

TRAFFIC IMPACT STUDY

# A66 Temple Sowerby Bypass & Improvement at Winderwath



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## Glossary

The following table details the acronyms and specialist terms used within the context of this report.

Term	Definition
<b>AADT</b>	<b>Annual Average Daily Traffic.</b> Average of 24 hour flows, seven days a week, for all days within the year.
<b>AAWT</b>	<b>Annual Average Weekday Traffic.</b> As AADT but for five days, (Monday to Friday) only.
<b>Accessibility</b>	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.
<b>ADT</b>	<b>Average Daily Traffic.</b> Average of 24 hour flows over the whole week.
<b>AM</b>	Denoting the morning peak period
<b>AST</b>	<b>Appraisal Summary Table.</b> 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
<b>ATC</b>	<b>Automatic Traffic Count,</b> a machine which measures traffic flow at a point in the road.
<b>AWT</b>	<b>Average Weekday Traffic.</b> Average of Monday to Friday 24 hour flows.
<b>COBA</b>	<b>Cost Benefit Analysis</b> – 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.
<b>CRF</b>	<b>Congestion Reference Flow</b> - AADT flow at which a road is likely to be congested in the peak periods of an average day.
<b>DfT</b>	<b>Department for Transport</b>
<b>DR</b>	<b>The Department’s Representative</b> is a consultant acting on behalf of the Highways Agency with regard to particular schemes.
<b>Discounting</b>	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.
<b>EST</b>	<b>Evaluation Summary Table.</b> In POPE studies, this is a summary of the evaluations of the TAG objectives using a similar format to the forecasts in the AST.
<b>HATRIS</b>	<b>Highways Agency Traffic Information System</b>
<b>HGV</b>	<b>Heavy Goods Vehicle.</b>
<b>Highways Agency</b>	An Executive Agency of the Department for Transport, responsible for operating, maintaining and improving the strategic road network in England.
<b>IP</b>	<b>Inter Peak</b> , the time between the AM and PM peaks
<b>KSI</b>	Killed or Seriously Injured
<b>Light vehicle</b>	Not a HGV. For traffic flow data, it is a vehicle less than 5.2m in length.
<b>Managing Agent</b>	A <b>Managing Agent</b> is responsible for the operation, maintenance, and improvement of the motorway and trunk road network of a Highways Agency area.
<b>MTC</b>	<b>Manual turning count.</b> A survey of the turning movements of vehicles at a junction undertaken by human observers, normally on a single day.
<b>NRTF</b>	<b>National Road Traffic Forecast.</b> 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 NRTF97 and the one previous was NRTF89.
<b>OGV1, OGV2</b>	<b>Other Goods Vehicle.</b> OGV1 = Goods Vehicles with 2 or 3 axles, OGV2= Goods Vehicles with 4 or more axles
<b>OPR</b>	<b>Order Publication Report</b>
<b>PAR</b>	<b>Project Appraisal Report</b> These are undertaken for Highways Agency improvement schemes which are not TPIs
<b>PIA</b>	<b>Personal Injury Accident.</b> A road traffic accident in which at least one person required medical treatment.
<b>PIA/mvkm</b>	PIA/mvkm is the number of <b>PIAs per million vehicle kilometres</b> where 'vehicle kilometres' are the number of vehicles using a section of the road multiplied by the length of the road.
<b>PM</b>	evening peak period
<b>POPE</b>	<b>Post Opening Project Evaluation</b> , before & after monitoring of all

	major highway schemes in England.
<b>Route Stress</b>	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.
<b>Screenline</b>	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).
<b>Seasonality</b>	Seasonality is the variation in traffic behaviour across the year due to varying daylight levels, weather conditions, school holidays, etc.
<b>Severance</b>	Community severance is the separation of adjacent areas by road or heavy traffic, causing negative impact on non-motorised users, particularly pedestrians.
<b>STATS19</b>	A database of injury accident statistics recorded by police officers attending accidents
<b>TIS</b>	<b>Traffic Impact Study</b>
<b>TAG</b>	Transport Analysis Guidance, as defined in WebTAG.
<b>TEMPRO</b>	<b>Trip End Model Presentation PROGRAM</b> , DfT software which provides forecast data on trips for transport planning purposes.
<b>TPI</b>	<b>Targeted Programme of Improvements.</b> 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.
<b>Vehicle hours</b>	<b>Vehicle hours</b> 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.
<b>VOT</b>	Value Of Time
<b>vpd</b>	<b>Vehicles Per Day</b>
<b>webTAG</b>	Department for Transport's website for guidance on the conduct of transport studies at <a href="http://www.webtag.org.uk/">http://www.webtag.org.uk/</a>

## Executive Summary

This report is the Traffic Impact Study (TIS) for the A66 Temple Sowerby Bypass and improvements at Winderwath scheme, which opened in October 2007. It is formed of a 4.9km dual carriageway running between a new junction with Cliburn road at one end and a new junction with Morland Road at the other. This report highlights the predicted and actual initial effects of the scheme's opening.

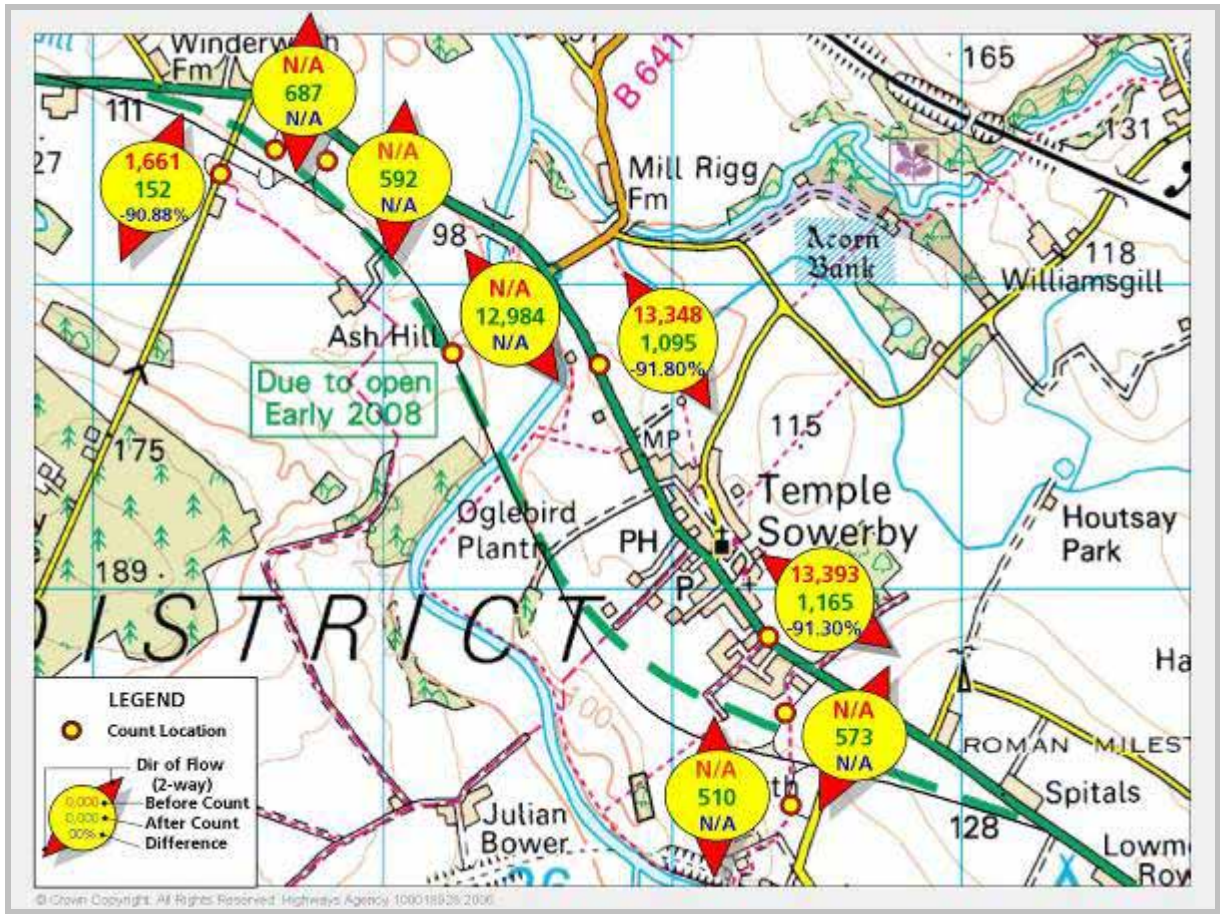
The A66 is a major Trans-Pennine route running between the west coast of Cumbria and the North East. It connects the M6 with the A1 and the A1(M). Before the bypass was opened, over 13,000 vehicles per day travelled through Temple Sowerby. This resulted in a poor accident record with 32 accidents occurring between 1995 and 2000 and also high levels of noise and pollution.

The aim of the bypass was to reduce traffic and HGVs in the village by around 95% and 97% respectively. It also aimed to improve safety on the A66 while minimizing the environmental effect on the SSSI site of the River Eden. The bypass was expected to have a positive impact upon the village's environment (local air quality and traffic noise) and reduce community severance. The bypass will remove the problems caused by the high number of access points and uncontrolled junctions which prevent the A66 running efficiently and hence improve reliability of the route for through traffic.

### The key initial impacts have been:

- ◆ **Journey Times** – Journey times have improved considerably for traffic using the bypass that would have previously used the A66 through Temple Sowerby. In some cases journey times have halved. There has been a greater improvement for westbound traffic than for eastbound traffic. The same can be said for journey speeds.
- ◆ **Access** – Access to all amenities within the village have improved as well as access around the village too. One notable exception however, has been access to the Holiday Village, with the site visit noting several drivers who appeared to be lost, whilst trying to access the Holiday Village. This issue is likely to be resolved following the completion of the western end of the bypass in early 2008. This will be considered further in the One-Year-After report.
- ◆ **Congestion** – As shown in Figure 0.1, the bypass has resulted in up to a 92% decrease in traffic through Temple Sowerby.

Figure 0.1 – Traffic Flow Change Summary (VPD)



