

A66 Stainburn and Great Clifton Bypass Five Year After Study

Post Opening Project Evaluation

August 2009



Post Opening Project Evaluation

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August 09

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Document History

JOB NUMBER:			DOCUMENT REF: A66 Stainburn 5 Year after_ Draft.doc			
Revision	Purpose Description	Originated	Checked	Reviewed	Authorised	Date
Final	Final	LS		SB	PR	Aug 09
2 nd Draft	2 nd Draft for review	LS		SB	PR	Aug 09
Draft	Draft for Client Review	LS	SB	SBu	PR	01 July 09
V1	5year after Draft	LS	SB			June 09

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Glossary

Term	Definition
AADT	Annual Average Daily Traffic. Average of 24 hour flows, seven days a week, for all days within the year.
AAWT	Annual Average Weekday Traffic. As AADT but for five days, (Monday to Friday) only.
Accessibility	Accessibility can be defined as 'ease of reaching'. The accessibility objective is concerned with increasing the ability with which people in different locations, and with differing availability of transport, can reach different types of facility.
AM Peak	denoting the morning peak period
AST	Appraisal Summary Table. This records the impacts of the scheme according to the Government's five key objects for transport, as defined in DfT guidance contained on its Transport Analysis Guidance web pages, WebTAG
ATC	Automatic Traffic Count, a machine which measures traffic flow at a point in the road.
AWT	Average Weekday Traffic. Average of Monday to Friday 24 hour flows.
BCR	Benefit Cost Ratio - The ratio between the monetised benefits and costs of a scheme, used as a measure of value for money in economic terms.
Chi Squared	A statistical test to determine whether the observed values of a variable are significantly different from those expected on the basis of a null hypothesis. Variables are categorised to determine whether a distribution of scores is due to chance or experimental factors and tests whether one variable is independent of another.
COBA	COst Benefit Analysis – a computer program which compares the costs of providing road schemes with the benefits derived by road users (in terms of time, vehicle operating costs and accidents), and expresses the results in terms of a monetary valuation. The COBA model uses the fixed trip matrix.
CRF	Congestion Reference Flow - AADT flow at which a road is likely to be congested in the peak periods of an average day.
DfT	Department for Transport
Discounting	Discounting is a technique used to compare costs and benefits that occur in different time periods and is the process of adjusting future cash flows to their present values to reflect the time value of money, e.g. £1 worth of benefits now is worth more than £1 in the future. A standard base year needs to be used which is 2002 for the appraisal used in this report.
DMRB	Design Manual for Roads and Bridges - A comprehensive manual system which sets out current standards, Advice Notes and other published documents relating to Trunk Road works.
Do Minimum	In scheme modelling, this is the scenario which comprises the existing road network plus improvement schemes that have already been committed.
Do Something	In scheme modelling, this is the scenario detailing the planned scheme.

Environmental Statement	This must be submitted with the initial planning application and covers all potential significant impacts that the road project may have.
EST	Evaluation Summary Table. In POPE studies, this is a summary of the evaluations of the TAG objectives using a similar format to the forecasts in the AST.
HGV	Heavy Goods Vehicle.
Highways Agency	An Executive Agency of the Department for Transport, responsible for operating, maintaining and improving the strategic road network in England.
IP	Inter Peak , the time between the AM and PM peaks
KSI	Killed or Seriously Injured
Light vehicle	Not a HGV. For traffic flow data, it is a vehicle less than 5.2m in length.
LILA	Locally Important Landscape Area.
MAC	A Managing Agent is responsible for the operation, maintenance, and improvement of the motorway and trunk road network of a Highways Agency area.
NATA	New Approach To Appraisals - Used for transport scheme appraisal since 1998.
NRTF	National Road Traffic Forecast. This document defines the latest forecasts produced by the Department of the Environment, Transport and the Regions of the growth in the volume of motor traffic. The most recent one is NRTF07 and the one previous was NRTF97.
Part 1 Claims	Claims for compensation under Part 1 of the Land Compensation Act 1973, relating to homeowners affected by road schemes
PIA	Personal Injury Accident. A road traffic accident in which at least one person required medical treatment.
PIA/mvkm	PIA/mvkm is the number of PIAs per million vehicle kilometres where 'vehicle kilometres' are the number of vehicles using a section of the road multiplied by the length of the road.
PM Peak	evening peak period
POPE	Post Opening Project Evaluation , before & after monitoring of all major highway schemes in England.
PROW	PROW are highways that allow the public right of passage, of which England has about 190,000 km.
PVB	Present Value of Benefits - The value of the scheme's estimated benefits discounted back to a common base year.
PVC	Present Value of Costs - The value of the scheme's estimated costs discounted back to a common base year.
Route Stress	This is used as a proxy for journey time reliability. It is described as the stress level of a road and is calculated as the ratio of flow to capacity: AADT / CRF.
Screenline	An imaginary line drawn across a transport corridor used to determine flows between areas on either side. Each road crossed by the screenline

	is monitored by a traffic count (ATC).
Seasonality	Seasonality is the variation in traffic behaviour across the year due to varying daylight levels, weather conditions, school holidays, etc.
Severance	Community severance is the separation of adjacent areas by road or heavy traffic, causing negative impact on non-motorised users, particularly pedestrians.
STATS19	A database of injury accident statistics recorded by police officers attending accidents
TIS	Traffic Impact Study
TAG	Transport Analysis Guidance , as defined in WebTAG.
TEMPRO	Trip End Model Presentation PROgram , DfT software which provides forecast data on trips for transport planning purposes.
TPI	Targeted Programme of Improvements . The Highways Agency's programme of investment in improvements to the Trunk road and Motorway road network comprised of a number of major schemes each costing more than £5m.
TRADS	Traffic count database developed by the Agency, to hold data from the Midlands, Southern and Northern monitoring regions.
Vehicle hours	Vehicle hours refers to the total time spent by all vehicles using a road and is expressed normally as a yearly value. For example, if 10,000 vehicles a day used a route with a 6 minute journey time, then the route's vehicle hours for the year would be 365,000.
vpd	Vehicles Per Day
webTAG	Department for Transport's website for guidance on the conduct of transport studies at http://www.webtag.org.uk/

Executive Summary

Scheme Description

The scheme consists of a single carriageway bypass around the villages of Stainburn and Great Clifton, with a short section of climbing lane. The new road is integrated with the old road with two new roundabouts at either end of the scheme. The scheme also includes a number of environmental measures, including an innovative new bat crossing.

Objectives (Appraisal Summary Table)	Objective Achieved?
♦ Reduce severance along existing A66;	Yes
♦ Improve journey times for through traffic;	Yes
♦ Improve air quality for Stainburn and Great Clifton; and	Yes
♦ Improve safety record for Stainburn and Great Clifton by removing through traffic from the existing A66 on to the new bypass.	Yes

Key Findings

- ***The objectives of the scheme were to improve safety, severance, air quality and journey times, and these have been met.***
- There has been a reduction of 8 personal injury accidents a year, this is marginally higher than the expected 7.5 saving;
- An innovative bat crossing point was implemented along with other measures as a response to the existence of bats discovered before construction;
- The use of stone walls designed to complement the existing walls in the area reflects the local character and gives the scheme a sense of place;
- In line with expectation, there was a large adverse impact on Upper Park (a heritage site). However, there has been an improvement in setting for the Conservation Area and Listed Buildings on the old A66 as expected;
- Consultation with the Stainburn Local Safety Group was carried out and identified outstanding concerns relating to speeding traffic through the village resulting from the lower traffic volumes since the scheme opened;
- Absence of the definitive COBA model (i.e. consistent with the AST and forecast) has limited opportunity to interpret differences between predicted and out-turn impacts. The HA has since improved its data archiving processes to ensure records of scheme appraisal supporting evidence are kept;
- The reduction in traffic volumes through the villages of Stainburn and Great Clifton has resulted in a moderate improvement in community severance as expected;
- Journey time savings are lower than predicted primarily due to congestion frequently occurring on the westbound carriageway of the bypass in the AM peak period;
- Journey time reliability has improved significantly on both the old and new A66, as a result of the additional capacity provided;
- The outturn benefit – cost ratio arising from the scheme is almost half that predicted, primarily due to lower than predicted journey time savings. However, this scheme still represents excellent value for money; and
- The outturn scheme cost is 25% higher than predicted, primarily due to higher land costs.

Summary of Scheme Impacts

Traffic

- The amount of traffic using the new bypass is in line with the predicted forecast at 8,500 vehicles per day (vpd).
- Traffic levels on the old A66 through Great Clifton have reduced by 72% since opening (a lower reduction than originally predicted) and through Stainburn have reduced by 58% (also less than predicted).
- Total traffic in the A66 corridor (new and old road) has increase by 4.5% between 2003 and 2009; this is less than that which can be expected through background traffic alone (5.1%).
- The reduction in traffic on the old road has also led to a corresponding reduction in the percentage of HGV's using the old route (from 8% to an average of 3.7%).
- Journey times have improved on both the old and new road, but not to the level predicted, primarily due to the post opening journey times being higher than predicted in the AM peak. Average savings for through traffic are around 2 minutes, although this saving varies by time of day and direction of travel.
- Traffic generated by the 'school run' is likely to be a primary cause of observed traffic congestion and queues on the Western Roundabout during the AM peak period.

Safety

- The average accident rate has reduced from 13 per year to 4.8 per year which represents a statistically significant saving – marginally higher than the expected saving of 7.5.
- The number of casualties has reduced following scheme opening, from 22 per year to 7.7 per year, representing a reduction of 65%.

Environment

- Carbon emissions have decreased by 12% as a result of the scheme which is greater than the predicted reduction of 2%. This difference is likely to be due to slightly slower than predicted vehicle speeds.
- Based on traffic volume changes, the scheme has had a beneficial impact on noise and air quality as expected.
- The bypass is a major feature on the landscape but landscape mitigation measures have been implemented in line with the proposals identified in the Environmental Statement. The planting carried out is generally well established and features such as the new stone walls reflect local character.
- As expected heritage impacts on Upper Park are considered to be very large adverse - there has been an improvement in setting for the Conservation Area and Listed Buildings on the old A66 as expected.
- Public rights of way have been maintained across the bypass as expected. As such, the impact on physical fitness has been evaluated as neutral.
- The impact on biodiversity is likely to be slight adverse as expected. Mitigation measures have been implemented, including the bat crossing point.

Accessibility

- The reduction in traffic volumes through the villages of Stainburn and Great Clifton has resulted in a moderate improvement in severance as predicted.
- In line with forecasts, the scheme has had no impact on public transport provision in the area.

Integration

- As forecast, this scheme is broadly consistent with the delivery of key policies set out in the Regional Planning Guidance, Cumbria and Lake District Joint Structure Plan, and the Allerdale Local Plan.

Summary of Scheme Economic Performance

	Pre-scheme forecast (2002 Prices)	Post-scheme re-forecast (2002 Prices)
Journey Time Benefit	£41.2m	£25.4m
Safety Benefit	£15.6m	£17.0m
Total 30 Year Benefits (PVB)	£56.7m	£42.4m
Costs (PVC)	£9.6m	£12.7m
Benefit Cost Ratio (BCR)	5.9	3.3

- The outturn scheme cost was 25% higher than predicted primarily due to higher than anticipated land costs.
- Journey time benefits were 25% less than predicted mainly due to an over estimation of benefits in the peak hours.
- The monetary safety benefits are within 15% of that predicted.
- The benefit cost ratio is lower than forecast due to the lower than predicted journey time benefit and higher than predicted scheme costs.

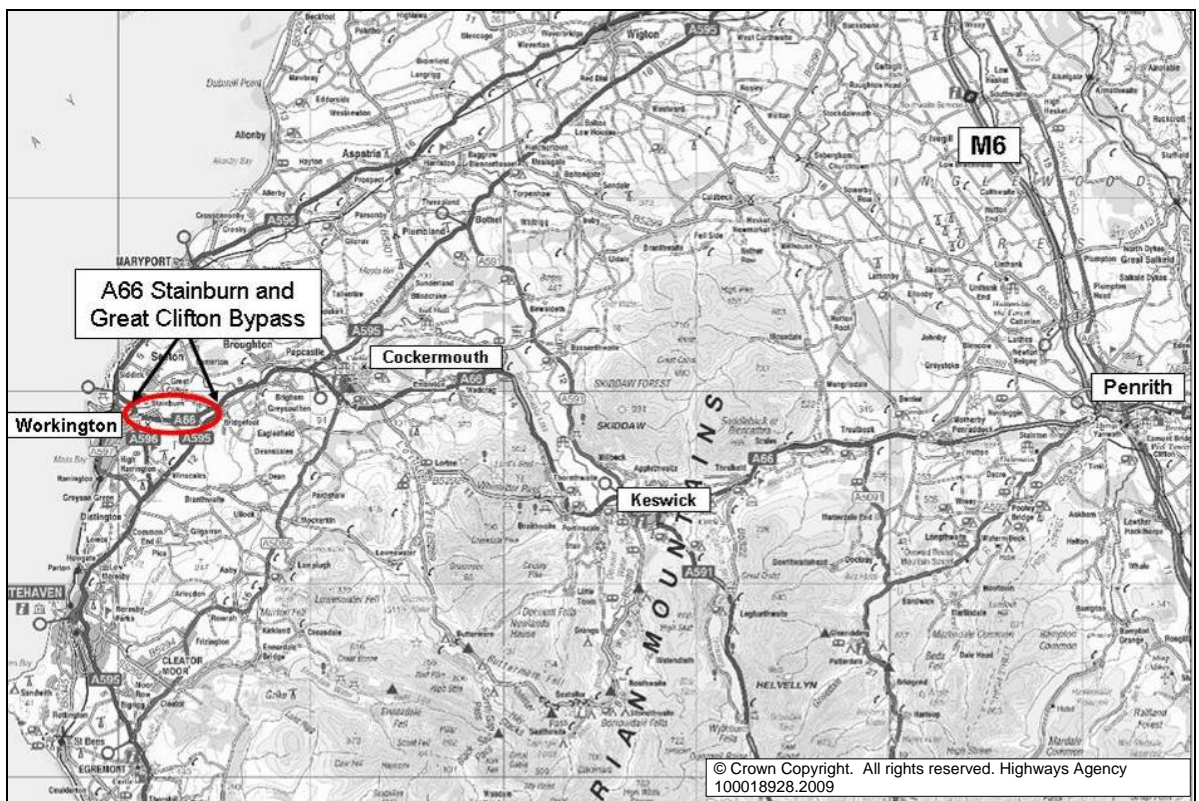
1. Introduction

Background to Scheme

Scheme Location

- 1.1 The A66 at Stainburn and Great Clifton is part of the A66 Trunk Road which links the M6 at Penrith to Workington on the west coast. The bypass is located to the east of Workington in Cumbria and falls within the Highways Agency Area 13. Figure 1.1 shows the location of the scheme in a regional context.

Figure 1.1 – Regional Location of Scheme



- 1.2 The A66 Stainburn and Great Clifton Bypass opened on 20 December 2002. It is a single carriageway road with short section of climbing lane going eastbound south of Stainburn. It is joined with the A66 at either end with a new roundabout. Stainburn School and Science College¹ is located directly on the western roundabout of the scheme, and currently has approximately 870 pupils.
- 1.3 The scheme bypasses the small villages of Stainburn and Great Clifton (combined population approx 3,200 Census 2001). The surrounding area is mainly rural in nature as it borders onto the Lake District, with the exception of Workington to the west of the scheme.

¹ Stainburn School and Science College is referred to as Stainburn School for the remainder of this report.

- 1.4 Other schemes within the locality include the A595 Parton Lillyhall improvement scheme which is to the south west of the scheme. This officially opened in Spring 2009, and as some routes were subject to traffic management and speed restrictions, the evaluation of this A66 Stainburn and Great Clifton scheme was delayed until this traffic management no longer influenced traffic conditions in the area.

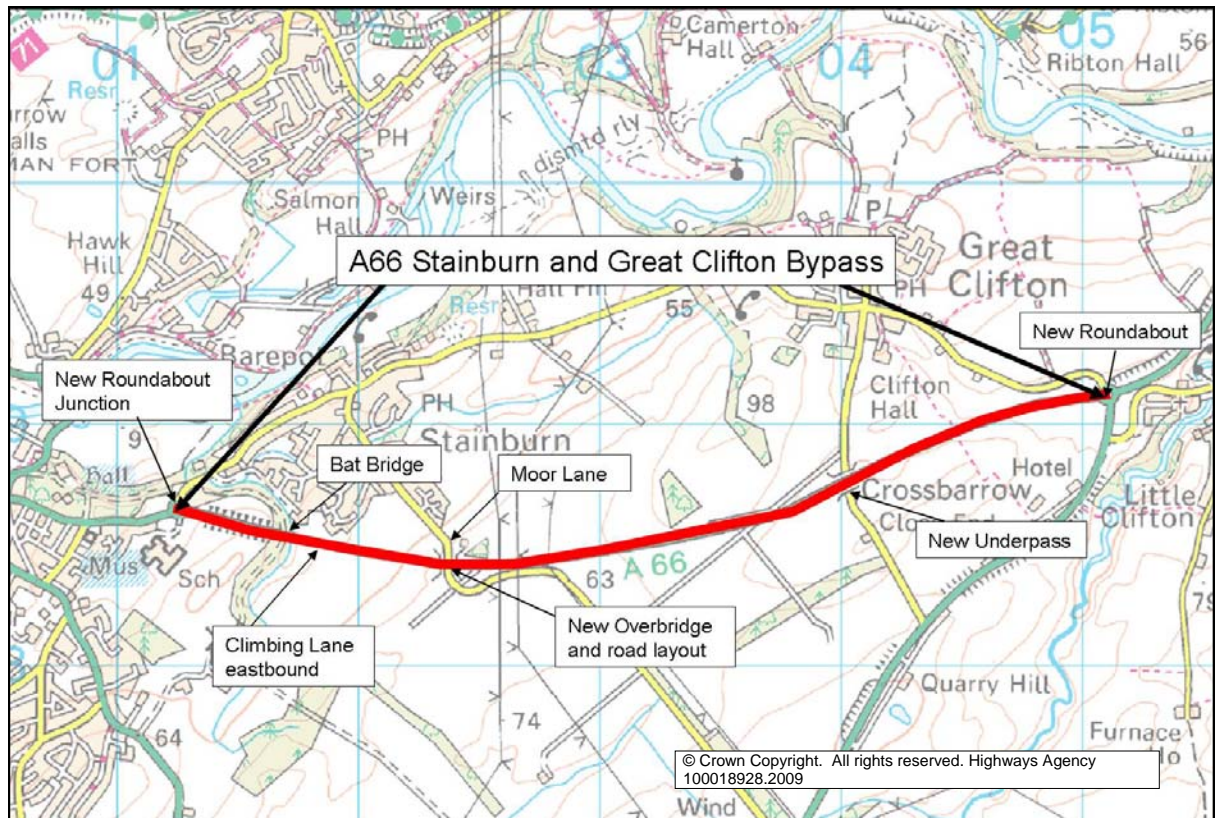
The Need for the scheme

- 1.5 The old A66 route through the villages of Stainburn and Great Clifton was a narrow and winding road through the villages and it suffered from a high accident rate and poor journey time reliability.
- 1.6 As a result of this, local residents had petitioned the council for a solution to the safety and reliability issues for several years prior to implementation.

Scheme Description

- 1.7 The bypass scheme consisted of the following works and a scheme layout is shown in Figure 1.2:
- 4.1 km of new single carriageway bypass, with a short section of climbing lane in the eastbound direction;
 - Two new roundabouts, one at the eastern end of the scheme which replaces a former T-Junction, and one entirely new roundabout junction at the western end of the scheme to link in with the existing road;
 - 1 overbridge and 1 underpass for small roads that would otherwise have been severed by the bypass; and
 - Additional environmental measures such as a bat bridge and a mammal ledge in the underpass.

Figure 1.2 – Scheme Layout



Scheme Objectives

1.8 The scheme was implemented to address the following objectives, which are highlighted within the scheme Appraisal Summary Table (AST). These objectives were:

- To reduce severance along existing A66;
- To improve journey times for through traffic;
- To improve air quality for Stainburn and Great Clifton; and
- To improve safety record for Stainburn and Great Clifton by removing through traffic from the existing A66 on to the new bypass.

History of the Scheme

1.9 The history of events leading up to the construction of the bypass are summarised as follows;

- The scheme was developed in the late 1980's and a Public Inquiry was undertaken in late 1994, however the majority of documents relating to this were unavailable for use in this report;
- The A66 Trunk Road (Stainburn and Great Clifton Bypass) (De-Trunking) Order 1996;
- The scheme economics were reappraised in 2000;

- Construction started – June 2001; and
- Scheme opened – December 2002.

Overview of POPE

- 1.10 The Highways Agency (HA) is responsible for improving the strategic highway network (motorways and trunk roads) by delivering Major Projects (formerly Targeted Programme of Improvements or TPI). At each key decision stage through the planning process schemes are subject to a rigorous appraisal process to provide a justification for the project's continued development. An Appraisal Summary Table (AST) is produced which records the degree to which the five Central Government objectives for Transport (Environment, Safety, Economy, Accessibility and Integration) have been achieved. The contents of the AST (and where necessary it's more detailed supporting documentation) allow judgements to be made about the overall value for money of the scheme.
- 1.11 During the planning process scheme impacts are based on well informed predictions. However, it is vital to identify the strengths and weaknesses in the techniques used for appraising schemes so that improvements can be made in the future. For POPE this is achieved by comparing information collected 'before' and 'after' a scheme opens to traffic with predictions made during the planning process. Outturn impacts are summarised in an Evaluation Summary Table (EST).
- 1.12 POPE is mandatory for all Major Projects and is carried out generally at one year and five years after opening.

Purpose of the Report

- 1.13 This report provides the Five-Year After results of a study evaluating the effects of the A66 Stainburn and Great Clifton Bypass. This report has been prepared as part of the Post Opening Project Evaluation (POPE) Commission and builds on the Two-Year After Report prepared for the Highways Agency in September 2005 and the Traffic Impact Study (TIS) prepared in 2003.

Organisations involved in this study

- 1.14 The parties involved in monitoring the five year effects of the A66 Stainburn and Great Clifton Bypass are; the Highways Agency, Cumbria County Council (CCC) and Allerdale Borough Council.

