKAGE 1

6.3.3 Package 1 consists of no changes along the main highway links of the A66 but includes improvements to the junctions along the route. Existing junctions remain at grade i.e. roundabouts, but geometric changes have been made to the layout of the junctions to improve their operation. Hence design changes have been made at the A66/A66(M) roundabout, Blands Corner, Neasham Road, Yarm Road, DETC and the Great Burdon roundabouts to increase their capacity. Details of these changes are provided in the Engineering Assessment Report.

6.3.4 Examination of the traffic figures shows that compared to the do-minimum situation there is a slight reduction in flows on A167, A1150 and Yarm Road as due to the improvements on the A66(T) traffic is drawn out of the town centre due to faster journey times around the edge of the town. There is a slight increase in the amount of traffic along Haughton Road compared to the do-minimum.

6.3.5 As part of Package 1 it was assumed that a new Park & Ride site and Rail Halt would be constructed near Morton Palms.

PACKAGE 2

6.3.6 Package 2 involves the dualling of the A66 from the A1 to Great Burdon Roundabout. The Blackwell Grange A66(M)/A66 roundabout has been removed and a grade separated junction at Blands Corner has been modelled giving A66 traffic priority.

6.3.7 The Neasham Road roundabout has been modelled as a compact grade separated junction (GSJ) with priority given to the dualled A66.

6.3.8 The Yarm Road roundabout has also been modelled as a GSJ with priority given to the A66.

A grade separated junction (GSJ) is a two level motorway style junction.

6.3.9 The A66/DETC junction has been modelled as a GSJ with the A66 mainline carriageway running to the west of the new junction. The Great Burdon Roundabout has been modelled as at grade with an A66 east to A66 south dedicated left turning lane. The A66 mainline carriageway runs to the east of the existing Great Burdon Roundabout.

6.3.10 Examination of the traffic figures shows that, compared to the do-minimum situation, there is a reduction in flows on A167, Yarm Road and Haughton Road as due to the improvements on the A66(T), traffic is drawn out of the town centre due to faster journey times around the edge of the town. There is higher level of reduction in flows compared to the Package 1 due to the higher standard of carriageway being provided on the A66. There is a slight decrease in the amount of traffic along Haughton Road compared to Package 1. This reassignment of traffic onto the bypass results in an increase in flows on routes accessing the A66 such as Neasham Road, Grange Road and A1150.

6.3.11 Examination of the difference in flows between the do-minimum and Package 2 results shows a reduction in traffic flow in both directions on the A167 north of the Harrowgate Hill roundabout and on the A167 south of the Harrowgate Hill roundabout. Traffic travelling on the A1150 increases between the Harrowgate Hill roundabout and Great Burdon roundabout. Under closer investigation of the individual models for the morning peak, evening peak, and off peak hours for Package 2 it was found that the A1150 becomes heavily congested in the east bound direction (with a volume to capacity ratio greater than one). The congestion which this causes gives rise to a reassignment of traffic flows from the A167 to/from the A1 to A68 West Auckland Road to/from the A1 in order to avoid the congested A1150.

6.3.12 There is large reduction in traffic flows on the current A66 alignment through Blackwell as a new off-line route is constructed.


PACKAGE 3

6.3.13 Within Package 3 the Northern Bypass was modelled as a wide single carriageway road. The Northern Bypass runs from the Great Burdon Roundabout to a roundabout junction with the A167 North Road near Beaumont Hill. There is also a roundabout junction with Bishopton Lane and the section of Bishopton Lane south of this junction with the bypass closed off.

6.3.14 Also included in Package 3 is the Eastern Bypass provides a new route from the A66 just east of the Neasham Road Roundabout to the A66 dual carriageway in the vicinity of the Longnewton village. The Eastern Bypass will have a 2 lane dual carriageway road standard with restricted movement slip roads at either end.

6.3.15 As part of Package 3 the A66 will be dualled from the A1 to the south west of Darlington all the way round to the Great Burdon Roundabout.

6.3.16 The Blackwell Grange A66(M)/A66 roundabout has been removed leaving a link from Stapleton Bank into the present A66 alignment in Blackwell for local access purposes. A grade separated junction at Blands Corner has been modelled with off and on slips to/from the new dualled A66 to the Blands Corner roundabout and to/from a new roundabout on Croft Road. This gives the A66 priority through the Blands Corner junction.



6.3.17 The Neasham Road roundabout has been modelled as a compact grade separated junction (GSJ) with priority given to the dualled A66 as in Package 2.

6.3.18 The Yarm Road junction has been modelled as a grade separated junction with Yarm Road being the major priority movement (rather than at present where the A66 has priority and is modelled in Packages 1 and 2).

6.3.19 An at grade junction is provided at the junction between DETC and the existing carriageway of A66(T).

6.3.20 East facing dedicated turning lanes at the Great Burdon roundabout have been included to ease congestion on the Northern Bypass approach and A66(T) from Teesside.

6.3.21 The modelling of the Eastern and Northern bypasses has had an effect on two types of traffic flow. Firstly the strategic traffic travelling between the A1 south of Darlington and the Tees Valley has been affected and secondly local traffic travelling to areas within the Darlington study area (the Great Park development site in particular) has been affected.

6.3.22 The results showed reduced levels of traffic on the existing road network to the west of the Great Burdon roundabout. This reduction in traffic flow is due to traffic diverting away from the town centre and A1150 routes to/from the Great Park development site and using the new attractive Northern Bypass and dualled A66 south of the Great Burdon roundabout instead.

6.3.23 The Northern bypass and the dualled A66 form a strategic route from the A1 in the south west to the A167 in the north with the Eastern Bypass providing a strategic route to the east. These strategic faster routes divert traffic from using the town centre route, the A67 Yarm Road and from using the A68 West Auckland Road route as a cross town route to/from the east.


6.3.24 Strategic traffic which in the Do Minimum scenario uses the full length of the A66, diverts from the A66 between the new bypass and the Great Burdon roundabout onto the Eastern Bypass. This reduces the volume of strategic traffic on the A66 north of the new Eastern Bypass and on the A66 east of the Great Burdon roundabout.

6.3.25 The reduction in strategic traffic on the Eastern Bypass – Great Burdon roundabout section of the A66 is counteracted, to a certain extent, by the increase in local traffic to/from the Northern Bypass and the southern section of the A66 to/from the Great Park development and other key origin destination points. This is particularly significant in the southbound direction on the A66 between the Great Burdon roundabout and the Yarm Road roundabout where there is a significant increase in traffic flow between the Do Minimum and Package 3 scenario.

6.3.26 The DETC has reduced traffic flows compared to the do-minimum as a result of traffic diverting from town centre routes to the dualled A66 and the Northern bypass. In conjunction with this increase the A67 Yarm Road west of the A66 also has a significant reduction in traffic in 2010 although traffic increases on this route in 2025 as Teesside Airport expansion takes place.