# 1. Introduction

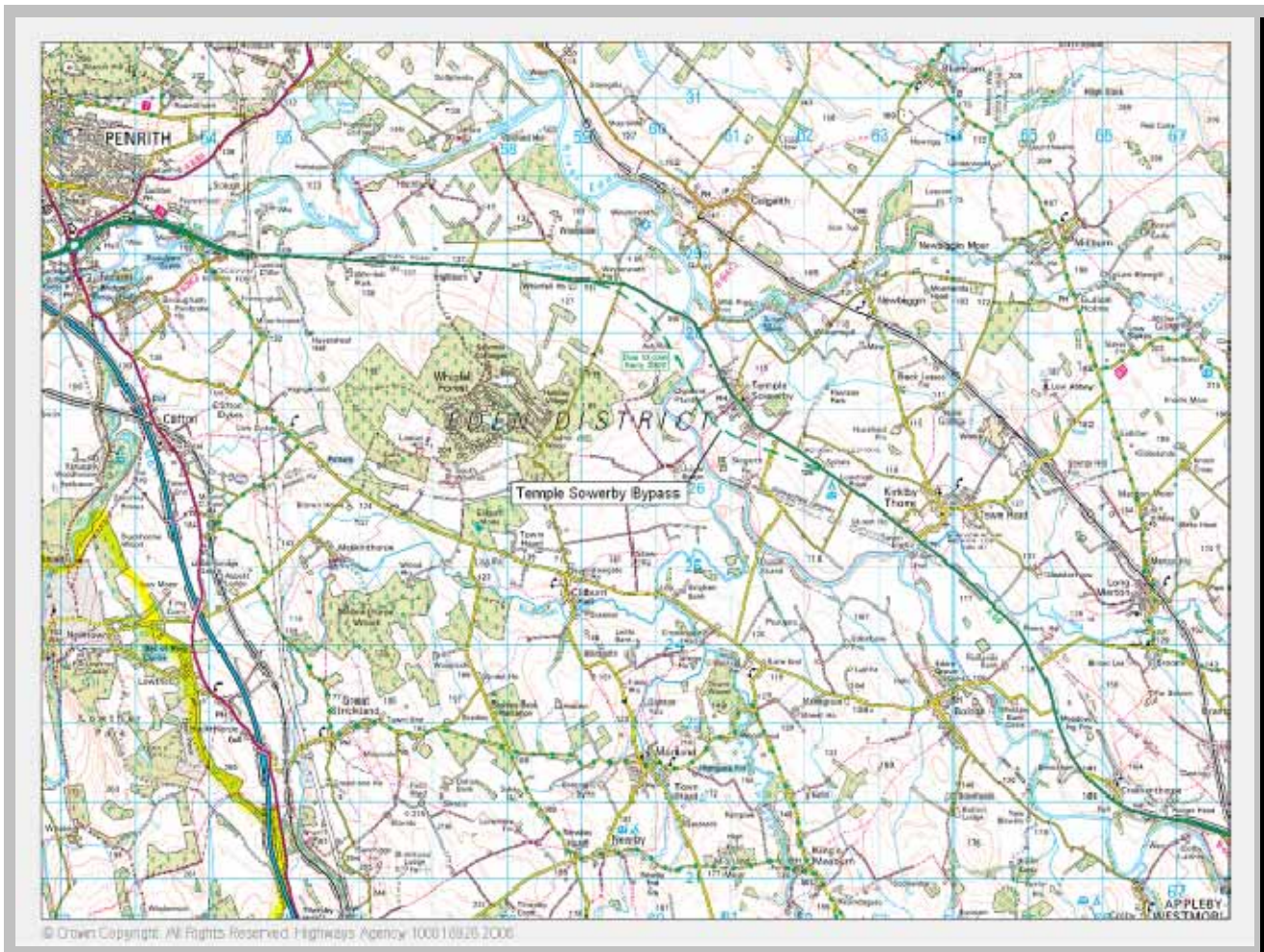
## BACKGROUND

- 1.1 Temple Sowerby is a village lying on the busy A66. A bypass was originally planned in 1974 but subsequently cancelled 9 years later.
- 1.2 An action group was formed in 1983, resulting in a protest the following year. A compromise was reached by providing a cheaper short term solution using islands, chevrons and smaller traffic management.
- 1.3 In 2001, 8 accident black-spots were identified on the A66 between Penrith and Scotch Corner. Three of these lie in the vicinity of Temple Sowerby itself. Many parents were reportedly reluctant to allow their children to travel alone or to cross the road.
- 1.4 The bypass was approved in early 2003 with an earliest start date of spring 2004. However, funding problems meant the scheme was eventually completed in October 2007.
- 1.5 This report outlines the results of traffic surveys and other work carried out to monitor the effects of the opening of the bypass. As shown in Figure 1.1, the bypass is a 3 mile (4.9 km) dual carriageway which runs south of the village of Temple Sowerby.
- 1.6 The A66 is a major link in Cumbria starting at Workington on the west coast and running through the Lake District national park towards the east coast near Darlington, linking the M6 and A1/ A1(M). Prior to the construction of the bypass the A66 ran through the village of Temple Sowerby with resultant negative traffic and environmental impacts on the local population.
- 1.7 There was a significant amount of traffic passing through Temple Sowerby village including a high proportion of HGVs<sup>1</sup>. This congestion caused problems such as poor local air quality, traffic noise, accidents, other safety problems and delayed journeys which in turn caused stress for both villagers and travellers.
- 1.8 'Before' and 'After' data was collected for the scheme in order to prepare a Traffic Impact Study (TIS) on the effects of the scheme opening. In addition, data from the Highways Agency has been used to evaluate the effects of the opening of the scheme on the traffic routing patterns in the area.
- 1.9 In addition to this, consideration has also been given to the initial concerns raised by residents and others over the construction of the bypass and the effects it may have on the village and surrounding areas.

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<sup>1</sup> (For the purpose of this report HGVs are divided into OGV1 and OGV2s. For details see Annex B).

Figure 1.1 – Location of Temple Sowerby Bypass



### OBJECTIVES OF THE SCHEME

1.10 The main objectives of the scheme:

#### Environmental

- ◆ Improve the amenity of the village by reducing noise and improving air quality by removing through traffic;
- ◆ Take full account of the sensitive location within the river Eden valley in determining mitigation measures.

#### Accessibility

- ◆ Reduce severance within the village of Temple Sowerby;
- ◆ Facilitate increased access to public transport;
- ◆ Provide facilities for non-motorised users on recreational routes within the river Eden valley.

**Safety**

- ◆ Improve safety for all road users on the section of A66 to be bypassed by providing through traffic with a high standard dual carriageway bypass.

**Economy**

- ◆ Improve journey time reliability for trunk road traffic;
- ◆ Reduce congestion caused by incidents.

**Integration**

- ◆ Support the strategic role of the A66 in regional transport policies;
- ◆ Promote the use of alternative modes of transport especially walking and cycling within the village.

## 2. Issues Raised By Local Residents and Other Interested Parties

- 2.1 The issues which have been raised by local residents in support of the bypass are summarised below:
- ◆ **A website set up by an action group consisting of residents from Temple Sowerby (using Cumbria Constabulary data) that there were 54 accidents including 7 fatalities in the 10 year period before the bypass was constructed.**
- 2.2 In addition to the above concerns other issues have been raised in the press and on other organisations websites which include:
- ◆ Noise pollution for residents living in the village as a result of the old A66;
  - ◆ The need to reduce traffic congestion as a whole throughout the village on both the old A66 and on roads trying to access the A66;
  - ◆ The removal or reduction of Heavy Goods Vehicles through the village
  - ◆ It is however, feared that the opening of the bypass will attract a greater number of HGVs to the area.
- 2.3 This report addresses the concerns raised in this chapter where relevant data is available. These will also be considered in more detail in the one year after report.

### Key Points from Section 2:

- ◆ **Overall support for the building of the bypass by the residents.**
- ◆ **Initial concern that the opening of the bypass will encourage more HGV's and traffic in general to the area.**

## 3. Data Collection and Traffic Impact

### DATA COLLECTION

- 3.1 Counts were undertaken at four sites before any work had taken place on the bypass in March 2006. After the scheme had been opened counts were undertaken on the same four sites together with four additional counts on the newly constructed roads during the end of October and beginning of November 2007. The count sites consist of three Highways Agency permanent sites and eight automatic traffic count (ATC) sites commissioned by Atkins. Furthermore two pre scheme turning counts and one post scheme turning count was also commissioned by Atkins; these took place in March 2006 and October 2007 respectively and ran from 7am to 7pm. The details of these sites are given below:
- 3.2 Highways Agency Permanent Sites:
- ◆ 3116/7: A66 East of Penrith (3116 E/B & 3117 W/B);
  - ◆ 30014442/3: A66 East of Appleby (30014442 E/B & 30014443 W/B);
  - ◆ 30014446/7: A66 East of Temple Sowerby (30014446 E/B & 30014447 W/B);
  - ◆ 1980/1: A66 Bypassing Temple Sowerby – Running from October 2007 onwards (1980 E/B & 1981 W/B).
- 3.3 Pre-scheme counts commissioned by Atkins:
- ◆ ATC 1: A685, south of A66, Brough (shown on small-scale map only);
  - ◆ ATC 2: A66, east of Chapel St, Temple Sowerby (shown on large-scale map only);
  - ◆ ATC 3: A66, east of B6412, Temple Sowerby (shown on large-scale map only);
  - ◆ ATC 4: Road to Cliburn & Center Parcs, south of A66 (shown on large-scale map only).
- 3.4 Post-scheme counts commissioned by Atkins:
- ◆ ATC 1: A685, south of A66, Brough (shown on small-scale map);
  - ◆ ATC 2: Link between bypass NW-bound carriageway and Morland Rd;
  - ◆ ATC 3: Link between bypass SE-bound carriageway and old A66, SE of Temple Sowerby;
  - ◆ ATC 4: Old A66, SE of Chapel St;
  - ◆ ATC 5: Old A66, SE of B6412;
  - ◆ ATC 6: Link between bypass SE-bound carriageway and old A66, NW of Temple Sowerby;
  - ◆ ATC 7: Link between bypass NW-bound carriageway and old A66, NW of Temple Sowerby;
  - ◆ ATC 8: Cliburn Lane.

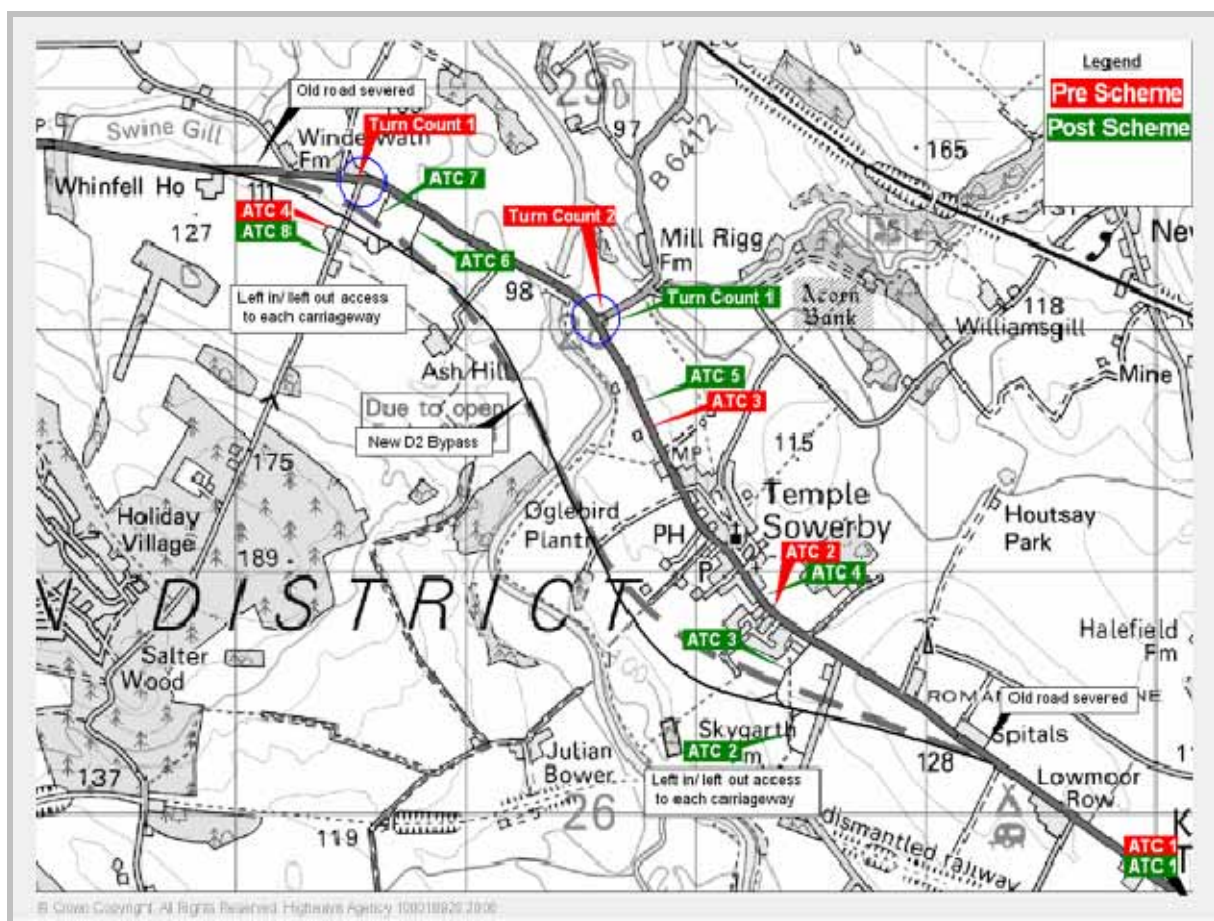
- 3.5 Pre-scheme manual classified turning counts commissioned by Atkins;
- ◆ Site 1: A66/ Lane to Cliburn (Center Parcs Access), Temple Sowerby;
  - ◆ Site 2: A66/ B6412, Temple Sowerby.
- 3.6 Post-scheme manual classified turning counts commissioned by Atkins;
- ◆ Site 1: A66/ B6412, Temple Sowerby.

The locations of these count sites are shown in Figure 3.1 and 3.2

### TRAFFIC IMPACT

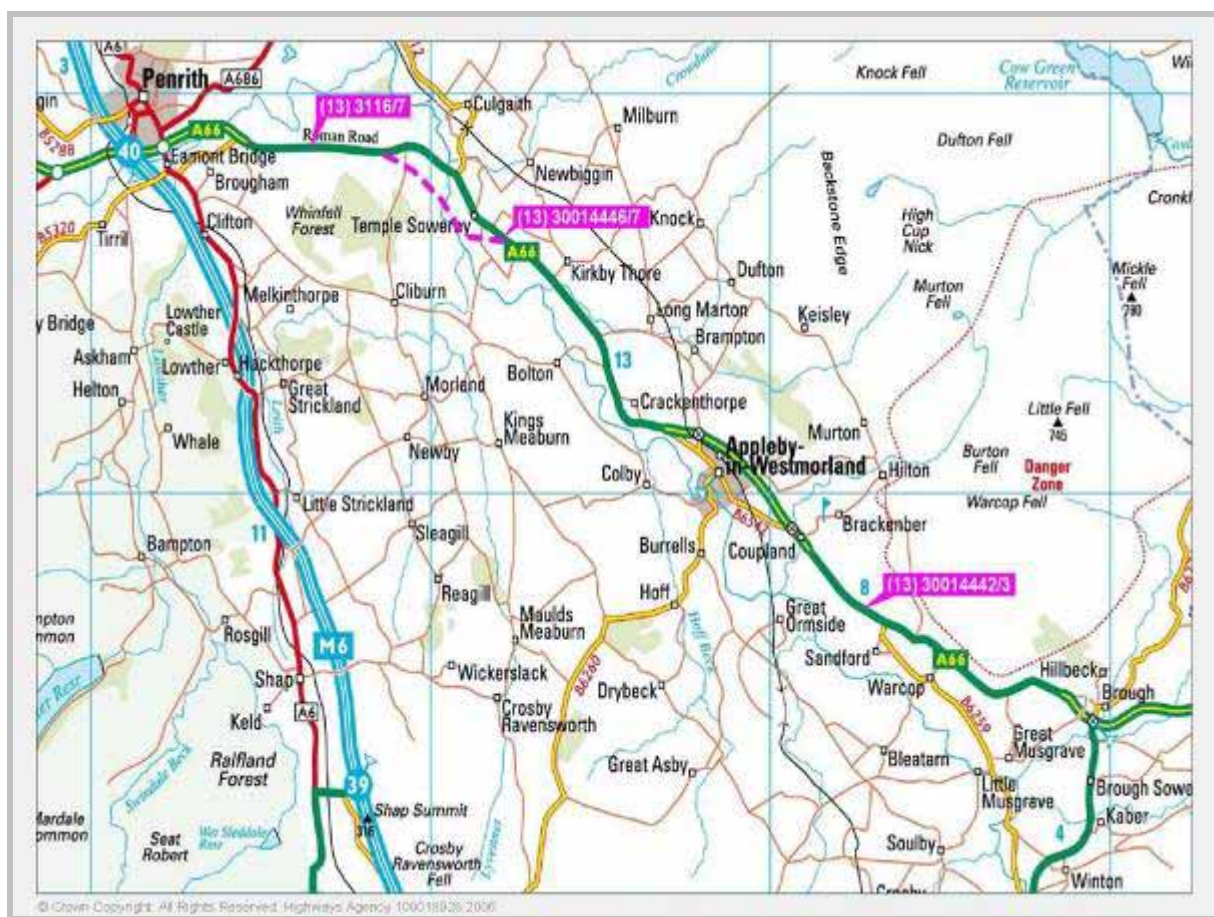
- 3.7 The impact of the bypass in relation to changes in traffic volume, directional flow and journey time and speed has been assessed. Using ‘before’ and ‘after’ opening data, a comparative analysis was possible, with any changes resulting from the bypass identified and any subsequent impacts reported.