Report Structure

- 1.15 The remainder of the report will be structured as follows:
- **Section 2: Consultation** – This section details the findings from consultation with stakeholders;
 - **Section 3: Traffic Analysis** – This section gives the analysis of the traffic impacts of the scheme and includes an evaluation of ‘before’ and ‘after’ traffic volumes and journey times, and a comparison with traffic forecasts;
 - **Section 4: Safety Analysis** – The key safety impacts are analysed in this section based on data from before and after the opening of the scheme. This includes a comparison of changes in accidents compared to the predicted impacts;
 - **Section 5: Economic Assessment** – This section evaluates the economic benefits of the scheme in comparison with the impacts that were predicted;
 - **Section 6: Environmental Assessment** – The environmental impact of the bypass is assessed in this section;
 - **Section 7: Accessibility** - An assessment of the scheme against the accessibility sub-objective; and
 - **Section 8: Integration** – An assessment of how the scheme aligns with national and local policy and integration with other modes.

Sources

- 1.16 The sources upon which this evaluation is based include the following;
- Traffic counts from the Highways Agency’s TRADS database;
 - Commissioned journey time surveys, both before and after opening;
 - Commissioned traffic counts, both before and after opening;
 - Accident records obtained from the Area 13 Managing Agency Contractor (MAC) and CCC;
 - Site visits appraising the scheme by a transport planner and a landscape architect;
 - Reports appraising the scheme from 1994 (used for reference, not figures);
 - Cost Benefit Analysis (COBA) files from 2000; and
 - Environmental Statement and supporting documents including AST. A full list of environmental information requested is available in Appendix H.

2. Consultation

Introduction

- 2.1 At the inception meeting held in May 2008 with the HA and Cumbria County Council several issues were identified as being of key interest for this scheme, including the impact on the local school children and possible speeding through the villages (as can be common in bypass schemes).
- 2.2 It was considered that a residential survey would not allow the wider impacts of the scheme to be taken into account; therefore it was decided to do a local stakeholder questionnaire as the more suitable form of consultation.
- 2.3 In addition to the statutory consultees, the following groups have been identified for consultation in order to gain views from the wider community:
- Local schools and colleges;
 - Vulnerable user groups such as ramblers/cyclists;
 - Local businesses including pubs and small hotels;
 - Parish councils;
 - Local bus operators (Stagecoach);
 - Local road safety group;
 - West Lakes Renaissance; and
 - Local Councillors.
- 2.4 A short questionnaire was distributed in May 2009 along with an accompanying letter outlining the aim of the consultation (see Appendix D for an example of the questionnaire). A total of 26 identical questionnaires were sent out, and 12 were returned.

Summary of key results

- 2.5 The following outlines the key findings from the consultation process. The full consultation results are outlined in Appendix C.
- 2.6 All but one of the respondents have been in the area since before the bypass opened, therefore there has been no differentiation made in terms of time in the area, as the answers given were similar in both cases.
- 2.7 The key findings from the consultation include;
- Overall, the respondents considered that the bypass had been a success, and had achieved all of its objectives;
 - The only issues that some respondents considered had been made worse since the bypass opened was speeding traffic on the old A66;

- Respondents were split in terms of the beneficial effect on the local economy, with equal numbers believing it was beneficial, and not beneficial; and
- Again, respondents were split as to whether the bypass had been either beneficial, or had had no impact on the wider economic area.

2.8 The additional comments added by the questionnaire respondents were;

- *Flooding in Bridgefoot has increased due to the surface water holding tanks under the bypass overflowing into the Lost Rigg beck at Bridgefoot.*
- *Suggested continuation of the double white lines towards Workington (under the bridge travelling towards the Stainburn School roundabout), as at this point vision is limited for traffic travelling towards Cockermouth (EB).*
- *Since the bypass opened, the roads through Great Clifton are no longer gritted during icy weather (Although the section through Stainburn is). This frequently causes incidents as black ice occurs regularly between the Ginn House and the end of the housing, heading towards Stainburn.*

2.9 In addition to the questionnaire a meeting took place with the Stainburn Local Safety Group in September 2008, which enabled Atkins to meet with residents and to further consider the concerns of speeding and ratrunning traffic that the residents had. A summary of the issues raised in this meeting has been given throughout the report under the heading Stainburn Local Safety Group.

3. Traffic Analysis

Introduction

3.1 In order to assess the traffic impacts of the scheme, this section reports on:

- Data Collection;
- Traffic volumes for 24hr average weekday;
- Proportion of heavy goods vehicles;
- Long term trends in daily traffic volumes; and
- Journey time changes on the A66.

Data Collection

Timing of Data Collection

3.2 For the purpose of the POPE process for this scheme, traffic counts were undertaken at the following times on the A66 and other roads close to the scheme;

- November 2002 - before scheme opened;
- April 2005 - neutral month 2 years after scheme opened; and
- March 2009 - neutral month 6 years after scheme opened.

Sources of Data

3.3 Traffic data used throughout this section is derived from the following sources:

- HA TRADS database – permanent counts on the A66, A595 and A596 where available both before and after opening; and
- Temporary traffic counts on the non trunk roads, and roads where TRADS sites were not operational, were commissioned specially for this report.

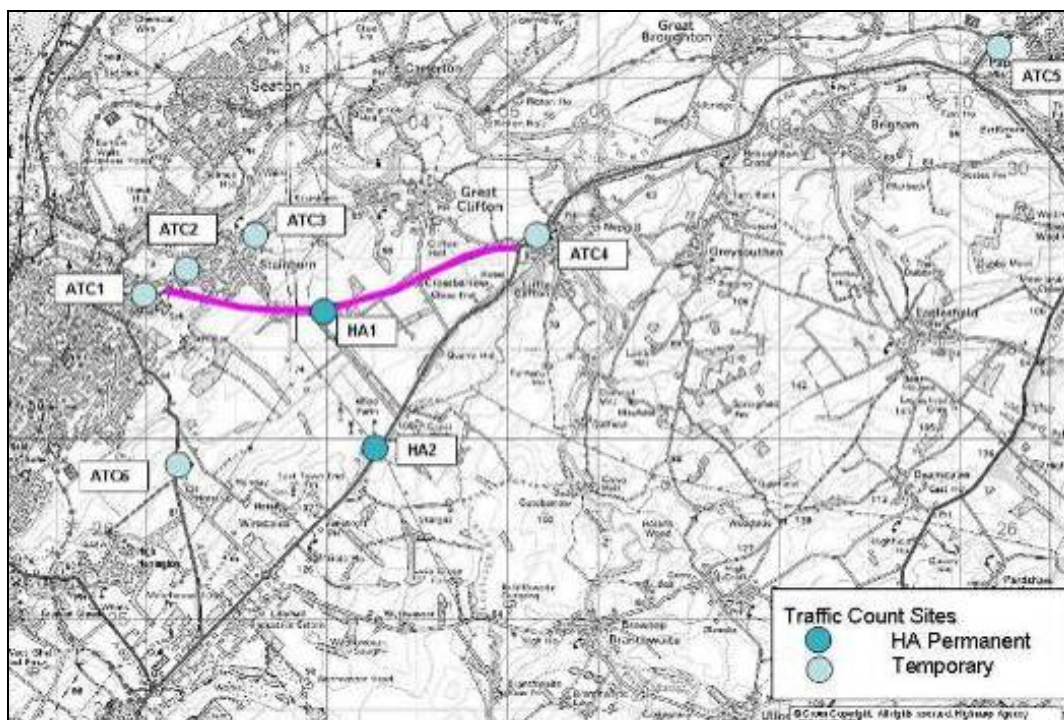
3.4 The temporary counts were undertaken at the following sites, and are shown in Figure 3.1.

- ATC1 - just west of the western roundabout of the scheme;
- ATC2 - Old A66 western side of Stainburn (Stainburn School);
- ATC3- Old A66 east of Stainburn (near the Briery Pub);
- ATC4 - just east of eastern roundabout of the scheme;
- ATC5 - A595 Papcastle Bypass; and
- ATC6 - A596 between Workington and the A595.

3.5 The following HA permanent TRADS sites were also used, and are shown in Figure 3.1.

- HA1 - A66 Stainburn and Great Clifton Bypass; and
- HA2 - A595 near Capel How.

Figure 3.1 – Traffic Counter Locations



3.6 Although the scheme opened in December 2002, the after data for the Five Year After report has been collected in March/April as the winter period are not considered 'neutral' months.

3.7 In addition, the counts have been undertaken in 2009 due to interference on the surrounding routes caused by the construction of the A595 Parton Lillyhall improvement throughout 2008. Although it was unlikely to have much effect on any rerouting once the scheme opened, it has caused some disruption with road/junction closures at various times throughout 2008. After discussion with the MAC, HA and Cumbria County Council, it was therefore decided that traffic surveys should be delayed until after the planned opening of the Parton Lillyhall scheme in late 2008. Hence, the after surveys were undertaken in Spring 2009.

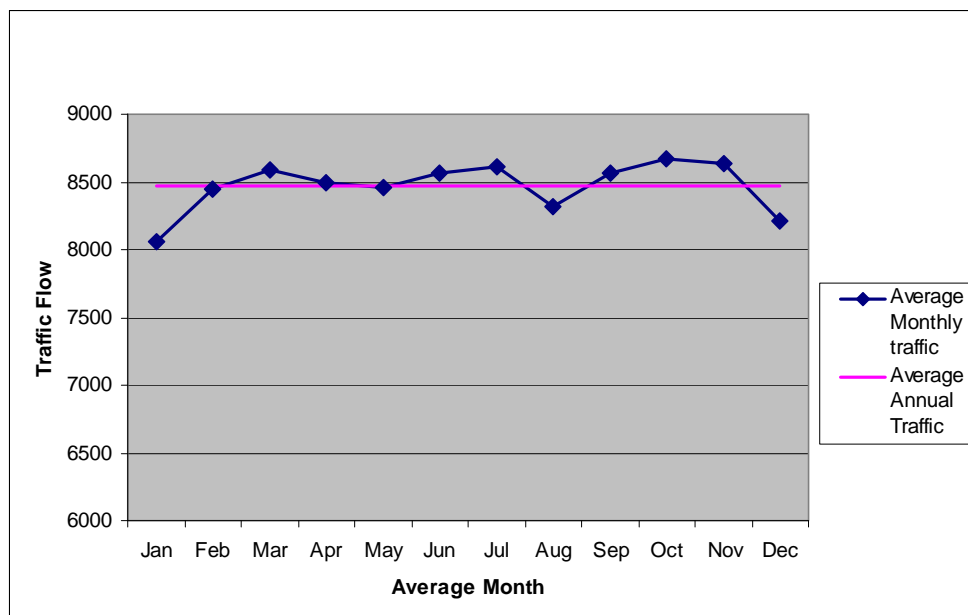
3.8 The A595 Parton Lillyhall scheme was delayed slightly, and was completed at the beginning of March 2009, and at that time the diversions were lifted. From the figures detailed in the following section, it is not considered that the opening of the A595 Parton Lillyhall scheme has had a noticeable impact on traffic flows in the area.

Traffic Volume Analysis

Seasonality

- 3.9 The data used for the traffic counts was gathered in November before the scheme opened, but due to the other schemes in the area, post scheme data was used from March. Therefore it is important to consider the possible impact on this in terms of traffic analysis.
- 3.10 Figure 3.2 shows the average weekday daily traffic per month along the A66 bypass (averaged between 2004 and 2009). The key points are as follows;
- The flows show a wide seasonal variation, with flows dropping considerably for December and January;
 - There is a considerable drop in traffic during August which is likely to be related to the lack of traffic generated by Stainburn School in the summer holidays;
 - Traffic is also lower in February and April/May which may also be linked to school holidays;
 - Overall, the total variation across the months is approximately 600 vehicles, which accounts for about 7% of the average total traffic; and
 - Traffic does not increase considerably in the summer months therefore it is likely that tourism is not significant in terms of traffic generation.
- 3.11 It is therefore considered that it is reasonable to compare the flows between November and March as they represent a similar traffic flow, although both are slightly higher than the annual average.

Figure 3.2 - Yearly Trend in Weekday Traffic on the A66



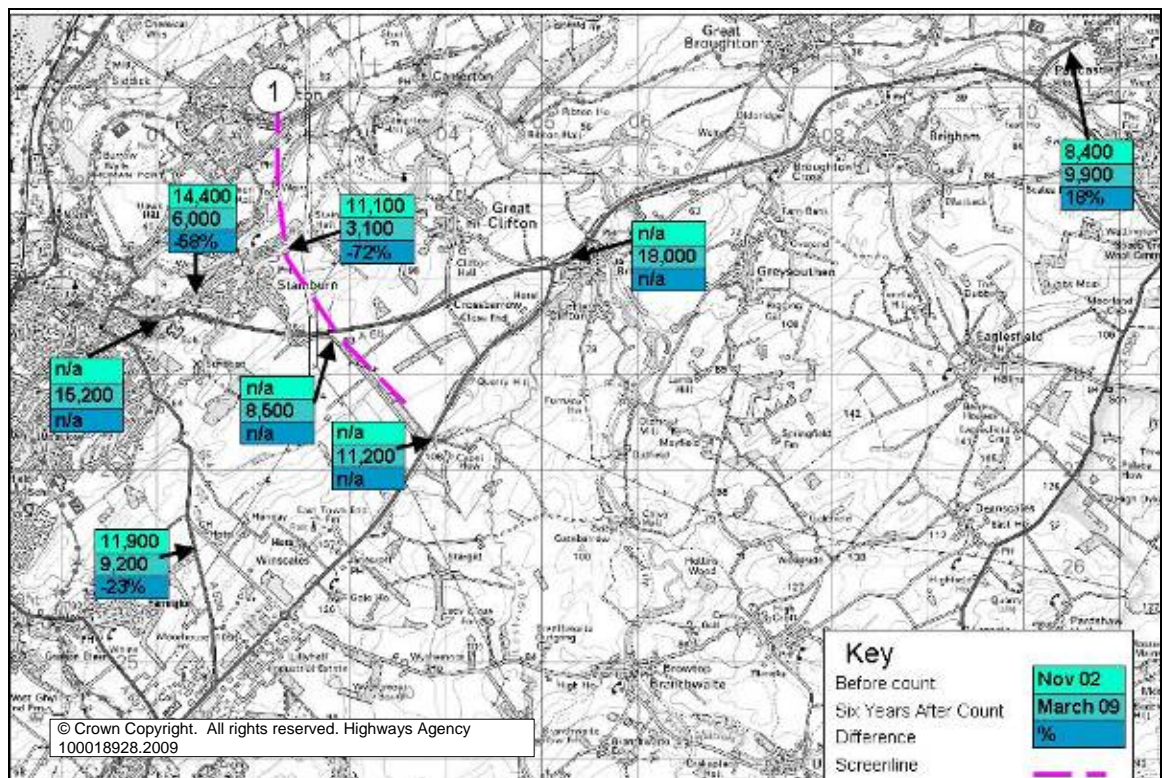
Traffic Volumes at locations around the bypass

3.12 Traffic volumes on the old road and the bypass, as well as a number of adjacent routes are shown in Table 3.1 and mapped in Figure 3.3. All counts are given in 24 hour average weekday flows (AWT).

Table 3.1 - AWT Flow Comparison

Location	Before (2002)	After (2005)	After (2009)	Difference (2002-2009)
Old A66 through Stainburn	14,400	6,200	6,000	-8,400 (-58%)
Old A66 by the Briery Pub	11,100	3,200	3,100	-8,000 (-72%)
New A66 Bypass	-	8,400	8,500	-
A66 to west of scheme	-	14,800	15,200	-
A66 to east of scheme	-	18,100	18,000	-
A595 near Capel How	-	9,800	11,200	-
A595 Papcastle	8,400	10,800	9,900	1,500 (18%)
A596 High Harrington	11,900	8,300	9,200	-2,700 (-23%)

Figure 3.3 – Traffic Flow Comparison



- 3.13 The key points shown in Table 3.1 and Figure 3.3 are:
- Between 58-72% of traffic has been removed from the old road post opening;
 - The bypass carries an average of 8,500 vehicles per day;
 - The traffic to the west of Stainburn has not decreased as much as the site to the east of Stainburn, but this is likely to be residents going in and out of the village from the western end to use the bypass, rather than traffic from Stainburn going through Great Clifton towards Cockermouth.
 - Traffic on the A596 to the south of the scheme has decreased by 23%, however the figures on the A595 were unavailable to see whether there has been a transfer in traffic, but it is not an obvious alternative route.

Screenlines

- 3.14 Whilst the scheme has been successful at removing traffic from the old road, it is also useful to consider the traffic impact across the corridor of the old and new road. Figure 3.3 also shows the screenline that has been used. The lower count on the old road has been used, as this is likely to be the traffic that uses the old road as a through route. It can be seen that the total traffic across the old and new road (using the lower of the two counts on the old road) has increased from 11,100 vehicles pre scheme to 11,600 post opening, which is an increase of approximately 4.5%. This is in line with the predicted traffic growth between 2003 and 2009 as predicted by TEMPRO/ NRTF, which indicated a growth of 5.1% in this area.
- 3.15 As there has not been a significant increase in traffic across the screenline, it indicates that the scheme has not had any strategic rerouting effects as it serves the local area.

Change in Heavy Goods Vehicles (HGV)

- 3.16 The old A66 was considered to be unsuitable for HGVs due to the narrow and winding nature of the route. None of the pre scheme traffic counts contained a breakdown of the HGV percentage, however, the AST for this scheme dated 1998 states that there was an 8% HGV proportion, and therefore this has been assumed as the average along the route. Table 3.2 shows the changes in HGV % before and after the scheme opened.
- 3.17 The table indicates that the scheme has removed HGV traffic from the old road, especially from the western section through Stainburn.

Table 3.2 - HGV % comparison

	Before Opening	After Opening
A66 Old road (western end)	8%	2.1%
A66 Old road (eastern end)		5.3%
A66 Bypass	-	6%

Analysis of Forecast vs. Outturn Traffic Volumes

- 3.18 The COBA for this scheme predicted traffic flows in the Do Something scenario (with Bypass) for 2009 (opening year of 2003) for a high and low growth option. Table 3.3 shows how the resulting predictions compare with the outturn traffic flows. The COBA (version 2000) only used traffic flows on the old and new road, as it was not expected to affect traffic on other roads.
- 3.19 The following figures are Annual Average Daily Traffic (AADT) as this is the output of COBA therefore, in order to enable comparison, the Actual figures in the following table are also AADT. The predicted low and high growth scenarios are related to the expected traffic growth over the scheme life period.

Table 3.3 - Predicted vs. Outturn AADT

Road	Predicted Low Growth (LG)	Predicted High Growth (HG)	Actual	Difference	
				LG	HG
Old A66 East	1,900	2,100	3,000	1,100	900
Old A66 West	4,500	4,800	5,400	900	600
Bypass	8,100	8,700	8,200	100	-500

- 3.20 The key points to note from Table 3.3 are;
- The actual traffic flows on the eastern section of the old road are consistently higher than forecast by around 31-36%. This represents an under prediction of traffic;
 - The traffic flow on the western section of the old road was under predicted slightly, although is a more accurate prediction than the other half of the bypass;
 - The traffic on the bypass was predicted accurately, as the outturn traffic flows are between the high and low growth estimates.
- 3.21 The predicted level of transfer (in terms of traffic flow) from the old road to the bypass appears to be accurate, however actual traffic volumes are higher than predicted on the old road. It is likely that this traffic is local traffic going to and from the villages, and has been underestimated within the traffic forecasts.

Consultation

- 3.22 A consultation of key stakeholders was undertaken as part of this study, and contained two questions relating to traffic;
- *Do you feel that the scheme has been successful in removing through traffic from the two villages?*

- *How has traffic congestion on the old A66 changed since the bypass opened?*
- 3.23 Of the 26 forms sent, 12 were returned, and of these, all respondents agreed or strongly agreed that the scheme was successful in removing through traffic from the villages. 11 out of the 12 respondents stated that they felt that the traffic congestion on the old road had improved, with the remaining response stating that there was no change.
- 3.24 It was however noted by several stakeholders, that due to congestion in the westbound direction in the AM peak on the bypass, many of the local people use the old road as it is considered to be quicker, and this may contribute to the higher traffic volumes on the old road.
- 3.25 This therefore supports the traffic figures shown in the previous section, and shows that the scheme has been largely successful in its traffic objectives.

Stainburn Safety Group

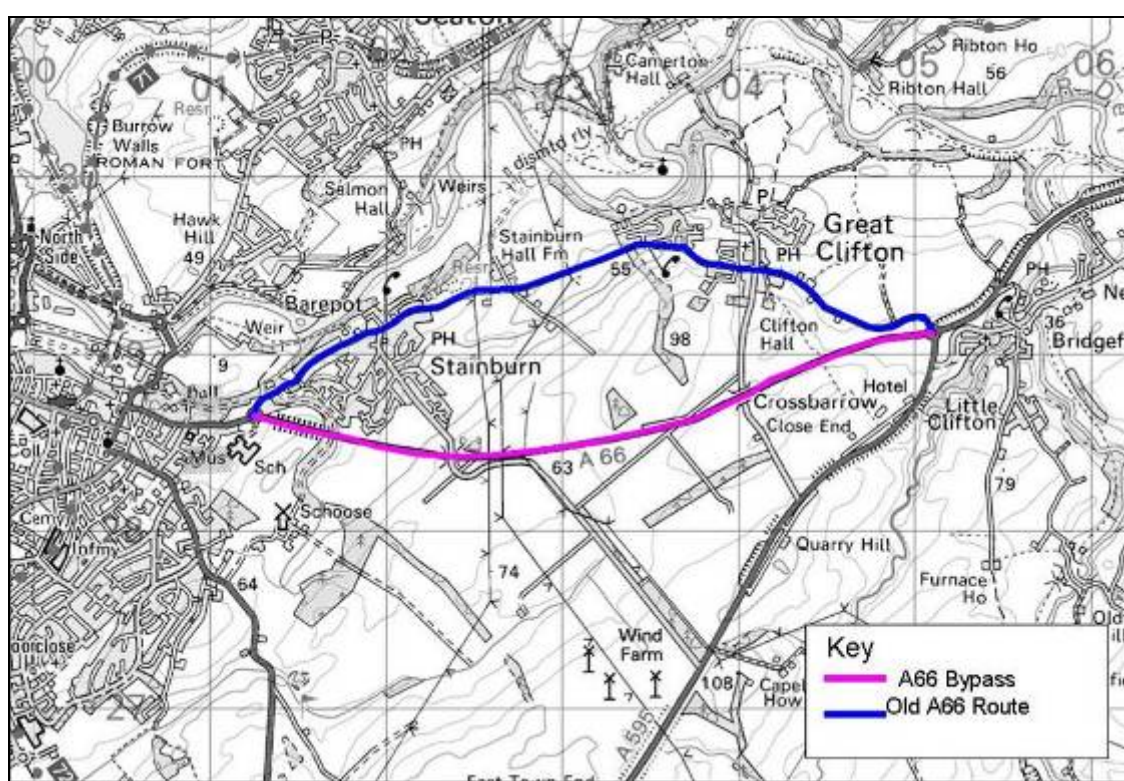
- 3.26 This group suggested that there might be an element of rat running down Moor Road between the old A66 and the A595 as an alternative to using the new roundabout by Stainburn School, however no traffic counts were available to demonstrate this, and it was noted that it is unlikely to provide a significant time saving in most time periods.