6.4 ENVIRONMENTAL IMPACT

6.4.1 An environmental assessment was undertaken to determine the extent and significance of environmental impacts of the three proposed packages for transport



improvements around Darlington. The assessment has been undertaken with reference to the Design Manual for Roads and Bridges (DMRB) Volume 11 and the DfT's 'Guidance on the Methodology for Multi-Modal Studies (GOMMMS)'. The results of this study have been used to produce a set of GOMMMS worksheets and a GOMMMS Appraisal Summary Table for each option. The Appraisal Summary Tables can be found in Appendix 4.

6.4.2 Quantitative noise and air quality assessments were undertaken for the Environmental Assessment. Other issues such as water resources, heritage of historic resources, townscape/ visual impact assessment, and biodiversity were assessed based on desk study information and consultation. A limited number of consultations with statutory and non-statutory consultees were undertaken to identify the key environmental issues to each proposed package.

6.4.3 A number of impacts have been identified with regard to the three packages.

PACKAGE 1 – SUMMARY OF ENVIRONMENTAL IMPACTS

6.4.4 Increases in traffic noise are predicted on a limited number of links within the existing road network of Darlington. The potential change in traffic noise is likely to be minor and mitigation measures are unlikely to be required. Where junction improvements are proposed, either no receptors (such as houses) are located within 300m or the new alignments move traffic away from receptors. The largest noise increase of +1.6 dB is the result of traffic associated with the proposed Park and Ride Scheme. This corresponds to a barely perceptible minor impact.

6.4.5 A slight improvement in local air quality is expected along major routes to the north of the town and a slightly adverse impact is predicted at Blackwell Village. No changes of +/- 2µg/m³ are predicted for PM¹⁰ and NO².

6.4.6 The improvements to the existing road corridor, including the park and ride and rail stop, will have a slight adverse impact on the quality and character of the landscape, largely as a result of increased urbanisation and loss of tree belts providing screening to recreational areas, such as golf courses.


6.4.7 Several known and potentially unknown archaeological sites may be affected by the proposed improvements. The Park and Ride/Rail Halt may also affect several known and potentially unknown archaeological sites. The full impact cannot be assessed without further archaeological investigation.

PACKAGE 2 – SUMMARY OF ENVIRONMENTAL IMPACTS

6.4.8 Increases in traffic noise are predicted on a number of links within the existing road network of Darlington although the potential change in traffic noise is likely to be minor and mitigation measures are unlikely to be required. However, it is anticipated that noise mitigation measures may be required as a result of junction improvements at A66/A67, Neasham Road, and Blackwell Grange and as a result of road widening, particularly at Blackwell Grange.

6.4.9 A major improvement in local air quality is expected at properties adjacent to the A66 through Blackwell. A slight improvement is also predicted on major routes through the north of the town.

6.4.10 The largely on line improvements will have a slight adverse impact on the landscape, the most significant of which will be any crossing of the River Tees that may be necessary to bypass Blackwell.



6.4.11 Several known and potentially unknown archaeological sites may be affected by the scheme. The Grade II listed Blackwell Bridge may also be affected. The full impact cannot be assessed without further archaeological investigation.

6.4.12 As a result of new river crossings and works adjacent to existing river crossings, an impact on the aquatic and riparian habitats may be experienced. However, the proposals will include an element of landscape planting along the line of the carriageway providing an opportunity to enhance the nature conservation sites adjacent to the alignment.

6.4.13 The main impact on watercourses includes the potential contamination of nearby controlled waters during the construction and operational phase. However, the use of current good practices (e.g. Environment Agency guidelines) during construction should significantly reduce the impact. During the operational phase it is recommended that the drainage strategy includes sustainable urban drainage systems (SUDS). The incorporation of these measures should significantly minimise the risk of pollution and flooding. The construction of roads and bridges in floodplains has the potential to exacerbate the flood risk down stream due to the loss of floodplain and through the alteration of flood flows. Construction of roads in the floodplain also increases the risk of the roads being flooded. It is recommended that early discussions are held with the Environment Agency with regard to construction in the 1 in 100 year indicative fluvial floodplain. Culverting of watercourses and construction within 8m, and/or across a watercourse, requires the consent of the Environment Agency.


PACKAGE 3 – SUMMARY OF ENVIRONMENTAL IMPACTS

6.4.14 Increases in traffic noise are predicted for 6 links within the existing road network of Darlington. However, with the exception of the A66 east of Neasham Road Roundabout to the new Eastern Bypass, the potential change is likely to be minor and no requirements for mitigation measures is anticipated. Mitigation measures may be required in some areas where junction improvements and road widening are proposed. The new bypasses introduce new sources of noise to local noise sensitive receptors and, as such, it is anticipated that mitigation measures may be required.

6.4.15 A major improvement in local air quality is expected at properties adjacent to the A66 through Blackwell. Improvements are also predicted on major routes through the north of the town.

6.4.16 The eastern bypass crosses an open, low lying, gently undulating and ordinary landscape with few features of value, which is already dissected by major roads. This bypass will exacerbate the dissection caused by the existing transport infrastructure. The northern bypass crosses a more pristine and tranquil rural landscape in cuttings and on embankments. It is likely to have a moderate adverse impact in this area, particularly on the settings of the valley of the River Skerne, Ketton Bridge SAM and the village of Barmpton.

6.4.17 A Scheduled Ancient Monument (SAM) and several known and potentially unknown archaeological sites may be affected by the northern bypass scheme. The settings of Grade II listed buildings may also be affected. The Eastern Bypass may affect several known and potentially unknown archaeological sites. The full impact cannot be assessed without further archaeological investigation.



6.4.18 There may be impacts on at least one of four Sites of Nature Conservation Importance (SNCI) located on the alignment of the northern bypass. However, landscape planting will provide an opportunity to enhance nature conservation sites adjacent to the alignment.

6.4.19 The main potential impacts on watercourses include the potential contamination of nearby controlled waters during the construction and operational phase of the scheme. However, the use of current good practices (e.g. Environment Agency guidelines) during the construction phase should significantly reduce the impact. During the operational phase it is recommended that the drainage strategy includes sustainable urban drainage systems (SUDS) which should significantly minimise the risk of pollution and flooding. The construction of roads and bridges in floodplains has the potential to exacerbate the flood risk down stream due to the loss of floodplain and through the alteration of flood flows. Construction of roads in the floodplain also increases the risk of the roads being flooded. It is recommended that early discussions are held with the Environment Agency with regard to construction in the 1 in 100 year indicative fluvial floodplain. Culverting of watercourses and construction within 8m, and/or across a watercourse, requires the consent of the Environment Agency.

6.5 ENGINEERING ASSESSMENT

6.5.1 The engineering assessment was based on traffic figures provided from the TRIPS traffic model for each of the three packages of measures in terms of link flows and turning movements for:

OPENING YEAR FLOWS (2010)

6.5.2 This is in accordance with the DMRB Volume 5, Assessment and Preparation of Road Schemes, which states that opening year flows shall be used as starting points in the design and economic assessment of new rural trunk road links.

