

LNMS EVALUATION REPORT

A21 Johns Cross Junction Improvement



June 2005



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Contents

<i>Section</i>	<i>Page</i>
1. Introduction	1
Background	1
Scheme Objectives	2
Purpose of the Report	2
2. Data Collection	5
'Before' Surveys	5
'After' Surveys	5
3. Scheme Impact	6
Overview	6
Safety	6
Traffic Flow	6
Junction Delay	8
4. POPE Methodology	9
Introduction	9
Accidents	9
Journey Time Savings	9
Scheme Cost	10
Summary	11
5. Summary of Appraisal and Evaluation Summary Tables	13
Introduction	13
PAR Document	13
Outturn Effects	16
6. Conclusions	25
Annex A –Analysis of Accident Data	27
Annex B –Analysis of Traffic Flow Data	31
Annex D - Original Scheme AST	38
Annex E - Atkins EST	41

List of Tables

Table 3.1 – Analysis of ATC Data	7
Table 3.2 – Comparison of Manual Classified Count Data	7
Table 3.3 – Average delay by Time Period and Arm	8
Table 4.1 – Accidents Savings and Benefits	9
Table 4.2 – Delay Costs Benefits (Post – Pre) associated with the Scheme	10
Table 4.3 – POPE Comparison: Assessment of Scheme Cost	11
Table 4.4 – POPE Comparison: Summary	11
Table A1– Accident Data	29
Table B1 – Pre Opening Flows	35
Table B3 – Pre and Post Opening Flows	36
Table B4 – Post Opening Flows	37

List of Figures

Figure 1.1 – Location of Scheme	3
Figure 1.2 – New Roundabout	4
Figure 1.3 – Old Junction Layout	4
Figure 5.1 – Pre Opening Photo	17
Figure 5.2 – Post Opening Photo	18
Figure 5.3 – Environmental/Noise Barrier	18
Figure 5.4 – Example of Planting Accompanying the Scheme	19
Figure 5.5 – Example of Planting Accompanying the Scheme II	20
Figure 5.6 – Pedestrian Crossing and New Footway	21
Figure 5.7 – New Bus Stop on West Side of A21	22
Figure 5.8 – Bus Stop to the East Side of A21 on Access Road	22
Figure 5.9 – Parking and Drop off Areas for Mountfield School	23
Figure A1– Pre and Post Opening Accidents	28
Figure B1– Location of Monitoring Sites with Average Daily Traffic	32
Figure B2– Average Daily Traffic by Month on A21 at Kent Street	33
Figure B3– Average Daily Traffic by Month on A21 at Robertsbridge Bypass	33
Figure B4– Turning Movements at Johns Cross	34

1. Introduction

BACKGROUND

The Scheme

- 1.1 The A21 Johns Cross Junction Improvement opened on 9th May 2003. The scheme involved the replacement of a priority junction with a three arm roundabout and the provision of a right turning lane for northbound traffic to improve safety through the village, with additional access and off road parking for community facilities.
- 1.2 In 1985, East Sussex County Council Accident Investigation Section recommended that the junction should be improved by the construction of a roundabout. A number of different roundabout layouts were considered with two options being presented at public consultation in 1995.
- 1.3 The A21 is realigned further from street frontage with parking bays provided between the A21 and the footway.
- 1.4 Figure 1.1 shows the location of the scheme and Figure 1.2 shows a photo of the junction in its new form and Figure 1.3 of the junction in its old form. CAD mapping images are included in Appendix A and show the A21 Johns Cross junction before and after the implementation of the scheme.

Original PAR Document

- 1.5 The PAR was produced by WS Atkins and was last updated on December 2001. To avoid confusion, in this document where 'WS Atkins' is referred to it is as the producers of the PAR, whilst where 'Atkins' is referred to it refers to the Atkins team undertaking this evaluation.

SCHEME OBJECTIVES

- 1.6 The scheme was designed to meet the following three objectives:
- ◆ To improve safety for all motorists, pedestrians and others using the junction.
 - ◆ To protect and enhance the built environment (in particular the setting of listed buildings) and the natural environment (in particular to integrate the junction into the surrounding landscape and to enhance existing ecological habitats).
 - ◆ To improve accessibility between community facilities located near the junction.

PURPOSE OF THE REPORT

- 1.7 The Highways Agency has commissioned a series of studies to re-evaluate recently implemented trunk road schemes. The aim of this process is to provide a back check of the levels of benefit accruing from new schemes and to determine how far the department achieves the objectives and benefits claimed from programme of schemes. In turn, this process seeks to maximise the value for money from similar schemes in the future.
- 1.8 This report represents the LNMS evaluation report for the A21 Johns Cross Junction Improvement. This report has been prepared as part of the Post Opening Project Evaluation (POPE) Commission.
- 1.9 This report will initially undertake an assessment of the 'physical' impact of the scheme, namely:
- ◆ A comparison of the 'Before' and 'After' traffic volumes on the A21 to illustrate how traffic volumes have changed since the opening of the scheme;
 - ◆ A comparison of 'Before' and 'After' journey times to illustrate how journey times have changed since the opening of the safety improvements; and,
 - ◆ The report will also outline the changes in accidents on the route since the scheme has been implemented and establish whether they have changed as predicted since the opening of the scheme.
- 1.10 This in turn is followed by the assessment of the scheme in accordance with the 'POPE methodology', which is being followed for the purpose of this study. This methodology aims to provide a method by which the forecast and outturn effects of a scheme can be evaluated on a common basis. This process ultimately presents two appraisals:
- ◆ Appraisal 1: The Original PAR assessment (including the original AST). This is a forecast of the cost/benefits of the scheme, usually calculated in accordance with PAR2 (1994 prices discounted at 6%).
 - ◆ Appraisal 2: An Evaluation Summary Table (EST) based on outturn effects, but evaluated on precisely the same terms (version of the PAR document, present value year and discount rate) of the original assessment. The calculation is usually a simple pro-rate of the original assessment based on the outturn impact with regard to user benefits and scheme costs. The advantage of this assessment is that it is an outturn assessment that is directly comparable with the original PAR AST.

1.11 Following this introduction the report has been divided into five further sections as follows:

- ◆ Section 2 outlines existing data collation and new data collection;
- ◆ Section 3 outlines the scheme's impact and reports on traffic volume and journey time changes attributable to the A21 Johns Cross Junction Improvement;
- ◆ Section 4 presents an assessment of predicted and outturn economic benefits using the POPE journey time methodology;
- ◆ Section 5 presents the original Appraisal Summary Table (AST) for the A21 Johns Cross Junction Improvement, and then re-evaluates these predictions with an Evaluation Summary Table (EST); and
- ◆ Section 6 summarises the main conclusions from the evaluations and the limitations to use.