Journey Time Analysis

Introduction

- 3.27 This section considers the journey time changes that have taken place along the A66 corridor since the scheme opened. Two routes have been looked at for this analysis; the old A66 route, and the new bypass route. The routes are shown in Figure 3.4.
- 3.28 The pre scheme and post scheme surveys were undertaken using the same time periods; AM Peak (7.30am-9.30am), Interpeak (10am-3pm) and PM peak (4pm to 6pm). Details of the number of runs and times are given in Appendix E.

Figure 3.4 – Location of Journey Time Survey Routes



Before and After Opening – Old Vs New Route

- 3.29 Before journey times on the old A66 route have been compared to the 6-year after journey times using the new route. Comparisons have also been made with the 2 year after journey times to judge whether the benefits shown in the 2 year after report have been maintained.
- 3.30 The results are presented in Table 3.4 which shows:
- Journey times in the eastbound direction in all time periods achieve a significant saving, on both the old and new road compared to the pre scheme situation;

- Traffic achieves a saving of approximately 1 minute 46 seconds in the interpeak and PM peak westbound;
- Traffic travelling westbound in the AM peak achieve a disbenefit compared to the pre scheme situation on both the bypass and the old road; and
- Traffic on the old road has also benefited from a journey time saving, which indicates that the traffic in the pre scheme situation was constrained by congestion, and not just by the speed limits.

Table 3.4 - Before and After Journey Time comparison

Direction and Time period	Before (Old Route)	After (Old Route)	After (Bypass)	Time Saving	
				Old Route	Old Route to Bypass
Eastbound					
AM Peak	04:52	04:26	03:07	00:26	01:45
Inter Peak	04:56	04:16	03:12	00:40	01:44
PM Peak	04:59	04:04	02:58	00:55	02:01
Westbound					
AM Peak	04:41	04:44	04:58	-00:03	-00:17
Inter Peak	04:45	04:42	02:59	00:03	01:46
PM Peak	04:47	04:23	03:00	00:24	01:47

3.31 Queuing traffic was noted during a site visit on the westbound carriageway of the bypass in the AM peak on the approach to the western roundabout and is shown in Figure 3.5. This supports the slight journey time disbenefit shown in the AM peak.

Figure 3.5 – Queuing traffic on A66 westbound in AM peak



Comparison with Predicted Journey Times

- 3.32 Predicted journey times have been derived from the COBA files which have also been used in the Economy section of this report. The COBA was rerun to an opening year of 2009 to allow direct comparison with the outturn journey times undertaken in 2009. The times used are an average two way journey time.

**Table 3.5 - Comparison of Predicted vs. Outturn Journey Time
Savings on the Trunk Road**

Time period	LG Predicted Saving	HG Predicted Saving		Actual Before	Actual After	Outturn Saving (m:s)
Average Peak	03:21	03:51	AM peak	04:47	03:55	00:52
			PM peak	04:53	02:59	01:54
Interpeak	02:42	02:51	Interpeak	04:51	03:07	01:44
Off peak	01:44	01:44	Off peak	No journey times undertaken (assume interpeak)		

- 3.33 Table 3.5 shows that the forecast journey time savings derived from COBA (for 2009) for all time periods (except the off peak), in both the high and low growth scenarios are higher than the outturn values achieved. The journey times for the Do Minimum scenario from COBA suggested that journey times without the scheme (in the simulated 2009 opening year) would have been in the region of 6 minutes 30 seconds and 7 minutes, compared to observed before journey times of approximately 4 minutes 50 seconds.
- 3.34 Therefore the outturn savings are significantly less than predicted in all time periods, but are particularly less in the AM peak where the outturn times are affected by queuing at the western roundabout near the school.
- 3.35 The predicted journey times on the bypass for the Do Something scenario were estimated to be in the region of 3 minutes in all time periods. Therefore in terms of the accuracy of the predicted journey times that could be achieved, the predicted and outturn journey times for the bypass are very close.
- 3.36 It should also be noted that the COBA files used for this evaluation do not contain any junction disbenefit for traffic at the western roundabout, which is the primary cause of delay, particularly in the AM peak and this contributes to the higher time savings forecast.

Consultation

- 3.37 A consultation of key stakeholders was undertaken as part of this study, and contained two questions relating to journey times. These were;
- *Do you feel that the scheme has been successful in improving journey times on the new A66?*

- *How has traffic congestion on the old A66 changed since the bypass opened?*

- 3.38 Of the 26 forms sent, 12 were returned. All respondents agreed or strongly agreed that the scheme was improving journey times on the A66 route. 11 out of the 12 respondents stated that they felt that the traffic congestion on the old road had improved, with the remaining response stating that there was no change.
- 3.39 It was however noted by several stakeholders, that due to congestion in the AM peak westbound on the bypass, many 'locals' use the old road as it is considered to be quicker.

Stainburn Local Safety Group

- 3.40 In addition, it was noted by the Stainburn Safety Group suggested that local people avoid travelling at school start times, as this is when the Western Roundabout is congested and journey times are increased.
- 3.41 This therefore supports the journey time improvements shown in the previous section, and shows that the scheme has been largely successful in improving journey times, at least in the interpeak and PM peak times.

Summary

Traffic Volumes

- Seasonality analysis showed there was a minimal difference between March data and November data in this area;
- Analysis also highlighted the impact of school traffic on monthly traffic flows; and
- The bypass has successfully rerouted a large amount of traffic away from the villages of Stainburn and Great Clifton, a drop of 58% and 72% in traffic respectively was evident.

Journey Times

- Significant journey time savings are observed on the bypass compared to the old road. Savings of around 1.75 minutes, and 2 minutes are observed depending on time period and direction, the exception being the AM peak in the westbound direction on the bypass, where a disbenefit is observed. It is likely that this is due to the traffic accessing the school at the western end of the bypass in this time period; and
- Journey time savings were also achieved for traffic using the old road. Savings varied from a couple of seconds to almost a minute, depending on direction and time period because of the removal of traffic.

Forecast Traffic and Journey Times

- Traffic flow forecasts for the bypass appear accurate, however the forecast traffic on the old road is significantly lower than actual outturn flows;
- Forecast journey time savings were substantially higher than was actually observed. Again, the AM peak figure saving is influenced by school traffic.

4. Safety

Introduction

- 4.1 One of the main objectives of this scheme is to improve the safety record through the villages by removing through traffic. This section aims to evaluate the performance of the scheme against the NATA safety objective. According to WebTAG, this objective is:

'To reduce the loss of life, injuries and damage to property resulting from transport accidents and crime'

- 4.2 The Safety Objective has 2 sub objectives;

- To reduce accidents; and
- To improve security.

Accidents

- 4.3 This section looks at personal injury accident (PIA) data for the old and new road, for 3 years prior to opening, and 6 years after opening to enable an analysis of the reduction in road traffic accidents and severity.

Data Source

- 4.4 The accident data used within this section has been obtained from both the MAC (Amey Mouchel) and Capita Symonds who represent CCC. The area chosen relates to the network used in the COBA which was used to originally appraise this scheme, and extends slightly beyond the bypassed area.
- 4.5 It should be noted however, that the data provided has not been validated by the Department for Transport (DfT), as it was sourced from provisional STATS 19 data. The requirement for up to date information was a consideration in the decision to use this data, and as it was sourced from Cumbria Constabulary, it is considered to be sufficiently robust to be used in this context. Therefore, the figures may be subject to change, although it is not anticipated that this would be significant in terms of the analysis of accident numbers presented in this report.

Locations of Accidents

- 4.6 In the years prior to the construction of the scheme, the A66 route through the villages of Stainburn and Great Clifton had a poor safety record with accidents occurring all along the route. There were clusters at junctions with side roads in both villages.
- 4.7 The locations of the before and after opening accidents are shown in Figure 4.1 and Figure 4.2.

Figure 4.1 – Before Accidents on A66

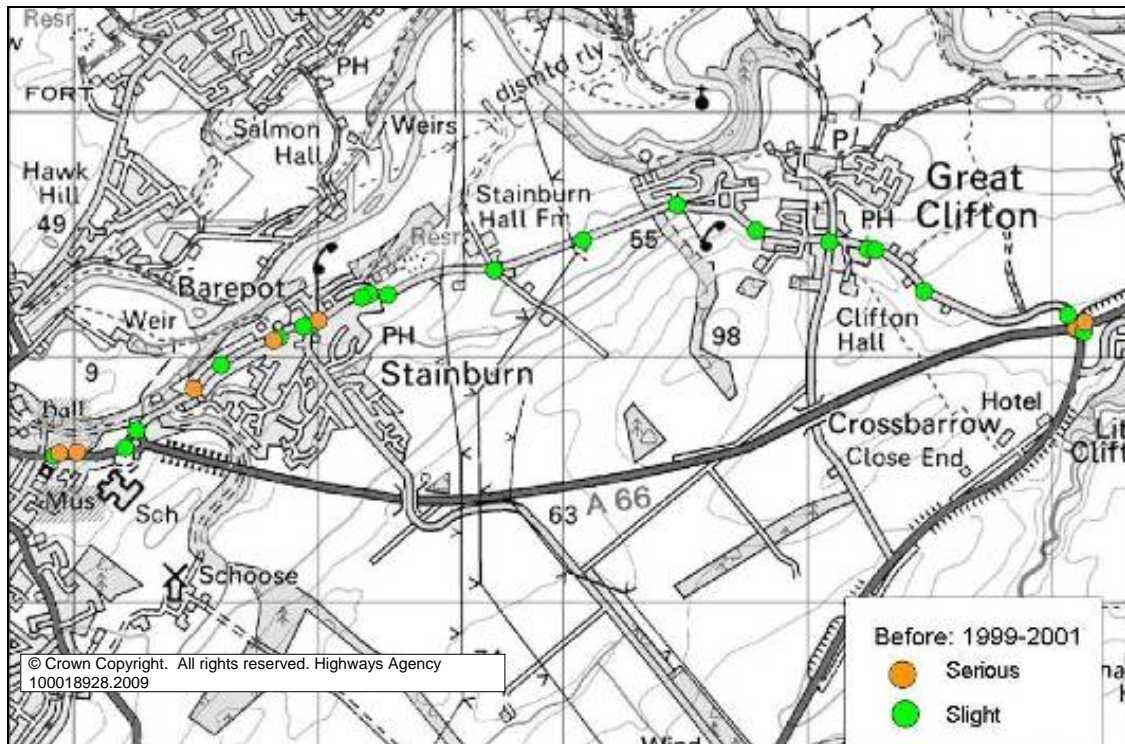
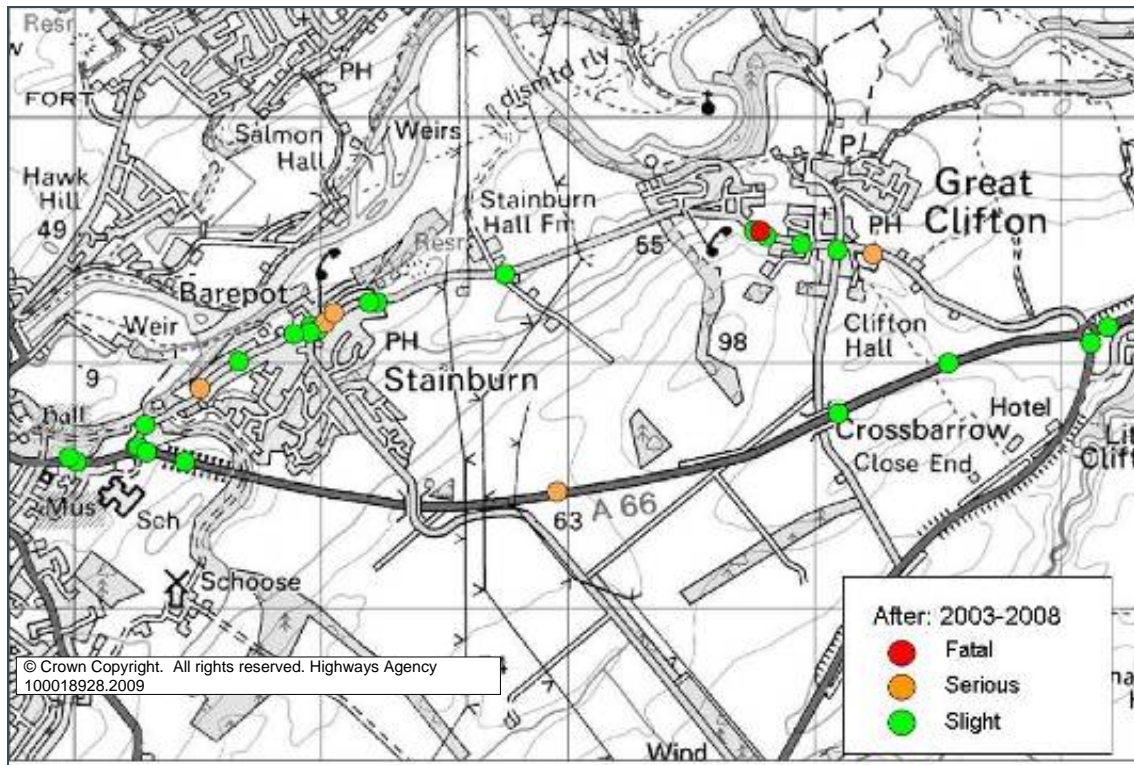


Figure 4.2 – After Accidents Old A66 and Bypass



4.8 The key points that can be seen from the accident maps are:

- Before scheme construction there were accident clusters in the villages where side roads entered;
- Before scheme construction there was an accident cluster at the A66 junction with the A595, and this also had a high severity ratio;
- After the bypass opened, the number of accidents at this junction has decreased compared to the pre scheme T junction; and
- After opening there are still clusters around the village junctions on the old road, however there are fewer per year compared to the pre scheme situation.

Accident Severity

4.9 Table 4.1 and Table 4.2 show the numbers and severities of the accidents per year both before and after opening.

Table 4.1 - Pre scheme accident severity

Year		Slight	Serious	Fatal	Severity Index* ²	Total
Before	1998/99	11	1	0	8.3%	12
	1999/2000	10	2	0	16.7%	12
	2000/01	11	5	0	30%	16
Annual Average					20.5%	13

Table 4.2 - Post scheme accident severity

Year		Slight	Serious	Fatal	Severity Index*	Total
After	2003	6	0	0	0%	6
	2004	0	1	0	100%	1
	2005	4	3	0	42.8%	7
	2006	1	1	0	50%	2
	2007	8	1	1	20%	10
	2008	3	0	0	0	3
Annual Average					24%	4.8

4.10 In the three year before period, the average number of accidents was 13 per year, with an accident severity index of 20.5%. Post opening the average

² Severity Index is calculated as the proportion of all accidents that are serious or fatal

number of accidents is 4.8, which represents a decrease of 8.2 accidents or a 63% average decrease after opening. It should be noted that the average accident severity post opening has increased from 20.5% to 24%, even though the total number of accidents has decreased.

- 4.11 The table also shows that although the average number of accidents post opening is 4.8 annually, the actual number of accidents per year varies from 1 to 10 per year.
- 4.12 The detailed information on accidents is based on the network used in the COBA assessment. Table 4.3 also breaks the accident saving down into the old and new road, and indicates that the average number of accidents on the old road has decreased by 72%.

Table 4.3 - Average Annual Accidents Before and After opening

Area Covered	Average Annual Accidents 3 years before	Average Annual Accidents 6 years after	difference
Old Road	13	3.6	-9.4
Bypass	0	1.2	1.2
Total Change	13	4.8	-8.2

Casualty Analysis

- 4.13 Table 4.4 shows the casualty figures over the appraised area. The term 'casualty' refers to someone who has received either a slight or serious injury or is killed as a result of an accident. In one accident there may be several casualties.

Table 4.4 - Casualty Analysis

	Before	After	Before (Per Year)	After (Per Year)
Slight	58	33	19.3	5.5
Serious	8	12	2.7	2
Fatal	0	1	0	0.16
Total	66	46	22	7.66

- 4.14 Over the appraised area there has been a 65% reduction in casualties per year since the bypass opened.
- 4.15 Slight casualties have seen the biggest reduction overall, however serious accidents per year have only reduced slightly. On further inspection, 8 out of the 12 serious casualties, and the 1 fatal casualty after opening have been from just 2 accidents. Both of these accidents were attributed to careless driving and excessive speed. These are discussed in more detail in the Accident Types section.

Accident Rates

- 4.16 Accident rates measured by number of accidents per million vehicle kilometres (PIA/mvkm) give a better indication as to the safety of a road than using pure accident numbers alone. This is because the accident rate takes into account how much the road is being used and over what distance travelled. Therefore an increase in accidents does not necessarily equate to an increased accident rate. Table 4.5 shows the change in accident rate for the A66 scheme. Note the accident figures are slightly different in this section, as the previous sections use the COBA area, which is slightly larger than just the old and new road sections. As this section uses the difference in mvkm travelled, we have used a direct comparison of before and after situations.

Table 4.5 - Accident Rate Comparison on old and new road

	Accidents per year	PIA/mvkm	National average PIA/mvkm for road type
3 years before	11.3	0.651	0.844
6 years after Old Road	3.16	0.503	0.776
6 years after Bypass	1.33	0.108	0.145 to 0.197 ³

- 4.17 Table 4.5 shows that the accident rate prior to scheme opening was 0.651 accidents per million vehicle kilometres (PIA/mvkm) which was below the national average of 0.844 for similar types of road (i.e. old design single carriageway). Post opening, the accident rate has reduced on the old road, and still remains below the national average for a non trunk road.
- 4.18 The accident rate for the new bypass is significantly less than the national average for this type of road (i.e. a new design single carriageway) at 0.108 PIA/mvkm.

Accident Types

- 4.19 Further investigation into the serious and fatal accidents occurring after opening indicates that the majority are caused by driver error as opposed to any design faults with the roads themselves. Post opening, all the fatal and serious accidents occur on the old road, which possibly indicates that the new bypass may have impacted on the accident severity on the old road.

³ The bypass has a climbing lane, therefore both accident type 5 and 7 for links and junctions have been used.

- 4.20 Further investigation of the accident figures and the local media reports highlights an opinion that some young drivers use the old and new road loop as a race track.
- 4.21 Of the 6 serious accidents and 1 fatal accident post opening, 5 have one or more of the following primary contributory factors in their accident descriptions;
- Careless/reckless driving behaviour;
 - Aggressive driving behaviour;
 - Exceeding speed limit; and
 - Impaired by alcohol.
- 4.22 In addition, all but one of the drivers in the serious or fatal accidents was recorded to be male between the ages of 18-22, which links in with reports of speeding and inexperienced drivers.

Statistical Significance of Changes in Accident Numbers

- 4.23 To test whether any of the changes in accident numbers observed in the table should be considered to be significant the Chi Squared test has been used. The results of this test clearly show that the decrease in accident numbers is highly likely to be due to the scheme and not just chance alone.
- 4.24 This therefore shows that the impact of the scheme is significant, as it has been successful in reducing accident numbers along this stretch significantly.

Forecast Safety Impact

- 4.25 Forecasts of the 30 year safety impact were made using the COBA model for this scheme. The model covers a small area which overall covers the old and new road, with short additional sections to either side. The model is based on observed accident data for the key routes, but uses COBA default values for the remainder of the network.
- 4.26 For the purpose of this study, the whole network was examined enabling direct comparison of the observed change in accidents to the predicted figures.

Table 4.6 - Forecast Vs Outturn Accident Saving

	Low Growth	High Growth	Outturn
Opening Year	7.1	7.9	8.2
30 years	242.4	292.6	289.5 ⁴

- 4.27 Table 4.6 shows that the outturn accident saving is higher than both the low and high growth predictions, indicating that the scheme performed better than expected.

⁴ Estimated benefit based on the relationship between the opening year and 30 year forecast, and represents a single value based on 60% of the low growth estimate, and 40% of the high growth estimate.

Consultation

- 4.28 As Safety was highlighted as one of the scheme objectives, and was further raised by Cumbria County Council at the inception meeting, additional consultation has been directly undertaken with both the Stainburn Local Safety Group and the local Police.

Stainburn Local Safety Group

- 4.29 The Stainburn Local Safety Group was set up after the opening of the bypass by concerned Stainburn residents who were concerned with speeding issues. Villagers were concerned about the speed of vehicles through the village, as they felt that people travel at higher speeds now that there are less heavy vehicles slowing traffic through the villages.
- 4.30 There have also been a number of slight accidents which have resulted in damage to people's property, such as front brick walls, which implies that people are travelling at speeds unsuitable to their surroundings.
- 4.31 This group raised concerns on the route that Moor Road from Stainburn takes on the new bridge over the new road. The alignment has been changed, introducing two sharp bends which the group felt may have introduced a problem in terms of accidents. They did note that there were very few vehicles using the route.
- 4.32 Accident data on this road has been analysed using data between 1997 and 2009, and highlights only one accident post opening on this over bridge, and no accidents from the original alignment.

Cumbria Western Road Policing Unit

- 4.33 The Cumbria Western Road Policing Unit was also contacted as part of the study to gain their response to these issues. The Police stated that they felt that there was a problem with young male 'boy racers' now using the old and new route loop, as a number of incidents had been reported.
- 4.34 In addition, the police considered there was also an issue with speeding on the old road, which is likely to be attributed to the reduced traffic allowing vehicles to travel faster.
- 4.35 On a number of occasions, police have provided an obvious presence in the area and this seems to deter speeding drivers, however they are unable to do this on a regular basis. In addition, the police have used speed guns on several occasions in the area.
- 4.36 The police also commented that they did not feel that there was an overall increased risk of all accidents, but felt that the severe accidents were generally caused by a small group of young drivers. They did not consider that the introduction of the bypass had introduced any additional safety problems, bar a slight issue with road marking lining on the approach to the western roundabout. They considered that the 'no overtaking' lining going westbound was not

extended long enough to stop people overtaking on the approach to the roundabout, although this has not yet resulted in any accidents.

Local Stakeholder Questionnaire

- 4.37 Consultation with key stakeholders was undertaken as part of this study, and contained two questions relating to safety;
- Do you feel that the scheme has been successful in improving Road Safety through the villages?
 - How have the following (speeding traffic on old A66) changed since the bypass opened?
- 4.38 Of the 26 forms sent, 12 were returned, and of these, nine respondents agreed or strongly agreed that the scheme had improved road safety through the villages. The remaining 3 respondents thought that there had been no change.
- 4.39 In terms of speeding, 6 out of the 12 respondents stated that they felt that the number of people speeding on the old road had decreased, however 2 stated that they thought the speeding issue had become worse. The remaining 4 responses did not consider that there had been any change.
- 4.40 This therefore supports the accident figures shown in the previous section and shows that the scheme has been largely successful in decreasing accidents, although a number of high profile accidents may give residents a slightly different perception of overall safety.