DESIGN REFERENCE FLOWS (2025)


6.5.3 This is in accordance with DMRB Volume 6, Road Geometry, which states that junctions shall be designed and evaluated with respect to the design year traffic flows, defined as fifteen years after opening.

6.5.4 The scheme design and traffic forecasting tasks was an iterative process throughout the scheme assessment as the traffic figures are dependent on which link or junction option is being considered at any time.

6.5.5 In order to review the existing infrastructure and topography within the study area, two dimensional Ordnance Survey landline mapping was adopted with three dimensional contour plans (5m) used for the design of the vertical alignments for the Northern and Eastern bypasses including the earthwork analysis.

6.5.6 The major A66(T) junctions within the study area have been identified and are defined as follows:

- Great Burdon Roundabout
- A66(T) / DETC Roundabout
- A66(T) / A67 Roundabout
- A66(T) / Neasham Road Roundabout

- 
-
- Blands Corner Roundabout
 - Blackwell Holme Roundabout

6.5.7 A list of potential schemes were identified at the steering group workshop in July 2003 and were then grouped into three packages for the purposes of economic and environmental assessment. Each package provides a solution to meet the predicted traffic flows and are generally graded by overall scheme size and cost.

6.5.8 Package 1 retains the A66(T) as a wide single lane road upgrading three of the six roundabouts purely to meet the predicted 2025 traffic flows. These include the Great Burdon roundabout which requires grade separation, the A66(T)/ DETC roundabout and the A66(T)/ A67 roundabout.

6.5.9 Package 2 upgrades the A66(T) to D2AP standard including a bypass around Blackwell Grange, with all junctions grade separated providing free flow movement for A66(T) traffic from the A1(M) to Teesside. The widening of the A66 would be to the north side of the existing carriageway from Blands Corner to the East Coast Mainline railway crossing and then cross over to the south and east side for the remaining length to Great Burdon roundabout. This minimises impact on the local community.

6.5.10 Package 3 upgrades the A66(T) to Dual 2 Lane All Purpose (D2AP) standard and includes a bypass around Blackwell Grange, grade separated junctions along the A66(T) up to the Eastern Bypass with free flow to A66(T) traffic. A grade separated junction at the A66(T)/ A67 junction providing free flow to non A66(T) traffic and a new D2AP link from the DETC roundabout to the A66(T) east of Beacon Hill. The Eastern Bypass will provide a direct link from Darlington East to the A66(T) at Longnewton via free flow movement for A66(T) traffic from the A1(M) to Teesside. The Northern Bypass would provide a more direct link for traffic from the A1(M) to Darlington East, removing traffic from the local roads.

6.5.11 Package 3 could be considered without one of the bypass options, which would reduce cost and impact while still providing an acceptable level of intervention. The provision of the Northern Bypass relieves and reduces the amount of traffic on other roads within the area. The link is not required to purely cater for the additional traffic flows generated by the Great Park Development.

6.5.12 Due to the traffic flows predicted for package 3, it is apparent that dualling of the A66(T) north of the Eastern Bypass may not be justified. An alternative solution would be to retain the A66(T) as wide single standard between the Eastern Bypass and Great Burdon roundabout, providing at grade junctions to the A67 and the DETC. This solution would reduce the cost of Package 3 in the region of £16 million.

6.5.13 Six options were considered for the northern bypass and based on environmental, engineering and cost analysis. A preferred solution was selected to provide an optimal balance between route length and environmental impact.

6.5.14 Six options were considered for the eastern bypass and based on environmental, engineering and cost analysis, a preferred solution was chosen in a manner similar to the Northern Bypass. Its estimated cost is £104 million.

COST ESTIMATES

6.5.15 The Cost Estimates have been divided into the three sections, one for each package. Within these sections a cost has been provided for each junction and the cost to upgrade the A66(T) from WS2 (wide single two way) to D2AP standard. Separate costs have also been provided for the two bypass options.

6.5.16 The costs are based on the Highway Agency's Green Book, estimated to 2001 Q3 using the base dates as shown below: -

- Preliminary Design and Statutory Procedures 2000 Q4
- Detailed Design and Construction – Road Works 2000 Q4
- Detailed Design and Construction – Structures 2001 Q2
- Other Major Items 2001 Q4*

6.5.17 The package costs were calculated as;

TABLE 6.1 PACKAGE COST ESTIMATES

Description	Package Cost (£000s)
Package 1	£ 9,745 ³
Package 2	£ 117,655
Package 3	£ 223,254

6.5.18 A number of assumptions have been made to generate the cost estimates, these are highlighted below: -

- Inflation
- Risk/contingency percentage assumed as 75% of the estimated works cost
- Non recoverable VAT
- Site clearance.
- Fencing and safety fencing
- Drainage and traffic signs & road markings
- Environmental Mitigation
- Public Inquiry for the Northern Bypass
- Land costs
- Allowed £12.5 million for Longnewton interchange.

6.6 ECONOMIC ASSESSMENT OF PROPOSALS

6.6.1 TUBA (Transport Users Benefit Appraisal) is a computer program developed for DfT to undertake an economic appraisal for multi-modal transport studies.

6.6.2 The aim of TUBA is to carry out an economic appraisal in accordance with GOMMMS. Details of the method, as implemented in TUBA can be found in Volume 2 Appendix F of GOMMMS.

³ Excludes cost of rail halt and Park & Ride

6.6.3 TUBA undertakes a matrix-based appraisal with either fixed or variable trip matrices. It takes trip, time, distance and charge matrices from a transport model. The user also inputs other costs associated with the do-minimum and do-something schemes. TUBA will then calculate the user benefits in time, fuel vehicle operating costs (VOC), non-fuel VOC and charge; operator and government revenues; and the scheme costs, discounted to the present value year. Values calculated from input model data were interpolated and extrapolated to cover the full appraisal period as necessary.

6.6.4 Due to the large extent of the model, the TUBA results were sectorised to identify and exclude illogical benefits (i.e. benefits attributed to other minor changes in the model).

6.6.5 Results are reported as perceived costs and market prices. Table 6.1 shows a summary of the results obtained for each of the various packages compared to the do-minimum.

TABLE 6.2 SUMMARY OF TUBA RESULTS (£000S, OVER 30 YEAR ASSESSMENT PERIOD, 1998 PRICES)

Scenario	Present Value Benefits	Present Value Costs	Net Present Value	Benefit Cost Ratio
Dm vs P1	£121,846	£8,625	£113,221	14.13
Dm Vs P2	£171,908	£65,194	£106,714	2.64
Dm vs P3	£222,324	£120,685	£101,639	1.84

Note⁴

EVALUATION OF ACCIDENT BENEFITS/ DISBENEFITS

6.6.6 TUBA does not calculate benefits that are due to changes in accident costs. An analysis of the accident benefits was carried using a separate spreadsheet based method. The results obtained are illustrated in Table 6.2.

6.6.7 The results show that Package 1 results in accident disbenefits. Package 2 results in accident savings. Package 3 provides the highest accident savings. Accident results are disaggregated in further detail in the Appraisal Summary Tables located in Appendix 4.