1.12 It is intended that the findings of this report will feed into a wider summary of the outcomes of the POPE process.

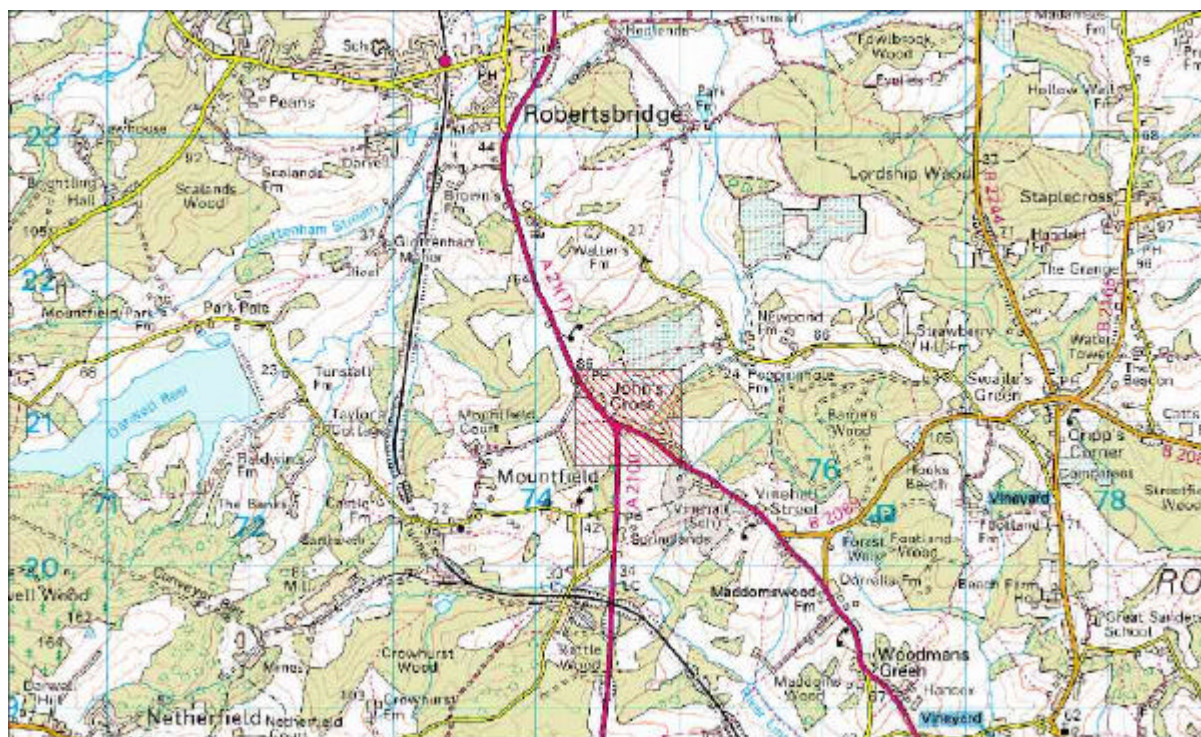


Figure 1.1 – Location of Scheme



Figure 1.2 – New Roundabout



Figure 1.3 – Old Junction Layout

2. Data Collection

'BEFORE' SURVEYS

2.1 The PAR document submitted in support of the scheme was based upon the following data:

- ◆ Public Consultation 1995;
- ◆ Traffic flow data from the Highways Agency traffic monitoring south;
- ◆ Noise and air quality assessment and dwelling survey;
- ◆ 1996 – 2000 Accident data in close proximity to the junction.; and,
- ◆ Journey time surveys.

'AFTER' SURVEYS

2.2 In the course of undertaking the POPE evaluation of the scheme, the following data was utilised.

Automatic Traffic Counts

2.3 Automatic traffic counts were obtained from Highways Agency Traffic monitoring south team for:

- ◆ NB A21 Kent Street (E 578214, N 116833);
- ◆ SB A21 Kent Street (E 578214, N 116833);
- ◆ NB A21 Robertsbridge Bypass (E 574068, N 124329); and
- ◆ SB A21 Robertsbridge Bypass (E 574068, N 124329).

Manual Classified Counts

2.4 Count on Us were commissioned to undertake a Manual classified count as well as a junction delay survey. The manual classified count was undertaken on Tuesday 12th October 2004 between 7AM and 7PM.

Junction Delay Survey

2.5 Junction delay surveys was also undertaken on Tuesday 12th October 2004 between 7AM and 7PM.

Accident Data

2.6 Accident data was obtained from the managing agent for 1999 to 2004.

3. Scheme Impact

OVERVIEW

- 3.1 This section provides details of the outturn safety and traffic impacts of the scheme.

SAFETY

- 3.2 The original PAR assessment examined accident data for the period 1996 to 2000. In this period there were a total of 14 PIA's, equating to 2.8 PIA's per annum.
- 3.3 In order to both confirm the original finding, and to establish the accident data for following completion of the scheme new data was obtained from the Managing Agent for the period 1/1/1999 to 31/7/2004. In the 53 months prior to the opening of the scheme there was a total of six PIA's (1.4 accidents per annum), compared to a single accident in the 14 months post opening (0.9 accidents per annum). Therefore, from the limited data available it appears that the scheme has provided a material decrease in the accident rate at the junction.
- 3.4 Further detail on the analysis of accident data is presented in Annex A.

TRAFFIC FLOW

- 3.5 Two sources of traffic data were used in the assessment of the impact of the scheme, namely
- ◆ Highways Agency Permanent Monitoring Sites; and
 - ◆ Manual Classified Count.

Highways Agency Permanent Monitoring Sites

- 3.6 The following are the permanent monitoring sites that we utilised during this evaluation:
- ◆ A21 Kent Street (located south of the scheme); and,
 - ◆ A21 Robertsbridge Bypass (located north of the scheme)
- 3.7 Table 3.1 presents a summary of the ATC data at each site. In general traffic levels at the A21 Robertsbridge site are stagnant with a slight decrease in AADT values between 1998 and 2004. At the Kent Street site traffic levels have grown by 9.5% over the same period.

Table 3.1 – Analysis of ATC Data

Year	A21 Kent Street		A21 Robertsbridge Bypass	
	Nbd	Sbd	Nbd	Sbd
1998	6347	6400	7813	7875
1999	7191	7226	7579	7682
2000	7162	7220	7011	7158
2001	7708	7778	7780	7932
2002	7280	7430	7832	7952
2003	7680	7638	7740	7869
2004	7090	6873	7655	7783

Note: All values are 24-hour AADT

Manual Classified Count Data

3.8 Manual Classified Count Data was available from two sources:

- ◆ The COBA model; and,
- ◆ A post-opening count undertaken by Atkins in October 2004.

3.9 Table 3.2 presents the data from each source. This demonstrates that the scheme has had little impact on the pattern of traffic at the junction. In particular it does not appear that the two right-turns at the original priority junction (movements 2 and 3), which would benefit most from the new roundabout, have increased significantly.

Table 3.2 – Comparison of Manual Classified Count Data

Movement	AM Peak		PM Peak	
	Before	After	Before	After
1. A2100 to A21 north	273	310	227	255
2. A2100 to A21 south	143	135	84	132
3. A21 north to A21 2100	240	240	341	333
4. A21 north to A21 south	320	331	495	472
5. A21 south to A21 north	453	407	316	304
6. A21 south to A2100	115	141	96	119

Note: All flows are in vehicles. The 'Before' count was undertaken in 2002, the 'After' count was undertaken in October 2004.

3.10 The traffic flow analysis can be seen in greater detail in Annex B.

JUNCTION DELAY

- 3.11 As part of the manual classified count junction delay was also calculated. The average junction delay per vehicle by time period is shown in Table 3.3.

Table 3.3 – Average delay by Time Period and Arm

Arm	AM (Secs)	IP (Secs)	PM (Secs)
A21 North	1	1	1
A2100 London Road	4	3	3
A21 South	2	3	3

- 3.12 As can be seen from Table 3.3 the delays experienced by vehicles at the roundabout are negligible. Delays from the junction in its pre scheme format i.e. priority junction could be extracted from PICADY files but a better comparison is contained with the following section where economic benefits are calculated using JUICE.
- 3.13 The junction delay analysis can be seen in greater detail in Annex C.

4. POPE Methodology

INTRODUCTION

- 4.1 This section assesses the level of economic benefits predicted for the scheme and compares these predictions with actual benefits accrued when considering actual traffic volume changes and actual journey time benefits. The re-evaluation, termed the Post Opening Project Evaluation (POPE) methodology, uses observed accident and link transit savings to provide an economic assessment of the performance of the scheme. This result is presented in the scheme EST and is expressed in same terms as the original evaluation (present value year of 1994, and discount rate of 6 per cent).

ACCIDENTS

- 4.2 WS Atkins original assessment predicted an accident saving of 1.13 accidents per year high growth and 1 accident a year low growth.
- 4.3 Table 4.1 presents the 30-year accident savings and benefits attributed to the scheme.

Table 4.1 – Accidents Savings and Benefits

	Original WS Atkins			POPE		
	First Year Accident Saving	30 Year Accident Saving	30 Year Accident Benefits	First Year Accident Saving	30 Year Accident Saving	30 Year Accident Benefits
Low Growth	1	35	£1,145m	0.9	32	£0.965m
High Growth	1.13	45	£1.575m	0.9	36	£1.175m

All costs and benefits are 1994 prices discounted to 1994 at 6%.

- 4.4 **Table 4.1 illustrates that the scheme is forecast to provide a lower level of accident benefit than predicted in the original assessment.**

JOURNEY TIME SAVINGS

- 4.5 The PAR worksheet 7.2 predicted a slight decrease in journey time with a 0.09 minutes peak journey time saving and 0.06 minute inter peak journey time saving both in High and low growth.
- 4.6 Pre opening predictions regarding journey times were made using a combination of PICADY and ARCADY. The figures from these two junction assessment packages were then placed into JUICE in order to extrapolate junction delays. The Do Something junction delay costs were subtracted from do minimum junction delays costs to give a journey time benefit. This same method was used to calculate journey time benefit post opening.