Figure 3.1 – Traffic Count (ATC) Sites & Turning counts for Temple Sowerby



- 3.8 Highways Agency Automatic Traffic Counters (ATCs) were in place along the A66 before the bypass was opened. The locations of these ATC sites are shown in Figure 3.2.
- 3.9 A further Highways Agency Automatic Traffic Counter was added in October 2007 along the new bypass although the precise location is unclear as yet.

**Figure 3.2 - Highways Agency Permanent Site Locations**



**Site Visit**

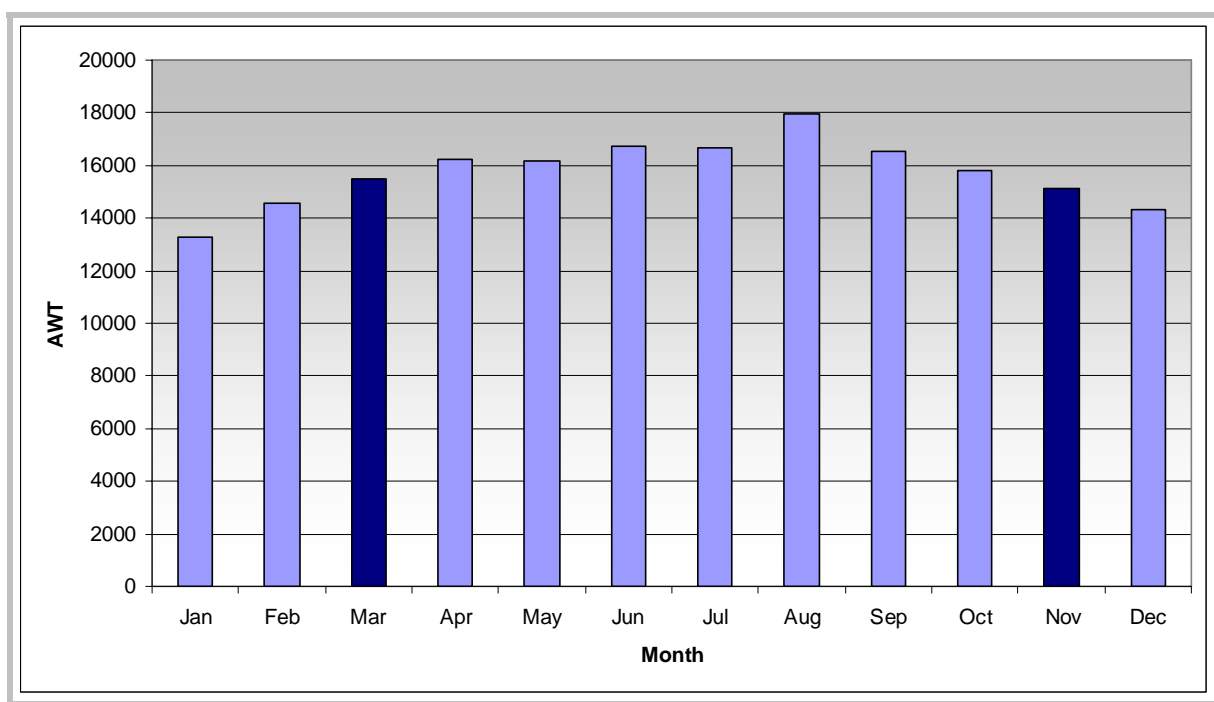
- 3.10 A site visit was undertaken on 10th December 2007 in order to assess the changes which have taken place since the bypass was completed and to clarify the traffic surveys that are outlined above. The site visit incorporated a general visual survey in order to observe issues relating to the bypass and in particular to determine:
- ◆ The road layout around the Winderwath area since it is not obvious on the map;
  - ◆ Obtain photographs of the new bypass;
  - ◆ An understanding as to what is currently happening in the local area including,
    - ◆ Remaining road works in the area,
    - ◆ How motorists and pedestrians appear to be coping with the new bypass,
    - ◆ How accessible the village is now.

## SUMMARY OF RESULTS

### Traffic Volume Variation

3.11 Count site 3116/7 located on the A66 East of Penrith was used to examine the seasonal variation in local traffic movement. This site was used as it is near to Temple Sowerby but should not be influenced by the new bypass. Figure 3.3 shows the seasonal variation of average weekday traffic (AWT) flow at count site 3116/7. In particular it shows the average monthly AWT from January 2004 – December 2005. Pre scheme counts took place in March and post scheme counts took place in November (as highlighted in Figure 3.3).

Figure 3.3 – Seasonal Volume Variation

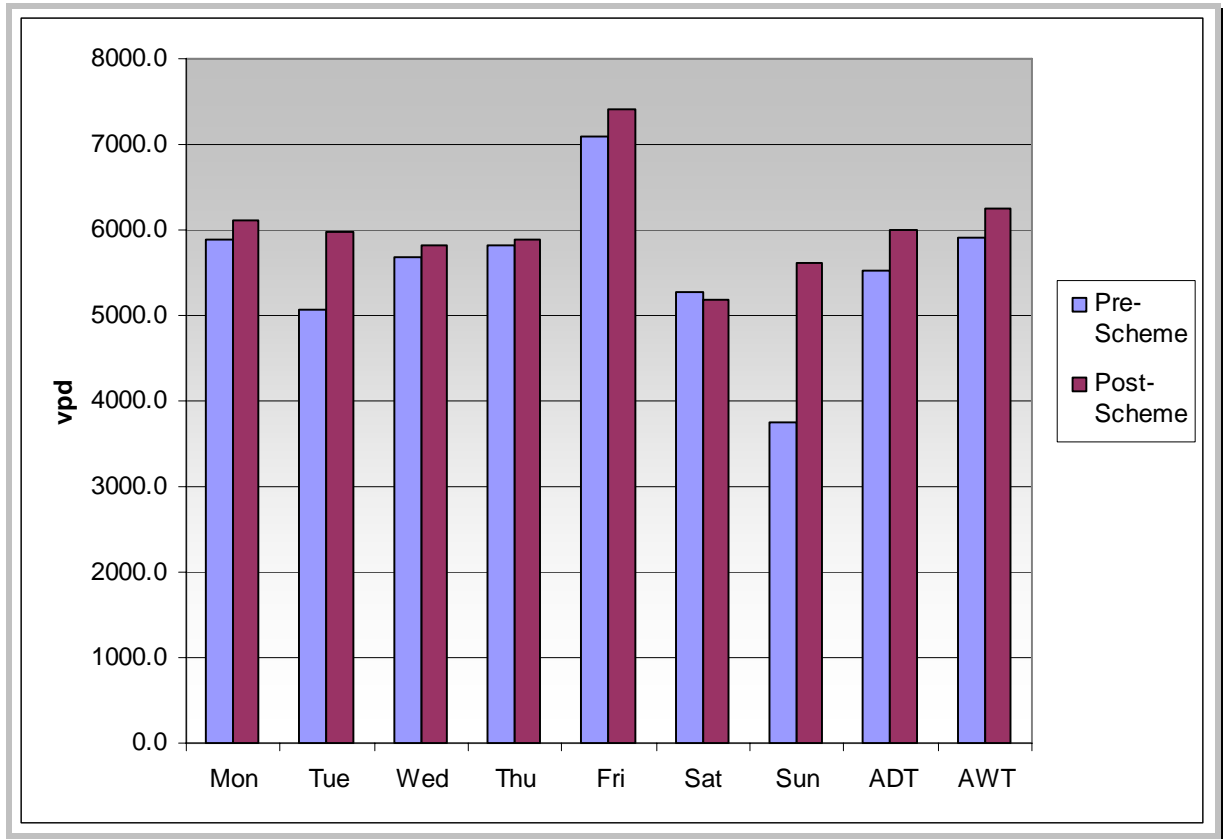


3.12 Figure 3.3 shows that in any given year there is normally around 2.5% more traffic in March than in November. Therefore it is likely that the number of vehicles will be different by around 2.5%, solely due to seasonality rather than influence by the new bypass.

3.13 Using ATC 1 site data which is located on the A685, south of the A66 at Brough we can estimate the traffic growth between the 'Before' (2006) and 'After' (2007) studies. 5,512vpd was recorded in March 2006 and 5,694vpd in November 2007. This equates to an increase of 3.3%. Since 2.5% of this can be directly attributed to seasonal differences we can assume that the general traffic growth in the area between March 2006 and November 2007 is approximately 0.8%.

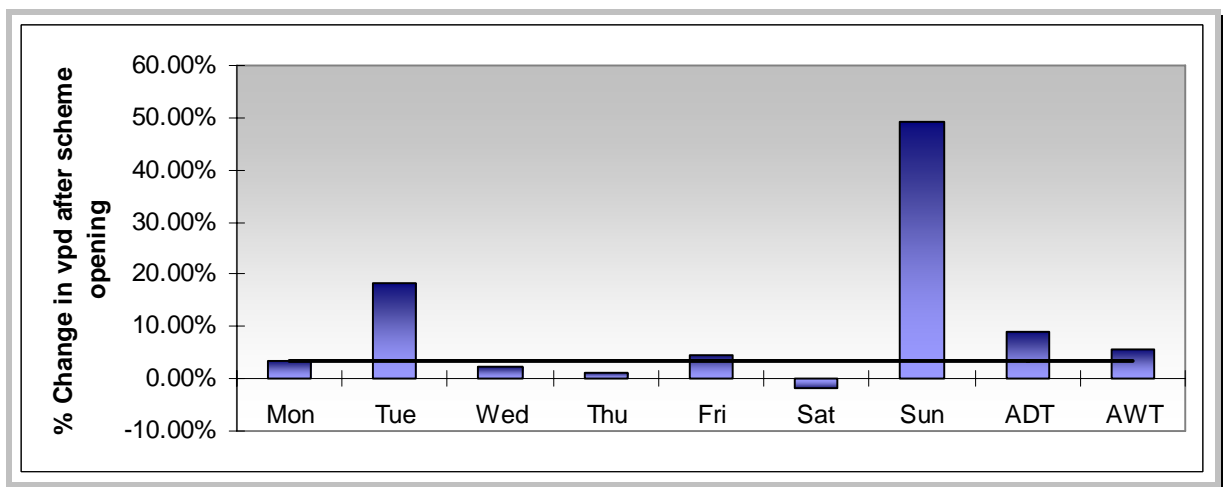
3.14 Since ATC 1 is located sufficiently far away from the bypass it is to be expected that traffic in the area should have increased by around 3.3% simply because of natural growth and seasonality and not as a direct result of the bypass itself.