TABLE 6.3 – ACCIDENT BENEFITS/ DISBENEFITS

SCENARIO	OVERALL BENEFITS, 1998 prices, discounted to 1998, (£000s)
Package 1	-1,551 (disbenefit)
Package 2	+395
Package 3	+2,823

⁴ See Table 10.1 for definitions of PV, NPV, BCR



6.7 ECONOMIC REGENERATION AND DEVELOPMENT IMPACT

6.7.1 A key driver of the study is the constraining effect of congestion on the A66(T) and its' impact on economic development and regeneration in Darlington. As such an assessment was carried out of the level to which the options under consideration allow economic development in the area.

6.7.2 The journey time benefits to resident populations in gaining access to key development sites were used as a proxy for regeneration potential of the options presented.

6.7.3 Journey time savings were established using the traffic model. Census data was then used to establish population in each output area (OA), and the Index of Multiple Deprivation (IMD) for each OA. A common zone plan was produced to relate traffic model zones to OAs. Three destination zones were identified, representing: Darlington town centre; Morton Park; and Durham Tees Valley Airport. Do-minimum journey times were established for the AM peak hour between these three destination zones and all residential origin zones within 10 miles of the Morton Park zone (as the crow flies). Comparative AM peak journey times were also established for each of the three option packages.

6.7.4 For each package origin zones were attributed to a band based on the degree of time savings to the three destination zones. This was based on an average of the three time savings, for each package option. The bands chosen were:

- greater than 5 minute increase in journey times
- between 1 and 5 minutes increase in journey times
- negligible change in journey time (between -1 and +1 minutes)
- between 1 and 5 minutes decrease in journey times
- greater than 5 minute decrease in journey times

6.7.5 For each package a colour coded plan was produced that shows the geographical spread of these time savings by band for the zones in question. Using the zone-ward correspondence, each ward was given a representative time saving based on the colour-coded plan. Where a ward was comprised of several origin zones, which have different bandings, a judgement was made of the overall banding for that ward.

6.7.6 For each package the population for each time saving band was established by totalling up the population in all wards that fall within each band. The same totalling was done into each band only for wards with IMD below a certain threshold.

SUMMARY OF REGENERATION JOURNEY TIME RESULTS

6.7.7 In conclusion it is clear that highway based trips derive journey time benefits from the implementation of Package 2 and Package 3. Negligible journey time benefits accrue from the implementation of Package 1. If these journey time benefits are considered as a proxy for the transport related regeneration benefits that each package brings, then it can be concluded that Packages 2 & 3 have the greatest potential to bring regeneration benefits to the Tees Valley Gateway.



6.8 APPRAISAL SUMMARY TABLES

6.8.1 The findings of the preceding sections of this chapter, along with the findings of the detailed reports that accompany this document, have been distilled into three “Appraisal Summary Tables” (ASTs) which are contained in Appendix E. The content and layout of the ASTs has been determined with reference to the Guidance on Methodology for Multi-Modal Studies (GOMMMS) issued by DfT, varied where appropriate with agreement of the TVGateway client team.

6.8.2 The ASTs provide a high level summary of the range of findings related to each of the three packages that have the subject of detailed appraisal. They provide an opportunity for decision makers to weigh up costs and benefits of each package in order to determine views on their relative merits. The ASTs were used by the TVGateway consultant team to determine the preferred option, as described below.

6.8.3 The main findings of the ASTs can be summarised below:

- Package 1: environmental impacts are slightly negative; safety benefits are negative; the economic case for the package is sound, capital costs are modest and regeneration needs are impacted upon positively; accessibility impacts are neutral; integration impacts are positive.
- Package 2: environmental impacts are slightly negative; safety impacts are positive; the economic case for the package is sound, but capital costs are significantly greater than Package 1, regeneration needs are impacted upon positively; accessibility impacts are neutral; integration impacts are positive.
- Package 3: environmental impacts are potentially significantly negative; safety impacts are positive; the economic case for the package is acceptable but not as strong as for Packages 1 and 2, capital costs are significant, regeneration needs are impacted upon positively; accessibility impacts are neutral; integration impacts are positive.



7 Consultation on Intervention Options (Post Appraisal)

A summary of feedback from the second stakeholder seminar can be found on the study website

7.1 INTRODUCTION

7.1.1 A second stakeholder seminar was held on 23 February 2004 for the wider reference group.

7.1.2 As the stakeholder views form part of the overall recommendations for the project, the objectives of the seminar were to

- Present the work undertaken to date
- Explain the relationship between the Tees Valley Gateway Study and the Tees Valley Transport 2010 study being undertaken separately.
- Present the 3 packages of options including the results of the detailed assessments of each
- Enable the stakeholders, through discussion groups to review the option packages, noting the advantages and disadvantages of each and rate the packages according to their preferences.

7.2 SEMINAR FINDINGS

7.2.1 The group divided into smaller groups to further discuss and assess the packages of schemes put forward for consideration. In summary these were;

- Package 1 – low cost measures to tackle the worst congestion hotspots on the A66, with Park and Ride and a new rail halt aimed at containing traffic growth.
- Package 2 – widen the carriageway and reconfiguration of junctions on the A66 around Darlington.
- Package 3 – New strategic links to the North and East of Darlington.

7.2.2 The packages were compared to the Do Minimum base, currently the existing network with some planned minor works to the east of Darlington railway station.

7.2.3 The findings of the seminar are summarised as:

- Package 1 was considered as more deliverable but there was some doubt within certain groups that the package of measure would not meet all the study objectives.
- Package 2 was considered to meet the study objectives but questions were raised as to whether a more streamlined version was possible.
- Package 3 was seen as a long term, aspirational project from which some hybrid schemes could be developed.



8 Summary of Public Transport Options Considered

8.1 STAGE 1 – TEES VALLEY GATEWAY STUDY SCOPING STUDY

Detailed consideration has been given to demand restraint measures and public transport options throughout the study process.

8.1.1 As part of the scoping study a long list of potential solutions was established from the Institute of Highways and Transportation Guidelines on the Development of Urban Transport Strategies and the Governments Guidance on Methodology for Multi Modal Studies (GOMMMS). This list of options included public transport infrastructure measures, public transport management measures and public transport pricing measures as well a wide range of demand management measures. Each potential solution was considered in a workshop of Steering Group members held on 18th September 2002 and assessed to rate its importance in relation to the objectives of the study. Options for consideration were classified into three categories as being:

- Appropriate to be included in the Stage 2 Study Brief
- Appropriate to the Stage 2 Study Brief but work was on going as part of other initiatives/ studies
- Important in their own right but not appropriate to the Stage 2 Study Brief

8.1.2 Options identified as being appropriate to the second stage of the study were then included as part of the study brief which was issued in March 2003.

8.2 STAGE 2 – A66 TEES VALLEY GATEWAY STUDY

PHASE 1 – PROJECT INCEPTION

8.2.1 A review of potential measures proposed as part of the scoping study and any additional measures omitted was carried out through the first Steering Group Meeting held in May 2003. This was held as a workshop and was facilitated by Capital Value and Risk Limited. Whilst the objectives of the study were refined no additional options for consideration were identified.