Security

- 4.41 The AST for this scheme did not use the Security sub objective. The Post Opening site visit confirmed that it was unlikely the scheme had any impact on security.

Summary

Accidents

- The average accident rate has reduced from 13 per year to 4.8 per year which represents a statistically significant saving;
- Accident severity has increased slightly post opening and that this is likely to be related to the young male drivers driving irresponsibly on the old and new road, as well as issues with some drivers speeding through the old road;
- The number of casualties has reduced post opening, from 22 per year, to 7.7 per year, a reduction of 65%;
- Predicted accident savings are shown to be reasonably accurate, as the average accident saving post opening is close to that which was predicted;
- The number of accidents per year shows a large variation, however the average of 6 years post opening data is shown to be a significant decrease from the pre scheme figures; and
- Consultation responses regarding concerns over 'boy racers' in the area are supported by the slight increase in accident severity.

5. Economy

Introduction

- 5.1 The original appraisal of the scheme included forecasts of the economic impacts of the scheme over 30 years, and is detailed in the Proof of Evidence (Traffic and Economic Aspects) document which was provided to the Public Inquiry in 1994. The data used for this assessment is therefore outdated as it used an opening year of 1997 while the scheme did not open until the end of 2002.

Appraisal Methodology

- 5.2 The safety and journey time benefits for this scheme were all appraised using COBA modelling.
- 5.3 The COBA model was updated in 2000 with a revised opening year of 2003, although no supporting documents have been provided for this COBA. The 2000 COBA has been used as a base for the economic and cost calculations detailed in the rest of this chapter.
- 5.4 As the scheme opened in December 2002, and COBA used an opening year of 2003 the COBA has not been rerun with updated accident or traffic figures, as these were considered to be accurate enough for a predicted situation.

Area of Study

- 5.5 The study area for the scheme assessment includes the old road through Stainburn and Great Clifton, as well as the new bypass. It also includes the two roundabout junctions at either end of the scheme.

Evaluation of Safety Benefits

- 5.6 When appraising trunk road schemes, the economic impact of changes in safety forecast by COBA and are assigned monetary benefits for the reduction in the number and severity of personal injury accidents over the appraisal period.
- 5.7 The COBA model used for this scheme as a basis for the following appraisal was completed in 2000, and uses 1994 prices. It is based on a 30 year appraisal period, from an opening year of 2003.

Evaluation of Safety Benefits using the POPE method

- 5.8 The POPE method of evaluating the overall economic benefit value resulting from safety improvements is based on the comparison of the observed and forecast accidents saving in the opening year. For the purpose of this comparison, it is assumed that the observed safety impact in the opening year is the same, or similar, to what could be achieved per year over the 30 year assessment period. This then enables the comparison of the forecast opening year accident saving with the observed accident saving, and therefore the calculation of a 30 year monetised accident benefit.

Table 5.1 - Predicted Accident Savings

		Low Growth (Opening year)	Low Growth (30 years)	High Growth (Opening year)	High Growth (30years)
COBA Predicted PIAs	DM	11	381.3	12	456.6
	DS	3.9	138.8	4.1	164.0
	Saving	7.1	242.4	7.9	292.6
	% change	-64.5%	-64%	-65.8%	-64%
Actual observed accidents – before and after opening (annual average)	Before	13			
	After	4.8			
	Average Saving	8.2			
	% change	-63.1%			

- 5.9 The actual accidents used in Table 5.1 for the before situation are based on the average of three years of before accidents. The accidents for the actual after situation are based on the average of 6 years data.
- 5.10 The predicted saving in terms of numbers of accidents across the COBA network in the scheme opening year was 7.1 assuming low traffic growth, and 7.9 assuming high growth. These figures combine link and junction accidents. The actual number of accidents saved over the first 6 years has averaged out at 8.2 per year, very similar to predicted.
- 5.11 The table also shows that the predicted accident saving was around 65% in the first year, and the observed number of accidents has actually reduced by 63%. This indicates that the scheme is currently performing close to the expected level in terms of safety.
- 5.12 The predicted accident savings for the first year of 7.42 (a weighted average of the high and low growth predictions) is 9.5% less than actually achieved. This gives a best estimate of actual accident savings of £17.034 million over the 30 year evaluation period compared to the predicted weighted saving benefit of £15.556 million in 2002 prices discounted to 2002. This is shown in Table 5.2.

Table 5.2 - Accident benefits

	Accidents Saved (opening year)	Monetary Benefit (over 30 years)
Weighted Average	7.42	£15.556m
Outturn	8.2	£17.034m

Evaluation of Journey Time Benefits

- 5.13 The basis of the POPE methodology for evaluating the Journey Time benefits are based on vehicle hour savings. This is calculated through a comparison of changes in total link transit times before and after scheme opening using observed journey times and traffic flows.
- 5.14 The detail of the calculations is shown in Appendix F.
- 5.15 The benefits arising from the vehicle hours benefits are monetised in proportion to the forecast benefits.
- 5.16 In order to calculate the monetary benefit of the changes in vehicle hours outlined in the Appendix F, a comparison has been made between the actual and predicted benefits. As the observed links in the outturn situation are almost identical to the COBA network, the following calculation is based on outturn benefits being comparable to the predicted benefits. Table 5.3 shows the calculation for the predicted and outturn benefit in 2002 prices, discounted to 2002.

Table 5.3 - Outturn Link Transit Benefit

Time period	Predicted Vehicle Hour Saving %	Predicted Weighted Monetary benefit	Actual Vehicle Hour Saving %	Monetary Benefit
Peak Low Growth	49%	£10.274m (per peak)	13.6%	£2.771m
Peak HG	52%		31.5%	£6.418m
Interpeak - LG	40%	£16.615m	30%	£11.913m
Interpeak - HG	45%			
Off peak - LG	28%	£4.021m	30.4%	£4.259m
Off peak - HG	30%			
Total		£41.186m		£25.362m

Summary of Monetised Benefits

- 5.17 In order to bring together the total monetised benefits of the A66 Stainburn and Great Clifton scheme, the following table summarises the forecast benefits with the outturn benefits.

Table 5.4 - Summary of Present Value Benefits

	Weighted Forecast	Outturn
Journey Time	£41.186m	£25.362m
Safety	£15.556m	£17.034m
Total	£56.742m	£42.396m

- 5.18 Table 5.4 shows that benefits were 25% less than forecast, due to the overestimation of travel time benefits in the peak hour.

Scheme Cost

- 5.19 The outturn capital costs of the scheme as spent by the HA up to 2009/10 is shown in Table 5.5.

Table 5.5 - Outturn Capital Costs

Costs in £m 2002 prices		
Works, Preparation and Supervision	Land	Total
£10.359m	£2.125m	£12.484m

- 5.20 Initial cost estimates for this scheme used an opening year of 1997, however the scheme was delayed, therefore the figures used in the rerun of COBA in 2000 estimated the cost of the 2003 opening year scheme as £5.157million in 1994 prices discounted to 1994.
- 5.21 Using the cost breakdown made available this has been rebased to 2002 prices and discounted to compare the predicted current Present Value Costs (PVC) with the outturn PVC, as shown in Table 5.6.

Table 5.6 - Forecast vs. Outturn Present Value Cost (PVC)

Cost	Forecast from COBA	Forecast from COBA	Outturn ⁵
Price Basis	1994 discounted to 1994 at 6%	2002 discounted to 2002 at 3.5%	2002 discounted to 2002 at 3.5%
Works/Construction /Preparation and Supervision	£5.023m	£9.310m	£10.588 million
Land	£0.134m	£0.249m	£2.140 million
Part 1 claims	£0m	£0m	£0.007 million
Total PVC	£5.157 million	£9.560 million	£12.735 million

- 5.22 As can be seen in Table 5.6, the majority of the increase in outturn cost appears to come from land costs as the predicted land costs are less than 25% of the outturn costs.

⁵ As received from the HA in August 2008.

Benefit Cost Ratio (BCR)

- 5.23 Benefit Cost Ratio (BCR) is a measurement applied to highways schemes to give a value for money figure. It measures the return of a scheme for each unit of cost to public accounts⁶.
- 5.24 Table 5.7 compares the predicted BCR with the outturn BCR for the A66 Stainburn scheme, in 2002 prices, discounted to 2002.
- 5.25 The link transit benefits detailed in the table below are based on a 24 hour time period, as detailed in the link transit benefit section. The same method has been used for the forecast and the outturn to allow direct comparison.

Table 5.7 - Benefit Cost Ratio

2002 prices and values	Weighted ⁷ Forecast	Outturn
Link Transit benefits	£41.186m	£25.362m
Safety benefits	£15.556m	£17.034m
Total cost of Benefits	£56.742m	£42.396m
Cost of scheme	£9.560 million	£12.735 million
BCR	5.9	3.3

- 5.26 The figures show that the outturn BCR is approximately 44% less than predicted. This is due to the journey time benefits being overestimated particularly in the AM peak, and the overall cost of the scheme increasing by almost 25%.
- 5.27 However, a BCR of more than 2 is considered to be high value for money, and therefore this scheme can still be considered to have achieved good value for money for the area.

Reliability

- 5.28 Reliability of journey times is an important economic factor for travellers but is not simple to measure. The WebTAG guidance uses the measurement of the route stress as a reasonable proxy for measuring the reliability sub-objective; the concept of 'stress' has been developed to provide a broad indication of the relationship between volumes and capacity on a road.
- 5.29 The calculation of stress is calculated to be the ratio of the AADT volume to the Congestion Reference Flow (CRF), a definition of capacity. The CRF is defined in the Design Manual for Roads and Bridges (*DMRB*) *Volume 5 Section 1 Part 3* and is based on road type, the number of lanes, and the proportion of HGVs in the peak period, proportion of traffic than occurs in the peak, how the peak flow is split by direction and the ratio between AADT and AAWT.
- 5.30 WebTAG guidance is that only values between 75% - 125% should be considered and anything outside this range should be adjusted up or down to 75% or 125%.

⁶ As defined in WebTag 6.1.4

⁷ 60% of the Low Growth forecast, and 40% of the High Growth forecast

The old road in the Do Something scenario should also be assessed (this assessment included in the AST).

5.31 The evaluation of the OYA Route Stress has been undertaken as shown in Table 5.8.

Table 5.8 - Route Stress

		Calculated Route Stress	Reported Route Stress (range 75% - 125%)
Forecast (AST)	Old Road Before	99%	99%
	Old Road After	-	-
	Bypass After	25%	75%
Outturn	Old Road Before	102%	102%
	Old Road After	32%	75%
	Bypass After	26%	75%

5.32 The key points from Table 5.8 are:

- The route stress on the trunk road was predicted to reduce from 99% to 25%; and
- Actual route stress for the old road has changed from 102% to 32%, and to 26% on the bypass.
- Following the WebTAG guidance, the route stress for both the old and new road after opening has been adjusted to 75%.

Summary

Benefits

- The monetised benefits have been calculated for one year, but then adjusted to represent 30 years and are derived from journey time savings and accident reductions;
- Safety benefits have been shown to be higher than the predicted benefits, with the best estimate of outturn 30 year benefits expected to be £17.034m compared to forecasts of £15.556m;
- Journey time benefits have been shown to be substantially less than predicted particularly in the AM peak hour. This has led to the outturn benefits being 40% less than forecast;

Cost

- Capital cost of the scheme was £12.484 million, 25% more than forecast, largely as a result of the increase in land costs.

Benefit Cost Ratio

- The outturn BCR was evaluated to be less than the predicted, but at 3.3, is considered to be good value for money.

6. Environmental Objective

Introduction

- 6.1 As part of the evaluation of this scheme's impacts, this section of the report has reviewed the scheme's influence upon the environment. This section contains a summary of the environmental impacts of the scheme. A further detailed evaluation is given in Appendix G.

Environmental Effects

- 6.2 The key environmental effects identified in the Environmental Statement (ES) were;
- Landtake - loss of 15.72 ha of agricultural land with 11 farms subject to severance by the bypass;
 - Landscape and visual intrusion – affect on the Locally Important Landscape Area with approximately 560m of the route falling within the designated area, affect on the Upper Park section of Curwen Park an important historical parkland, loss of ancient semi natural woodland, loss of hedgerows, over 80 residential and other properties experiencing increased visual intrusion;
 - Public Rights of Way – severance of three routes across the line of the bypass;
 - Ecology - loss and severance of ancient semi natural woodland at Stainburn School and Scale Beck, loss and severance of three other hedgerows and verge habitats;
 - Heritage – direct affect on the Upper Park section of Curwen Park a Grade II site in the English Heritage Register of Historic Parks and Gardens;
 - Noise – around 260 residential properties experiencing a decrease in noise and 28 experiencing an increase in noise;
 - Air Quality – no quantified effects noted but a general improvement considered likely; and
 - Water Quality – no quantified effects noted but a general improvement considered likely.

Environmental Objectives

- 6.3 The ES did not specifically state scheme objectives for the range of environmental topics but a number of aims and objectives for the proposals were included in the landscape text of the ES. These included the following:
- To integrate the new road into its landscape setting;
 - To mitigate adverse impacts of the development on the environment and amenity of nearby residents;

- To provide interest and amenity for road users; and
- To conserve existing wildlife habitats in the highway corridor where practicable and create a diverse vegetation cover to encourage the development of new habitats.

6.4 It was further stated in the ES that:

- The proposed road scheme aims to blend with the existing landscape to create the least possible intrusion;
- The scheme has taken particular regard of the issues relevant to areas of landscape, ecological and scientific interest; and
- Existing trees, woodland and diverse ground flora within the highway boundary would be protected and retained where feasible.

Site Visit

6.5 A site visit was undertaken in August 2008 which allowed a general overview of the scheme with access from over-bridges and underpasses, public footpaths and local roads.

Consultation

6.6 The following organisations (Table 6.1) have been consulted regarding their views on the impacts they perceive the road scheme has had on the environment, and whether they feel that the mitigation measures implemented have been effective.

6.7 At the current time of writing, comments have only been received from Allerdale District Council and the Environment Agency. No comments have been received from the remaining organisations.

Table 6.1 - Summary of Consultation Responses

Organisation	Field of Interest	Response Received
		Comments
Natural England	Landscape and Biodiversity	Did not comment
English Heritage	Heritage	Did not comment
Environment Agency	Water	Surface water drainage aspects not addressed satisfactorily at design stage. Drainage measures installed in a reasonable manner. Unsure about effectiveness of Stainburn pond, noted flooding problems in the area and do not recognise success of the drainage scheme. No record of pollution incidents but no monitoring carried out by EA

Cumbria County Council	General	Did not comment
Allerdale District Council	General	Commented on impact on historic park, and landscape

- 6.8 Discussion has also taken place with the members of the HA team, Designers, Department's Agent and Environmental Coordinator, specialist ecological advisor, contractor and MAC for the scheme.

Noise

Predicted Impacts

- 6.9 The AST stated that there would be a benefit from the removal of through traffic from the villages of Stainburn and Great Clifton. With the scheme it was predicted that 7 properties would experience an increase in noise and 179 properties would experience a decrease in noise.
- 6.10 The ES noted that the predicted traffic flows along the bypass would generate traffic noise and vibration and this would have an impact on the properties in the vicinity. It predicted that 28 residential properties would experience an increase with the scheme. This was balanced by 259 residential properties experiencing a decrease with the scheme.
- 6.11 As no properties were predicted to experience noise levels in excess of 68dB(A) no noise insulation in the form of secondary glazing in accordance with the criteria given in the Noise Insulation Regulations 1975 was considered necessary.

Evaluation

- 6.12 It is understood that three properties were eligible for noise insulation and that some Part 1 claims have been made. Confirmation of the number of agreed claims has been sought from the HA Part 1 Team and will be incorporated into the report once provided.
- 6.13 Noise mitigation measures in the form of earth mounding, noise fences and use of a low noise surface have been provided. Based on traffic flows which are less than predicted, noise will have increased adjacent to the bypass although this could be less than expected. The noise levels in Stainburn and Great Clifton are likely to have improved as expected. Further study would be required to evaluate specific noise impacts at local receptors.

Stainburn Safety Group

- 6.14 This group thought that although traffic had not decreased as much as had been expected, the number of HGVs had reduced, and this made a big difference to noise.

Local Air Quality

Predicted Impacts

- 6.15 The AST predicted that decreased traffic flows with the scheme on the old A66 would lead to an improvement in air quality with 261 properties experiencing an improvement in air quality and no properties experiencing worsened air quality. Decreases in Particulate Matter (-78 PM₁₀) and Nitrogen Dioxide (-496 NO₂) were predicted.
- 6.16 The ES did not consider air quality but noted that residents were subject to loss of amenity caused by air pollution.

Evaluation

- 6.17 Based on traffic flows after opening it would appear that congestion has eased on the old A66. It can be deduced that on this basis and with improvements in vehicle technology that air quality within the villages will be much improved. Traffic is free flowing on the bypass and existing local air quality in the vicinity of the bypass would have been good. No properties are likely to have an experienced a deterioration in air quality.

Greenhouse Gases

- 6.18 The AST did not include any predictions for annual CO₂ emissions changes. The following forecast was calculated using the DMRB screening methodology⁸ and was based on the assumptions that the scheme would result in increased speeds on the new road.
- 6.19 The carbon evaluation shows that the scheme has a slight impact in carbon emissions in the opening year, as they have been shown to decrease by approximately 12 % as shown in Table 6.2, and this is likely to be due to speeds not increasing as much as anticipated.

Table 6.2 - Predicted and Outturn Carbon

Scenario	Carbon (tonnes/year)	
	DMRB (scheme length only)	
	Forecast	Outturn
Do Minimum – No scheme	1168	1380
Do Something – with scheme	1143	1204
Difference	-25	-176
% Difference	-2%	-12%

⁸ DMRB Air Quality Spreadsheet

Landscape and Townscape

Predicted Impacts

- 6.20 The AST predicted that there would be a slight negative impact with woodland severed.
- 6.21 Landscape impacts were noted in the ES as;
- Removal of existing vegetation, particularly from ancient woodlands at Scale Beck and Stainburn School;
 - Affect on Locally Important Landscape Area (LILA) with 560m of the route within the LILA;
 - Affect on Curwen Park which is designated Grade II in the English Heritage Register of Parks and Gardens of Special Historic Interest; and
 - Visual intrusion on residential properties with 4 experiencing high intrusion, 28 medium and 72 low. No beneficial visual intrusion from reduction in traffic on old A66 noted.

Evaluation

- 6.22 Overall the planting is exhibiting good growth though there are variations along the route. The tree and shrub planting is establishing best in the more sheltered, lower lying areas at either end of the scheme. Extensive earthworks have been included to help screen traffic.
- 6.23 A sonic bat bridge has been installed over the bypass between the severed sections of Scale Beck woodland and this forms a distinctive feature along the route.
- 6.24 Subsequent to the ES, at the western end of the scheme a number of attractive stone retaining walls have been incorporated into the scheme. These have been designed to complement the existing stone walls in this area and blend in very well giving a distinctive, high quality character to this end of the scheme.

Biodiversity

Predicted Impacts

- 6.25 The AST stated that there would be an impact on ancient woodland with the scheme and an overall assessment of slight adverse was predicted.
- 6.26 The ES stated that the scheme would result in the loss of;
- The majority of an ancient woodland bank adjacent to the A66 near Stainburn School;
 - Woodland at Scale Beck designated as ancient woodland;
 - Mature hedgerows, hedgebank flora and semi improved grassland;

Evaluation

- 6.27 Although bats were not identified as being affected in the ES subsequent studies before construction took place showed that six species of bats were present in areas affected by the scheme. Mitigation measures were incorporated into the scheme and a manmade habitat link for bats has been installed; this was the first such structure to be built on a road in the UK. It is understood that studies to assess the success of the structure indicate that bat numbers crossing the road are about 40% of those crossing the line of the route before construction took place.
- 6.28 There is evidence of bat boxes being installed and discussions with the ecology consultant indicate that in the period after installation these were being used by bats, though no checking was carried out as part of this review. The Scale Beck culvert also includes the crevices proposed in the application for the bat licence.
- 6.29 The works to trees and planting at Scale Beck appears not to have taken place as specified. At the time of the site visit the appearance of the trees was unattractive and the trees could be subject to windblow in the future. The species rich grassland proposals appear generally successful.
- 6.30 Based on the Environmental Audit Report prepared in 2004 the proposed translocation of turves, the spreading of species rich seed bank soil and the creation of wildflower areas was undertaken and there was some evidence of species rich swards developing noted during the site visit.
- 6.31 Overall the ecological measures are considered to be successful but would require monitoring to fully evaluate effectiveness.

Heritage

Predicted Impacts

- 6.32 The AST predicted that there would be a very significant impact on the integrity of Upper Park which was designated by English Heritage as a Grade II site in their Register of Parks and Gardens of Historic Interest. It recorded an unacceptable intrusion/division of Upper Park. It also noted the impact on the context of the Scheduled Ancient Monument (although no indication of its location was noted) and Listed Buildings. A large adverse impact was predicted overall.
- 6.33 The ES identified the following potential impacts on heritage and archaeology;
- The Portland Square Conservation Area would not be affected by the proposed bypass although the Stainburn School junction lay within 230 metres of it's eastern boundary;
 - None of the 14 Listed Buildings noted in the ES would be directly affected by the bypass;

- The desk top survey in the ES noted that the bypass would not appear to affect any archaeological sites apart from former open fields and common land;
- The bypass would 'coincide' with Upper Park but did not specify the effect that this might have on the park; and
- Further archaeological assessment work was recommended and a four stage programme was noted with details being provided in an annexe to the ES.

Evaluation

- 6.34 The ES underestimated the effect of the scheme on the park but the alignment in cutting and stone walls at the junction help to reduce the impact. The impact of the scheme is significant but without major realignment of the route or extensive mitigation such as a cut and cover tunnel it is hard to see how the impacts could be further reduced. Other heritage assets in the area have been avoided and the Portland Square Conservation Area has been improved through the removal of traffic on the old A66.

Water

Predicted Impacts

- 6.35 The AST stated that, assuming effective mitigation the risk of damage to the water environment was likely to be slight. It predicted a slight negative impact overall.
- 6.36 The ES noted that the watercourses which might be affected by the proposals were;
- Scale Beck – the ES indicated that the beck would be carried under the bypass in a 1.8m diameter culvert.
 - Harry Gill – the bypass would cross over the gill in culvert under the road;
 - Highway drainage run-off would discharge into three local watercourses - Stan Beck which was culverted under Stainburn Road, Scale Beck and an un-named beck which flowed into Lost Rigg Beck south of the scheme.