Figure 3.4 – Daily Volume Variation



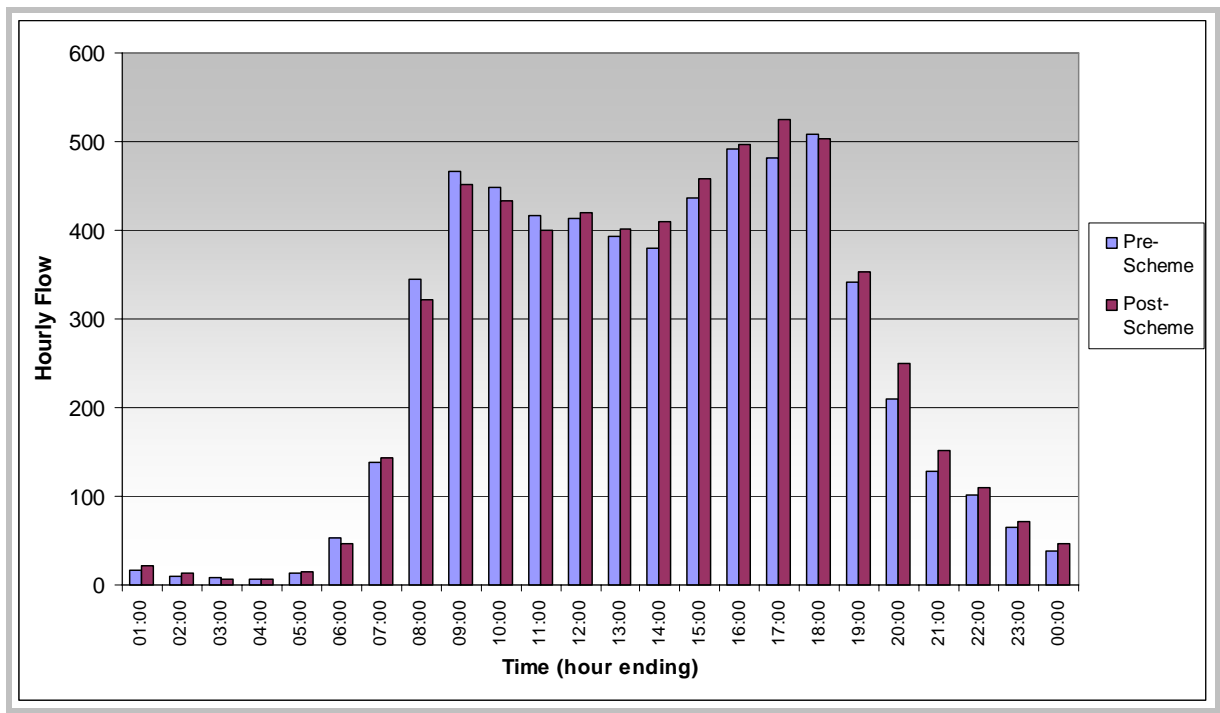
3.15 Figure 3.4 shows the daily variation through ATC1 in March 2006 (Pre-scheme) and October/November 2007 (Post-scheme). This demonstrates the volume of weekday traffic is fairly consistent with the exception of Fridays where there is an increase in VPD. As would be expected there is a small reduction in traffic volume on Saturday and Sunday (Pre-scheme). However there is an unexpectedly high amount of traffic on Sunday (Post-scheme).

Figure 3.5 – Daily Volume Variation – Change after bypass



- 3.16 Figure 3.5 shows most days have an increase in traffic volume of around 3.3% (As shown by the line on the graph). This increase can therefore be attributed to seasonal variation and natural growth and has not therefore occurred due to the bypass. However there was a much larger increase on Tuesdays and especially Sundays. It is likely these large increases are due to some external factor or local event.
- 3.17 This suggests the bypass has had little or no bearing on the volume of traffic in the local area as it would be represented by a more uniform increase throughout the week.

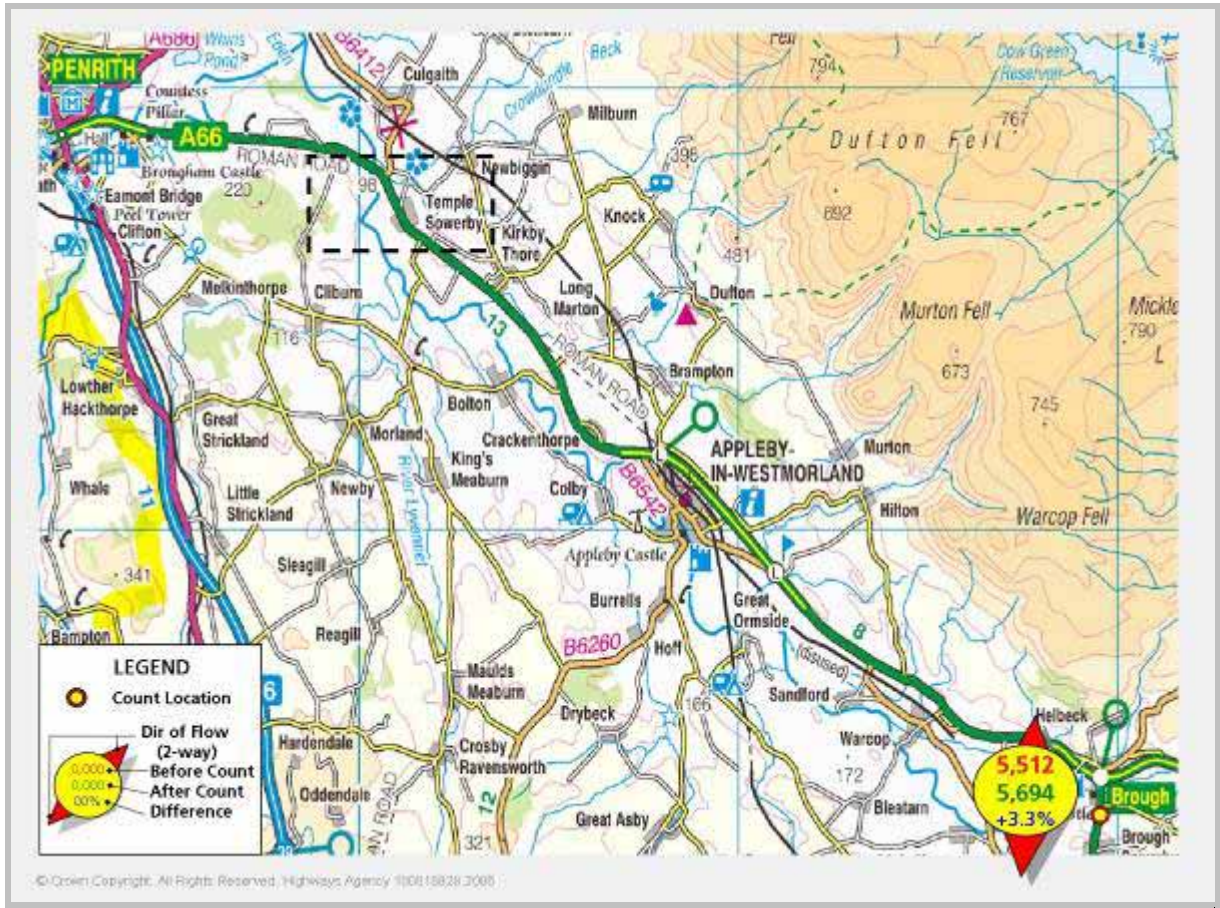
**Figure 3.6 – Hourly Volume Variation**



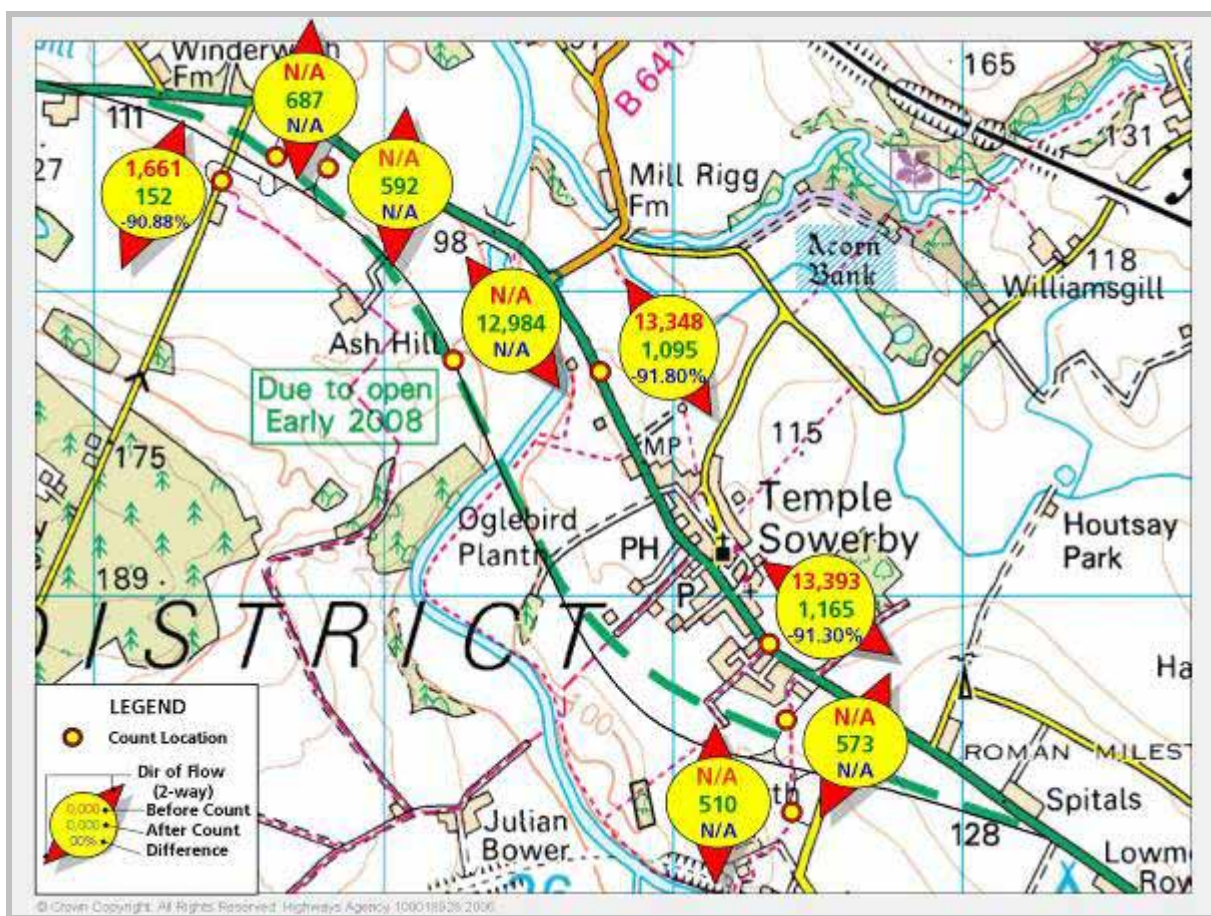
- 3.18 Figure 3.6 shows the average daily variation at ATC1 over an AWT 24 hour period in March 2006 (Pre-scheme) and October/November 2007 (Post-scheme). There are defined peak hours in the morning (9am) and evening (5pm) with a slight lull during the inter-peak.

### AUTOMATIC TRAFFIC COUNTS

Figure 3.7 – Traffic Flows Before and After the Bypass (Average VPD over 7 Days)



**Figure 3.8 – Traffic Flows Before and After the Bypass (Average VPD over 7 Days) in Temple Sowerby region**

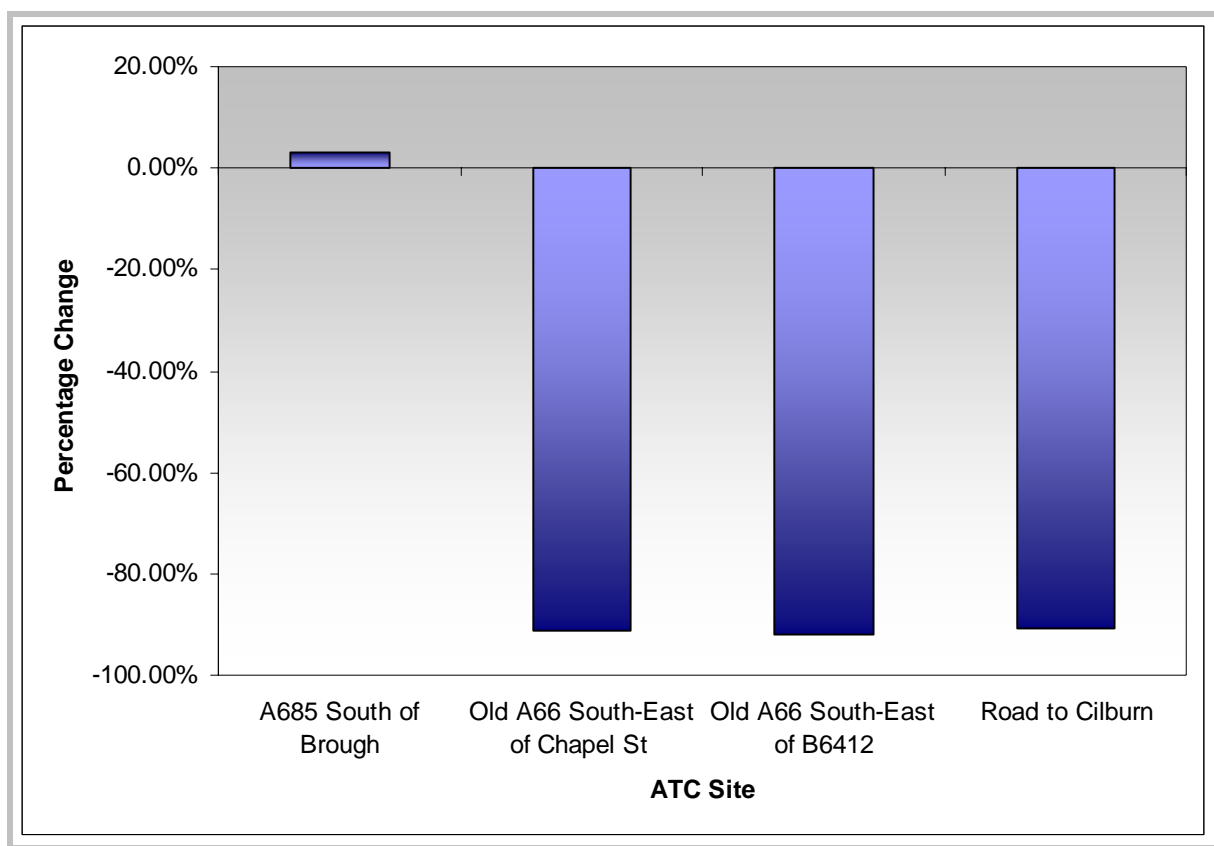


3.19 Figures 3.7 and 3.8 summarise the Automatic Traffic Count (ATC) data collected into a 7 day average traffic flow in and around Temple Sowerby. The diagram allows for a comparison of traffic volume before and after the opening of the bypass. From this we can make the following key observations:

- ◆ Using a new HA permanent site we see that around 13,000vpd are using the new bypass. This is only based on a small amount of data (October 2007 to January 2008), a more accurate figure will be determined in the one year after report due in early 2009;
- ◆ By looking at the two ATCs on the old road through Temple Sowerby it can be seen that traffic volumes on this road have fallen from around 13,400vpd to 1,100vpd since opening, a fall of 92%, very close to the pre scheme 95% target;
- ◆ The road towards Cliburn has seen a 91% decrease in VPD from 1,661 to 152vpd. From the map it is unclear why. After the site visit it became apparent that the road where these ATCs are located is no longer being used to access the holiday village and now its only purpose is to access the village of Cliburn. It was also noticeable that several drivers seem to be lost, perhaps looking for access to the holiday village.