- 4.7 The post opening evaluation utilised the new MCC together with a junction delay survey. This allowed the ARCADY model to be re-run and re-validated, with the output from this used within the JUICE economic evaluation model.
- 4.8 Within the ARCADY and JUICE models the flows from the manual classified count were factored using a combination of NRTF and TEMPRO to 2002 and 2015 values so as direct assessment could be made with pre opening predictions. The original geometries used in the WS Atkins ARCADY and PICADY assessments were used but these were validated through measurements taken on a visit to the site and CAD mapping of the scheme.
- 4.9 Table 4.2 shows the results of the JUICE assessments presented for the following cases:
- ◆ Original PAR assessment;
 - ◆ Corrected PAR assessment with updated junction geometries to reflect the ‘as-built’ scheme; and,
 - ◆ Evaluation based on post-opening traffic flows.

Table 4.2 – Delay Costs Benefits (Post – Pre) associated with the Scheme

		AM	PM	Total
Original PAR	High	£0.125m		
	Low	£0.231m		
Reproduced ARCADY/JUICE Evaluation	High	£0.129m	£0.562m	£0.691m
	Low	£0.410m	£0.008m	£0.049m
Post Opening Impact	High	£0.142m	£0.631m	£0.773m
	Low	£0.320m	£0.005m	£0.038m

Note: All costs and benefits are 1994 prices discounted to 1994 at 6%. No evaluation of economic benefit is included for inter-peak/off-peak conditions or for Saturday and Sunday. The original PAR did not include a breakdown by time period.

- 4.10 **Table 4.2 demonstrates that the scheme delivers greater use time benefits than predicted in the PAR assessment. This is a function of the lower level of delay forecast in the POPE ARCADY/JUICE assessment than that forecast in the original PAR assessment.**

SCHEME COST

- 4.11 The Total Current Project Cost was at £1,901,377 excluding VAT.
- 4.12 Table 4.3 presents the conversion of the outturn cost to the present value year of 1994, using the assumption that the scheme cost is incurred at scheme opening (Quarter 2 2003)

Table 4.3 – POPE Comparison: Assessment of Scheme Cost

	Cost (1)	RPI (2003) (2)	RPF (2003) (3)	RPI (1994) (4)	Discount Factor (2003) (5)	Present Value Cost ((4*3*1)/2)* 5
Original PAR	£1,930,000	-	-	-	-	£1,173,458
Actual Outturn	£1,901,377	181.3	0.99	144.1	0.592	£885,710

All Costs are in 1994 prices discounted to 1994 at 6%.

- 4.13 From Table 4.3 it is apparent that the outturn cost is 12% less than the predicted cost in 1994 prices.

SUMMARY

- 4.14 Table 4.4 presents a summary of the original PAR and POPE economic evaluation of the scheme. It should be emphasised that the assessment is expressed in terms of 1994 prices, discounted to 1994 at 6 per cent, and that the methodology used is in accordance with PAR2.

Table 4.4 – POPE Comparison: Summary

	Original WS Atkins		POPE	
	Low (1)	High (2)	Low (3)	High (4)
Accidents	£0.963m	£1.279m	£0.965m	£1.175m
VOC	-	-	-	-
Journey Time	£0.125m	£0.231m	£0.038m	£0.773m
PVB	£1.087m	£1.509m	£1.003m	£1.948m
PVC	£1.173m	£1.173m	£0.886m	£0.886m
NPV	-£0.086	£0.336m	£0.117m	£1.062m
BCR	0.93	1.29	1.13	2.20

All costs and benefits are 1994 prices discounted to 1994 at 6%.

- 4.15 The main points to note are:
- ◆ Scheme delivers approximately the same accident benefit as predicted;
 - ◆ Journey time benefits substantially higher in the PM peak but substantially lower than in the AM peak;
 - ◆ Outturn scheme cost is 25% less than predicted.
 - ◆ Scheme delivers substantially more journey time benefit than was predicted.
 - ◆ As a result of the higher journey time benefit in high growth and lower scheme cost the scheme has delivered a higher level of benefit cost ratio than was predicted pre opening.

- 4.16 **Overall the scheme represents good value for money with higher levels of benefit than were predicted and lower scheme cost.**

5. Summary of Appraisal and Evaluation Summary Tables

INTRODUCTION

- 5.1 In order to fully evaluate the effects of the junction improvement scheme, Atkins has undertaken a review of the original PAR document prepared by WS Atkins Consultants Limited, Gillingham. The Appraisal Summary Table (AST) from this document, which summarise the predicted impact of the scheme under the five objectives of environment, safety, economy, accessibility and integration, is presented as Annex D in this report.
- 5.2 The Atkins review focused on:
- ◆ The main body of the PAR document itself; and,
 - ◆ The Appraisal Summary Table (AST) from the PAR.

- 5.3 Each of these is dealt with in turn below.

PAR DOCUMENT

- 5.4 The main points to note from the PAR document of the A21/A2100 John's Cross Junction Improvement are as follows.

Environment

- 5.5 The PAR document states the following in terms of environment:
- 5.6 **Noise** – 10 residential properties, pub and school have noise levels greater than 70dB(A); 12 residential properties and a cricket pavilion have noise levels 55-70 dB(A).
- 5.7 **Landscape** – Initial Adverse impact mitigated in time by improved visual screening and integration with existing landscape pattern.
- 5.8 **Biodiversity** – Opportunities for habitat creation on current area of arable land incorporated into the scheme, which could include wetland, wildflower grassland and mixed tree and shrub plantings. Given suitable design, the overall impact may be positive for biodiversity.
- 5.9 **Heritage** – Initially there may be a slight adverse visual impact on some of the listed buildings and the overall setting of the cultural historic resources due to the size of the proposed junction in relation to the existing settlement. The impact on the potential archaeological remains is unknown. The setting of 7 grade II listed buildings in village affected by their proximity to the A21.
- 5.10 **Water** – No impacts on water resources. Existing road run-off discharges into a small, mainly dry stream bed, and this has been identified for improvements, which could include use of wetland systems to provide bio filtration and wildlife habitat. An

overall improvement in the quality of the run-off may result from the road improvement works.

Safety

- 5.11 The PAR document states that the existing junction layout together with nearby accesses is complicated and can be confusing to road users. The accidents and casualty figures below were recorded on the length affected by the roundabout scheme.
- 5.12 Accident data for 1996 to 2000 is presented where 14 accidents were observed in 5 years (2.8/year). This is higher than the national average for rural junctions of this type (1.11 accidents per year, in COBA manual DMRB 13.1.2). However, the PAR states, it should be noted that the number of accidents during the latest available 3 year period has reduced dramatically. If the accident rate of nearly 3 accidents per year is maintained then up to 1 accident per year could be saved by the installation of a roundabout. However, if the rate is closer to current rate (1 PIA per year), then no savings in accidents could be expected.
- 5.13 Negligible accident impact expect during construction or future maintenance.

Economy

- 5.14 The PAR states that at this location there are ghost islands on both minor and major roads which are consequently not easily understood by drivers.

Accessibility

- 5.15 The PAR states that no provision of a pedestrian crossing at the junction gives problems for pedestrians crossing the A21/A2100. These include users of Mountfield and Whatlington Primary School and King George's playing field and those travelling to bus stops.

Integration

- 5.16 The PAR states that the proposal conforms to policies to make best use of strategic network but some conflict with AONB and countryside protection policies.

Appraisal Summary Table (AST)

- 5.17 The main points to note from the AST of the A21/A2100 John's Cross Junction Improvement PAR are stated below under the five different objectives. The AST is presented in Table 5.1.