Evaluation

- 6.37 From observations during the site visit the crossing of the Scale Beck was achieved with a bridge structure rather than a culvert as indicated in the ES. The bridge includes a footway for pedestrians on the west side and a ledge for mammals on the east. There were no indications that the river was flowing under the road unsatisfactorily and anecdotal evidence suggests that the footpath and ledge are being used although there is evidence of littering and graffiti on the mammal ledge.

- 6.38 At Scale Beck a balancing pond has been constructed adjacent to the eastern back of the river, south of the bypass. The pond is a later mitigation measure proposed after the ES was published. This has been planted with trees, shrubs and reeds to provide a habitat for wildlife in addition to its function in attenuating run off. Although some vegetation is establishing successfully the steepness of the sides of the ponds are such that it is not possible to create the variety of habitats that would provide a wildlife resource. The pond appears to be operating successfully in balancing flow into Scale Beck. The pond was proposed after the publication of the ES. The construction suggests that it has a primary balancing purpose rather than ecological.
- 6.39 Further study would be required to fully evaluate this sub-objective but based on the information available there is nothing to suggest that the mitigation measures are performing other than as expected.

Physical Fitness and Journey Ambience

Predicted Impacts

- 6.40 The AST did not include an entry for either Physical Fitness or Journey Ambience as these were not criteria assessed at the time.
- 6.41 The ES included some information;
- View from the road – the appraisal framework noted that the existing road had suburban residential and undulating pastureland views and that the published route would have undulating pasture land views
 - Driver stress – the appraisal framework in the ES noted that motorists on the existing route experienced moderate to high driver stress but for the new route stress would be low.

Evaluation

Physical Fitness

- 6.42 During the site visit pedestrians were noted using the footpaths and bridges at varying locations along the scheme and the footpath network appeared to be well used. Anecdotal evidence of the use of the permissive footpath along Scale Beck suggests it is well used but is subject to graffiti and littering.
- 6.43 It would appear that the diversions to the PROW network have generally been implemented as expected with access being maintained across the bypass.
- 6.44 Based on the information available it is likely that the impacts of the bypass are as expected or better on public rights of way. Levels of physical fitness are therefore likely to have been maintained or possibly improved although there is no NMU survey information to quantify this.

Journey Ambience

- 6.45 For vehicle drivers, congestion has eased in general, lighting, lay-bys and clear signage has been provided and therefore driver stress is likely to have improved. Driver views are different but equally good. As expected the use of environmental barriers and earth mounding has limited some views out from the carriageway. Facilities are readily accessible within Stainburn and Great Clifton from the roundabouts at either end of the bypass. Overall journey ambience would be expected to have improved.

Summary

Noise

- Based on traffic flows which are less than predicted; although the bypass has introduced a source of noise into the countryside for adjacent properties, the impact could be less than predicted. Traffic flows have significantly reduced on the old A66 and the local noise climate is expected to have improved.

Air Quality

- Based on traffic flows, the local air quality on the old A66 will have improved, as expected.

Greenhouse Gases

- Based on the DMRB calculation, the bypass has had a slightly beneficial impact on the carbon emissions.

Landscape

- The bypass is a major feature in the landscape but landscape mitigation measures have been implemented in line with the proposals in the ES. Planting is generally well established. Features such as the new stone walls reflect local character. Ongoing establishment is necessary for long term objectives to be met.

Heritage of Historic Resources

- The impacts on Upper Park are considered to be very large adverse as expected. There has been an improvement in setting for the Conservation Area and Listed Buildings on the old A66 as expected. Further information would be required to evaluate archaeological impacts.

Biodiversity

- Based on the information available, the impacts are likely to be slight adverse as expected; mitigation measures are in place, eg use of a 'bat bridge' and this would appear to have encouraged bat flight across the bypass.

Water Environment;

- Based on the information available it is likely that the impacts are slight adverse as expected. However further study would be required to fully evaluate this sub-objective.

Physical fitness

- Public rights of way have been maintained across the bypass as expected and it is considered that impacts are neutral.

Journey Ambience

- The impacts are considered to be as expected.

7. The Accessibility Objective

Introduction

7.1 The Accessibility objective consists of three main elements:

- Option values;
- Severance; and
- Access to the transport system.

Option Values

7.2 This concerns the availability of transport options in an area, even if they are not used. This means that the provision of a frequent bus service is beneficial to a car user even if it is not used, as it offers another mode of transport should they wish to use it.

7.3 There is likely to have been a slight improvement in the reliability of the bus service serving Stainburn and Great Clifton due to reduced congestion. It is not considered that that any other improvements to the frequency of the bus service have taken place as a direct result of the scheme. Therefore the impact on option values can be considered neutral.

Severance

7.4 Severance is defined by WebTAG as:

7.5 *'This sub-objective is concerned with severance as it affects those using non-motorised modes, especially pedestrians (Unit 3.6.2, Para 1.1.1).'*

7.6 *'To ensure a consistent approach, classification should be based on pedestrians only (Para 1.1.3).'*

Predicted Impacts

7.7 The ES noted that two existing Public Rights Of Way (PROW) which would be severed by the proposed route, these were:

- FP 230001 which runs south west from Great Clifton; and
- FP 241008, east of Great Clifton.

7.8 Mitigation measures were designed as follows:

- FP 230001 - steps in the embankment and an at-grade crossing would be provided to enable pedestrians to continue to use the route.
- FP 241008 – although severed, it terminates where the bypass meets the line of the old A66, and therefore was considered to be largely unaffected.

Evaluation

- 7.9 Of the two PROW severed, a replacement was provided for FP 230001. Post opening it was observed that the appropriate mitigation measures were in place, and whilst the severed route now crosses a busy road, it crosses at the narrowest point with good visibility. Figure 7.1 shows the steps provided to access the at grade crossing point of FP 230001.

Figure 7.1 – Steps at crossing of FP 230001



- 7.10 The AST which was produced in 1998, states that the removal of through traffic in Stainburn and Great Clifton will reduce severance. Following scheme opening, traffic volumes travelling through the villages have fallen by between 50% and 72% thus resulting in a moderate reduction in community severance for a rural area (as defined in DMRB Vol. 11 Part 8), and shown in Figure 7.2.

Figure 7.2 – Reduced Severance through Stainburn



Consultation

- 7.11 The Stainburn and Great Clifton stakeholder questionnaire included a number of questions which are related to walking and cycling: The questions and the responses are listed below:
- *Have conditions improved for; School Children, other pedestrians, and cyclists?*

- 7.12 The questionnaire results show that 9 out of 12 respondents stated that walking for pedestrians, including school children in the area is now improved, whilst 6 out of 12 respondents consider that conditions for cyclists have improved (4 stated that they did not know for cyclists).

Access to the Transport System

- 7.13 Access to the transport system considers access to a car and access to the public transport system.
- 7.14 For this evaluation, consideration has been given to access to public transport. WebTAG recommends appraisal using distance or walk time from a public transport service, plus consideration to service frequency, speed of travel and quality of the public transport service.
- 7.15 Improving access to public transport was not a scheme objective for the A66 Stainburn and Great Clifton scheme. However, this is not to say that there have not been indirect benefits resulting from the scheme.
- 7.16 Benefits include the following:
- Buses can now stop in Stainburn without causing significant disruption to the flow of traffic passing through the town;
 - Lighter traffic volumes have resulted in a more pleasant waiting environment for local bus users (largely through removal of traffic, reduced noise and improved roadside air quality); and
 - Reduced traffic volumes have helped to reduce the severance that previously affected the residences close to the old route; consequently the accessibility and safety of bus stops on both sides of the route appear to have improved significantly.
- 7.17 It is understood that there has been no increase in frequency of bus services since the opening of the scheme, however, the reliability of buses is likely to have improved as traffic now flows more freely due to the reduction in other traffic on the old A66 route. There are currently two bus routes using the old road through the villages, one is the 36 route to Cockermouth, whilst the other is the X4/X5 service which terminates in Penrith. The impact is recognised as small, and therefore it is considered that the impact on Access to the Transport System is neutral.

Summary

- There has been a slightly positive impact in terms of option values since opening. However, this is not as a result of the scheme. Therefore the scoring for the EST is neutral;
- The reduction in traffic volumes through the villages of Stainburn and Great Clifton has resulted in a moderate improvement in community severance; and
- There have been no improvements in public transport as a direct result of the scheme. Therefore the effect on access to the transport system can be considered neutral.

8. The Integration Objective

Introduction

8.1 The Integration Objective consists of two main elements:

- Interchange with other transport modes; and
- Land Use Policy.

8.2 This section will also look at:

- Quality of Life; and
- Social Exclusion.

Transport Interchange

8.3 The AST states that the scheme will have minimal impact on public transport. It was not the intention of the scheme to directly improve public transport and public transport interchanges. However, the bypass may have facilitated an improvement in this area due to less through traffic through the villages. Following a site visit and consultation with the local stakeholders it appears that there have not been any changes to the bus stop provision in Stainburn or Great Clifton as a result of the scheme.

8.4 It is considered that there has been a slight benefit in terms of transport interchange. This is not due to the improvement of facilities, purely the removal of through traffic improving the ambience of the waiting environment; therefore for the scheme EST, this has been scored as a neutral impact.

Land Use and Policy Integration

8.5 For land use policy, WebTAG defines that:

8.6 *'This sub-objective summarises the assessments made of the extent to which the proposal is integrated with land use proposals and policies and with proposals and policies concerning transport (all modes). The assessment of proposals in the context of national, regional, strategic and detailed local planning policies is included in current recommended appraisal practice' (WebTAG Unit 3.7.2 Para 1.1.1).*

8.7 The AST states that:

8.8 *'the A66 scheme is consistent with transport plans in RPG/Structure/Local Plans which concentrate resources on A66'.*

8.9 This section reviews the relevant policies and strategies in relation to the A66 scheme.

8.10 The Regional Transport Strategy (RTS) identified the A66 between the M6 Junction 40 and Workington as a Strategic Access Route for the area and the current RTS states that further improvement of the A66 from the M6 to West

Cumbria is required to assist in regeneration of the area, to address safety issues and cater for heavy goods vehicles.

Cumbria Local Transport Plan (LTP1 2000-2005)

- 8.11 The Local Transport Plan for Cumbria stated that the A66 Stainburn and Great Clifton Bypass scheme was already included in the current Targeted Programme of Improvements (TPI), and that it would have a major impact on the quality of the environment in both villages. It also states that the scheme had widespread support from the county and district councils, as well as the local communities, and that the construction of the scheme is welcomed.

Allerdale Local Plan (1999-2006)

- 8.12 Policy TR1 of the Allerdale Local Plan aimed to protect the approved route of the A66(T) Stainburn and Great Clifton bypass from development.

Cumbria and Lake District Joint Structure Plan (2001-2015)

- 8.13 The Joint Structure plan Policy T25 states that;
- 8.14 *New road building or significant upgrading of existing roads will only be permitted where:*
- *there is a compelling need to address problems of through traffic or road safety or regeneration, which cannot be met by reasonable alternative means and where all practical measures are taken to mitigate the effects of such works on the environment, or*
 - *where necessary to serve new development in the immediate locality, and in either case*
 - *it can be justified within the overall approach to the future.*
- 8.15 The scheme has been shown to be consistent with local and regional policy, and has been welcomed by the local community in terms of traffic and safety benefits, therefore the effect of this scheme on Land Use and Policy integration is considered to be slight beneficial.

Quality of Life

- 8.16 Quality of Life is not part of the appraisal process and has therefore only been considered briefly in this report as a measure of public perception.
- 8.17 As quality of life and social exclusion are difficult to quantify, this objective was partly measured by asking a specific question on the stakeholder survey which is shown below:
- *Have conditions improved for: School Children, other pedestrians and cyclists?*
- 8.18 All those who responded indicated that they felt that conditions had improved, or had made no change. In addition, all respondents to the questionnaire agreed

that the bypass scheme had been beneficial for the villages of Stainburn and Great Clifton.

- 8.19 Therefore the effect of the scheme in improving the quality of life is considered to be slight beneficial.

Summary

- There has been a slightly beneficial impact in terms of transport interchange since opening. However this is a result of a reduction in traffic rather than any direct improvements to facilities. Therefore the scoring for the EST is neutral;
- The reduction in traffic volumes through the villages of Stainburn and Great Clifton as well as an improvement in safety has resulted in a scoring of slight beneficial for land use and policy integration as it supports a number of policies; and
- Although Quality of Life was not included in the original AST, the response from the stakeholder survey suggests improvement, therefore this has been scored as slight beneficial.

Appendix A - AST

A66 Stainburn and Great Clifton Bypass (Version of 24 July 1998)		Environment and safety problems in Great Clifton and Stainburn. Substandard road restricts traffic		Cost £9.6m
OBJECTIVE	SUB OBJECTIVE	QUALITATIVE IMPACTS	QUANTITATIVE MEASURE	ASSESSMENT SCORE
ENVIRONMENT	Noise	Benefits from the removal of through traffic from the villages of Stainburn and Great Clifton	No. properties experiencing Increase in noise 7 Decrease in noise 179	Net 172 properties win with scheme
	Local Air Quality (LAQ)	Scheme improves local air quality	No. properties experiencing; Improved air quality 261 Worse air quality 0	-78 PM10 -496 NO2
	Greenhouse Gases	Slight negative impact – woodland severed	-	Slight -ve
	Landscape	Impact on ancient woodland	-	Slight -ve
	Heritage of Historic Resources	Very significant impact on the integrity of Registered Park and context of Scheduled Ancient Monument and Listed Building, Unacceptable intrusion/division of park	-	Large -ve
	Biodiversity	Impact on ancient woodland	-	Slight -ve
	Water Environment	Assuming effective mitigation, risk of damage to the water environment is likely to be slight	-	Slight -ve
SAFETY	Accidents	-	Accidents Deaths Serious Slight 242 7 81 260	PVB £7.04m 240% of PVC
ECONOMY	Journey Times and VOCs	Savings arise from speeding up of through traffic in heavily trafficked areas	Peak Interpeak 1.9 1.7	PVB £129m 240% of PVC
	Cost	-	-	£5.5m
	Reliability	-	Through Route Stress Before 99% After 25%	Slight, Low relative to PVC
	Regeneration	Serves West Cumbria and Furness Objective 2 areas	Serves regeneration area?	Yes
ACCESSIBILITY	Public Transport	Bypass will improve public transport reliability	-	Moderate +ve
	Severance	Existing severance due to heavy traffic flows will be relieved in the area	-	Moderate +ve
	Pedestrians and others	Although moderate numbers benefit, the effect on individual journeys will be slight	-	Slight +ve
INTEGRATION	Land-Use Policy	Consistent with transport plans in RPG/Structure/Local Plans which concentrate resources on A66	-	+ve
	Other Government Policies	-	-	-

Appendix B - EST

A66 Stainburn and Great Clifton Bypass				Present Value cost to Government £12.4m (2002 Prices Discounted to 2002)
OBJECTIVE	SUB OBJECTIVE	QUALITATIVE IMPACTS	QUANTITATIVE MEASURE	ASSESSMENT SCORE
ENVIRONMENT	Noise	Based upon traffic flows noise is likely to be as expected, or better on the old road.	-	As Expected
	Local Air Quality (LAQ)	Based upon traffic flows it is likely the impacts are almost as expected, or better.	-	As Expected
	Greenhouse Gases	Not assessed	-	-
	Landscape	Generally as expected	-	As Expected
	Townscape	Not assessed in AST, but assessed as beneficial for EST	-	Slight Beneficial
	Heritage of Historic Resources	As expected	-	As Expected
	Biodiversity	As expected, although not all implemented fully	-	As Expected
	Water Environment	As expected	-	As Expected
	Physical Fitness	Public rights of way maintained across the Bypass	-	Neutral
	Journey Ambience	Improved ambience on the A66 through the villages	-	Beneficial
SAFETY	Accidents	Higher than expected accident saving over first 6 years of scheme, with a slight increase in accident severity	8.2 accidents saved in opening year	PVB £17.034m
	Security	Not assessed	-	-
ECONOMY	Transport Economic Efficiency	Journey time savings less than predicted (in COBA)	Through traffic journey time savings of around 1-2 minutes	PVB £25.362m
	Reliability		Through Route Stress Before 102% After 75%	Slight Beneficial, As Expected
	Wider Economic Impacts	Not assessed	-	-
ACCESSIBILITY	Option Values	Not assessed	-	-
	Severance	Reduced Severance in villages of Stainburn and Great Clifton from decreased traffic volumes	-	As Expected
	Access to the Transport System	Not assessed	-	-
INTEGRATION	Transport Interchange	Not assessed	-	-
	Land-Use Policy	Compliant with local transport plan and other policies. No significant non-compliances identified	-	As Expected
	Other Government Policies	No significant non-compliances identified	-	As Expected

Appendix C - Consultation Responses

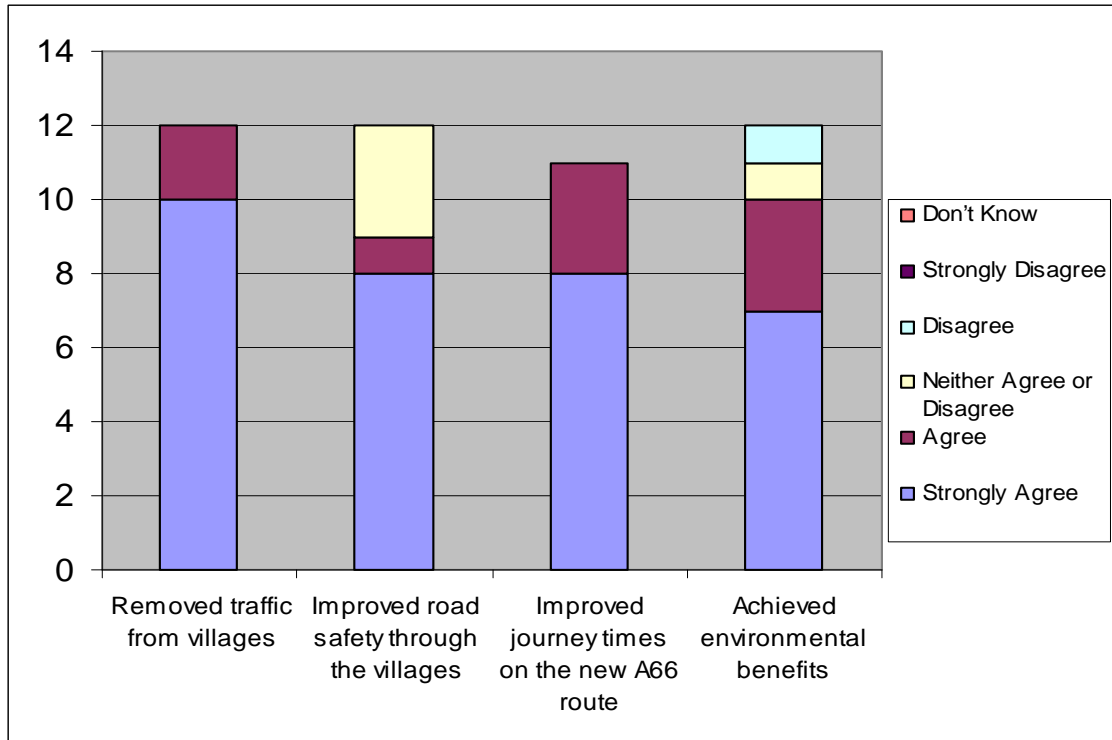
C.1 Introduction

- C.1.1 This section details the findings from consultation with stakeholders in May 2009. The aim of the consultation exercise was to determine the extent to which local stakeholders felt the scheme had met its original objectives and to identify any remaining areas of concern.
- C.1.2 In addition to the statutory consultees, the following groups were identified for consultation in order to gain views from the wider community:
- Local schools and colleges;
 - Vulnerable user groups such as ramblers/cyclists;
 - Local businesses including pubs and small hotels;
 - Parish councils;
 - Local bus operators (Stagecoach);
 - Local road safety group;
 - West Lakes Renaissance; and
 - Local Councillors.
- C.1.3 A short questionnaire was distributed in May 2009 along with an accompanying letter outlining the aim of the consultation (see Appendix D for an example). A total of 26 identical questionnaires were sent out, and 12 were returned.

C.2 Analysis

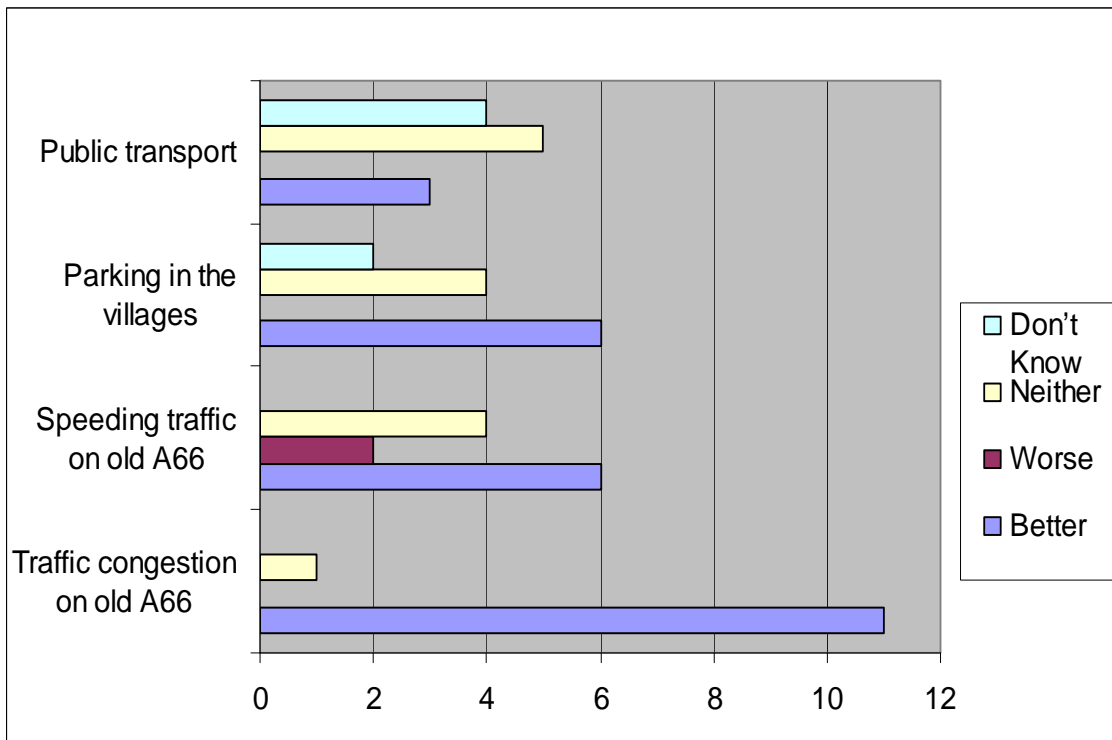
- C.2.1 Of the 12 responses received, just one stakeholder had been operating in the area for less than 6 years, and had similar responses to those who had been in the area for a number of years. Therefore for the following analysis, all responses have been collated together.
- C.2.2 Figure C.1 shows the perceived impact of the Bypass in achieving its objectives:

Figure C.1 – Has the scheme been successful in meeting its objectives?