PHASE 4 – PRE APPRAISAL WORKSHOP

8.2.2 A pre appraisal workshop was held on 14th July 2003 for stakeholders with an interest in the study. The Workshop provided stakeholders with the opportunity to discuss, and put forward views on the problems and issues with in the study area and discuss potential options for solutions. As part of the discussions the need to assess the following measures was identified: and this was fed into the next stage of the study

8.2.3 The following public transport solutions were raised:

- Park and Ride
- Improved heavy rail services
- New rail station at Morton Palms
- Recasting of bus services in East Darlington

8.2.4 These were then fed into the Stage 1 appraisal process. The Stage 1 Appraisal formed the first level of appraisal and focused on to what extent various measures

identified in the previous phase of the study met local, sub regional and national objectives set by the Steering Group.

8.2.5 Eight out of fourteen options passed the appraisal and were taken forward to the Stage 2 Appraisal stage. Three of the options which passed the appraisal were referred on to the Tees Valley Transport 2010 study. One option is to be taken forward by the Tees Valley Joint Strategy Unit through the Tees Valley Bus Quality Partnership. Two options were sifted out of the study at this stage. A summary of the results is shown below.

TABLE 8.1 SUMMARY OF STAGE 1 APPRAISAL OF OPTIONS RESULTS

Option		Pass to Stage 2 Appraisal?
A1	Company Travel Plans	Y
B1	A66 Junction Capacity Improvements	Y
B2	Upgrading of the A66(T) to Dual Carriageway	Y
B3	Darlington Northern Bypass	Y
B4	North facing slip roads at A1(M)/A66(M) junction	Y
B5	New Darlington Eastern Bypass	Y
B6	Improved Heavy Rail Links and Terminals	To be considered in TVT2010 study
B7	New Station at Morton Palms	Y also to be considered in TVT2010 study
B8	Park and Ride	Y
B9	Recast Bus Service Provision in East Darlington	To be considered in TVT2010 study
C1	Parking Controls / Parking Standards	N. Did not meet local study objectives.
C2	Road Speed Restrictions	N. Did not meet local study objectives.
C3	Public Transport Management Measures	Y also to be taken forward by TVJSU.
D1	Information Provision – Car and Public Transport	Y


8.2.6 As part of the Stage 2 Appraisal process a number of options were combined into complimentary packages. The following demand restraint and public transport measures were included with in the modelling process.

8.2.7 As part of the do-minimum scenario, the impact of company travel plans and local bus service improvements based upon the 'Corridors of Certainty' initiative was included within the modelling procedure. In terms of the 'Corridors of Certainty' initiative measures this included applying reductions in car based trips due to improved the provision of information to public transport users such as real time information at bus stops.

8.2.8 As part of the Package 1 proposals the effects of a new park and ride site at Morton Palms and a new rail halt at Morton Palms were taken in to consideration.

POTENTIAL FOR MODE SWITCH

8.2.9 Analysis of the origin-destination information collected as part of the roadside interview surveys shows that the A66(T) is used as a local bypass to travel from one side of Darlington to the other. Potentially these are car based trips that could be accommodated for by local public transport improvements such as improved local bus services.



8.2.10 Analysis of the roadside interview site between Blands Corner and Neasham Road shows that 30% of traffic travelling on this section of road is local traffic i.e. has origins and destinations within Darlington.. This is consistent in both the AM and PM peaks. Analysis of the roadside interview site between Great Burdon and Yarm Road shows that 20% of traffic travelling on this section of road is local traffic. Again this is consistent in both the AM and PM peaks. This illustrates that, assuming 20% of these local trips would transfer from using the car to improved local bus services, this would reduce overall traffic levels by 6% between Blands Corner and Neasham Road. The overall reduction in car based trips between Great Burdon and Yarm Road would be less.

8.2.11 Whilst these extensive improvements in local bus services this would have a limited effect on the operation on the A66(T) around Darlington in the short term, the overall effect on capacity would be small in the longer term as general traffic levels grow and development takes place.

8.2.12 Results from other recent studies, most notably Tyneside Area Multi-Modal Study (TAMMS), shows that even with enhanced public transport improvements which included significant mass transit improvements (LRT and heavy rail) and improved bus journey times, there was little or no effect on reducing the number of car based trips. Even with substantial public transport fare reductions (80% for bus and 50% for rail) this only reduced highway trips (vehicles per hour) by 5% in the AM peak and 3% in the inter peak.

SUMMARY OF PUBLIC TRANSPORT CONSIDERATIONS

8.2.13 The detailed description of the study process shows that demand restraint and public transport measures have been taken into account throughout the progression of the study, with a number of opportunities to feed comments/ additional options into the process. Results from the origin destination surveys and other studies shows that even with optimistic assumptions with regard to mode switch and public transport fare levels, given the nature of trips travelling on the A66(T) around Darlington, that extensive public transport improvements would have little effect on the operation of the A66(T).

9 Moving Towards a Preferred Strategy

9.1.1 Based on the results of the Stage 2 Appraisal and comments from the Steering Group and Wider Reference Group, a high level summary of the findings of the study at this stage is as follows:

- Package 1 was deemed affordable and achieved the objectives of the study, and also provided some benefits to the urban area road network of Darlington as a result of the modest capacity improvements provided on the A66.
- Package 2 met the objectives of the study in full, and offered greater benefits to Darlington's transport network, but had a very high capital cost associated with it.
- Package 3 did not meet the requirements of the Affordability and Financial Sustainability supporting analysis, and should not be considered further.

9.1.2 These conclusions were drawn as part of the Detailed Option Appraisal Report. As part of the report the consultant team recommended that Package 1 should be taken forward for further analysis as the preferred option. A major factor in the opinion of the consultant team was to promote a scheme that was deliverable and in accordance with the regional imperative across the Tees Valley to attract development and regeneration that will improve prosperity, skills and employment levels to the UK national average.


9.1.3 In the case of Package 2, the necessary powers and funding required to enact this package could take much longer, 20 years or more, to assemble because of the other national and regional priorities that will take precedence in the Government's Targeted Programme of Improvements (TPI). Officers of the Highways Agency confirmed that this timescale was reasonable as Package 2 is unlikely to be seen as a high priority nationally at the current time. We believe that waiting two decades or more to implement a preferred option, with all the barriers to access to new development that that implies in the Tees Valley Gateway, would not meet the region's regeneration imperative in a timely fashion.

9.1.4 Package 3 was not pursued further due high scheme costs (and therefore low BCR), high environmental impact and did not fully meet the objectives of the study.

9.1.5 The consultant team recommended that the Package 1 was taken forward as the preferred option for further assessment. Discussions with the Highways Agency took place so that this key stakeholder could sign up to the principles of this recommendation and any necessary modifications included.