Environment

- 5.18 The following environmental impacts were predicted in the AST:
- ◆ **Noise** – Noise will generally be reduced by the scheme. Decreases will be 3dB(A) or more at 4 residential properties with 1 to 3dB(A) decreases at further 6 dwellings. There will be significant noise reductions at other locations including the school. *Net 10 properties experience lower noise levels;*

- ◆ **Local air quality** – Although there is no change in roadside pollutant concentrations or the number of properties within the 50m bands, there will be a slight improvement in air quality at properties near the junction due to a small increase in the distance between the roads and the properties. *Neutral*;
- ◆ **Landscape** – Initial adverse impact on local landscape character. Neutral effect in the longer term due to improved screening, with planting to integrate the junction into the surrounding landscape. *Neutral*;
- ◆ **Biodiversity** – Low diversity of habitats affected. Opportunities for habitat creation and enhancement of existing habitats along the western edge of the road corridor. *Slight Benefit*;
- ◆ **Heritage** – Initial impact on the overall setting of the cultural historic resources due to increased junction size. Impact on the potential archaeological remains is unknown. *Slight Adverse*;
- ◆ **Water** – Existing road run-off discharges into the stream with no provision for filtration. No impact on water resources. The proposal of wetland systems to provide bio filtration may result in an overall improvement in the quality of road run off. *Neutral*;

Safety

5.19 The following safety impacts were predicted in the AST:

- ◆ Construction and maintenance periods have not been assessed.
- ◆ The AST presents the following predicted accident impact of the scheme over 30 years:

Accidents	Number	Fatal	Serious	Slight
LOW	30	1	9	38
HIGH	34	1	10	44

Economy

5.20 Economy impacts were split into four different sub objectives of:

- ◆ Journey times and vehicle operating costs;
- ◆ Cost;
- ◆ Journey time reliability; and
- ◆ Regeneration.

5.21 The following impacts were predicted regarding journey times and vehicle operating costs :

- ◆ Slight decrease in journey time. Construction and maintenance periods have not been assessed.
- ◆ Trunk road journey time savings of 0.09 minutes peak and 0.06 minutes inter peak.

- 5.22 The following impact was predicted regarding scheme cost-
- ◆ Revised junction layout may lead to increased maintenance costs due to increased pavement area and additional road signs.
- 5.23 The following impact was predicted regarding journey time reliability-
- ◆ Reduction in accidents should improve reliability in the long term.
- 5.24 The following impact was predicted regarding regeneration-
- ◆ The village is not a designated regeneration area and there are no developments conditional in the scheme. *Neutral.*

Accessibility

- ◆ Pedestrians and Others – Footway added to W side of junction. Existing footways on other sides of junction retained. Pedestrian pelican crossing added to junction. *Moderate benefit.*
- ◆ Access to public transport – Existing bus stops reinstated on realigned roads. Additional puffin crossing increases ease of access to bus stops. *Slight benefit.*
- ◆ Community transport – General pattern of movement unaffected, but additional puffin crossing and parking/drop-off bays provide some benefit for local residents and users of the primary school. *Slight benefit.*

Integration

- ◆ Conforms to policies to make best use of strategic road network and protect heritage, but some conflict with AONB and countryside protection policies. *Neutral.*

OUTTURN EFFECTS

- 5.25 In order to assess the actual or outturn effects of the opening of the scheme, we have produced an Evaluation Summary table (EST), which mirrors the appearance of the AST, and includes details of the actual sub objectives that have been evaluated. The EST is presented in Annex E.
- 5.26 Section three discussed the economy and safety impacts of the scheme. This section concentrates on the other three impacts included in the AST, namely
- ◆ **Environmental Impacts** such as noise, local air quality, landscape, biodiversity, heritage and water;
 - ◆ **Accessibility Impacts** such as change in access to public transport, severance within communities and impact on pedestrian and other modes; and
 - ◆ **Integration** measured by how the scheme accords with policy.
- 5.27 The assessments that follow are all subjective assessments from members of the evaluation team.
- 5.28 The following reiterates the statements that accompanied these impacts before providing photographic evidence that the mitigating measures have been implemented.

Noise – Noise will generally be reduced by the scheme Decreases will be 3dB(A) or more at 4 residential properties with a 1 to 3 dB(A) decreases at a further 6 dwellings. There will be significant noise reductions at other locations including the school. Net 10 properties experience lower noise levels.

5.29 Whilst no noise assessment has been undertaken post opening there are two reasons that we can conclude that noise levels have decreased (although this can't be quantified). These two reasons are as follows:

- ◆ The new alignment of the A21 North and A21 south has moved to the west thus taking traffic away from the properties and noise will have a greater chance to dissipate due to greater distance between properties and traffic. Figure 5.1 shows a post opening photo showing the A21 running past property entrances and Figure 5.2 shows the new access road and car park where the A21 used to run.
- ◆ Environmental/Noise barrier provided on the east side of the A21 providing a barrier between properties including the school and the A21. Figure 5.3 shows a photo of the environmental barrier included as part of the scheme.



Figure 5.1 – Pre Opening Photo



Figure 5.2 – Post Opening Photo

- 5.30 Figure 5.1 shows that the original A21 ran right up against the entrances to the properties, whilst Figure 5.2 is a photo from roughly the same spot showing that that piece of road is now a school car park and access road and the A21 is off picture to the right.



Figure 5.3 – Environmental/Noise Barrier

- 5.31 Figure 5.3 shows the environmental/noise barrier that was provided with the scheme, with the A21 and new roundabout to the left and properties and school to the right (on the other side of the barrier).

- 5.32 As a result of the carriageway being realigned further away from the properties and school and that an environmental/noise barrier has been provided we can conclude that the scheme has been beneficial in noise related impacts. (Although it can't be quantified).

Biodiversity – Low diversity of habitats affected. Opportunities for habitat creation and enhancement of existing habitats along the western edge of the road corridor. Slight Benefit.

- 5.33 The PAR states that Opportunities for habitat creation on current area of arable land incorporated into the scheme, which could include wetland, wildflower grassland and mixed tree and shrub plantings. Given suitable design, the overall impact may be positive for biodiversity.
- 5.34 Figures 5.4 and 5.5 show examples of planting provided with the scheme.



Figure 5.4 – Example of Planting Accompanying the Scheme



Figure 5.5 – Example of Planting Accompanying the Scheme II

5.35 From Figure 5.4 and 5.5 it is apparent that planting and landscaping has accompanied the scheme. Figure 5.4 shows planting that used to be on arable land and it could be argued that it has indeed led to a habitat creation but it will be a few years before this is firmly established.

5.36 We agree with WS Atkins prediction that the impact could be a slight benefit but suggest that this is re-evaluated in future years.

Heritage – Initial impact on the overall setting of the cultural historic resources due to increased junction size. Slight Adverse.

5.37 Figure 1.2 and 1.3 show photos of the junctions as it now is and the junction as it was. It is apparent that the junction is larger in size hence WS Atkins assessment of slight adverse due to initial impact on the overall setting of the cultural historic resources due to increased junction size is agreed with.

Accessibility – Pedestrians and Others – Footway added to west side of junction. Existing footways on other sides of junction retained. Pedestrian pelican crossing added to junction. Moderate Benefit.

5.38 Figure 5.6 shows the new pedestrian crossing and footway provided as part of the scheme with the school, environmental barrier and roundabout to the rear.



Figure 5.6 – Pedestrian Crossing and New Footway

- 5.39 Figure 5.6 shows a section of the new footway to the west of the junction and the new puffin crossing that has been provided. From a visit to the site it wasn't obvious who would use the crossing or the new footway and we concluded that it would have very little use. As a result of the footway and crossing being provided we have assessed this as a benefit but as we feel that it will result in very little footfall then this has only been assessed as a slight benefit.

Accessibility – Access to Public Transport – Existing bus stops reinstated on realigned roads. Additional puffin crossing increases ease of access to bus stops.

- 5.40 Figures 5.7 and 5.8 show the new bus stop provision provided as part of this scheme.



Figure 5.7 – New Bus Stop on West Side of A21



Figure 5.8 – Bus Stop to the East Side of A21 on Access Road

- 5.41 Figure 5.7 and 5.8 show photos of the bus stops on the east and west sides of the A21. The bus stop on the west side is a new bus stop whilst the bus stop on the east side sits on the alignment of the A21 before the scheme was implemented. The puffin crossing as shown in Figure 5.6 will help access to the bus stop (on the west side of the A21) especially for the school.
- 5.42 John's Cross is served by an hourly bus route between Maidstone and Hastings. The following provides a brief description of the services:

Hastings – Southbound. Weekday - Buses are every hour between 06:20 and 1742 after which there are two evening buses. Saturday – Buses are every hour between 0742 and 1742 and there are two evening buses. Sunday – No Buses

Maidstone – Northbound. Weekday – One at 0735, hourly between 0903 and 1908, plus two evening buses. Saturday – Hourly between 0908 and 1908 and two evening buses. Sunday - no buses.