- ◆ Other post scheme counts along new slip roads, shown in Figure 3.8 show these roads are each carrying around 500-700vpd. It is likely these vehicles are trying to access Temple Sowerby.

**Figure 3.9 – Change in Total Vehicle Flow Before and After Bypass (over 2 week period)**

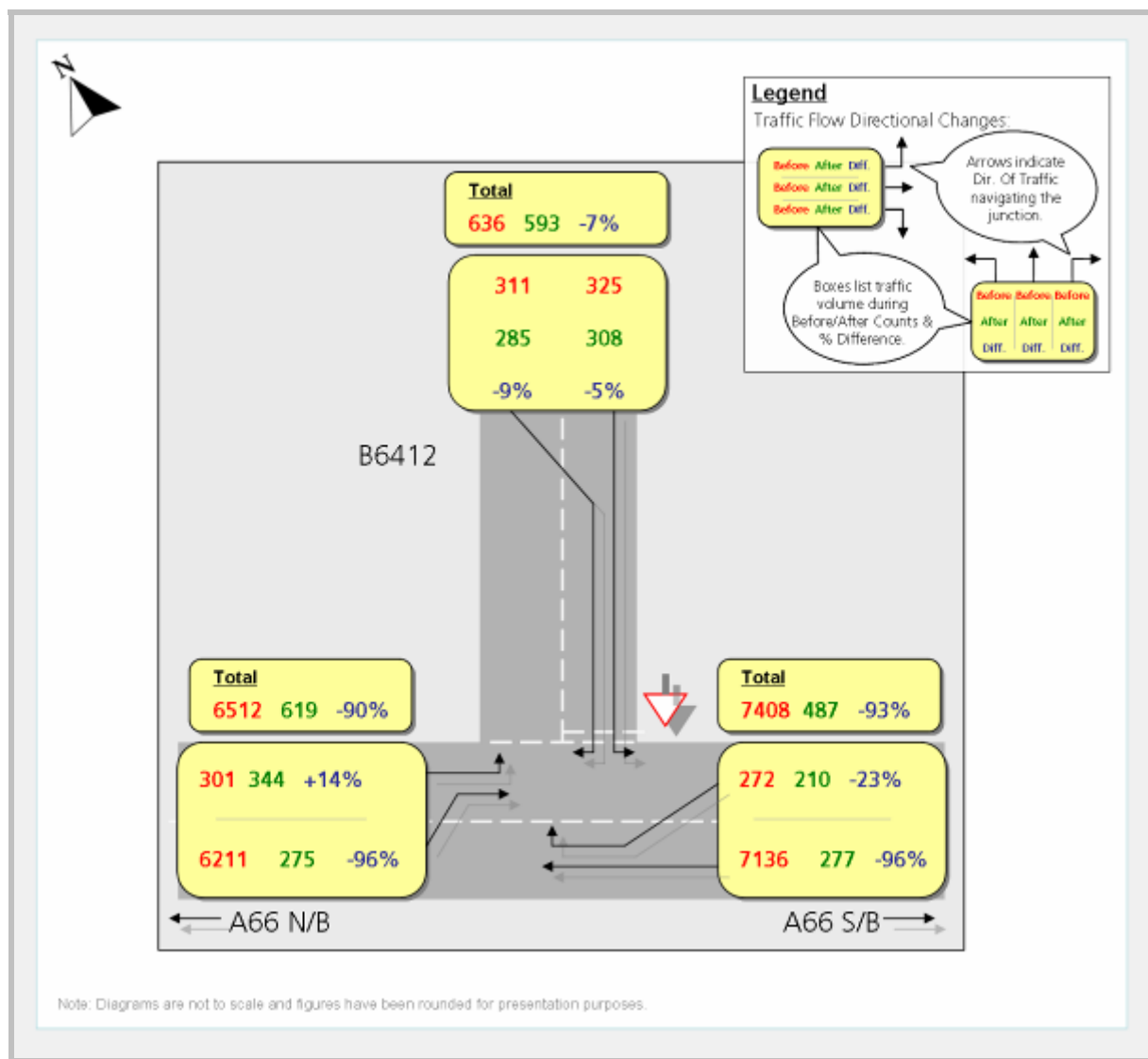


3.20 In summary, we can see from Figure 3.9 that the bypass has shifted the majority of traffic from Temple Sowerby to the bypass, whilst general traffic levels in the local area have remained relatively unchanged as demonstrated by the count on the A685 south of Brough.

### Turning Counts

3.21 Turning counts were undertaken in March 2006 at the A66/ Road to Cilburn and A66/ B6412 junctions. The A66/ B6412 junction turning count was repeated in October 2007 to understand changes in both traffic volumes and turning movements along the A66 as shown in Figure 3.10. They are 12 hour counts recorded on one day and therefore should not be regarded as statistically significant changes.

Figure 3.10 – Turning Count at B6412/Old A66



3.22 Figure 3.10 represents the junction between the old A66 and the B6412, just north of Temple Sowerby.

- ◆ 14,556 vehicles used this junction in a 12 hour period before the opening of the bypass. After the bypass opened 1,699 vehicles used the junction in a 12 hour period. Equating to a reduction of 88%;
- ◆ There has been a decrease of 96% of traffic travelling along the A66 in both directions. This is highly likely to be a direct result of the bypass;
- ◆ However traffic using the B6412 has remained fairly steady with only around a 7% decrease;
- ◆ 43% of traffic approaching this junction from the A66 N/B now turns to use the B6412 compared to 4% before the bypass. 56% of traffic approaching this junction from the A66 S/B now turns to use the B6412 compared to 5% before

the bypass. This may suggest the junction is now being used more for access rather than as a through road, again probably as a direct result of the bypass.

3.23 Analysis of the A66/ Lane to Cliburn junction turning count will be left until the one year after report as no post scheme turning count has been commissioned at this site yet.

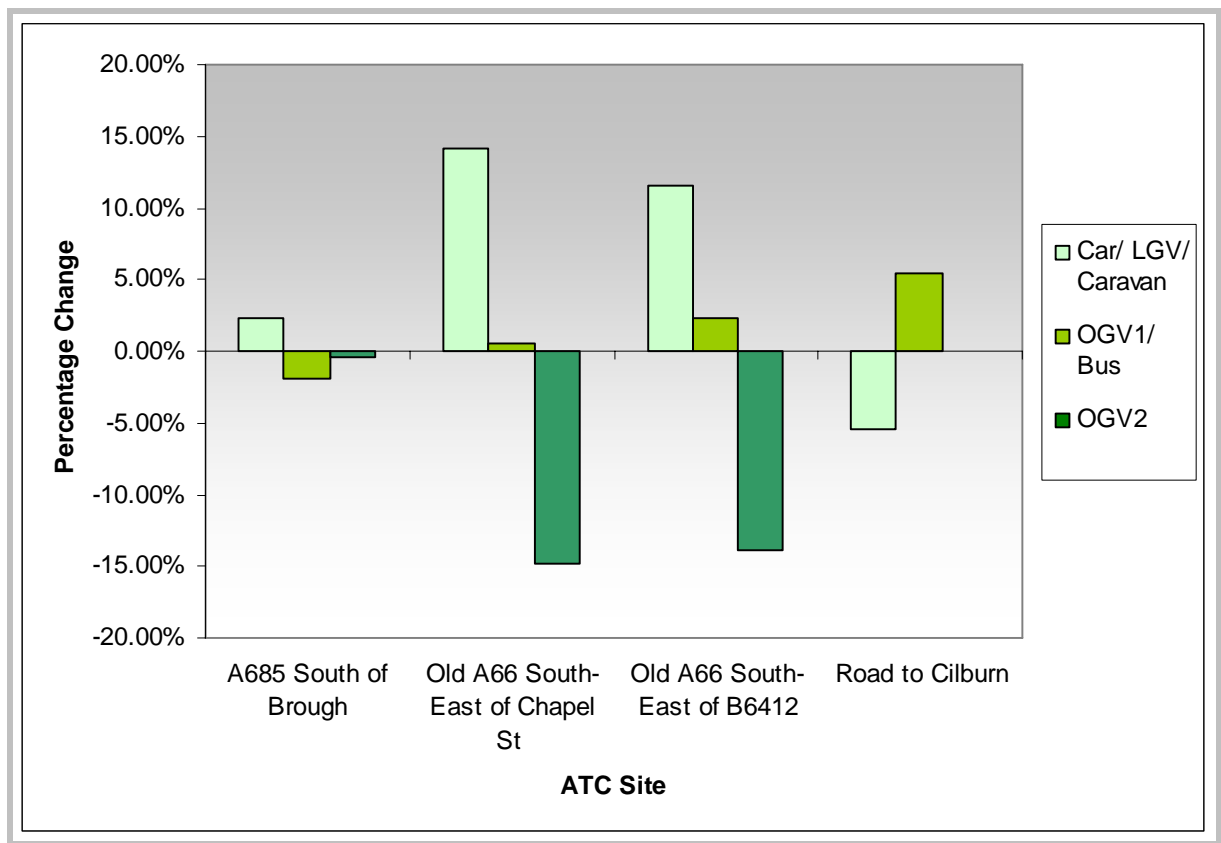
**Classified Counts**

3.24 For the purpose of this scheme vehicles were classified into the following 3 categories:

- ◆ Car/ LGV/ Caravan
- ◆ OGV 1/ Bus
- ◆ OGV 2

For details into what each category includes please refer to Annex B at the end of this report.

**Figure 3.11 – Change in Vehicle classification before and after bypass (over 2 week period)**



3.25 Figure 3.11 shows the change in proportion of each class after the bypass was built. The key observations are:

- ◆ The A685 South of Brough has remained virtually the same as expected as this site should not of been directly affected by the bypass;
- ◆ The old A66 SE of Chapel St and the old A66 SE of B6412 are both located in Temple Sowerby. They both show a similar trend of around a 15% increase in the proportion of Car/ LGV/ Caravans and a 15% decrease in proportion of OGV2s. This gives further evidence that the old road is no longer being used as much as a through road by lorries;
- ◆ The road to Cilburn shows a 5% decrease in proportion of Car/ LGV/ Caravans and a 5 % increase in proportion of OGV 1/ Buses. This may be because cars now use an alternative route to Cliburn but bus routes have remained the same.