9.1.6 The consultant team suggested that further development of this package should be undertaken, using micro simulation modelling tools to understand in detail the operation of the A66 in this package both now, in 2010 and in 2025. This will provide officers of the Highways Agency with sufficient analysis to accept in principle the components of the improvements as a sound means of moving forward with development and transportation issues in the Darlington area. If necessary a hybrid Package 1, taking elements of Package 2 that may be proven necessary by the micro simulation analysis, should be developed and tested alongside the existing packages.

9.1.7 The preferred strategy, if implemented, could have some local impacts internal to Darlington and they are too detailed to be considered by the TVGS. However they would warrant further consideration as part of a local transport strategy for Darlington. The kinds of interventions required to alleviate these potential future transport problems are already being thought through by the Council as part of its



award of Showcase Sustainable Travel Town status by the Department for Transport in April 2004.

9.1.8 The Northern Bypass (an element of the rejected Package 3) has a positive impact on local traffic problems to the north of Darlington that analysis has shown can't be tackled through other options (namely the A1/A66 North facing slip roads), but it also has the potential for significant environmental impacts as it passes across attractive open countryside and close to scheduled monuments and designated habitat sites. However, the Northern Bypass has a relatively modest impact on the local objectives of the Tees Valley Gateway Study, which are to limit traffic growth on the A66(T) and encourage regeneration in the Tees Valley Gateway corridor and therefore the Tees Valley Gateway Study is not pursuing it further.

9.2 HIGHWAYS AGENCY SAFETY REVIEW OF PACKAGE 1

9.2.1 Package 1 proposals were submitted to the Highway Agency – Safety Standards and Research team for outline safety approval. The proposals at Great Burdon roundabout were deemed to have high risks and departures would be necessary. Their approval could not be guaranteed. Therefore a hybrid scheme was developed.

9.2.2 The main concern from the Highways Agency was the alignment of the link from the A66(T) north to the A66(T) eastbound carriageway. It was considered that the proposed alignment did not comply with the definition of a “loop” in accordance with link design standards.

9.2.3 There was also some concern regarding the proposed highway layout between the DETC roundabout and Great Burdon roundabout due to the additional auxiliary lane on the northbound carriageway. This would result in a 2 (northbound) + 1 (southbound) lane arrangement which is a non standard layout.

9.2.4 The proposed dedicated straight on at the DETC roundabout, although permissible within highway design standards was met with some concern due to the potential high entry speeds from the A66(T) southbound carriageway. To overcome this, the dedicated straight on would have to be designed to highway link design standards resulting in a non standard road layout.


9.3 DEVELOPMENT OF HYBRID SCHEME – PACKAGE 1B

9.3.1 Following comments from the HA an alternative hybrid scheme was developed. The proposed highway layout continues the dualling of the A66(T) from the east through to the A67 roundabout, providing in essence a grade separated junction at the DETC. A schematic diagram of the scheme is contained in Appendix C.

9.3.2 Re-modelling this highway layout has highlighted that at the design year (2025) the traffic flows west of the DETC and the A67 roundabout in Darlington are so congested that road users from the east are discouraged from using the A67 junction as an approach to Darlington town centre and are leaving the A66(T) at Great Burdon and travelling along the A1150.

9.3.3 This has resulted in the requirement to upgrade the Great Burdon roundabout to an 80m inscribed circle diameter (ICD) with wider approach widths and a larger circulatory.

9.3.4 The A67 no longer requires upgrading to a 100m ICD, a 80m ICD roundabout with no dedicated left turns is sufficient assuming a three lane circulatory.



9.3.5 Neasham Road, Blands Corner and Blackwell Holme roundabouts all have the capacity to cope with the predicted traffic flows in 2025 for this option. The use of signals could be installed to aid traffic flows during peak periods.

9.3.6 It is noted that there is an existing minor road merge onto the A66(T) just west of the proposed merge on the eastbound carriageway and that there could be issues with regard to the proposed layout. One option would be to close this minor road merge (Sadberge west) onto the A66(T) as local traffic could use the merge east of Sadberge.

9.3.7 The horizontal alignment design for the mainline has adopted at least desirable minimum radii for a 120kph design speed. Consideration was given to the length of the slips to achieve the required vertical clearance between the mainline and the slip lanes where they cross.

9.3.8 It is envisaged that the north/ eastbound diverge would pass under the mainline, as the mainline would be on embankment in this location rising to pass over the DETC. The bridge carrying the mainline over the DETC has been shown to extend over the dismantled railway line. The span could be reduced to clear only the road if it was concluded that the railway line would not, in the future be re-instated.

9.3.9 It is also envisaged that the mainline would also pass over the A66(T), this bridge would be heavily skewed. The westbound diverge to Great Burdon roundabout could pass either over or under the mainline.

9.3.10 The total costs for the scheme were calculated at £51,530,363.

9.4 VALIDATION OF HYBRID SCHEME

SAFETY

9.4.1 Scheme drawings for Package 1B were submitted to the Highways Agency – Safety Standards and Research team. Based on the current level of design, the Highways Agency stated that there were no fundamental objections to the scheme on safety grounds⁵.


VISSIM MODEL DEVELOPMENT

9.4.2 The consultant team undertook a VISSIM modelling exercise of the A66(T). The model area covered the immediate study area to assess the performance of the preferred Package 1B through the analysis of queues and delays at all the junctions along the scheme. VISSIM is a micro-simulation modelling tool used to visually and operationally demonstrate the effects improvements on the highway network.

9.4.3 A total of 10 models were produced to include Do Nothing, Do Minimum and Do Something scenarios over a range of years. Traffic information for these models was extracted from the Tees Valley Gateway TRIPS model.

9.4.4 The network created in the VISSIM model was produced using the Ordnance Survey maps as a base. The network covers the A66(M) from its junction with the A1 at Blackwell to its junction with the A1150 at Great Burdon and includes all the major junctions within the area. Details of the number of lanes on each section of road as well as the presence of give way markings were incorporated into the model to better

⁵ The Highways Agency stated that during the detailed design stage, the slip roads, if they exceed 0.75km, should be designed as interchange links with a design speed of 85kph.



represent the existing situation. The rate of acceleration of vehicles exiting give ways was also altered for this reason.

9.4.5 The traffic flows and journey times extracted from the model were consistent with the prescribed method in Volume 12 of the DMRB. All journey times were within 45 seconds of the recorded journey time surveys, and all vehicle flows were within 50 vehicles.

VISSIM MODEL RESULTS

9.4.6 The model tests used the traffic forecasts agreed with in the Steering Group for 2010 and 2025. As part of these forecasts it was assumed that the Great Park development site was developed to it's full extent. For the do-minimum situation the VISSIM model illustrated that, based on this scenario, the DETC junction with the A66(T) does not operate satisfactorily in the future years with traffic queuing on the northbound approach of the DETC junction. This results in a back log of traffic affecting the operation of the Yarm Road roundabout. This in turn effects the operation of Yarm Road. It should be emphasised that in reality, the DETC is unlikely to be completed before 2008 and Great Park is unlikely to be fully developed for a number of years after 2010.