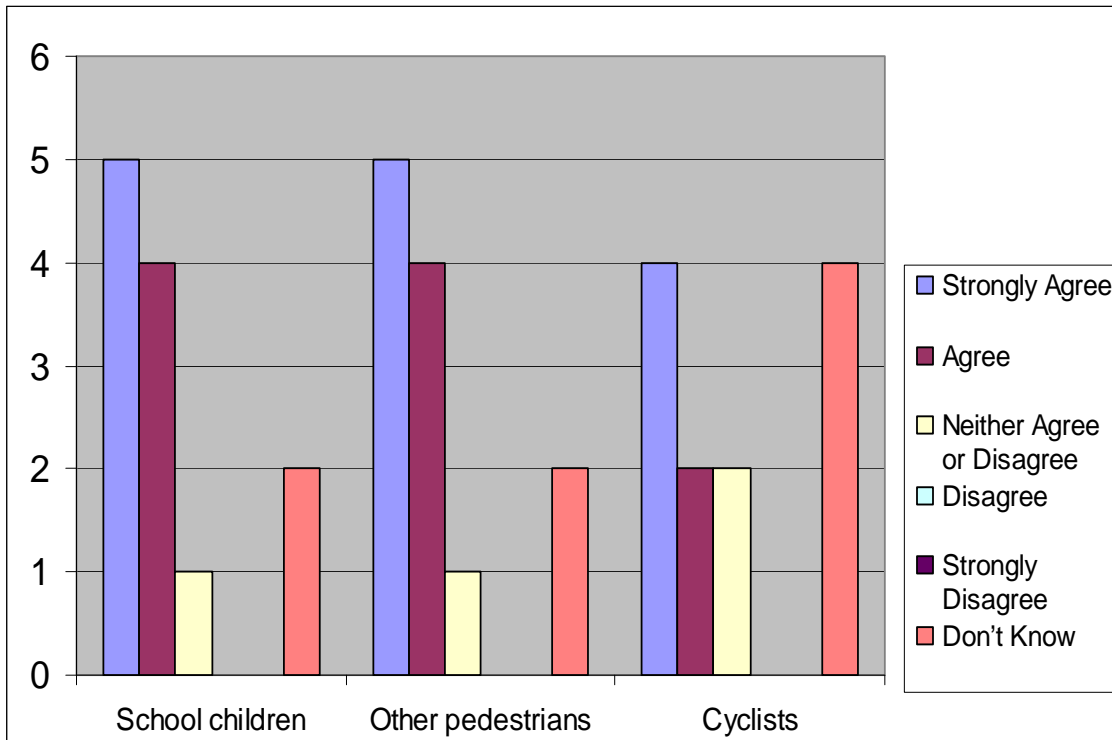
C.2.3 Stakeholders were asked to give their opinion on how a number of issues had changed since the bypass. The responses given are illustrated in Figure C.2

Figure C.2 – How have the following changed since the Bypass opened?



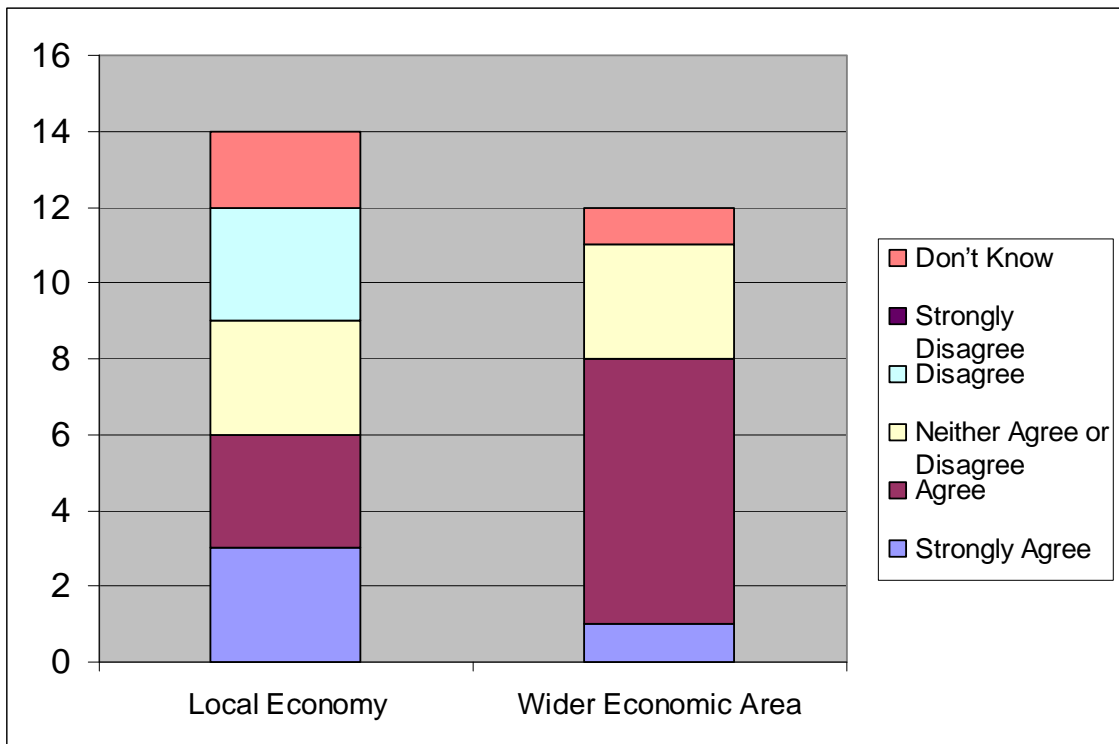
C.2.4 A number of groups of people such as school children were directly affected by the bypass, therefore the stakeholders were asked whether they felt conditions had improved for the different groups. The responses are shown in Figure C.3:

Figure C.3 – Have conditions improved for the following groups?



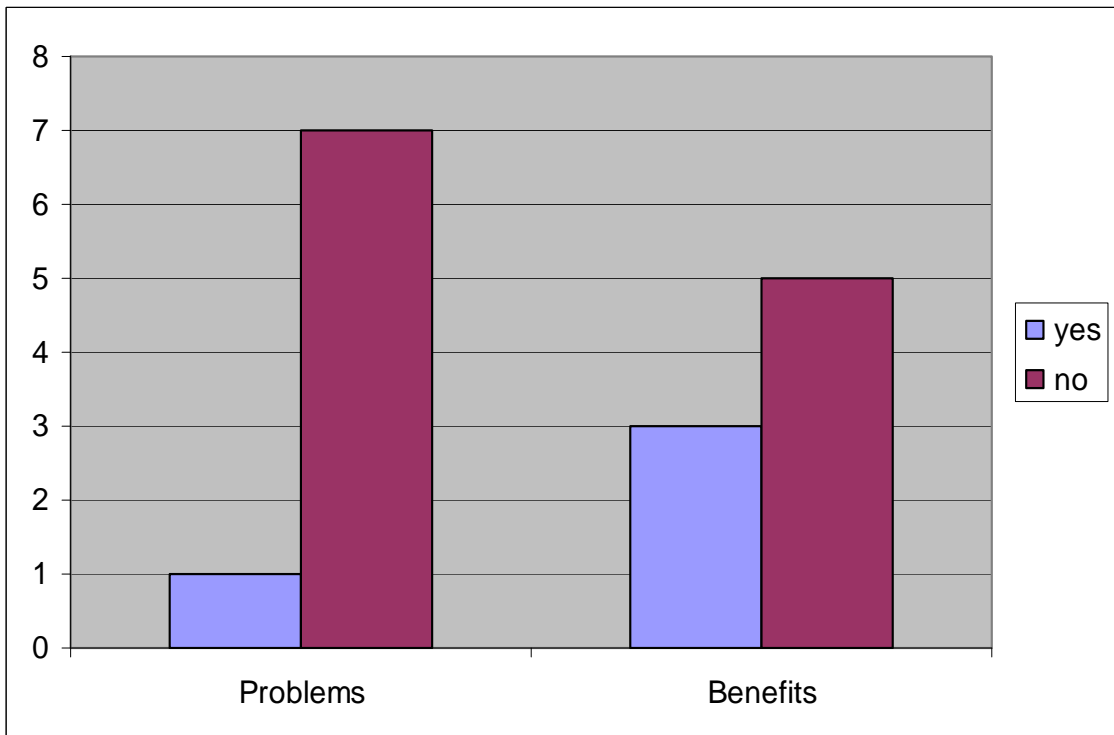
- Bypass schemes can have an impact on both the local and wider economic area, therefore the stakeholders were asked if they felt that the bypass had had a beneficial effect. Figure C.4 shows the responses.

Figure C.4 – The scheme had a beneficial effect on the following;



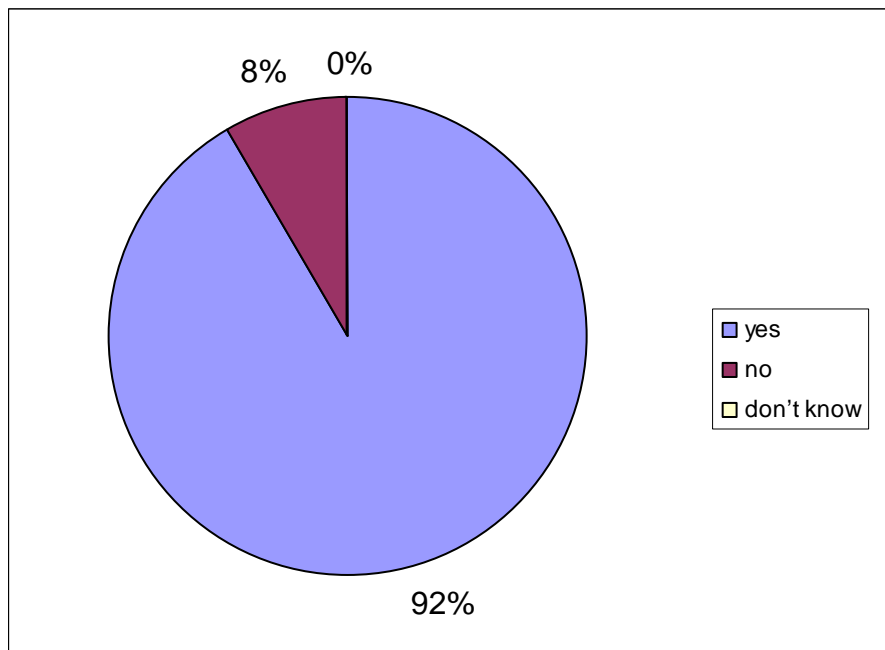
C.2.5 Stakeholders were asked if they felt that the scheme had introduced any problems or benefits to the villages. Not all respondents answered this question. Figure C.5 shows the responses given:

Figure C.5 – Has the scheme introduced other problems or benefits in the villages?



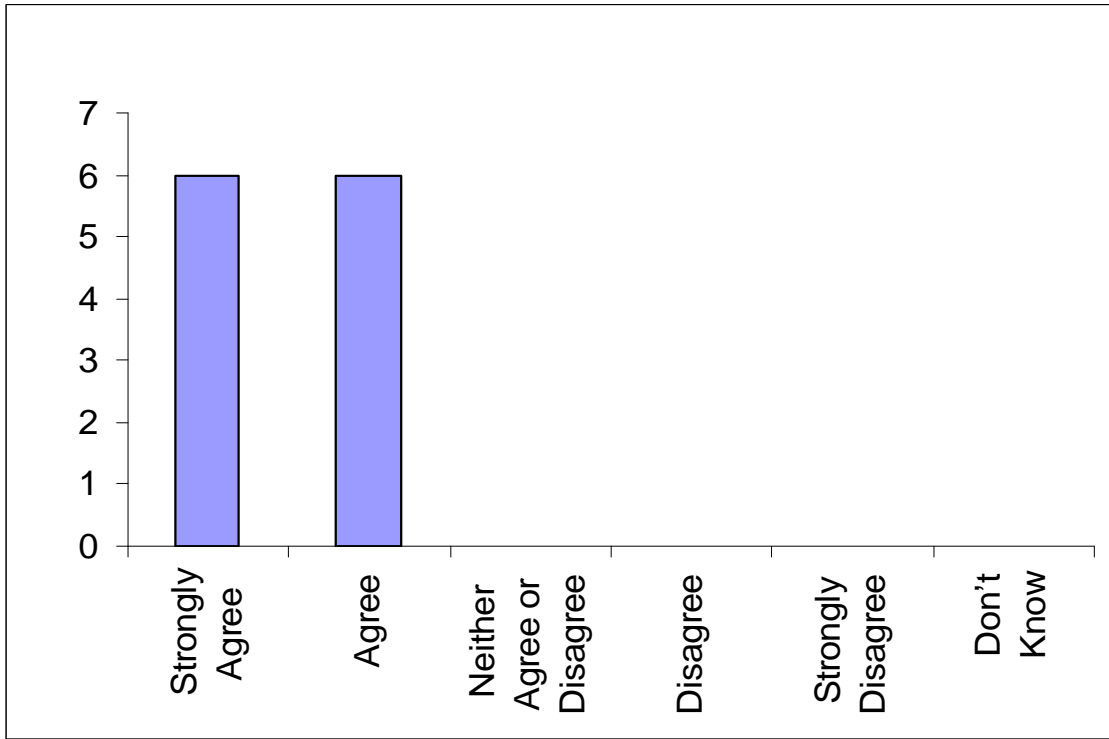
- C.2.6 The problems reported were detailed as; surface water directly entering watercourse in Bridgefoot causing flooding. The Benefits reported were detailed as; better traffic flow, less cars on road, a safer environment and quieter due to less heavy traffic.
- C.2.7 Respondents were asked whether they were satisfied with the environmental measures that were implemented as part of the scheme. The results are displayed in Figure C.6:

Figure C.6 – Are you satisfied with the environmental measures implemented as part of this scheme?



- C.2.8 The one respondent who stated they were dissatisfied with the environmental measures commented that they felt environmental improvements tend to be an afterthought, and that bypassed routes could always be improved.
- C.2.9 Respondents were finally asked whether they would agree that the bypass had been beneficial for the villages of Stainburn and Great Clifton. The results are displayed in Figure C.7:

Figure C.7 – Overall, do you agree that the bypass has been beneficial for the villages of Stainburn and Great Clifton?



C.3 Stakeholder Comments

C.3.1 The questionnaire respondents were given the opportunity to suggest improvements to the A66 and to provide any further comments. In total, 3 stakeholders gave further comments or suggestions. The comments were:

- Flooding in Bridgefoot has increased due to the surface water holding tanks under the bypass overflowing into the Lost Rigg Beck at Bridgefoot;
- Suggested continuation of the double white lines towards Workington (under the bridge travelling towards the Stainburn School Roundabout) as at this point vision is limited for traffic travelling towards Cockermouth; and
- Since the bypass opened, roads through Great Clifton are no longer gritted during icy weather (although the road through Stainburn is). This frequently causes black ice causing a hazard on the route.

Appendix D - Stakeholder Questionnaire

A66 Stainburn and Great Clifton Bypass

Thank you for taking a few minutes to answer the following questions.

Please could you answer on behalf of the group you are representing by ticking the appropriate box for each question.

This scheme was opened by the Highways Agency in December 2002 to help remove through traffic from the villages of Stainburn and Great Clifton. Please would you take a few minutes to answer the following questions to inform the scheme evaluation report.

1. How long has your business/organisation been operating in the area?

Less than 6 Years	More than 6 Years

2. Do you feel that the scheme has been successful, in terms of meeting its objectives outlined below?

	Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree	Don't Know
Removed through traffic from the two villages						
Improved Road Safety through the villages						
Improved journey times on the new A66 route						
Achieved Environmental benefits (improved air quality/reduced noise)						

3. How have the following changed since the Bypass opened?

	Better	Worse	Neither	Don't Know
Traffic Congestion on old A66				
Speeding traffic on old A66				
Parking in the villages				
Public Transport				

4. Have conditions improved for:

	Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree	Don't Know
School Children						
Other pedestrians						
Cyclists						

5. The scheme has had a beneficial effect on:

	Strongly Agree	Agree	Neither Agree or Disagree	Disagree	Strongly Disagree	Don't Know
The Local Economy (Stainburn & Great Clifton)						
The Wider Economic Area (Cumbria)						

Appendix E – Journey Times

E.1 After Journey Time details

**Old
A66**

	Eastbound	TP1	TP2	TP3	TP4	TP5	Total	Average
AM peak	Run 1	00:22	00:48	01:22	00:38	01:07	04:17	04:26
	Run 2	00:20	00:49	01:12	00:38	01:09	04:08	
	Run 3	00:21	00:55	01:45	00:47	01:13	05:01	
	Run 4	00:19	00:51	01:33	00:42	01:10	04:35	
	Run 5	00:24	00:54	01:21	00:39	01:02	04:20	
	Run 6	00:22	00:50	01:22	00:39	01:04	04:17	
Inter Peak	Run 1	00:18	00:49	01:17	00:42	01:07	04:13	04:16
	Run 2	00:19	00:50	01:26	00:37	01:01	04:13	
	Run 3	00:19	00:49	01:17	00:39	01:04	04:08	
	Run 4	00:23	00:52	01:20	00:40	01:03	04:18	
	Run 5	00:20	00:50	01:25	00:42	01:05	04:22	
	Run 6	00:21	00:52	01:24	00:42	01:03	04:22	
PM Peak	Run 1	00:20	00:51	01:13	00:41	01:00	04:05	04:04
	Run 2	00:20	00:50	01:33	00:42	01:03	04:28	
	Run 3	00:21	00:50	01:17	00:39	01:01	04:08	
	Run 4	00:20	00:51	01:06	00:36	00:58	03:51	
	Run 5	00:19	00:52	01:10	00:39	00:57	03:57	
	Run 6	00:18	00:51	01:12	00:37	00:58	03:56	

	Westbound	TP5	TP4	TP3	TP2	TP1	Total	Average
AM peak	Run 1	01:20	00:41	01:26	00:50	00:24	04:41	04:44
	Run 2	01:18	00:42	01:19	00:51	00:24	04:34	
	Run 3	01:17	00:39	01:27	00:50	00:27	04:40	
	Run 4	01:14	00:40	01:21	00:54	00:29	04:38	
	Run 5	01:16	00:40	01:19	00:49	00:40	04:44	
	Run 6	01:13	00:44	01:31	00:55	00:42	05:05	
Inter Peak	Run 1	01:21	00:49	01:31	00:55	00:25	05:01	04:41
	Run 2	01:15	00:43	01:18	00:55	00:38	04:49	
	Run 3	01:12	00:41	01:17	00:51	00:30	04:31	
	Run 4	01:14	00:41	01:19	00:49	00:34	04:37	
	Run 5	01:16	00:42	01:22	00:53	00:28	04:41	
	Run 6	01:13	00:41	01:20	00:49	00:27	04:30	
PM Peak	Run 1	01:11	00:40	01:15	00:49	00:31	04:26	04:23
	Run 2	01:14	00:40	01:15	00:51	00:27	04:27	
	Run 3	01:14	00:40	01:19	00:51	00:28	04:32	
	Run 4	01:09	00:38	01:15	00:49	00:23	04:14	
	Run 5	01:12	00:38	01:18	00:51	00:22	04:21	
	Run 6	01:13	00:39	01:16	00:50	00:22	04:20	

Bypass

	Eastbound	TP5	TP4	TP3	TP2	TP1	Total	Average
AM peak	Run 1	00:36	00:29	00:15	00:57	01:23	03:40	03:07
	Run 2	00:31	00:26	00:15	00:50	00:51	02:53	
	Run 3	00:30	00:30	00:17	00:58	01:06	03:21	
	Run 4	00:35	00:27	00:15	00:53	01:00	03:10	
	Run 5	00:32	00:26	00:14	00:49	00:46	02:47	
	Run 6	00:31	00:26	00:14	00:50	00:49	02:50	
Inter Peak	Run 1	00:37	00:31	00:15	00:56	01:00	03:19	03:12
	Run 2	00:29	00:26	00:14	00:52	01:21	03:22	
	Run 3	00:30	00:27	00:15	00:49	00:58	02:59	
	Run 4	00:34	00:31	00:16	00:54	00:55	03:10	
	Run 5	00:30	00:28	00:17	01:04	01:01	03:20	
	Run 6	00:32	00:28	00:15	00:52	00:55	03:02	
PM Peak	Run 1	00:34	00:27	00:14	00:49	00:54	02:58	02:58
	Run 2	00:28	00:27	00:14	00:52	00:57	02:58	
	Run 3	00:31	00:26	00:14	00:51	01:12	03:14	
	Run 4	00:29	00:27	00:15	00:49	00:49	02:49	
	Run 5	00:29	00:27	00:15	00:51	00:57	02:59	
	Run 6	00:28	00:27	00:14	00:51	00:50	02:50	

	Westbound	TP1	TP2	TP3	TP4	TP5	Total	Average
AM peak	Run 1	01:05	00:58	00:16	00:28	00:29	03:16	04:58
	Run 2	00:59	00:53	00:14	00:27	00:28	03:01	
	Run 3	00:57	00:51	00:15	00:28	00:30	03:01	
	Run 4	00:54	00:48	00:15	00:27	00:58	03:22	
	Run 5	00:54	01:09	00:16	02:24	06:31	11:14	
	Run 6	00:58	00:51	00:15	01:41	02:06	05:51	
Inter Peak	Run 1	00:55	00:49	00:14	00:32	00:34	03:04	02:59
	Run 2	00:55	00:51	00:15	00:27	00:24	02:52	
	Run 3	00:54	00:53	00:15	00:28	00:32	03:02	
	Run 4	00:54	00:53	00:17	00:32	00:33	03:09	
	Run 5	00:54	00:51	00:15	00:26	00:26	02:52	
	Run 6	00:54	00:50	00:14	00:28	00:26	02:52	
PM Peak	Run 1	00:53	00:53	00:14	00:27	00:27	02:54	03:00
	Run 2	00:54	00:53	00:17	00:33	00:32	03:09	
	Run 3	00:54	00:52	00:15	00:30	00:25	02:56	
	Run 4	00:51	00:50	00:16	00:31	00:31	02:59	
	Run 5	00:53	00:59	00:15	00:28	00:29	03:04	
	Run 6	00:52	00:51	00:14	00:27	00:35	02:59	

Appendix F – Economy Calculations

F.1 Evaluation of Journey Time benefits using POPE method

F.1.1 To calculate vehicle hour benefits resulting from the scheme (using link transit times derived from Journey times), the COBA information from 2000 has been used, with the following changes implemented to enable a like for like comparison (Original COBA refers to the one run in 2000);

- Original Do Minimum (DM) – Although flow data was collected prior to scheme implementation, journey time predictions must be determined by rerunning the COBA deck with a journey time year set to the same as when the post opening surveys were undertaken;
- Original Do Something (DS) – As with the Do Minimum, this data will need to be determined from rerunning the COBA deck for the survey year after opening;
- Actual Before– Pre opening count and journey time data is collected for each new scheme route before opening. This information is obtained for the AM, IP and PM time periods; and
- Actual After – This uses traffic volumes and journey times from surveys after the opening of the schemes for the same times and sites as the Actual Before.