Figure 3.12 – Before & After OGV1/Bus Flow at B6412/Old A66

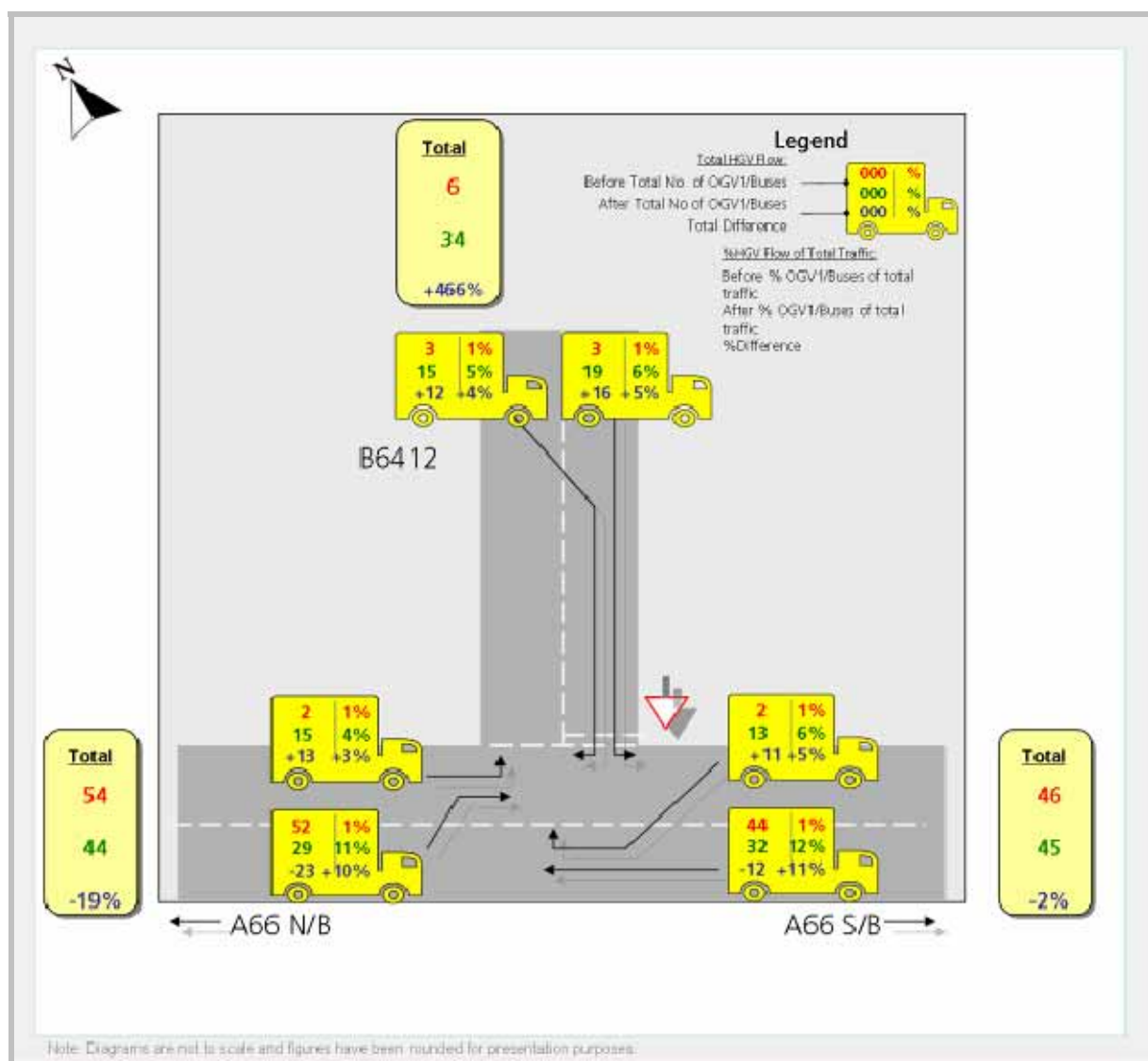
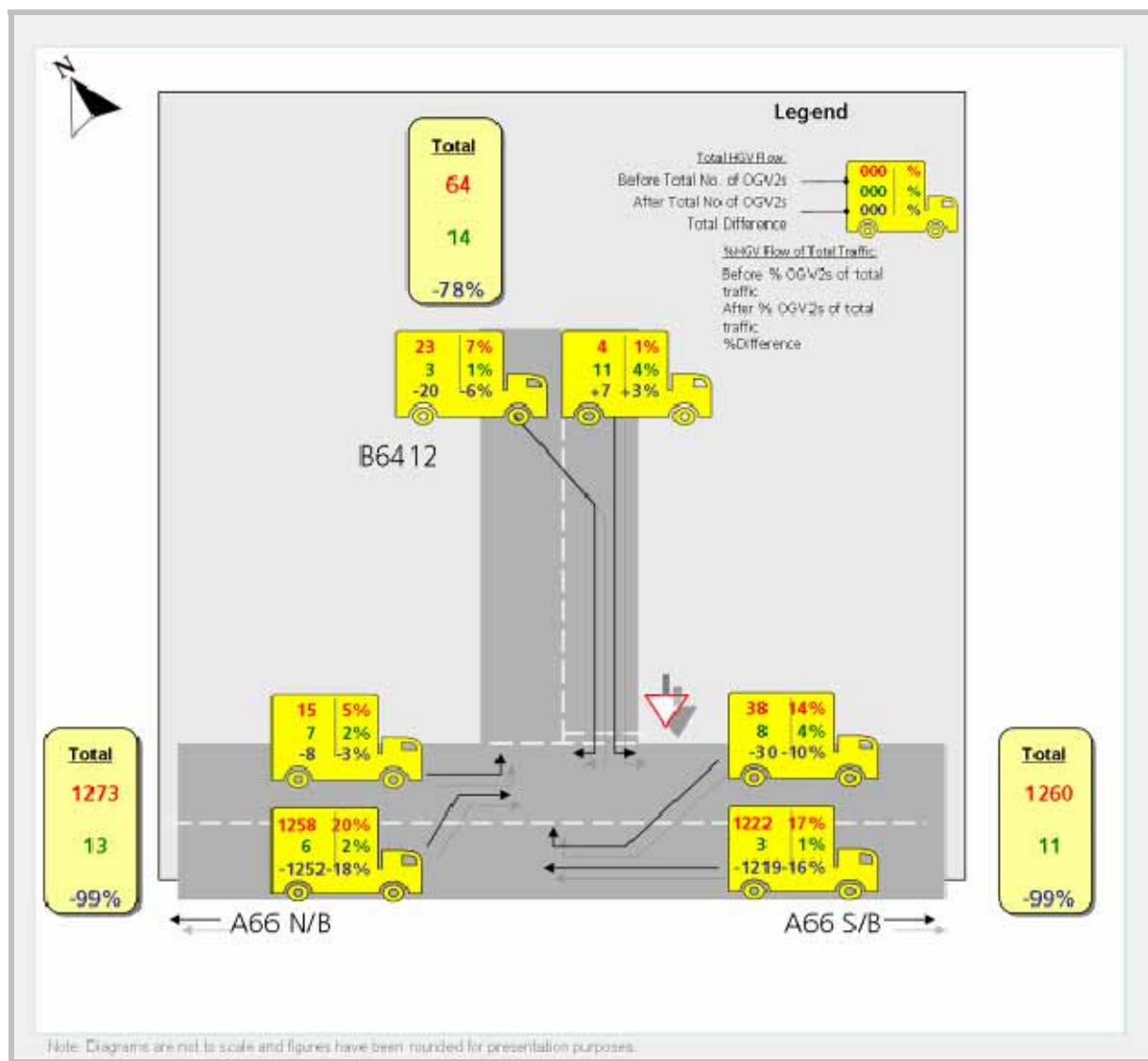


Figure 3.13 – Before & After OGV2 Flow at B6412/Old A66



3.26 Figures 3.12 and 3.13 show the changes in both traffic volumes and turning movements at the B6412 and old A66 junction for OGV 1/ Buses and OGV2's respectively. The key observations are:

- ◆ 106 OGV 1/ Buses used this junction in a 12 hour period before the opening of the bypass. After the bypass 123 OGV 1/ Buses used the junction in a 12 hour period. This is a increase of 16%;
- ◆ The number of OGV 1/ Buses turning off the A66 has increased by 3-5%.
- ◆ The number of OGV 1/ Buses using the B6412 has increased almost 6 fold but this was from a low base.
- ◆ 2,597 OGV2s used this junction in a 12 hour period before the opening of the bypass. Whereas after the bypass 38 OGV 2's used the junction in a 12 hour period. This is a reduction of 99%;

- ◆ The number of OGV2s turning off the A66 has decreased by 3% from the north and 10% from the south.
- ◆ The number of OGV2s using the B6412 has decreased by 78%
- ◆ The total number of OGV2s using the A66 has reduced by 99%.

3.27 Collectively the number of HGVs using this junction in a 12 hour period has decreased by around 94%, close to the prediction of 97%. In summary the counts show that the Temple Sowerby bypass has successfully rerouted a large number of HGVs from Temple Sowerby.

### Journey Times

3.28 Journey time runs were undertaken before and after the scheme's opening to establish any economic (dis)benefits. As shown in Figure 3.14 and Figure 3.15, three routes were tested, these were:

- ◆ Route 1- Pre scheme (Green) - A66 between junction with B6542, Appleby and roundabout with A6 south of Penrith via Temple Sowerby;
- ◆ Route 2 – Post scheme (Red) - A66 between junction with B6542, Appleby and roundabout with A6 south of Penrith via new bypass;
- ◆ Route 3 - Post scheme (Yellow) - Old A66 between NW end of bypass and SE end of bypass through Temple Sowerby.

Figure 3.14 – Journey Time Routes (JTRs)

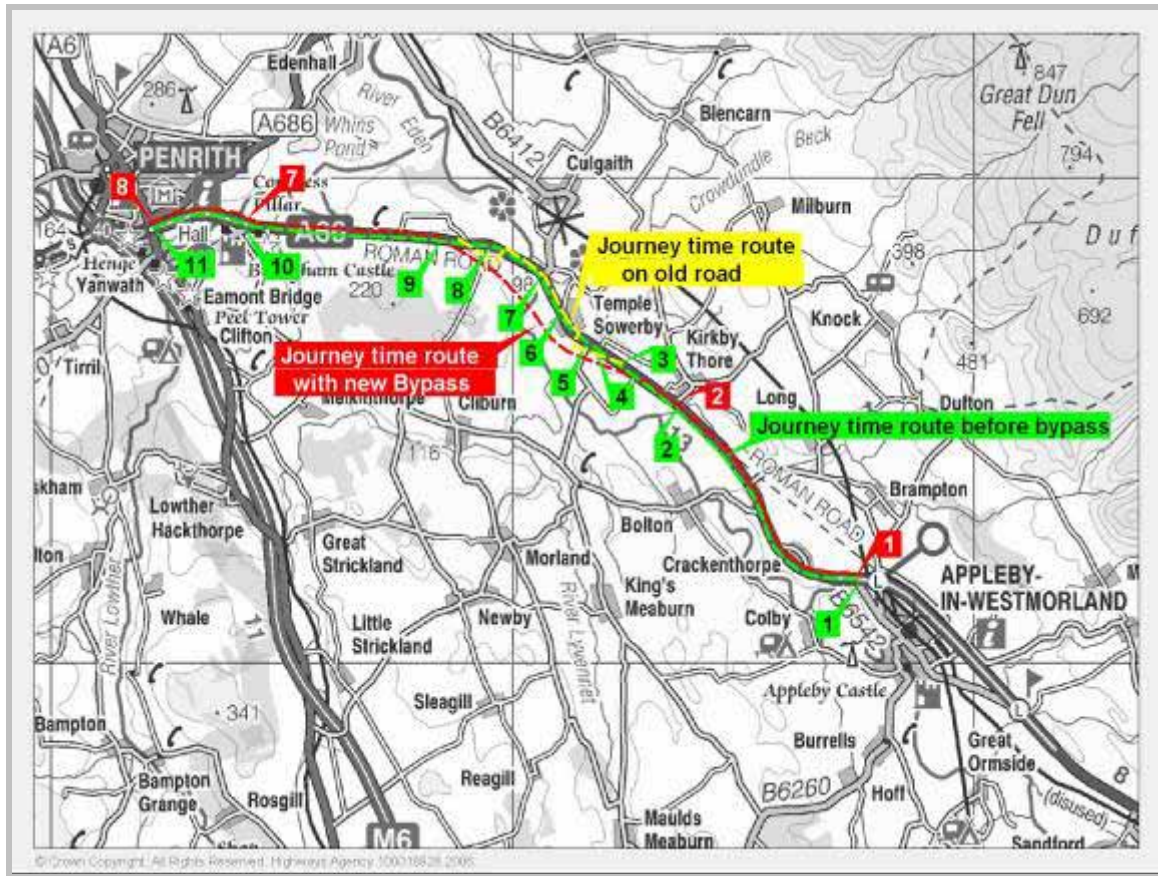


Figure 3.15 – Journey Time Routes (JTRs) –Detailed Version

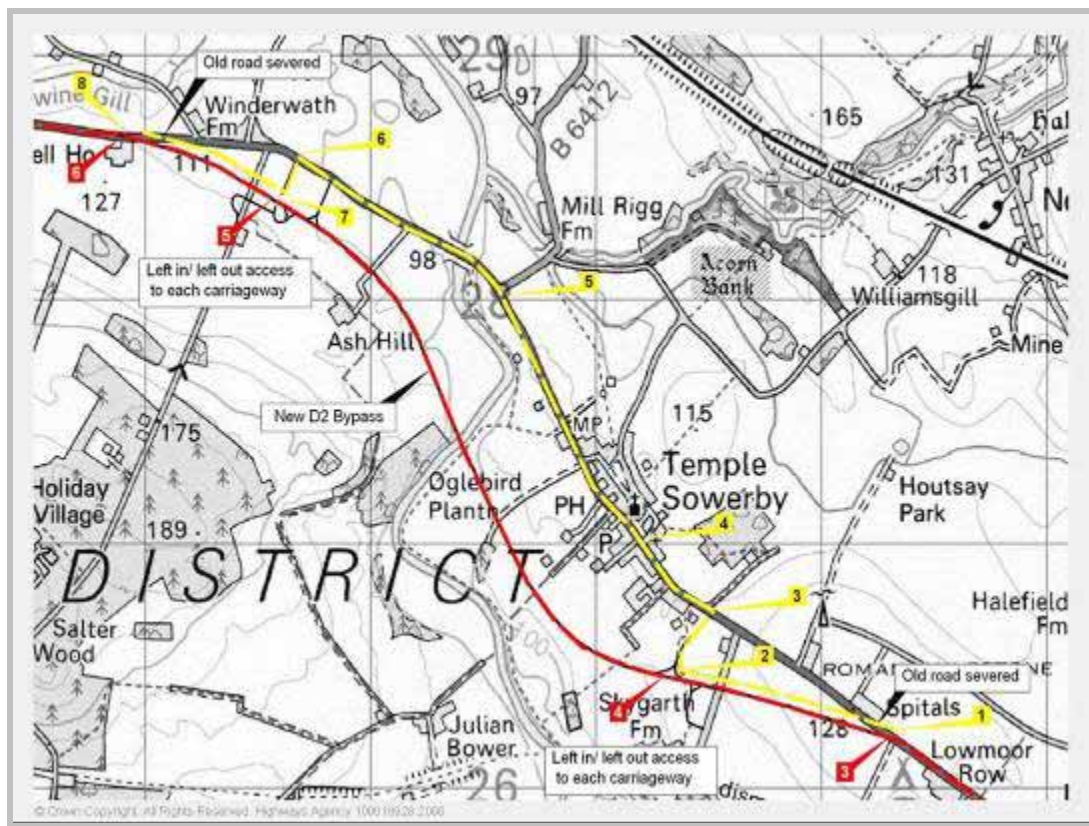


Table 3.1 – Before and After Journey Times from Appleby to Penrith

Journey Times	Period	A66 Via Temple Sowerby (Pre-Scheme)	A66 Via Bypass (Post-Scheme)	Difference
W/B	AM	18:17	14:59	-03:18
	Inter	17:31	14:56	-02:35
	PM	17:54	15:01	-02:53
E/B	AM	16:55	16:22	-00:33
	Inter	16:29	16:29	00:00
	PM	17:16	16:22	-00:54