- 5.43 As a result of the new puffin crossing, access to the bus stop on the west side of the carriageway is improved and we agree with the evaluation of a slight benefit. But this benefit will only be very slight due to the lack of frequency of service and lack of patronage.

Accessibility – Community Severance – General pattern of movement unaffected, but additional puffin crossing and parking/drop off bays provide some benefit for local residents and users of the primary school.

- 5.44 Figure 5.9 shows the parking and school drop off zone provided as part of the scheme (this is provided on the old alignment of the A21).



Figure 5.9 – Parking and Drop off Areas for Mountfield School

- 5.45 Figure 5.6 shows the puffin crossing that was provided as part of the scheme and Figure 5.9 (above) shows the parking and drop off areas provided as part of the scheme (as well as environmental barrier). Therefore as these have been provided we have agreed with WS Atkins assessment of a slight beneficial impact.
- 5.46 The main points to note from Outturn Impacts are:
- ◆ Impact of noise has been reduced by the realignment of the carriageway and the provision of an environmental barrier;
 - ◆ Planting which accompanied the scheme has led to habitat creation;
 - ◆ Impact on heritage due to larger junction size;

- ◆ Accessibility for pedestrians and others has been improved through the provision of a pedestrian crossing and footway;
- ◆ Access to public transport has improved through the provision of a new bus stop and a pedestrian crossing giving easier access to the bus stop. It should be noted that this is only a slight benefit due to lack of service frequency and patronage; and
- ◆ New pedestrian crossing and additional parking bays has provided benefit with regard to community severance.

6. Conclusions

- 6.1 The main points to note from this evaluation of the A29 Johns Cross Junction Improvement are:

Safety

- 6.2 Six accidents occurred in 53 months pre opening which equates to 0.13 accidents per month;
- 6.3 One accident occurred in 14 months post opening which equates to 0.07 accidents per month;
- 6.4 From the accident descriptions it was established that 4 out of 6 post opening accidents caused by the junction in its original form;
- 6.5 No accidents were caused by the junction in its current form; and
- 6.6 0.90 accidents saved a year with a change in junction form (assuming that no accidents occur on the roundabout).

Traffic Volumes

- 6.7 A21 carries approximately 7000 – 7500 vehicles daily;
- 6.8 A21 has a fairly seasonal flow with more traffic during the summer months;
- 6.9 Traffic levels remain fairly constant and do not appear to have been affected by the traffic flow; and
- 6.10 The different movements from each arm are similar in both the AM and PM peaks.

Junction Delay

- 6.11 Maximum average junction delay on the day of surveys of 4 seconds demonstrates that the junction operates below capacity.

POPE

- 6.12 Outturn scheme cost is 25% less than predicted.
- 6.13 Scheme delivers substantially more journey time benefit than was predicted.
- 6.14 As a result of the higher journey time benefit in high growth and lower scheme cost the scheme has delivered a higher benefit cost ratio than forecast pre opening.

Outturn Effects

- 6.15 Impact of noise has been reduced by the realignment of the carriageway and the provision of an environmental barrier;

- 6.16 Planting which accompanied the scheme has led to habitat creation;
- 6.17 Impact on heritage due to larger junction size;
- 6.18 Accessibility for pedestrians and others has been improved through the provision of a pedestrian crossing and footway;
- 6.19 Access to public transport has improved through the provision of a new bus stop and a pedestrian crossing giving easier access to the bus stop. It should be noted that this is only a slight benefit due to lack of service frequency and patronage; and
- 6.20 New pedestrian crossing and additional parking bays has provided benefit with regard to community severance.

Overall

- 6.21 The scheme has been a greater success than predicted.

Annex A – Analysis of Accident Data

Safety

The original Atkins PAR and AST estimated that the scheme would result in between 30 and 34 accidents over the 30 year assessment period. They also forecast that if the accident rate of nearly 3 accidents per year was maintained pre opening then up to 1 accident per year could be saved by the installation of a roundabout.

It is usual for accident savings to be evaluated at least three years after opening in order to get a fair reflection in the number of accidents in the vicinity of the roundabout. Therefore this evaluation should be considered to be an initial view based upon limited available data.

The PAR examined accidents between 1996 and the 2000. During this period 14 PIA's occurred, of which 3 were serious and 11 slight. This equated to an observed accident rate of 2.8 personal injury accidents per annum which is over double the national average accident rate of 1.11 personal injury accidents for this type of rural junction.

From the PAR it was unclear which area was used to select accidents included within the accident dataset. Therefore for the purpose of this evaluation the accident assessment was revisited to assess the pre and post opening accident record so that an accurate like-for-like comparison could be made.

Accident data was obtained from the managing agent for the period 01/01/1999 to 31/07/2004.

Figure A1 displays the accidents recorded in the vicinity of Johns Cross over the 67 month period.

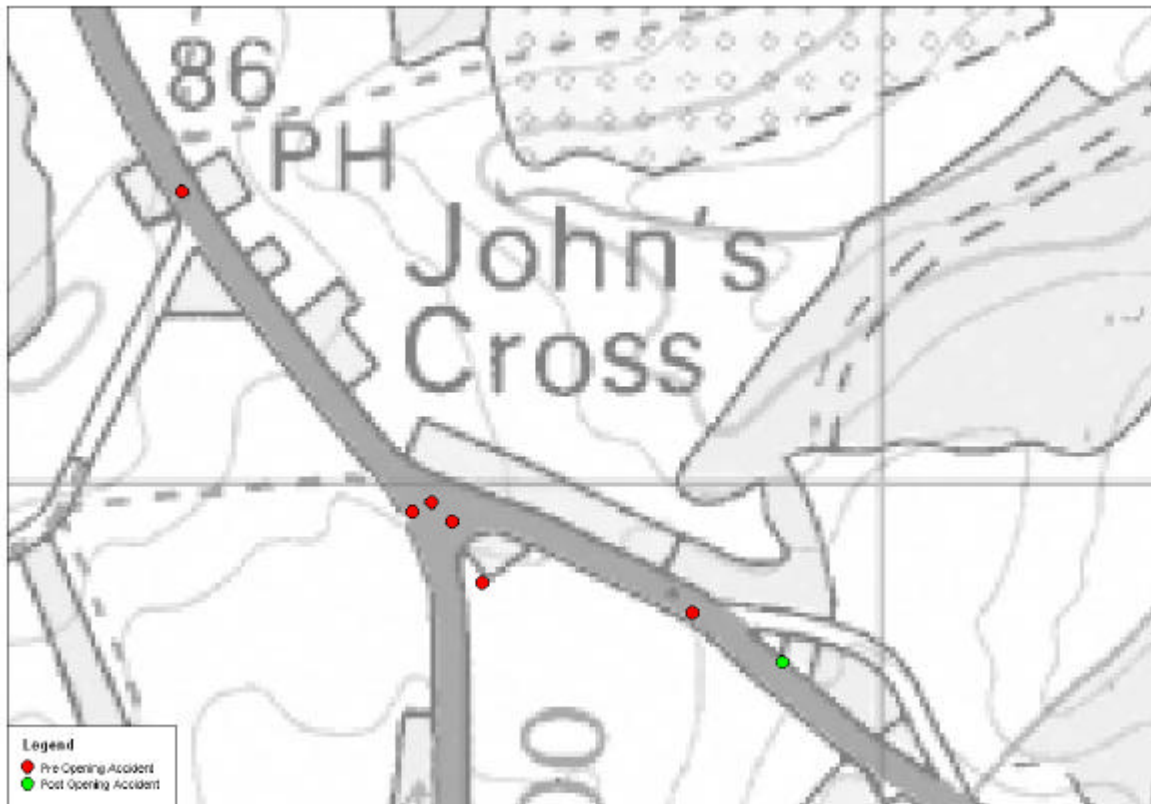


Figure A1– Pre and Post Opening Accidents

From Figure A1 it is apparent that 7 accidents occurred over the 67 month period with 6 accidents in the 53 months pre opening and one accident in the 14 months post opening. Table A1 summarises these accidents.