9.4.7 The VISSIM model also illustrates that in the future years the Great Burdon Roundabout fails to operate efficiently in the AM peak. The problems in 2010 are magnified in 2025

9.4.8 The do-something scenario (Package 1B) demonstrates that the new off line alignment of the A66 between Yarm Road and the A66(T) east of Great Burdon Roundabout operates satisfactorily in 2010 and 2025. This section of carriageway provides relief to the proposed DETC/ A66(T) junctions as well as the existing Great Burdon Roundabout. The model illustrates queuing on Yarm Road.

9.4.9 The VISSIM model shows that the southern section of the scheme operates satisfactorily at the Neasham Road and Blands Corner although Blands Corner may need to be signalised to cope with future traffic growth. In 2025 the section of road at Blackwell Bridge acts as bottleneck to traffic entering the study area. With out major infrastructure improvements in this area, which were considered with in the Package 2 assessment, there are limited small scale infrastructure improvements that can be implemented.

PACKAGE 1B SCHEME ECONOMICS

9.4.10 A TUBA assessment was carried out of the costs versus the benefits of the scheme over a 60 year evaluation period, using a discount rate of 3.5%. This assessment used a revised version of TUBA issued by DfT since the previous economic assessment work was undertaken on Packages 1,2 &3.

9.4.11 The results, illustrated in Table 9.1, show that scheme demonstrates a positive benefit to cost ratio with substantial net present value benefits. This assessment does do not include benefits due to accident savings which are not assessed in TUBA.

Package 1B economic assessment used a revised version of TUBA issued but the results are broadly comparable.



TABLE 9.1 PACKAGE 1B TUBA RESULTS

Net Present Value
The difference between the present value of a stream of costs and a stream of benefits.

Present Value
The future value expressed in present terms by means of discounting.

Benefit to Cost Ratio
A ratio to identify the relationship between the cost and benefits.

Analysis of Monetised Costs and Benefits (£000s)	
Non-Exchequer Impacts	
Consumer User Benefits	79376
Business User Benefits	141853
Private Sector Provider Impacts	0
Other Business Impacts	0
Accident Benefits	
Not assessed by TUBA	
Net present Value of Benefits (PVB) 221229	
Local Government Funding	0
Central Government Funding	68774
Net present Value Costs (PVC) 68774⁶	
Overall Impact	
Net present Value (NPV)	152455
Benefit to Cost Ratio (BCR)	3.217
Appraisal Period 2010 to 2069, Prices Discounted to 2002	

9.4.12 An Appraisal Summary Table for Package 1B was produced summarising these various elements. This is located in Appendix D.


SCHEME FUNDING

9.4.13 The conventional mechanism for the delivery of trunk road improvements is through the ‘Targeted Programme of Improvements’ (TPI) for which the Highways Agency is responsible. The White Paper daughter document, A New Deal for Trunk Roads in England, announced that the previous Government’s National Roads Programme had been scaled back to a much better targeted and smaller one that can be delivered in a realistic time frame.

9.4.14 The TPI aims to address some of the most pressing network problems, easing congestion and making travel safer, providing safer and healthier communities and supporting regeneration and integration. When announced in 1998 as part of A New Deal for Trunk Roads in England, the TPI consisted of 37 schemes. Since then a further 41 schemes have been added, making a current total of 78 schemes.

9.4.15 Transport 2010, the Government’s 10 year spending plan for transport, published in July 2000 had anticipated that the schemes in the TPI at that time would be delivered by 2010. Many of the schemes added to the TPI post ‘Transport 2010’ will be delivered beyond the timescale of the Ten Year plan.

⁶ PVC includes monies lost to Govt through taxation (fuel) as well as direct scheme costs



9.4.16 In July 2004 Government published a long term strategy for a modern, efficient and sustainable transport system backed up by sustained high levels of investment over the next 15 years in *The Future of Transport White Paper*. Whilst the forecast expenditure represents a significant increase in transport investment, it is likely that a large proportion of these additional resources will be required to fund the Government's commitments in respect of rail. This will impact on the funding available for capital investment on the trunk and local authority road networks.

9.4.17 The DfT is currently reviewing the levels of expenditure to be made available for the various modes of transport, including funding of the TPI. Potential outcomes could be that the delivery of some schemes could be delayed, or even removed from the TPI altogether. Under these circumstances, the cases for any potential new additions to the TPI would need to be very strong.

9.4.18 Those schemes that might have their deliveries delayed due to budgeting constraints already have an established case and any new candidates for the TPI would be in competition with these delayed schemes. Whilst the Preferred Strategy at £51M would still be subject to stiff competition for funding, in the circumstances where the available budget is finite, it would stand a better chance of funding than the £120M full dualling option, particularly as the Package 1B deals with the most congested part of the A66 Darlington Bypass. The additional dualling provided by Package 2 would be on a less congested section of the bypass and therefore, incrementally is likely to provide a lower rate of return, particularly as the section between Blackwell Bridge and Blands Corner is offline.



10 Preferred Strategy

10.1.1 Package 1B would provide a new offline dual carriageway alignment to the east of the existing A66 between A67/A66 Yarm Road Junction and A66 east of Great Burdon, which would in essence grade separate the Great Burdon and proposed DETC junctions. In addition, Package 1B would provide capacity improvements to the existing at-grade roundabouts between the A67/A66 Yarm Road and A167/A67/A66 Blands Corner junctions. There is the potential for the package to be enhanced by a Park and Ride scheme in east Darlington, together with a new Rail Halt at Morton Palms. These would be at extra cost to the estimate currently provided.

10.1.2 At an estimated cost of £51.5M, this scheme would reduce congestion sufficiently in order for all of the planned development in east Darlington to progress with in the short to medium term and hence satisfy the study objectives. With a benefit to cost ratio of 3.22, the package is considered to represent value for money.


10.1.3 This compares to Package 2 which, with a scheme cost of £117.7M and a benefit to cost ratio of 2.64, is unlikely to be delivered with in the timescales for the Tees Valley Vision. The scheme has potential environmental impacts particularly associated with the proposed new River Tees crossings and adjacent land.

10.1.4 The conventional mechanism for the delivery of trunk road improvements is through the 'Targeted Programme of Improvements' (TPI) for which the Highways Agency is responsible. As outlined in the previous chapter Package 1B presents the opportunity of a far higher chance of delivery compared to the Package 2 due to finite amount of funding for major trunk road highway schemes, an increased number of TPI schemes and a number of already well established schemes which have been delayed due to funding constraints.

10.1.5 Package 1B, through consultation with the Highways Agency Safety Standards and Research team, has demonstrated that the scheme meets the required safety criteria at an outline level of design. Through the use of micro-simulation software, using VISSIM, the improvements proposed as part of the scheme were demonstrated to be successful in operational terms. The scheme through a TUBA assessment demonstrates a positive benefit to cost ratio. The scheme is deliverable within the timescales associated with the planned development in Darlington and the wider Tees Valley. Package 1B would not preclude further upgrades of the route, should the need be established.