Table 3.2 – Before and After Journey Times to Negotiate Temple Sowerby Village

Journey Times	Period	A66 Via Temple Sowerby (Pre-Scheme)	Old A66 through Temple Sowerby (Post-Scheme)	Difference
W/B	AM	07:07	05:43	-01:24
	Inter	07:01	05:34	-01:27
	PM	07:02	05:43	-01:19
E/B	AM	06:59	05:09	-01:49
	Inter	06:53	05:16	-01:37
	PM	07:09	05:11	-01:58

**Table 3.3 – Before and After Journey Times to Negotiate Temple Sowerby Village**

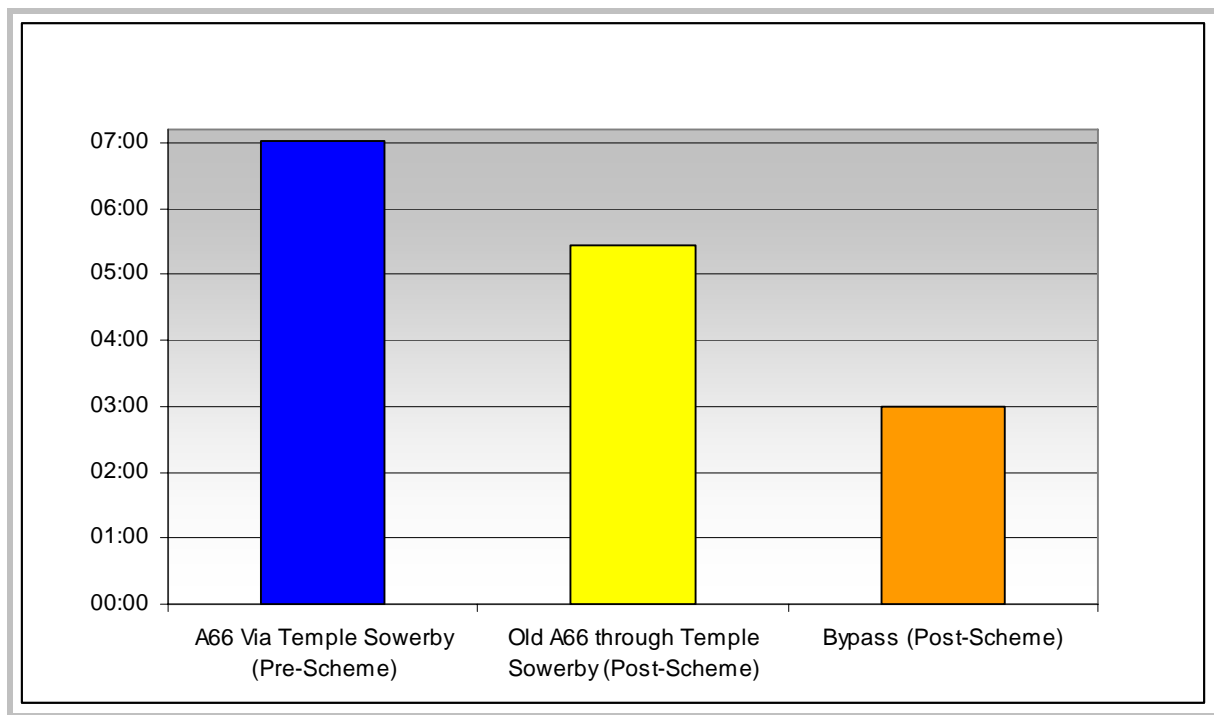
Journey Times	Period	A66 Via Temple Sowerby (Pre-Scheme)	Bypass (Post-Scheme)	Difference
W/B	AM	07:07	02:50	-04:17
	Inter	07:01	02:51	-04:10
	PM	07:02	02:54	-04:08
E/B	AM	06:59	03:15	-03:44
	Inter	06:53	03:03	-03:50
	PM	07:09	03:04	-04:05

**Table 3.4 – After and After Journey Times to Negotiate Temple Sowerby Village**

Journey Times	Period	Old A66 through Temple Sowerby (Post-Scheme)	Bypass (Post-Scheme)	Difference
W/B	AM	05:43	02:50	-02:53
	Inter	05:34	02:51	-02:43
	PM	05:43	02:54	-02:49
E/B	AM	05:09	03:15	-01:54
	Inter	05:16	03:03	-02:13
	PM	05:11	03:04	-02:07

- 3.29 Table 3.1 relates to the journey from the A66 junction with B6542, Appleby to the A6 roundabout south of Penrith. Specifically it compares the average journey time for pre-scheme (using old A66 through Temple Sowerby) with post-scheme (using the new bypass).
- 3.30 Tables 3.2-3.4 relates to the journey through/around Temple Sowerby. Specifically it compares the average journey time for pre-scheme (old A66), post-scheme (old A66) and post-scheme (bypass). The orange journey time route was not conducted but has been calculated by using data from points 3 to 6 along the red route. Likewise the blue journey time route was assembled from using points 3 to 9 along the green route.
- 3.31 From the data collected we can make the following key observations:
- ◆ On average around 3 minutes can be saved per vehicle by using the bypass to travel westbound between Appleby and Penrith rather than the old route via Temple Sowerby. However on average less than a minute can be saved on the same route going eastbound;
  - ◆ Journey times through Temple Sowerby on the old A66 have reduced by around 1-2 minutes in both directions since the bypass opened;
  - ◆ Travelling from one end of the bypass to the other is around 3 minutes quicker using the bypass than going through Temple Sowerby for westbound traffic and around 2 minutes quicker for eastbound traffic;
  - ◆ Overall journey times through Temple Sowerby are now on average around 4 minutes quicker by using the bypass than they were before the scheme opened.

**Figure 3.16 – Average Journey Time for Traversing Temple Sowerby**



3.32 In summary, initial findings indicate that journey times along the A66 have reduced since the bypass has opened with around a 15% decrease in journey time between Appleby and Penrith. Figure 3.16 shows over a 50% decrease in journey times for traffic going past Temple Sowerby.

**Journey Speeds**

3.33 Using the journey times for before and after the opening of the bypass any changes in speed can be measured by also using distances between timing points. Figures 3.14 and 3.15 show the routes that have been taken.

**Table 3.5 – Before and After Journey Speeds from Appleby to Penrith**

Journey Speeds (kph)	Period	A66 Via Temple Sowerby (Pre-Scheme)	A66 Via Bypass (Post-Scheme)	Difference
W/B	AM	62.86	73.72	10.86
	Inter	65.63	74.01	8.38
	PM	64.21	73.50	9.29
E/B	AM	67.95	69.93	1.98
	Inter	69.72	69.41	-0.31
	PM	66.55	69.86	3.32

**Table 3.6 – Before and After Journey Speeds to Negotiate Temple Sowerby Village**

Journey Speeds (kph)	Period	A66 Via Temple Sowerby (Pre-Scheme)	Old A66 through Temple Sowerby (Post-Scheme)	Difference
W/B	AM	63.77	79.39	15.62
	Inter	64.68	81.53	16.85
	PM	64.53	79.39	14.86
E/B	AM	64.99	88.12	23.13
	Inter	65.93	86.17	20.24
	PM	63.47	87.56	24.08

**Table 3.7 – Before and After Journey Speeds to Negotiate Temple Sowerby Village**

Journey Speeds (kph)	Period	A66 Via Temple Sowerby (Pre-Scheme)	Bypass (Post-Scheme)	Difference
W/B	AM	63.77	88.61	24.84
	Inter	64.68	88.37	23.69
	PM	64.53	86.66	22.14
E/B	AM	64.99	77.51	12.52
	Inter	65.93	82.57	16.64
	PM	63.47	81.83	18.36

**Table 3.8 – Before and After Journey Speeds to Negotiate Temple Sowerby Village**

Journey Speeds (kph)	Period	Old A66 through Temple Sowerby (Post-Scheme)	Bypass (Post-Scheme)	Difference
W/B	AM	79.39	88.61	9.22
	Inter	81.53	88.37	6.85
	PM	79.39	86.66	7.28
E/B	AM	88.12	77.51	-10.62
	Inter	86.17	82.57	-3.60
	PM	87.56	81.83	-5.72

3.34 From the data collected we can make the following key observations:

- ◆ Before the bypass opened the average speed between Appleby and Penrith traveling westbound varied from 63kph to 66kph during different times of the day, whereas afterwards the average speed for the same journey was around 74kph, an increase of around 9kph;
- ◆ Before the bypass on the same route going eastbound the average speed varied from 67kph to 70kph during different times of the day, whereas afterwards the average speed for the same journey was around 70kph, an increase of around 2kph;

- ◆ Average speed through the village as increased, around 15-17kph going westbound and around 20-24kph going eastbound;
  - ◆ The average speed through the bypass is around 7-9kph higher than it is going through the village traveling westbound, but traveling eastbound average speed is between 4kph and 11kph lower on the bypass.
  - ◆ Overall average journey speeds through Temple Sowerby are now on average 22-25kph higher for westbound traffic and 13-18kph higher for eastbound traffic than they were before the scheme opened.
- 3.35 The general findings of the average speed surveys are that the bypass has generally increased the speed on all the routes surveyed.

**Key Points from Section 3:**

- ◆ **There are 12,984vpd using the Temple Sowerby Bypass.**
- ◆ **Before the opening of the bypass there was 13,400vpd on the A66 through Temple Sowerby, after the bypass opening this has reduced to 1100vpd a reduction of around 91%.**
- ◆ **Journey times and speeds have improved, with approximately 2-3 minutes being saved by using the bypass rather than going through Temple Sowerby. Furthermore travelling through/around Temple Sowerby is around 4 minutes quicker than it was pre scheme. Travelling westbound has greater improvements in journey times and speed than eastbound.**
- ◆ **Turning counts carried out in Temple Sowerby itself revealed that traffic has also decreased by 88 %.**
- ◆ **The numbers of HGV's traveling through Temple Sowerby has decreased proportionately to the traffic, resulting in an average reduction in a 12 hour period of 2,500HGVs using the A66 Temple Sowerby Bypass, equating to a 94% reduction.**

## 4. Other Impacts of Scheme

- 4.1 A site visit was undertaken in December 2007 in order to assess the changes that may have taken place, and to clarify the traffic surveys which have been outlined in previous sections.
- 4.2 The site visit also incorporated a general visual survey in order to observe highway conditions relating to the other concerns raised by local residents and other stakeholders' pre- construction.
- 4.3 An Appraisal Summary Table (AST; see, Annex B) was compiled as part of the scheme's consideration before opening, setting out the key consequences of the scheme against the five Government objectives for transport of environment, safety, economy, accessibility and integration. Some of those objectives are further divided into a number of additional sub-objectives, reflecting the wide variety of impacts arising from transport projects.
- 4.4 The success of most of the mitigation measures is not clear at the present time due to the short time frame since opening, they will be considered in more detail in the One-Year-After Study. However, a number of points can be noted:
- ◆ **Noise and Local air quality** –The AST states that the removal of traffic through Temple Sowerby will improve both the noise and local air quality in the village with the exception of a few homes which are near the bypass. Site observations and the Traffic Analysis suggest the removal of traffic through Temple Sowerby has improved the noise and local air quality for people in the village. The reduction in HGV's through Temple Sowerby is a significant contributor to this. Noise from the bypass can not generally be heard from the village as the majority of the bypass is hidden by the gradient of the land. Figures 4.1, 4.2 and 4.4 are facing the bypass from Temple Sowerby which shows that it is not visible from most parts of the village. The One-Year-After Report will seek to quantify the improvements in local air quality.
  - ◆ **Landscape** – The AST stated that there would be an adverse effect at the bridge crossing the River Eden. Planting was taking place along the middle stretch of the bypass during the site visit, with some planting still to be done. Planting both at junctions and the highway boundaries will need to be monitored in the One-Year-After Study and beyond as trees and shrubs will take time to establish and mature.
  - ◆ **Accidents** – The AST indicated that accidents would reduce due to the removal of traffic from Temple Sowerby and the use of a dual carriageway. This would improve safety for both pedestrians and cyclists within the village. This will assessed in more detail within the One-Year-After report
  - ◆ **Reliability and Journey Ambience** – The AST said that driver stress would reduce due to drivers avoiding the village. On the site visit several drivers were spotted who appeared to be lost, looking for access to the Holiday Village from Temple Sowerby. This will have increased driver stress and will be considered in greater deal within the One-Year-After report upon full completion of the Western end of the bypass.
  - ◆ **Severance** – The AST suggested that current severance issues in and around Temple Sowerby would be removed. The reduction in traffic has made a visible difference to the village; the road no longer has a constant stream of traffic.