Table A1– Accident Data

Accident Reference	Pre Or Post	Severity	Casualties
T002006	PRE	Slight	3
T004721	PRE	Slight	1
T126350	PRE	Slight	1
T133161	PRE	Slight	1
T143860	PRE	Serious	1
K151258	PRE	Slight	1
K176796	POST	Slight	1

Pre Opening there were 0.13 accidents per month and Post Opening there were 0.07 accidents per month (14 months). All accidents were of slight severity other than one serious accident post opening.

Pre Opening Accident Descriptions

The following is the description of all accidents that occurred pre opening as presented in Table A1.

- ◆ T002006 – V2 travelling North on the A21 slowed for the junction with the A2100 but V1 travelling behind failed to slow and collided with rear.
- ◆ T004721 – Pedestrian crossing A21 from North side to central island was hit by Vehicle one travelling south east on A21, before reaching central island.
- ◆ T126350 – Vehicle two waiting at junction to turn onto A21. Vehicle two came up behind and failed to stop as looking right. Vehicle one collided with rear of vehicle two.
- ◆ T133161 – Vehicle two travelling SE turning right into A2100. Stops in central reservation. Vehicle one travelling north applies brakes to slow for right hand bend. Drivers alleges steering/brake failure.
- ◆ T143860 – Vehicle one failed to give way and drove into the path of vehicle two.
- ◆ K151258 – Vehicle 2 slowed and stopped as car in front turning right. Vehicle one failed to stop and collided into back of vehicle two.

Post Opening Accident Descriptions

The following is the description of the accident that occurred post opening as presented in Table A1.

- ◆ K176796 – Vehicle one travelling south lost control after front near side wheel clipped kerb. Vehicle mounted verge and hit two road signs.

From the pre opening accident descriptions it is apparent that 4 of the 6 accidents were caused by the junction in its original form. From the post opening accident data it is apparent that no accidents have been caused by the new junction form.

It can be concluded that if accidents that occurred in the 53 months pre opening carried on at the same rate then 0.90 accidents would be saved per year with the change in junction form (assuming that the new junction form continues to lead to no accidents).

The main points to note from the safety section are:

- ◆ Seven accidents occurred over 67 months;
- ◆ Six accidents occurred in 53 months pre opening which equates to 0.13 accidents per month;
- ◆ One accident occurred in 14 months post opening which equates to 0.07 accidents per month;
- ◆ From the accident descriptions it was established that 4 out of 6 accidents caused by the junction in its original form;
- ◆ No accidents were caused by the junction in its current form; and
- ◆ 0.90 accidents saved a year with a change in junction form (assuming that no accident occur on the roundabout).

Annex B –Analysis of Traffic Flow Data

Two sources of count data will be presented in this section:

- ◆ Highways Agency Permanent Monitoring Sites; and
- ◆ Manual Classified Count.

Highways Agency Permanent Monitoring Sites

The following are the permanent monitoring sites that we utilised during this evaluation:

- ◆ NB A21 Kent Street (E 578214, N 116833);
- ◆ SB A21 Kent Street (E 578214, N 116833);
- ◆ NB A21 Robertsbridge Bypass (E 574068, N 124329); and
- ◆ SB A21 Robertsbridge Bypass (E 574068, N 124329).

The locations of these count sites are shown in Figure 3.2 with ADT (weekday) being shown. It should be noted that although the permanent counts sites are a reasonable distance from the scheme (Robertsbridge Bypass 3.7km and Kent Street 5.6km) due to the nature of the local roads it can be used as a far indication of the traffic using the A21 arms of John’s Cross junction.

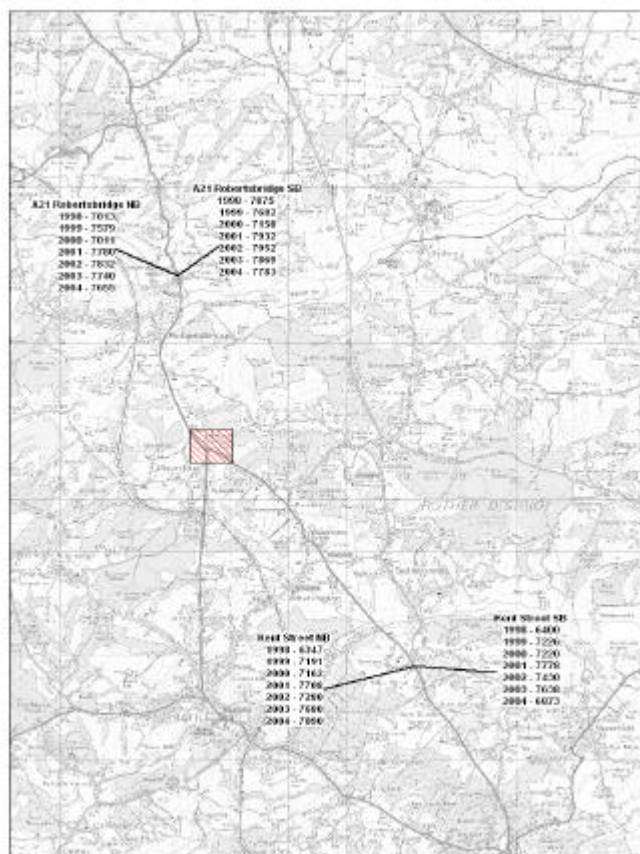


Figure B1– Location of Monitoring Sites with Average Daily Traffic

Figure B1 shows that the A21 carries approximately 7000 - 7500 vehicles daily.

Figure B2 presents Average Daily Traffic by month at the A21 at Kent Street. The dashed red line represents the opening date of the scheme.

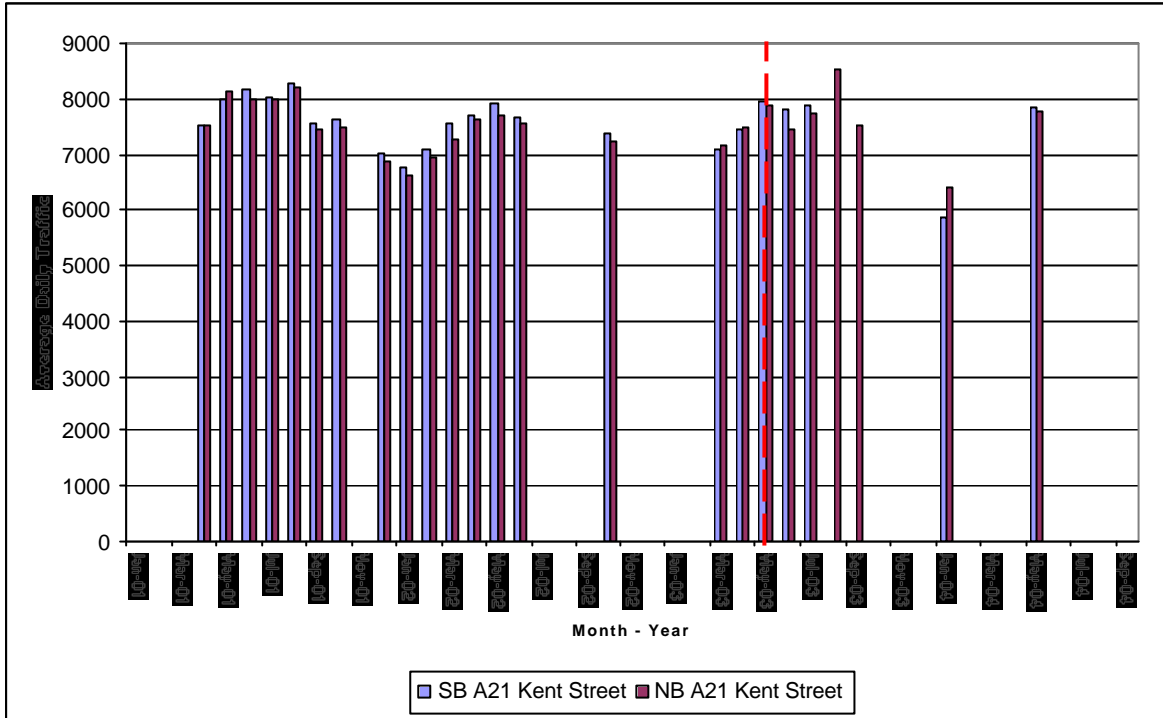


Figure B2– Average Daily Traffic by Month on A21 at Kent Street

As can be seen from Figure B2 numerous months of count data were missing (due to problems with the counters). It is therefore very difficult to draw any conclusions on the variability of counts at this site. It is apparent that the traffic flow is fairly seasonal.