F.1.2 No outturn journey times are available for the off peak period (between 7pm and 7am, therefore in order to ascertain an indicative benefit for the full 24 hour period, the inter peak journey time has been used as a proxy for the off peak traffic. Off peak traffic is assumed to be free flowing, and outturn journey times suggest that the inter peak period is free flowing, therefore offering a reasonable comparison.

Change in Vehicle Hours

F.1.3 As part of the assessment for this report, comparisons have been undertaken between;

- Vehicle hour savings as observed on the links which comprise the old A66 route through Stainburn and Great Clifton, and the A66 new bypass route; and
- Vehicle hour savings for the same links in the COBA run (2009 opening year).

F.1.4 The COBA deck was rerun to generate journey times for a single year of 2009, as this was when the after survey data was undertaken.

F.1.5 The results of the total journey hours over these selected links appear in Table F.1.

Table F.1 - Vehicle Hour change

COBA	Do Minimum (DM)/Do Something (DS)	Total Vehicle Hours per Hour over selected COBA links			
		Average Peak		Interpeak	Off Peak
Original COBA	DM LG	110.7		63.2	14.1
	DS LG	56.3		37.3	10.2
	Predicted % change	-49.1%		-40.0%	-27.7%
	DM HG	122.7		69.7	15.2
	DS HG	58.4		38.6	10.6
	Predicted % change	-52.4%		-44.6%	-30.2%
		AM Peak	PM Peak	Interpeak	Off peak
Outturn	Before	71.3	82.6	65.8	13.8
	After	61.6	56.5	46.0	9.6
	Actual % change	-13.6%	-31.5%	-30%	-30.4%

- 8.20 The key points on the changes in vehicle hours shown in Table E.1 are;
- The predicted savings from the COBA show large savings in each time period, ranging from 30% in the off peak, to over 50% in the peak hour;
 - The COBA forecast higher total vehicle hours than are shown in the outturn for the Do Minimum scenario;
 - The forecast Inter-peak and Off-peak percentage change is similar to the observed;
 - The forecast vehicle hours for the Do Something scenario are similar to the outturn; and
 - The forecast peak hour change in vehicle hours was higher than the outturn, particularly in the AM peak times.

Appendix G - Environmental Objective

G.1 Environmental Objective

Introduction

G.1.1 As part of the schemes predicted impacts, these objectives were covered in the AST and formed part of the scheme's pre-opening assessment. As part of the evaluation of this scheme's impacts, this section of the report has reviewed the scheme's influence upon the environment.

Data Collection

- G.1.2 The following documents have been used in the preparation of this section of the report;
- AST for the scheme;
 - A66 Trunk Road Stainburn and Great Clifton Bypass Environmental Statement (ES) and Non-technical Summary August 1993;
 - A66 Trunk Road Stainburn and Great Clifton Bypass Proof of Evidence Landscape April 1994;
 - A66 Stainburn and Great Clifton Bypass Method Statement in Respect of Bats September 2000;
 - A66 Stainburn and Great Clifton Bypass Stage 3 Ecological Assessment: Preliminary Bat Report July 2000;
 - A66 Stainburn and Great Clifton Bypass Two Year After Study;
 - A66 Stainburn and Great Clifton Bypass Environmental Audit May 2004.
- G.1.3 The full list of information requested and received to help with the compilation of this report is included in Appendix H.

Environmental Conditions

- G.1.4 As noted in Chapter 2 the existing route through the two villages suffered from a number of traffic related problems particularly congestion and poor safety. The traffic problems on the route gave rise to unacceptable levels of noise and air pollution (though not to the extent that an Air Quality Management Area was introduced) as well as visual intrusion, driver stress and severance. The bypass was designed to relieve these problems and comprised a 4.3 km section of single carriageway with an additional eastbound climbing lane provided over part of the route.
- G.1.5 The location of the route lay to the east of the town of Workington to the south of the River Derwent. The topography varies from around 10m AOD adjacent to the Derwent to 110m AOD to the south of Great Clifton. The line of the route was predominantly given over to agricultural land uses, mainly pasture but with some arable fields divided by hedgerows and small blocks of woodland. Two of these woodlands, at Scale Beck and adjacent to Stainburn School are ancient semi natural woodlands. The line of the bypass was crossed by a number of small

streams or becks. There was an area of restored open cast coal mining to the south of Great Clifton which had been landscaped and returned to agricultural use. Overall the route was in an area of attractive landscape that has been designated by the local authority as a Locally Important Landscape Area.

- G.1.6 There were no nationally designated sites of nature conservation interest but there were several Sites of Wildlife Interest designated by Cumbria Wildlife Trust. The ecological value of these predominantly related to their ground flora but two were noted as having value for wildlife, particularly birds, red squirrel, deer and one had a bat roost. Subsequent to the publication of the ES the woodland at Scale Beck was identified as being a valuable habitat for bats.
- G.1.7 The ES noted that there was evidence of occupation of the area since prehistoric times and that there were two conservation areas in Workington and fourteen Listed Buildings in the study area but that none of these would be directly affected by the route.
- G.1.8 The study area included a number of rights of way and the ES noted that that the route would cross two public footpaths and a private track used as a public footpath.

Environmental Effects

- G.1.9 The key environmental effects identified in the ES were;
- Landtake - loss of 15.72 ha of agricultural land with 11 farms subject to severance by the bypass;
 - Landscape and visual intrusion – affect on the Locally Important Landscape Area with approximately 560m of the route falling within the designated area, affect on the Upper Park section of Curwen Park an important historical parkland, loss of ancient semi natural woodland, loss of hedgerows, over 80 residential and other properties experiencing increased visual intrusion;
 - Public Rights of Way – severance of three routes across the line of the bypass;
 - Ecology - loss and severance of ancient semi natural woodland at Stainburn School and Scale Beck, loss and severance of three other hedgerows and verge habitats;
 - Heritage – direct affect on the Upper Park section of Curwen Park a Grade II site in the English Heritage Register of Historic Parks and Gardens;
 - Noise – around 260 residential properties experiencing a decrease in noise and 28 experiencing an increase in noise;
 - Air Quality – no quantified effects noted but a general improvement considered likely; and
 - Water Quality – no quantified effects noted but a general improvement considered likely.

Environmental Objectives

- G.1.10 The ES did not specifically state scheme objectives for the range of environmental topics but a number of aims and objectives for the proposals were included in the landscape text of the ES. These included the following:
- To integrate the new road into its landscape setting;
 - To mitigate adverse impacts of the development on the environment and amenity of nearby residents;
 - To provide interest and amenity for road users; and
 - To conserve existing wildlife habitats in the highway corridor where practicable and create a diverse vegetation cover to encourage the development of new habitats.
- G.1.11 It was further stated in the ES that:
- The proposed road scheme aims to blend with the existing landscape to create the least possible intrusion;
 - The scheme has taken particular regard of the issues relevant to areas of landscape, ecological and scientific interest; and
 - Existing trees, woodland and diverse ground flora within the highway boundary would be protected and retained where feasible.
- G.1.12 The ES described a range of mitigation measures in particular locations. These are described later in the text of this report under the separate environmental headings

Site Visit

- G.1.13 A site visit was undertaken in August 2008 which allowed a general overview of the scheme with access from over-bridges and underpasses, public footpaths and local roads.

Consultation

- G.1.14 The following organisations have been consulted regarding their views on the impacts they perceive the road scheme has had on the environment, and whether they feel that the mitigation measures implemented have been effective.
- Statutory environmental organisations – Natural England, English Heritage and the Environment Agency; and
 - Local Authorities – Allerdale District Council (ADC) and Cumbria County Council.
- G.1.15 At the current time of writing, comments have only been received from the Environment Agency and Allerdale District Council. No comments have been received from the remaining organisations.

Table G.1 – Summary of Consultation Responses

Organisation	Field of Interest	Response Received
		Comments
Natural England	Landscape and Biodiversity	Did not comment
English Heritage	Heritage	Did not comment
Environment Agency	Water	Surface water drainage aspects not addressed satisfactorily at design stage. Drainage measures installed in a reasonable manner. Unsure about effectiveness of Stainburn pond, note flooding problems in the area and do not recognise success of the drainage scheme. No record of pollution incidents but no monitoring carried out by EA
Cumbria County Council	General	Did not comment
Allerdale District Council	General	Commented on impact on historic park, and landscape.

G.1.16 Discussion has also taken place with the members of the HA team, Designers, Department’s Agent and Environmental Coordinator, specialist ecological advisors, contractor and Managing Agent for the scheme.

Environment

- G.1.17 Three of the environmental parameters (noise, local air quality and greenhouse gases) are directly related to traffic flows. No new modelling has been undertaken as part of this study. An assumption has been made that the level of traffic and the level of traffic noise or local air quality associated with that traffic are directly related. Therefore, if the observed level of traffic is as forecast it could be assumed that the traffic noise and local air quality impacts are as expected. Details on the traffic aspects of the project are included in chapter 2 of this report.
- G.1.18 The ES indicated that the traffic flows on the existing highway network subjected residents to loss of amenity caused by noise visual intrusion, air pollution and severance. The existing A66 passed through the villages of Stainburn and Great Clifton where there were many residential properties fronting onto the road. Over 150 residential properties and two schools were within 300m of the road. The predicted traffic growth, over 15 years, was considered likely to exacerbate the environmental problems on the existing route.
- G.1.19 The ES stated that traffic growth had been modelled by applying NRTF89 to the 1991 AADT flows. The modelling indicated that with high traffic growth, in the design year (2011) there would be an increase in traffic on the old A66 of up 166% if the bypass were not built (Do Minimum). However, if the bypass were

built (Do Something), in the design year (2011) traffic on the old A66 would fall by up to 62% with most traffic using the new bypass. More up to date traffic figures have been outlined in Chapter 2 of this report.

Noise

Predicted Impacts

- G.1.20 The AST stated that there would be a benefit from the removal of through traffic from the villages of Stainburn and Great Clifton. With the scheme it was predicted that 7 properties would experience an increase in noise and 179 properties would experience a decrease in noise.
- G.1.21 The ES noted that the predicted traffic flows along the bypass would generate traffic noise and vibration and this would have an impact on the properties in the vicinity. It predicted that 28 residential properties would experience an increase with the scheme. This was balanced by 259 residential properties experiencing a decrease with the scheme. No predictions were made for residential properties in the do nothing scenario though the appraisal framework in the ES noted that noise levels on the existing A66 would increase with the growth of traffic.
- G.1.22 The difference in figures in the AST and ES is probably due to changes in the design of the scheme including the use of a low noise surface and different assessment methodologies.
- G.1.23 Mitigation measures were proposed in the form of landscape mounding at several locations along the line of the bypass. It was expected that with the noise mitigation measures in place overall the situation with regard to noise would improve and a large number of residential properties would experience a decrease in noise as a result of the scheme as noted above.
- G.1.24 As no properties were predicted to experience noise levels in excess of 68dB(A) no noise insulation in the form of secondary glazing in accordance with the criteria given in the Noise Insulation Regulations 1975 was considered necessary.

Consultation

- G.1.25 No comments relating to noise have been received.

Evaluation

- G.1.26 It is understood that, in line with HA policy, the new carriageway surfacing was constructed from a thin layer of 'quieter' asphalt which reduces tyre noise. This is additional to measures outlined in the ES and is likely to result in a reduction in noise of up to 3dB.
- G.1.27 Noise mitigation measures have been provided as indicated in the ES including the provision of earth mounding on the northern side of the bypass at the western roundabout and between Scale Beck and Windy Ridge see Figure C.1 and on both sides of the bypass at the eastern end near Chapel Brow.



Figure G.1 - Mounding between Scale Beck and Windy Ridge

- G.1.28 It is understood that three properties were eligible for noise insulation and that some Part 1 claims have been made. Confirmation of the number of agreed claims has been sought from the HA Part 1 Team and will be incorporated into the report once provided.
- G.1.29 The traffic flows for the bypass and on the old A66 are as indicated in chapter 2 of this report. The ES predicted traffic flows on the old A66 in the design year (2011) in the do something high growth scenario of 6790 vehicles. Actual traffic flows on the old A66 in March 2009 are 6000 vehicles, lower than might have been predicted. The ES predicted traffic flows on the bypass in the design year (2011) in the do something high growth scenario of 10970 vehicles. Actual traffic flows on the bypass in March 2009 were 8500 vehicles. On this basis and combined with the implementation of a low noise surface that was not assessed in the ES, the noise levels are likely to be as predicted or possibly lower than expected in the ES.

Summary

- G.1.30 Noise mitigation measures in the form of earth mounding, noise fences and use of a low noise surface have been provided and based on traffic flows which are less than predicted, noise will have increased adjacent to the bypass but possibly less than predicted in the ES. The noise levels in Stainburn and Great Clifton are likely to have improved as expected. Further study would be required to evaluate specific noise impacts at local receptors.

Local Air Quality

Predicted Impacts

- G.1.31 The AST predicted that decreased traffic flows with the scheme on the old A66 would lead to an improvement in air quality with 261 properties experiencing an improvement in air quality and no properties experiencing worsened air quality. Decreases in Particulate Matter (-78 PM₁₀) and Nitrogen Dioxide (-496 NO₂) were predicted.
- G.1.32 With regard to Greenhouse Gases the AST did not predict tonnes of CO².

- G.1.33 The ES did not consider air quality but noted that residents were subject to loss of amenity caused by air pollution.

Consultation

- G.1.34 No comments relating to air quality have been received.

Evaluation

- G.1.35 Based on traffic flows after opening it would appear that congestion has eased on the old A66. The ES indicated that there were 10670 vehicles using the old A66 in the 1991 base year and traffic flows in March 2009 are 6000 vehicles compared with a high growth prediction for the 2011 design year if the bypass were not built of 17,760. It can be deduced that on this basis and with improvements in vehicle technology that air quality within the villages will be much improved. Traffic speeds on the bypass are good and air quality in the vicinity of the bypass would also be good. No properties are likely to have experienced a deterioration in air quality.

Summary

- G.1.36 Based on traffic flows it could be assumed that the impacts of the scheme on local air quality will have been as expected.

Greenhouse Gases

- G.1.37 The assessment of the impacts of transport schemes on emissions of greenhouse gases is now one of the environment sub-objectives. WebTAG notes that Carbon Dioxide (CO₂) is considered the most important greenhouse gas therefore, has been used as the key indicator for the purposes of assessing the impacts of transport options on climate change. Changes in CO₂ levels are considered in terms of equivalent tonnes of Carbon released as a result of the scheme under evaluation. Carbon emissions should be estimated for the 'with scheme' and 'without scheme' options for each year of the appraisal period.

Forecast

- G.1.38 The AST did not include any predictions for annual CO₂ emissions changes. This forecast was calculated using the DMRB screening methodology⁹ and was based on the assumptions that the scheme would result in increased speeds on the new road.

Evaluation of Carbon Emissions

- G.1.39 Since this scheme was evaluated, greenhouse gas emissions are now measured in terms of tonnes of Carbon rather than CO₂. The impact of the scheme on carbon emissions has been evaluated using the latest DMRB screening methodology.

⁹ DMRB Air Quality Spreadsheet

G.1.40 The DMRB method was used to recalculate a forecast and an outturn impacts based on the length of the scheme only. Table G.12 summarises the results.

Table G.2 - Evaluation of Carbon Emissions in opening year

Scenario	Carbon (tonnes/year)	
	DMRB (scheme length only)	
	Forecast	Outturn
Do Minimum – No scheme	1168	1380
Do Something – with scheme	1143	1204
Difference	-25	-176
% Difference	-2%	-12%

G.1.41 The carbon evaluation in the above table shows that the scheme has a slight impact in carbon emissions in the opening year, as they have been shown to decrease by approximately 12 %, and this is likely to be due to speeds not increasing as much as anticipated.

Landscape and Townscape

Predicted Impacts

G.1.42 The AST predicted that subsequent to the Public Inquiry in 1994 after which the Inspector recommended that the scheme should be approved, the scheme was delayed with opening occurring in December 2002.

G.1.43 Landscape impacts were noted in the ES as;

- Removal of existing vegetation, particularly from ancient woodlands at Scale Beck and Stainburn School;
- Affect on Locally Important Landscape Area (LILA) with 560m of the route within the LILA;
- Affect on Curwen Park which is designated Grade II in the English Heritage Register of Parks and Gardens of Special Historic Interest; and
- Visual intrusion on residential properties with 4 experiencing high intrusion, 28 medium and 72 low. No beneficial visual intrusion from reduction in traffic on old A66 noted.

G.1.44 The ES noted that the following landscape mitigation measures would be provided;

- Retention of existing trees, woodland and ground flora wherever possible and particularly at Stainburn School and Scale Beck;
- New planting – including dense tree and shrub screening, hedgerows intermittent trees and formal landscape treatment with mown grass.

Approximately 93,000m² of new planting and 2,300 linear metres of hedgerow were proposed; and

- Landscape mounding at three locations – at the western end of the scheme, east of Scale Beck and at the eastern end of the scheme.

G.1.45 The main landscape theme of the planting was intended to be the establishment of a series of small woods in keeping with the rural landscape to blur the highway boundaries and break its visual form. Quality views from the road were to be maintained. The locations of the most significant blocks of woodlands were as follows;

- on the landscape mound south of Stainburn, to link with that at Scale Beck;
- on the top of a prominent area of high ground at Windy Ridge ;
- on the restored open cast coal mine site to break up distant linear views of the road;
- next to the public footpath at the upper reaches of Harry Gill; and
- At the eastern end of the scheme at Chapel Brow.

G.1.46 Plant species would generally be locally native and would be maintained for three years

G.1.47 Highway lighting would only be provided at junctions but no mention was made of the type of lanterns to be used.

Consultation

8.21 Consultation comments have been received from Allerdale District Council only. They made favourable comments about the establishment of the landscape proposals which they thought were carefully considered, and generally satisfactory. No other comments were received.

Evaluation

G.1.48 The landscape planting, seeding and earthworks would appear to have been undertaken in line with the proposals in the ES. A variety of planting types and sizes has been used with native planting to screen and integrate the road into the local landscape. Evergreen planting has been used at the western roundabout. The majority of new planting was been carried out in season 2002/3 and it is understood were maintained for three years after completion.

G.1.49 Overall the planting is exhibiting good growth though there are variations along the route. The tree and shrub planting is establishing best in the more sheltered, lower lying areas at either end of the scheme. Growth is less advanced towards the centre of the scheme where the route crosses higher ground, presumably due to greater exposure to cold winds but possibly also due to poorer ground conditions associated with the restored open cast mine. There did not appear to be significant differences between planting on north or south facing cutting/embankment slopes but within planting areas there were some areas

where establishment was poorer possibly due to ground conditions. Of the plant species planted ash was growing notably well and alder, presumably planted as a nurse was also doing well. Figure G.2 and G.3 illustrate the planting along the scheme.



Figure G.2 - Well established planting in the middle of the scheme



Figure G.3 - Poorly established planting on made ground near Chapel Brow

G.1.50 Hedgerows were also generally growing reasonably well exhibiting the same overall variation in establishment as the tree and shrub planting i.e. better towards the ends of the scheme.



Figure G.4 - Well established hedge

- G.1.51 An evaluation of lighting impacts has not been undertaken as part of this study but it was noted that in line with the ES the junctions were lit with high mast full cut off lanterns.
- G.1.52 Extensive earthworks have been included to help screen traffic. This appears to have been implemented as described in the ES with mounding along the north of the bypass at the western end, between Scale Beck and Windy Ridge and on both sides of the bypass at the eastern end of the scheme.
- G.1.53 A sonic bat bridge has been installed over the bypass between the severed sections of Scale Beck woodland and this forms a distinctive feature along the route. Further details are given in the Biodiversity section of this report. Crown thinning appears not to have taken place on trees on the edges of the Scale Beck woodland as was proposed in the ES. It was not possible to see whether the translocation of ground flora proposed in the ES for these areas had taken place. There was no evidence of the cutting and stacking of felled trees as described in the ES though there was the trunk of one apparently fallen tree in the northern section of the wood.
- G.1.54 Grassland within the scheme appeared to be establishing well. To the western end of the scheme on the two deep cutting slopes what appeared to be species rich grassland was establishing reasonably well with good cover and very few rank grass or weed species present. This appears to have been improved since implementation when the grassland was said to be establishing poorly by members of the project team. This grassland appeared to have been sown on the bare cut slopes with no topsoil spread. In other areas of the scheme there was a noticeable presence of fine grass species in planting areas and on verges. Particular mention of reusing good low nutrient soils with a seed bank of good grass species in them was mentioned in the ES and the evidence suggests that this had been carried out. There was generally an absence of weed species in most areas of the scheme apart from on the mounds at the eastern end where there was an infestation of thistle and in an area of ornamental planting at the western end.

- G.1.55 Subsequent to the ES, at the western end of the scheme a number of attractive stone retaining walls have been incorporated into the scheme. These have been designed to complement the existing stone walls in this area and blend in very well giving a distinctive, high quality character to this end of the scheme as shown in Figure G.5 and Figure G.6. Within the roundabout there is a 1m high circular wall with planting inside. This was intended to be filled with soil and planted but the soil was deleted following a safety audit so the plant material is growing from ground level within the wall.



Figure G.5 - Existing walls near Scale Beck crossing



FigureGG.6 -New walls to match existing

- G.1.56 It is understood that there was a three year aftercare period included within the landscape contract to cover planting plot areas up to completion of the works. As would be expected six years after opening there is no evidence of maintenance operations (weed free circles etc) but overall establishment is satisfactory or good with few areas of weed growth as shown in G.7. Replacement planting appears to have taken place with few noticeable areas of failed planting. Tree shelters and ties were still in place and this will require attention in the coming years to avoid constraining growth of the plants.