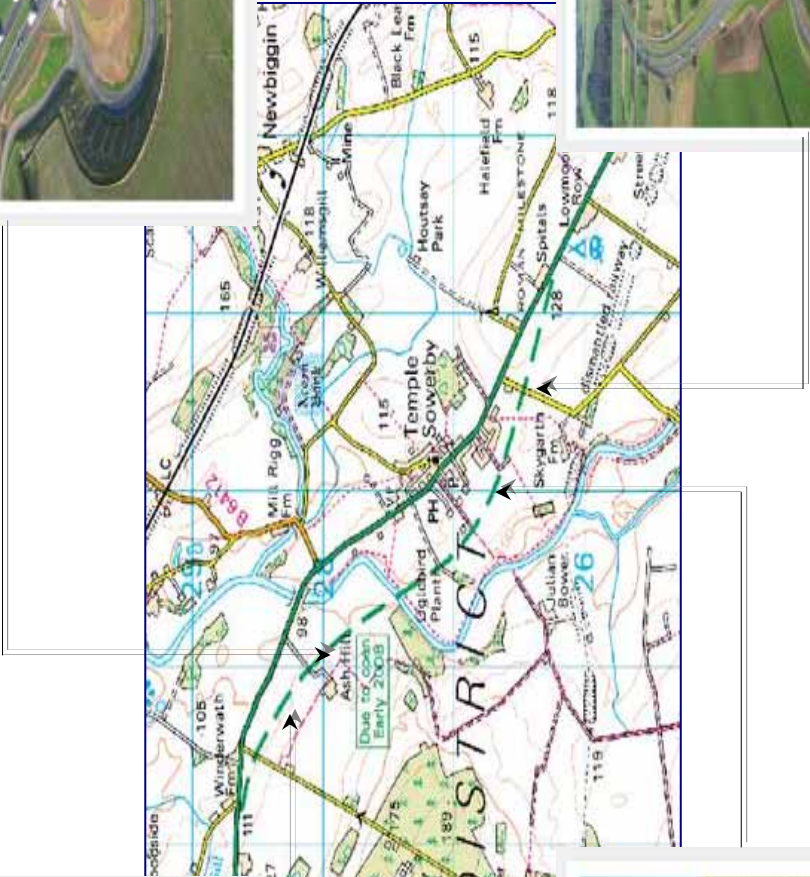
**Key Points from Section 4:**

- ◆ **Although the bypass is open some of the landscaping has not yet been completed, therefore this will be considered in the one-year after study.**
- ◆ **The reduction in traffic volume has reduced severance for villagers; this has made crossing the A66 easier for pedestrians.**
- ◆ **The removal of traffic from Temple Sowerby is likely to have resulted in improved local air quality and reduced noise pollution, the extent of this will be analysed in more detail in the One-Year-After Report.**

**Figure 4.1 – Temple Sowerby – Mitigation Measures**



Figure 4.2 – Key Features of A66 Temple Sowerby



## 5. Conclusions

5.1 Opened in October 2007 costing £39.6m, the Temple Sowerby Bypass aimed to improve the quality of life in Temple Sowerby by the removal of through-traffic. The main objectives of the scheme were:

### **Environmental**

- ◆ Improve the amenity of the village by reducing noise and improving air quality by removing through traffic;
- ◆ Take full account of the sensitive location within the river Eden valley in determining mitigation measure.

### **Accessibility**

- ◆ Reduce severance within the village of Temple Sowerby;
- ◆ Facilitate increased access to public transport;
- ◆ Provide facilities for non-motorised users on recreational routes within the river Eden valley.

### **Safety**

- ◆ Improve safety for all road users on the section of A66 to be bypassed by providing through traffic with a high standard dual carriageway bypass.

### **Economy**

- ◆ Improve journey time reliability for trunk road traffic;
- ◆ Reduce congestion caused by incidents.

### **Integration**

- ◆ Support the strategic role of the A66 in regional transport policies;
- ◆ Promote the use of alternative modes of transport especially walking and cycling within the village.

5.2 The aim of this report was to illustrate the traffic data collected and site observation as part of this Traffic Impact Study (TIS). The main observations that can be drawn from the findings are:

- ◆ Up to 92% of traffic (from 13,400vpd to 1,100vpd) has been removed from Temple Sowerby as a result of the opening of the bypass. This is in line with the expected reduction of 95%;
- ◆ The bypass appears not to have affected general traffic levels in the area with only a small amount of growth which can be attributed to seasonality or normal traffic growth;
- ◆ Improvements made near Winderwath Farm meant that traffic on the old road to Cliburn has reduced from 1,661vpd to 152vpd. On the site visit it was apparent the many motorists were having problems finding the new route to the holiday village;

- ◆ Journey time surveys have indicated that on average 2-3 minutes can be saved by using the bypass rather than the A66 through Temple Sowerby. A greater level of improvement was shown when travelling westbound. Furthermore traveling through/around Temple Sowerby is around 4 minutes quicker than it was pre scheme;
  - ◆ The number of HGVs travelling through Temple Sowerby has reduced from approximately 2,500vpd to 160vpd travelling through the village equivalent to a 94% decrease. The proportion of HGVs to other vehicles has also reduced by around 15%;
  - ◆ The proportion of vehicles turning on to the B6412 from the old A66 in Temple Sowerby has increased from around 5% to 50%. This suggests that the old A66 is now being used for access rather than as a through road;
  - ◆ By reducing traffic through Temple Sowerby it is likely that safety for pedestrians and cyclists has improved;
  - ◆ Noise and local air quality are likely to have been improved due to the reduction in traffic through the village.
- 5.3 These are the recorded impacts two months after the opening of the bypass and therefore represent initial views. All of these issues and more will be considered fully in the one year after evaluation.
- 5.4 The one year after evaluation will also analyse accident data to establish any safety improvements as a result of the scheme and other issues which have been addressed in overview within this report. The one year after evaluation will be started in autumn 2008 and reported in spring 2009.

## Annex A – Scheme Appraisal Summary Table

Option		Description	Problems				Present Value of Cost
A66 Temple Sowerby Bypass The Scheme		4.9 km Dual Carriageway Bypass of the village of Temple Sowerby on the A66 Trunk road. Route runs to the south of Temple Sowerby from Whinfell House to Spitals Farm. A new crossing of the River Eden is provided. Improves existing poor road geometry at Winderwath and Eden Bridge.	High volumes of traffic passing through rural village creating poor environment and safety problems. Sub-standard alignment exists through Winderwath and over River Eden. Properties and farm traffic with direct access to trunk road conflict with through traffic.				<b>£13.033m/£13.007m</b>
OBJECTIVE	SUB-OBJECTIVE	QUALITATIVE IMPACTS	QUANTITATIVE MEASURE				ASSESSMENT
ENVIRONMENT	Noise	c. 90% reduction in traffic in village centre results in significant reduction in traffic noise in the village, in 2020 147 properties experience a reduction in traffic noise, at 129 of which the reduction is more than 5dB(A). 45 properties in the south-east of the village and along the route experience an increase in traffic noise, at 25 of which the increase is greater than 5dB(A).	No. of people likely to be annoyed by traffic noise in the long term 2020: 47, cf 91 do minimum				Estimated reduction in population likely to be annoyed by noise in 2020: 44
	Local Air Quality	Predicted NO <sub>2</sub> and PM <sub>10</sub> concentrations are well below national objectives at all properties. Properties adversely affected are at either end of the Scheme where it rejoins existing A66. Annual mean NO <sub>2</sub> and PM <sub>10</sub> concentrations at properties directly facing on to existing A66 are significantly reduced.	No. properties where air quality is improved: NO <sub>2</sub> 165 improved 20 worse PM <sub>10</sub> 178 improved 7 worse				Change in concentrations weighted by the number of properties exposed: PM <sub>10</sub> -341.8 NO <sub>2</sub> - 2825.4
	Greenhouse Gases	Minor increase in emissions due to introduction of a new length of road and higher traffic speeds on the Bypass than through the village	2005 : Tonnes of CO <sub>2</sub> 10553.8, cf 9400.4 do minimum 2020: Tonnes of CO <sub>2</sub> 14158.8, cf 12489.8 do minimum				Tonnes of CO <sub>2</sub> + 1153.4 Tonnes of CO <sub>2</sub> + 1669.0
	Landscape	New route cuts across rolling farmland behind village, in cutting and on embankment. Adverse effect at bridge crossing of the scenic River Eden. Additional balancing ponds will not altered the assessment.	N/A				Score: Moderate adverse
	Townscape	Will largely remove visual impact of traffic through Temple Sowerby village	N/A				Score: Slight beneficial
	Heritage of Historic Resources	Improved context and amenity for Temple Sowerby Conservation area and Listed buildings. Slight adverse impacts on other sites could be adequately mitigated through evaluation, investigation and recording.	N/A				Score: Moderate beneficial
	Biodiversity	Severance impacts on bats, badgers, hedgerows and some loss of mature trees minimised by landscaping. Low risk of construction impact on River Eden (SSSI, SAC) and species. Minor or neutral impact on other ecological receptors.					Score: Minor Adverse
	Water Environment	Slight adverse impact of structures during flood flow in River Eden. Risk of pollution of high quality river from road drainage, mitigated by provision of 5 settlement ponds, a improvement over existing conditions	N/A				Score: Slight Beneficial
	Physical Fitness	No change compared to existing condition.					Score: Neutral
Journey Ambience	Slight change in views with neutral impact. Moderately beneficial effect on traveller stress due to avoidance of village.	N/A				Score: Neutral	
SAFETY	Accidents	Reduction in number of road traffic accidents is expected due to operational characteristics of dual carriageway and removal of through traffic from Temple Sowerby village.	Accidents low/high 76.2/85.3	Deaths low/high 3.4/4.1	Serious low/high 17.7/19.9	Slight low/high 92.9/98.2	PVB (Resource Costs) £3.709m (low growth) £4.183m (high growth)
	Security	No change to the existing situation					Score: Neutral
ECONOMY	Transport Efficiency Economic	Journey time savings for the movement of people and freight, particularly under future traffic demand as a result of bypassing Temple Sowerby.	Opening Year Vehicle-hours saved (2-way) Peak time savings (mins) (1-way) Off-peak time savings (mins) (1-way)		Low/high 92,052 / 98,197 1.22 / 1.27 0.97 / 0.98	NPV £m – Low / High Users: £13.161m / £18.712m Private Providers: £0.055m / £0.080m Public Providers: £-13.088m / £-13.088m Other Government: £1.363m / £1.402m	
	Reliability	Improved reliability as proposed dual 2-lane carriageway will provide uninterrupted traffic flow bypassing the village of Temple Sowerby.	Route Stress Before 72%; After 21%				Score: Neutral

	<b>Wider Economic Impacts</b>	Improvements to Strategic trans – Pennine route	Does not serve designated regeneration area	Score: No
<b>ACCESSIBILITY</b>	<b>Option values</b>	No change compared to existing conditions, provided bus operators continue to route through village	N/A	Score: Neutral
	<b>Severance</b>	Removal of existing severance issues in and around Temple Sowerby village, local footpath and road network and severance on farm units. Primarily of local importance, therefore assessment score is slight beneficial. Slight adverse effects of footpath does not outweigh the slight beneficial impact assessed.	N/A	Score: Slight beneficial
	<b>Access to the Transport System</b>	No change in existing conditions, subject to bus operators continuing to route through village	N/A	Score: Neutral
<b>INTEGRATION</b>	<b>Transport Interchange</b>	Scheme provides no rail link and buses will continue to serve the village	N/A	Score: Neutral
	<b>Land-Use Policy</b>	Scheme is consistent with County Structure Plan, Eden Local Plan and Regional Guidance. Changes to Planning Policy documents have not altered the previous assessment.	N/A	Score: Beneficial
	<b>Other Government Policies</b>	No other Government Policies are relevant to this Scheme	N/A	Score: Neutral

## Annex B – Vehicle Categories

MOTOR CYCLES	
<p><b>CAR</b></p> <p>SALOON      ESTATE</p> <p>PEOPLE CARRIER      CAR TOWING CARAVAN/TRAILER</p>	
<p><b>LIGHT GOODS VEHICLE (LGV)</b></p> <p>VAN      3.5 TONNES      PICK UP</p>	
<p><b>OTHER GOODS VEHICLES (OGV 1)</b></p> <p>7.5 TONNES      1 AXLES RIGID</p> <p>1 AXLES RIGID      3 AXLES RIGID</p>	
<p><b>OTHER GOODS VEHICLES (OGV 2)</b></p> <p>4 OR MORE AXLES RIGID      3 AXLES ARTIC</p> <p>4 OR MORE AXLES ARTIC      OTHER GOODS VEHICLE WITH TRAILER</p>	
<p><b>BUSES &amp; COACHES (PSV)</b></p> <p>DOUBLE DECK BUS      SINGLE DECK BUS OR COACH</p>	

Figure 8/1: COBA Vehicle Categories