Figure B3 shows the average daily traffic at Robertsbridge bypass, this also suffers from the same problem of counter reliability but does include more complete data.

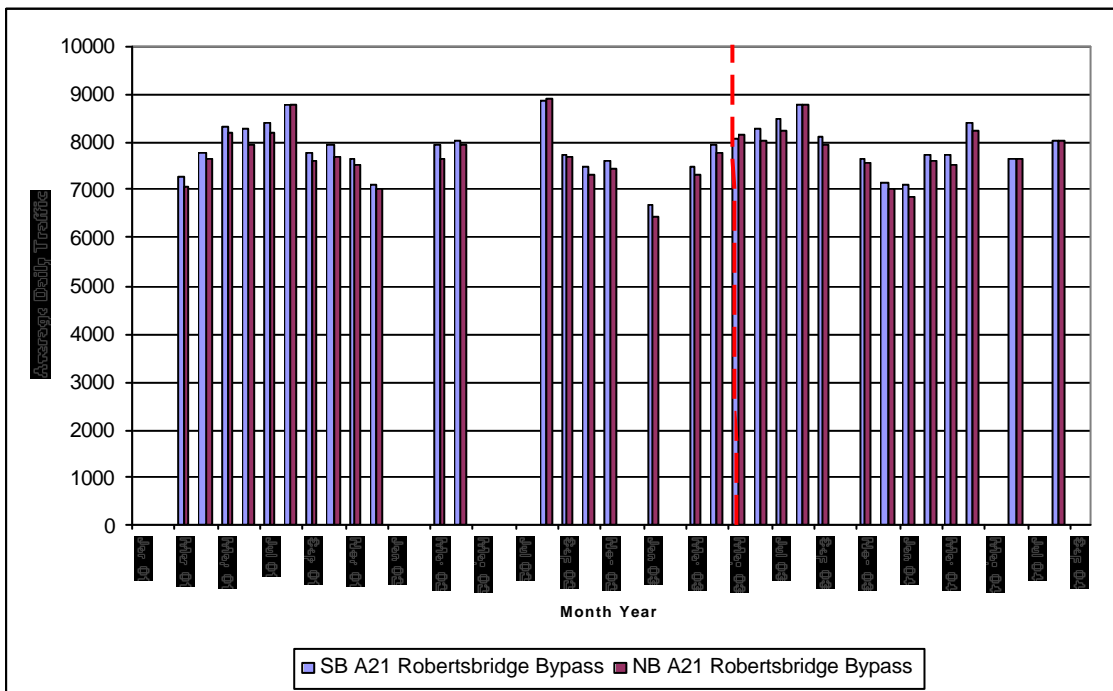


Figure B3– Average Daily Traffic by Month on A21 at Robertsbridge Bypass

It is apparent from Figure 3.4 that the scheme hasn't had any significant impact on the flow on the A21. It also should be noted that the A21 does appear to have a reasonable range in seasonal traffic.

Manual Classified Count

Pre opening counts and predictions were obtained from a COBA model undertaken for the scheme.

A manual classified count (post Opening) was undertaken at the site for the purposes of this evaluation. This count was undertaken on Tuesday 12th October 2004. The count was undertaken by counting the different movements as shown in Figure B4.

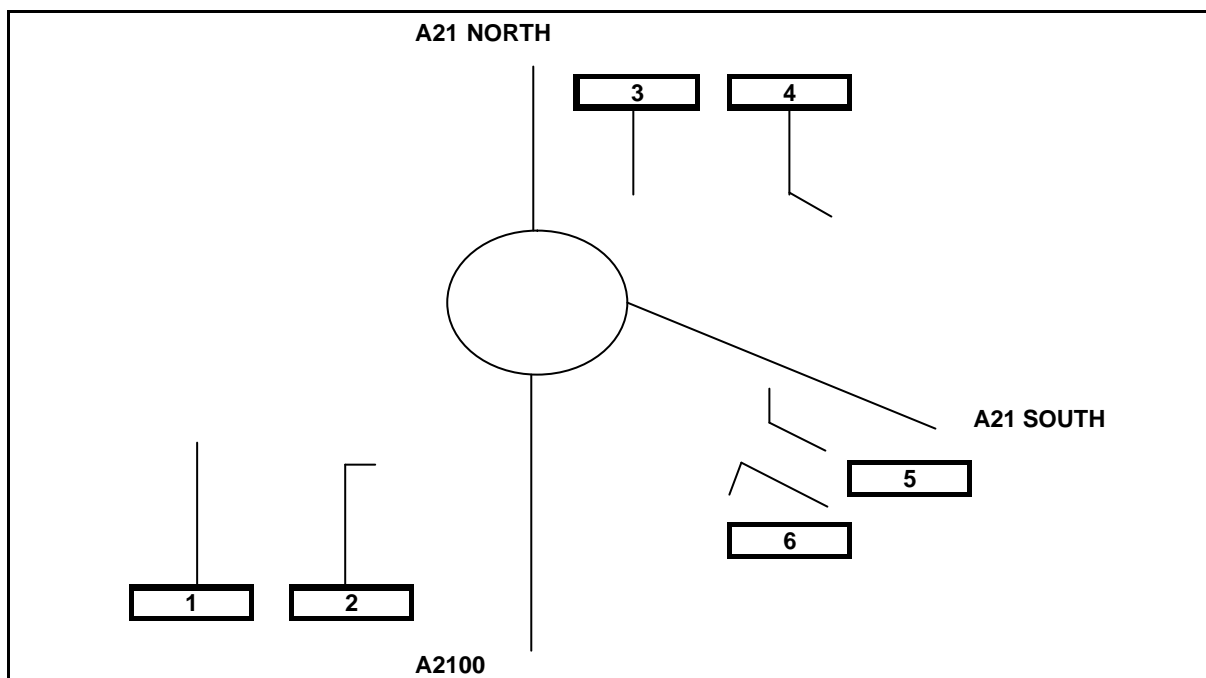


Figure B4– Turning Movements at Johns Cross

Pre opening flows are shown in Table B1, post opening flows in Table B2 and a pre and post opening flow comparison in Table B3.

Table B1 – Pre Opening Flows

Movement	Description	2002 AM	2002 PM	2015 LOW AM	2015 LOW PM	2015 HIGH AM	2015 HIGH PM
1	A2100 to A21 North	273	227	328	272	360	300
2	A2100 to A21 South	143	84	172	101	189	111
3	A21 North to A2100	240	341	288	409	317	450
4	A21 North to A21 South	320	495	384	594	422	653
5	A21 South to A21 North	453	316	544	379	598	417
6	A21 South to A2100	115	96	138	115	152	127

It was predicted pre opening that traffic would grow (2002 – 2015) by 20% low growth and 32% high growth. These figures are extracted from the JUICE files that accompanied the PAR.

Table B2- Post Opening Flows

Move ment	2004 AM	2004 PM	*2002 AM	*2002 PM	*2015 LOW AM	*2015 LOW PM	*2015 HIGH AM	*2015 HIGH PM
1	310	255	300	247	364	299	302	321
2	135	132	131	128	159	155	417	166
3	240	333	232	322	282	391	302	420
4	331	472	320	457	389	554	417	595
5	407	304	394	294	478	357	513	383
6	141	119	136	115	166	140	178	150
Total								

*Factored using a combination of NRTF and TEMPRO

The post opening counts in Table B2 are represented by 2004 and these counts were factored using NRTF weighted by TEMPRO to give figures for pre opening (2002) and 2015.

The purpose of this factoring was so that direct comparisons could be made as shown in Table B3.