Figure G.7 - Weed infestation in ornamental planting

Summary

- G.1.57 The bypass is a major feature in the landscape but landscape mitigation measures have been implemented in line with the proposals in the ES. The mitigation measures are establishing reasonably well with a few poorer areas due to exposure or ground conditions. Overall the scheme has been implemented well and has been maintained satisfactorily resulting in an attractive scheme overall. However to ensure that planting continues to establish and fulfil its long term objectives e.g. screening and integration some ongoing maintenance and management will be required.

Biodiversity

Predicted Impacts

- G.1.58 The AST stated that there would be an impact on ancient woodland with the scheme and an overall assessment of slight adverse was predicted.
- G.1.59 The ES stated that the scheme would result in the loss of;
- The majority of an ancient woodland bank adjacent to the A66 near Stainburn School;
 - Woodland at Scale Beck designated as ancient woodland;
 - Mature hedgerows, hedgebank flora and semi improved grassland;
- G.1.60 The effects of land-take would be addressed by the following general mitigation measures;
- Incorporation of badger tunnels and fencing where appropriate;
 - Minimising the amount of hedgerow removal;
 - Installing oil interceptors on road drainage outfalls;
 - Replacing lost areas of trees and shrubs with planting on new embankments and junction layouts. Planting would comprise native broadleaved trees, including species with a range of heights and foliage density; and

- Creation of suitable growing habitats for grasses in verges by combining local subsoils with calcareous quarry shatter and a small proportion of topsoil; and
- Replacement of areas of grassland lost by sowing new embankments and junctions with a seed mixture including native herb species characteristic of the local area.

G.1.61 Specific mitigation measures were included in the ES as follows;

- Minimisation of land take through Scale Beck woodland, coppicing/crown reduction of retained trees, translocation of herb species to unaffected areas of woodland, establishment of woodland/hedgebank species on undisturbed land/cutting slopes;
- Translocation of species rich turves where these would be lost;
- Deer reflectors to reduce the risk of accidents;
- Retention and incorporation of vegetation on lane from Stainburn into the scheme to preserve the existing features;
- New species rich grassland at Windy Ridge; and
- Reuse of soils containing a seed bank of valuable flora at Chapel Brow.

Consultation

G.1.62 No comments were received on biodiversity.

Evaluation

G.1.63 The mitigation measures proposed in the ES were reviewed during the site visit in June 2008. No new survey work has been undertaken as part of this report though the findings of an environmental audit carried out in 2004 were made available. No 'As Built' drawings have been made available which would have helped inform the evaluation.

G.1.64 The cutting slopes at the western end of the scheme did not have topsoil spread and a sward of species rich grass was established though this was patchy in places as shown in Figure G.8.



Figure G.8 - Species rich grassland on the cutting slopes west of Scale Beck

- G.1.65 As Built drawings would be required to be able to evaluate whether the cutting through Scale Beck woodland has been minimised. There was no evidence of crown thinning or coppicing and the trees retained on the edge of the cut appeared to be in poor condition and suffering from changes in water table and exposure. There was no evidence of cut timber in the woodland adjacent to the road. And further information would be required to evaluate the success of any translocation of ground flora.
- G.1.66 Although not mentioned in the ES bats were subsequently found in Scale Beck wood and a range of mitigation measures were proposed in a method statement in support of a bat licence application. These included; a manmade habitat link at canopy level, two bat boxes to replace every cavity suitable for bats found in trees to be felled, six crevices to be incorporated in the Scale Beck culvert design, a two metre high solid fence to be built alongside the road to prevent bats flying at low level across the bypass. Retention of trees and planting of specimen trees in the road verge, planting of shrubs near the entrance to Scale Beck culvert.



Figure G.9 -Man made habitat link at Scale Beck Woodland

- G.1.67 The manmade habitat link as shown in Figure G.9 has been installed as proposed and was the first such structure to be built on a road in the UK. It is understood that the design is a development of an earlier design that had a slightly different arrangement of wires and which incorporated a hemp rope for red squirrels to cross. It is understood that studies to assess the success of the structure indicate that bat numbers crossing the road are about 40% of those crossing the line of the route before construction took place.
- G.1.68 There is evidence of bat boxes being installed and discussions with the ecology consultant indicate that in the period after installation these were being used by bats, though no checking was carried out as part of this review. The Scale Beck culvert also includes the crevices proposed in the application for the bat licence. It was not possible to ascertain whether these were being occupied by bats at the time of the visit. The 2m solid barrier had been constructed adjacent to the road but there was no planting of specimen trees close to the road. There was planting within 10m of the culvert but it could have been closer to be more effective, although is an enhancement over the mitigation proposed in the ES.

- G.1.69 There were no badger tunnels noted during the site visit or fencing present on the scheme, presumably because there were no badgers present in the vicinity of the route by the time of detailed design;
- G.1.70 Oil interceptors were present at drainage outfalls as specified in the ES but it was not been possible to check the effectiveness of these during the site visit.
- G.1.71 Extensive planting of locally native trees and shrubs has taken place and is mostly establishing very well as shown in Figure G.10.
- G.1.72 Based on the information available it has not been possible to tell whether the creation of low nutrient soils with subsoil, calcareous quarry shatter and topsoil has taken place but as indicated in the landscape section above there is an attractive sward establishing well along the verges.



Figure G.10 -Verge with attractive grass species

- G.1.73 Various proposals for the recreation and establishment of species rich grassland were set out in the ES. These included translocation of turves at Scale Beck, the spreading of species rich seed bank soil at Chapel Brow and the creation of wildflower areas at Windy Ridge. It is understood from the Environmental Audit Report for the scheme that all translocated material was placed in the deep cutting at the western end of the scheme. A full survey of the species present was not carried out for this report but it was apparent that coverage of the slopes was good but with some bare patches. Further information would be required to be able to evaluate whether the species range reflected the previously occurring types and/or the translocated turves.
- G.1.74 Deer reflectors had been installed as indicated in the ES and shown in Figure G.11. Deer mortality figures have not been made available for use in this evaluation. A mammal pass has been included in the Scale Beck culvert and anecdotal evidence indicates that this is used though it is subject to littering and graffiti.



Figure G.11 - Deer reflectors

- G.1.75 Subsequent to the ES a balancing pond has been created adjacent to the scale beck to attenuate the flow from the bypass. At the time of the visit the pond was supporting a range of marginal vegetation dominated by phragmites. There is also some tree and shrub planting along one side to provide shade for the pond to introduce a variety of habitats.

Summary

- G.1.76 The ecological mitigation proposals were developed for the ES in 1993 since when the guidance and agreed 'best practice' for ecological issues associated with road schemes has developed. As such the measures in the ES have been further expanded and included specific bat and other mitigation proposals. The implementation of all the proposals has been varied with some measures implemented in full and others being less successful or apparently not implemented at all. Coppicing back and crown thinning the trees at Scale Beck woodland then stacking the wood on site didn't appear to have been carried out. Translocation of herb flora/topsoil was also uncertain from discussions held with the members of the construction team.
- G.1.77 The bat habitat link is the most obvious mitigation measure and indications are that it is having some success in encouraging bat flights across the bypass. Monitoring was carried out in the period immediately after the scheme opened but further surveys would be required to confirm success now. There were indications at the time of the monitoring that bats were following a slightly different route across the bypass, were not crossing at a sufficient height and were being hit by HGV's. Additional planting at the carriageway edge was considered to be the appropriate long term solution to this. The fencing has also been implemented as have the bat boxes and crevices. Indications are that these measures have been successful but the results of any monitoring undertaken as part of the scheme would be required to fully evaluate effectiveness of these measures. .
- G.1.78 The works to trees and planting at Scale Beck appears not to have taken place as specified. It is understood that a scheme to address these issues is proposed

under the LNMS programme. At the time of the site visit the appearance of the trees was unattractive and the trees could be subject to windblow in the future. The inclusion of the balancing pond and mammal ledge at Scale Beck culvert are additions to the measures in the ES. No particular measures for badgers were noted during the site visit. The species rich grassland proposals appear generally successful.

- G.1.79 Overall the ecological measures are considered to be successful but would require further study to fully evaluate effectiveness.

Heritage

Predicted Impacts

- G.1.80 The AST predicted that there would be a very significant impact on the integrity of Upper Park which was designated by English Heritage as a Grade II site in their Register of Parks and Gardens of Historic Interest. It recorded an unacceptable intrusion/division of Upper Park. It also noted the impact on the context of the Scheduled Ancient Monument (although no indication of its location was noted) and Listed Buildings. A large adverse impact was predicted overall.
- G.1.81 The ES stated that;
- Workington contained two conservation areas, Brow Top and Portland Square, part of the second of these fell within the ES study area and contained buildings from the Georgian, Victorian and Edwardian periods. There were 14 Listed Buildings in the study area;
 - There was limited evidence of occupation in the study area during the prehistoric period and the Anglo Saxon period but documentary evidence exists dating from the medieval period;
 - A number of sites from the medieval period were situated with the study area. These include the ruins of an early 13th century manor house at Workington Hall, the possible former Stainburn Chapel, earthworks possibly indicating fish ponds and evidence of an agricultural field system of townfields and outfields;
 - The post medieval period saw the establishment of new farmsteads such as Stainburn Moor Farm and the formalisation of earlier access tracks;
 - Industrial activity within the area was quite extensive with several mines, collieries, ironworks, forges, a tannery and a pottery; and
 - In the late 18th century the ornamental landscape of Curwen Park, of which Upper park forms a part was established. There was a diversion of Scale Beck and new structures such as walls, bridges and buildings were constructed most of which are still present today.
- G.1.82 The ES identified the following potential impacts on heritage and archaeology with proposed mitigation measures as follows;

- G.1.83 The Portland Square Conservation Area would not be affected by the proposed bypass although the Stainburn School junction lay within 230 metres of it's eastern boundary;
- G.1.84 None of the 14 Listed Buildings noted in the ES would be directly affected by the bypass;
- G.1.85 The desk top survey in the ES noted that the bypass would not appear to affect any archaeological sites apart from former open fields and common land. The ES proposed a programme of appropriate archaeological assessment in advance of construction to assess the effect on these assets and any other unknown remains;
- G.1.86 The bypass would 'coincide' with Upper Park but did not specify the effect that this might have on the park. 'Appropriate measures' would be adopted to minimise the potential visual impact and physical disturbance of original landscape features;
- G.1.87 Further archaeological assessment work was recommended and a four stage programme was noted with details being provided in an annexe to the ES.

Consultation

- 8.22 Consultation comments have been received from Allerdale District Council only. They made favourable comments about the affect on the historic parkland that the scheme passes through, as they acknowledged that there was very little that could have been done to mitigate the impact. No other comments were received.

Evaluation

- G.1.88 The extent of built heritage impacts appears to be limited to the effect on Upper Park as most other heritage assets are unaffected. The ES did not attempt to quantify the impact on the park but the effect of the bypass is considered to have been significant. The park itself has been severed with around 15% of the park area being cut off from the remaining portion seriously affecting the integrity of the park. The presence of a new dual carriageway road, albeit in deep cutting (see Figure G.12) will have also affected the enjoyment of the park for users.



Figure G.12 - Deep cutting through Upper Park reduces impact of the road

- G.1.89 As such the ES could be seen to underestimate the impact of the scheme and the actual effect is far greater than recorded. The use of stone walling at the junction of the bypass with the old A66 does help to integrate the road into the historic landscape, notably the bridge over the Scale Beck on the old A66, a Listed Building. The road is in deep cutting through the Park which helps to reduce the visual impact of the scheme and the absence of planting helps to maintain views between the severed portions of the park and is shown in Figure G.12
- G.1.90 With regard to archaeology, no information has been made available which would enable this aspect to be evaluated.



Figure G.13 - Detail of tie in between new and existing walls near the western roundabout.

Summary

- G.1.91 The ES underestimated the effect of the scheme on the park but the alignment in cutting and stone walls at the junction help to reduce the impact and is shown in Figure G.13. The impact of the scheme is significant but without major realignment of the route or extensive mitigation such as a cut and cover tunnel it is hard to see how the impacts could be further reduced. Other heritage assets in the area have been avoided and the Portland Square Conservation Area has been improved through the removal of traffic on the old A66.

Water

Predicted Impacts

- G.1.92 The AST stated that, assuming effective mitigation the risk of damage to the water environment was likely to be slight. It predicted a slight negative impact overall.
- G.1.93 The ES noted that the main watercourse in the area was the River Derwent which flowed in an east to west direction north of Stainburn and Great Clifton. Other watercourses in the study area were Scale Beck, Stan Beck, Lostrigg Beck, Eller Beck (originating as Green Gill) and Harry Gill. No information was available in the ES on the water quality in these rivers but it was noted that the River Derwent into which the Harry Gill and Scale Beck discharged was classified as a Class 1A river under the old National Rivers Authority (NRA) classification system.



Figure G.14 - Scale Beck

- G.1.94 The ES described only the structure needed where the bypass crossed the line of Scale Beck and not with any of the other watercourses. The watercourses affected by the proposals however were;
- Scale Beck – the ES indicated that the beck would be carried under the bypass in a 1.8m diameter culvert.
 - Harry Gill – the bypass crossed over the gill which is in culvert under the road;
 - Stan Beck – which is culverted under Stainburn Road (see Figure G.14); and
 - An un-named beck which flows into Lostrigg Beck south of the scheme.
- G.1.95 The ES made no comment on the effect of the scheme on water quality where it passed through the restored open cast mine at Chapel Brow.
- G.1.96 The ES referred to the effect of the scheme on the watercourses noting impacts on run off, quality and volume. An outline of drainage arrangements was given but there was no indication of flow attenuation measures. The likelihood of the NRA attaching appropriate conditions to consents for working on rivers was noted.
- G.1.97 The ES noted that the drainage outfalls from the road had been agreed with the NRA and that they considered that the highway drainage would have no adverse effects on the existing watercourses downstream of the points of discharge. No supporting evidence for this conclusion was included within the ES.
- G.1.98 The ES noted that quality of the run off would maintained by the provision of trapped gullies, oil interceptors and silt traps on road outfalls as directed by the NRA.

Consultation

- G.1.99 Consultation comments were received from the Environment Agency (EA). They felt that surface water drainage aspects were not addressed satisfactorily at the design stage. Although there had been pre-application discussions, when reconsulted on the scheme proposals the EA felt that there was no scope for discharge rates to be revised. They thought that the drainage measures had been installed in a reasonable manner but queried whether the pond near the Scale

Beck was operational. Continued flooding at the Stainburn end of the scheme and at Bridgefoot was noted and the public's perception that the bypass had exacerbated flooding in the area was recorded. Queries on the design standards of the surface water infrastructure were raised. Overall the EA commented that they would not recognise any notable successes in the drainage scheme. However, they did not criticise the drainage measures on environmental management grounds and were not aware of any pollution incidents.

Evaluation

- G.1.100 From observations during the site visit it appeared that the watercourses have been appropriately dealt with to maintain flows across the line of the bypass, notwithstanding the comments received from the EA which will have been based on observations over a longer period. The crossing of the Scale Beck was achieved with a bridge structure rather than a culvert as indicated in the ES. The bridge includes a footway for pedestrians on the west side and a ledge for mammals on the east and is shown in Figure G.15. On either side of the crossing there are extensive areas of rock placement to mitigate the potential erosion effects of the river in spate. There were no indications that the river was flowing under the road unsatisfactorily (see above) and anecdotal evidence suggests that the footpath and ledge are being used.



Figure G.15 - Scale Beck bridge showing footway, mammal ledge and environmental barrier

- G.1.101 Along the line of the route the gullies, filter drains and pipes appeared to be operating satisfactorily and there was no evidence of discharges adversely affecting receiving watercourses. Oil and silt traps also appeared to be working satisfactorily with no evidence of pollution in watercourses.
- G.1.102 At Scale Beck a balancing pond (Figure G.16) has been constructed adjacent to the eastern bank of the river, south of the bypass. The pond is a later mitigation measure proposed after the ES was published. This has been planted with trees, shrubs and reeds to provide a habitat for wildlife in addition to its function in attenuating run off. Although some vegetation is establishing successfully the steepness of the sides of the ponds are such that it is not possible to create the

variety of habitats that would provide a wildlife resource. The pond appears to be operating successfully in balancing flow into Scale Beck although comments from the EA based on a longer period of observation suggest this may not be the case (see above).



Figure G.16 - Balancing pond with reeds at Scale Beck

Summary

- G.1.103 The ES provided limited detail on mitigation measures for the road drainage and the effect it would have on local watercourses. The mitigation proposed was of a level appropriate at that stage and was typical of road schemes of that time. The inclusion of a balancing pond is a measure of more recent years and is an enhancement over the original proposals.
- G.1.104 Further study would be required to fully evaluate this sub-objective and investigate the comments made by the EA ,but based on observations at the site visit there is nothing to suggest that the mitigation measures are performing other than as expected.

Physical Fitness and Journey Ambience

Predicted Impacts

- G.1.105 The AST did not include an entry for either Physical Fitness or Journey Ambience as these were not criteria assessed at the time.
- G.1.106 The ES did not include a section on Physical Fitness or Journey Ambience but included some information related to these topics within various sections. The ES noted that 2 designated footpaths, a permissive footpath and roads used by pedestrians would be directly affected and that safety and amenity would be improved for pedestrians in Stainburn and Great Clifton. There were no bridleways noted in the study area though two minor roads crossing the route having low traffic volumes were suitable for equestrians.
- G.1.107 The ES noted substandard features of the existing A66 which subjected road users to delay, frustration, discomfort and potential hazard. Slow average speeds on the road were also noted.

- G.1.108 Footpath 230001 south of Great Clifton would be severed by the route but steps in the embankment and an at-grade crossing would be provided to enable pedestrians to continue to use the route. Footpath 2411008 would be largely unaffected as it terminated at the point where the new bypass would be coincident with the line of the old A66.
- G.1.109 The permissive footpath (Figure G.17) alongside Scale Beck to Schoose Farm was to be severed by the bypass but stiles were to be provided to enable continued pedestrian use of the footpath.



Figure G.17 - Permissive footpath along Scale Beck

- G.1.110 The two minor roads crossing the route were to be maintained, U2169 crossing over the bypass on a bridge and U2166 passing under the bypass. The U2169 crossing would require a minor diversion of the road to allow sufficient headroom for vehicles passing underneath.

Vehicle Drivers

- G.1.111 View from the road – the appraisal framework noted that the existing road had suburban residential and undulating pastureland views and that the published route would have undulating pasture land views
- G.1.112 Driver stress – the appraisal framework in the ES noted that motorists on the existing route experienced moderate to high driver stress but for the new route stress would be low.

Consultation

- G.1.113 No consultation has taken place on these topics.

Evaluation

- G.1.114 No pedestrian, cyclist or bridleway surveys have been undertaken as part of this study and it is presumed that a post opening NMU survey has not been carried out as part of the scheme. During the site visit pedestrians were noted using the footpaths and bridges at varying locations along the scheme and the footpath network appeared to be well used. Anecdotal evidence of the use of the

permissive footpath along Scale Beck suggests it is well used but is subject to graffiti and littering.

G.1.115 It would appear that the diversions to the PROW network have generally been implemented as expected with access being maintained across the bypass. The permissive footpath to Schoose Farm has been maintained by the provision of a footway built into the bridge over the Scale Beck. This is an enhancement on the proposal in the ES which was for an at grade crossing with stiles on the boundary fences.



Figure G.18 -Footway and cycleway at Chapel Brow junction

G.1.116 There have been only minor essential improvements to the townscape in Stainburn and Great Clifton but driver stress has been reduced along with the reduction in traffic by provision of lighting, signage and lay-bys contributing to a safer route overall and are shown in Figure G.18 and G.19.



Figure G.19 - Full cut off lighting and signage at the western roundabout

Summary

G.1.117 Based on the information available it is likely that the impacts of the bypass are as expected or better on public rights of way. Levels of physical fitness are therefore likely to have been maintained or possibly improved although there is no NMU survey information to quantify this.

G.1.118 For vehicle drivers, congestion has eased in general, lighting, lay-bys and clear signage has been provided and therefore driver stress is likely to have improved. Driver views are different but equally good. As expected the use of environmental barriers and earth mounding has limited some views out from the carriageway. Facilities are readily accessible within Stainburn and Great Clifton from the roundabouts at either end of the bypass. Overall journey ambience would be expected to have improved.

Summary

Noise

- Based on traffic flows which are less than predicted; although the bypass has introduced a source of noise into the countryside for adjacent properties the impact could be less than predicted, traffic flows have significantly reduced on the old A66 and the local noise climate is expected to have improved.

Air Quality

- Based on traffic flows, the local air quality on the old A66 will have improved as expected.

Greenhouse Gases

- Based on the DMRB calculation, the bypass has had a slightly beneficial impact on the carbon emissions.

Landscape

- The bypass is a major feature in the landscape but landscape mitigation measures have been implemented in line with the proposals in the ES. . Planting is generally well established. Features such as the new stone walls reflect local character. Ongoing establishment is necessary for long term objectives to be met.

Heritage of Historic Resources

- The impacts on Upper Park are considered to be very large adverse as expected. There has been an improvement in setting for the Conservation Area and Listed Buildings on the old A66 as expected. Further information would be required to evaluate archaeological impacts.

Biodiversity

- Based on the information available, the impacts are likely to be slight adverse as expected; mitigation measures are in place, eg use of a 'bat bridge' and this would appear to have encouraged bat flight across the bypass.

Water Environment;

- Based on the information available it is likely that the impacts are likely to be slight adverse as expected. However further study would be required to fully evaluate this sub-objective.

Physical fitness

- Public rights of way have been maintained across the bypass as expected and it is considered that impacts are neutral.

Journey Ambience

- The impacts are considered to be as expected.

Appendix H – Environmental Data Requested

Information Requested	Comments
Environmental Statement	ES including Non-Technical Summary dating back to early 1990's, 5 out of 8 Appendices provided
Any amendments	Not provided
As Built drawings	Not provided
Landscape and Ecology Management Plans, HEMP etc	Not provided
Contact names	Sourced by POPE team
Post opening surveys	Post Opening Environmental Audit Report (2004), no others provided
Archaeology Report	Not provided
NMU survey	Not provided
Information on environmental enhancements e.g. streetscape	Sourced by POPE team
Copy of the Health and Safety File	Not provided
Other	Appraisal Framework for the Published Route (1994), Stage 3 Ecological Assessment: Preliminary Bat Report (2000), Method Statement in respect of Bats (2000). Proof of Evidence - Landscape (1994)