10.1.6 Based upon evidence derived from the detailed, Stage 2, appraisal process and feedback derived for the Steering Group and Wider Reference Group it is recommended that Package 1B is taken forward as the preferred option as part of the Tees Valley Gateway Study – Stage 2.

10.1.7 Results from the micro-simulation analysis in 2025 of Package 1B show that the southern section of the A66(T) at Blackwell Bridge acts as bottleneck to traffic entering the study area. With out major infrastructure improvements in this area, which were considered with in the Package 2 assessment, there are limited further small scale infrastructure improvements that can be implemented to improve the operation of this section of road. It is recommended that performance of this section



of the network is monitored as development in Darlington and the wider Tees Valley takes place, to ascertain any requirement for further major upgrades to this southern section.

10.1.8 The HA have stated that construction of Package 1B or Package 2 could be achieved through the Government's Targeted Programme of Improvements, but under current arrangements the scheme would have to compete for funding with others in the programme, which is already over subscribed. The HA state that no guarantees can be given about the delivery of any projects proposed on the trunk road, emanating from this study. However, new proposals for funding regional transport are soon to be issued for consultation by the Department for Transport. There is some potential within these new arrangements, should they eventually be adopted, for different funding streams for trunk road projects which are considered to have regional importance.

10.1.9 The package is the lowest cost option that meets the study objectives and is deliverable within the timescales associated with the planned development in Darlington and the wider Tees Valley. The proposed package of measures would release land in the east of Darlington for development that is currently constrained by HA development control policies. It is therefore recommended that Package 1B should be considered as a way forward for providing better access to Tees Valley, reducing congestion on the A66(T) Darlington Bypass and to enable economic regeneration consistent with the 'Tees Valley Vision'.


10.1.10 It should be noted that the above recommendations are made on the premise that the proposed Darlington Eastern Transport Corridor (DETC) will be implemented. However, the estimated costs for this scheme have increased significantly since the TVGS began and its future progress is subject to financial approval by the DfT and satisfactory completion of the statutory procedures. Were the DETC not implemented, then further investigations would need to be undertaken to develop options that would satisfy the objectives prescribed for this study to allow the planned economic development of this part of the Tees Valley.

10.1.11 It should be noted that the Tees Valley 2010 Transport Study has now been completed. The results showed that a number of large scale public transport improvements, in terms of heavy rail and light rail, were unviable given current DfT funding criteria and appraisal techniques. Tees Valley Regeneration, the urban regeneration company for the sub-region is taking still taking forward plans to pursue funding for light rail.

10.1.12 Since the study commenced in May 2003 there has been a significant shift in the Government's view towards road tolling and congestion charging. The Government has recently published a report on the feasibility of road pricing which concluded that a national scheme based on in-vehicle satellite navigation will become technically feasible in the next 10 to 15 years. Given the future year horizon of 2025 identified with in this study, future work in implementing the preferred package of measures will need to consider current Government policies on Road Pricing at each stage of development.



Appendix A Bibliography of Study Reports

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- Inception Report¹
 - Traffic Surveys Report
 - Future Year Forecasting Report¹
 - TRIPS Local Model Validation Report
 - Options for Solutions Report¹
 - Wider Reference Group – Stakeholder Seminar¹
 - Stage 1 Appraisal Report¹
 - Detailed Option Appraisal Report¹
 - Wider Reference Group – Stakeholder Seminar 2¹
 - VISSIM Model Development Report
 - VISSIM Option Testing Report

¹General reports are available on the study website @:
www.tvgateway.org.uk



Appendix B Wider Reference Group



Mr. Alan Hunter	English Heritage
Lydia Speakman	Countryside Agency
Miss Julie Teall	The Environment Agency
Mr. Martin Howat	English Nature
Glen McGill	The Tees Forest
Mr Tim Sander	Friends of the Earth
Peter Walker	Transport 2000
Owen Wilson	Sustrans
Mrs Heather Evans	Cyclists Touring Club
Mr. George Muir	Association of Train Operating Companies
Mr Christopher Garnett	Great North Eastern Railway
Mr M.C. Murphy	Railway Development Society
Mr. Stephen Noble	Regional Bus Commission
Mr Paul de Santis	Stagecoach Busways
Mr C. Tunstall	Durham County Council
Tony Batty	Arriva Buses
Trevor Meridith	Tees and Hartlepool Port Authority
John Waiting	Teesside International Airport
Mike Robinson	Stockton Borough Council
Rachel Wood	Darlington Borough Council
Mr S. Rankin	CBI
Ms Rachel Spence	N.E.Chamber of Commerce Trade & Industry
Jill Smith	North East Chamber of Commerce (Darlington)
Caroline Foster	Darlington Transport Forum
Mr Tom McCartney	North Eastern Traffic Area
Mr Geoff Dunning	Road Haulage Association Northern Region
Mr Peter Sloyan	Northumbria Tourist Board
Richard Ellison	NFU
Ms Maxine Stubbs	Durham Constabulary
Mr Paul McCormick	RoSPA
Trevor Molton	Tees, East and North Yorkshire Ambulance Service Trust
County Durham & Darlington Fire & Rescue Brigade	
Mr Phil Bain	North East Ambulance Service (NHS Trust)
Mr Gerald Tompkins	County Durham and Tees Valley Health Authority



Antony Haslam	Country Landowners Association
Wendy L Suddes	British Horse Society
Mr Patrick Earle	Richmondshire District Council
Mr. M. Moore	North Yorkshire County Council
Mr Neil Etherington	Tees Valley Development Company
Joe Docherty	Tees Valley Urban Regeneration Company
Mr Paul Watters	AA
Mrs Sue Nicholson	RAC Foundation
Mr.I.Murphy	Hurworth Parish Council,
Mr.C.Walker	Middleton St. George Parish Council,
Mr. J. Turnbull	Redmarshall Parish Council
Mrs M Whitehead	Long Newton Parish Council
Mrs H Rennison	Eaglescliffe Parish Council
Mrs C Fox	Elton Parish Council
Mr D Suttill	Eryholme Parish Council
Mr Ian Donald Parr	Dalton on Tees Parish Council
Miss P Crack	Stapleton and Cleasby Parish Council
Mr I W Calvert	Croft on Tees Parish Council
Mr.A.G.Parks	Sadberge Parish Council,
Mrs.D.Guy	Whesoe Parish Council,
Councillor N.Welch	Archdeacon Newton Parish Council,
Mrs.D.Weaver	Piercebridge Parish Council,
Mr.C.Fletcher,	Bishopton Parish Council,
Mr.I.Murphy	Low Dinsdale Parish Council,
Mrs.A.Le Druillene	Heighington Parish Council,
Mr.H.Steel	Low Coniscliffe and Merrybent Parish
Caroline Foster	Darlington Transport Forum
Mr.M.H.W.Brown	High Coniscliffe Parish Council,
Mr.B.Heward	Neasham Parish Council,
Councillor Heather Scott	Park West Ward
Councillor James Ruck	Park West Ward



Appendix C Schematic Drawings



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Appendix D Appraisal Summary Tables



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