Table B3 – Pre and Post Opening Flows

Move ment	2002 AM PRE	2002 PM PRE	2004 AM	2004 PM	% Change AM	% Change PM	*2002 AM	*2002 PM	% Change AM	% Change PM
1	273	227	310	255	14%	12%	300	247	10%	9%
2	143	84	135	132	-6%	57%	131	128	8%	52%
3	240	341	240	333	0%	2%	232	322	-3%	-6%
4	320	495	331	472	3%	-5%	320	457	0%	-8%
5	453	316	407	304	-10%	4%	394	294	-13%	-7%
6	115	96	141	119	23%	24%	136	115	18%	20%

Key points to note from Table B3 is that:

- ◆ A2100 to A21 North traffic has grown by 14% in the AM peak and 12% in the PM peak;
- ◆ A2100 to A21 south has decreased by 6% in the AM peak and increased by 57% in the PM peak;
- ◆ A21 North to A2100 has stayed the same in the AM peak and has increased by 2% in the PM peak;
- ◆ A21 North to A21 South has increased by 3% in the AM peak and decreased by 5% in the PM peak;
- ◆ A21 South to A21 North has decreased by 10% in the AM peak and increased by 4% in the PM peak; and
- ◆ A21 South to A2100 has increased by 23% in the AM peak and 24% in the PM peak.

The manual classified counts can also be interrogated for traffic routing. Table B4 shows traffic routing and % of vehicles entering at each arm.

Table B4 – Post Opening Flows

From	To	AM		PM	
		Vehs	% Dist	Vehs	% Dist
A2100	A21 North	310	70%	255	66%
A2100	A21 South	135	30%	132	34%
From A2100		445	28%	387	24%
A21 North	A2100	240	42%	333	41%
A21 North	A2100	331	58%	472	59%
From A21 North		571	37%	805	50%
A21 South	A21 North	407	74%	304	72%
A21 South	A2100	141	26%	119	28%
From A21 South		548	35%	423	26%
TOTAL		1564	100%	1615	100%

The main points to note from Table B4 are that:

- ◆ The distributions of traffic exiting from each arm remains similar in both the AM and PM peaks which suggests that this is not a commuter route;
- ◆ Traffic entering the roundabout is relatively evenly split in the AM peak period with slightly less entering from the A2100; and
- ◆ Half the traffic entering the roundabout during the PM peak period is from the A21 north, with approximately a quarter from the A2100 and A21 South.

The main points to note from the traffic flow section are as follows:

- ◆ A21 carries approximately 7000 – 7500 vehicles daily;
- ◆ A21 has a fairly seasonal flow with more traffic during the summer months;
- ◆ Traffic levels remain fairly constant and do not appear to have been affected by the traffic flow; and
- ◆ The different movements from each arm are similar in both the AM and PM peaks.

Annex D - Original Scheme AST

A21/A2100 JOHN'S CROSS JUNCTION IMPROVEMENT		Provision of normal roundabout at priority junction and right turning lane for northbound traffic to improve safety through the village, with additional access and off road parking for community facilities.		
PROBLEMS		The existing junction is too complicated and confusing to motorists leading to a higher number of junction orientated accidents than a normal roundabout.		
OTHER OPTIONS		Various arrangements considered initially. Alternative roundabout included in public consultation; this scheme was preferred.		
OBJECTIVES		QUALITATIVE IMPACTS	QUANTITATIVE MEASURE	ASSESSMENT
ENVIRONMENT	Noise	Noise will generally be reduced by the scheme. Decreases will be 3dB(A) or more at 4 residential properties with 1 to 3 dB(A) decreases at 6 further dwellings. There will be significant noise reductions at other locations including the school.	No. properties experiencing: - Increase in noise 0 - Decrease in noise 10	Net 10 properties experience lower noise levels
CO ₂ : tonnes added Nil	Local air quality	Although there is no change in roadside pollutant concentrations or the number of properties within the 50m bands, there will be a slight improvement in air quality at properties near the junction due to a small increase in the distance between the roads and the properties.	No. properties experiencing: - better air quality 0 - worse air quality 0	+/- 0 PM10 +/- 0 NO2
	Landscape	Initial adverse impact on local landscape character. Neutral effect in the longer term due to improved screening, with planting to integrate the junction into the surrounding landscape.	Not Applicable	Neutral
	Biodiversity	Low diversity of habitats affected. Opportunities for habitat creation and enhancement of existing habitats along the western edge of the road corridor.	Not Applicable	Slight Benefit
	Heritage	Initial impact on the overall setting of the cultural historic resources due to increased junction size. Impact on the potential archaeological remains is unknown.	Not Applicable	Slight Adverse
	Water	No impact on water resources. The proposal of wetland systems to provide bio filtration may result in an overall improvement in the quality of road run off.	Not Applicable	Neutral
SAFETY	-	Construction and maintenance periods have not been assessed.	Accidents Deaths Serious Slight Low: 30 1 9 38 High: 34 1 10 44	PVB low £0.963m; 82% of PVC PVB high £1.279m 109% of PVC
ECONOMY	Journey times & VOCs	Slight decrease in journey time. Construction and maintenance periods have not been assessed.	Trunk road journey time savings: Peak 0.09 mins; Inter Peak 0.06 mins;	PVB low £0.125m 11% of PVC PVB high £0.231m 20% of PVC.
	Cost	Revised junction layout may lead to increased maintenance costs due to increased pavement area and additional road signs.	Not Applicable	PVC £1.173m
	Journey time reliability	Reduction in accidents should improve reliability in the long term.	Not Applicable	Not Applicable
	Regeneration	The village is not a designated regeneration area and there are no developments conditional in the scheme.	Not Applicable	Neutral

A21 Johns Cross Junction Improvement

ACCESSIBILITY	Pedestrians and others	Footway added to W side of junction. Existing footways on other sides of junction retained. Pedestrian pelican crossing added to junction.	Not Applicable	Moderate Benefit
	Access to public transport	Existing bus stops reinstated on realigned roads. Additional puffin crossing increases ease of access to bus stops.	Not Applicable	Slight Benefit
	Community severance	General pattern of movement unaffected, but additional puffin crossing and parking/drop off bays provide some benefit for local residents and users of the primary school.	Not Applicable	Slight Benefit
INTEGRATION		Conforms to policies to make best use of strategic road network and protect heritage, but some conflict with AONB and countryside protection policies.	Not Applicable	Neutral
Version of 04/04/01	Cost Benefit Analysis		PVB low £1.088m PVB high £1.509m PVC £1.173 NPV low -£0.086m NPV high £0.336m Weighted NPV £0.083m BCR low 0.9 BCR high 1.3 Weighted BCR 1.06	

Note: This Table reproduces the AST of the PAR document, all costs and benefits are in 1994 prices, discounted to 1994 at 6%.

Annex E - Atkins EST

A21/A2100 JOHN'S CROSS JUNCTION IMPROVEMENT		Provision of normal roundabout at priority junction and right turning lane for northbound traffic to improve safety through the village, with additional access and off road parking for community facilities.		
PROBLEMS		The existing junction is too complicated and confusing to motorists leading to a higher number of junction orientated accidents than a normal roundabout.		
OTHER OPTIONS		Various arrangements considered initially. Alternative roundabout included in public consultation; this scheme was preferred.		
OBJECTIVES		QUALITATIVE IMPACTS	QUANTITATIVE MEASURE	ASSESSMENT
ENVIRONMENT	Noise	Noise will generally be reduced by the scheme. Decreases will be 3dB(A) or more at 4 residential properties with 1 to 3 dB(A) decreases at 6 further dwellings. There will be significant noise reductions at other locations including the school.	No. properties experiencing: - Increase in noise 0 - Decrease in noise 10	Slight Benefit due to provision of environmental barrier
CO ₂ : tonnes added Nil	Local air quality	Although there is no change in roadside pollutant concentrations or the number of properties within the 50m bands, there will be a slight improvement in air quality at properties near the junction due to a small increase in the distance between the roads and the properties.	No. properties experiencing: - better air quality 0 - worse air quality 0	Unsure
	Landscape	Initial adverse impact on local landscape character. Neutral effect in the longer term due to improved screening, with planting to integrate the junction into the surrounding landscape.	Not Applicable	Neutral
	Biodiversity	Low diversity of habitats affected. Opportunities for habitat creation and enhancement of existing habitats along the western edge of the road corridor.	Not Applicable	Slight Benefit
	Heritage	Initial impact on the overall setting of the cultural historic resources due to increased junction size. Impact on the potential archaeological remains is unknown.	Not Applicable	Slight Adverse
	Water	No impact on water resources. The proposal of wetland systems to provide bio-filtration may result in an overall improvement in the quality of road run off.	Not Applicable	Neutral
SAFETY	-	Construction and maintenance periods have not been assessed.	Accidents Deaths Serious Slight Low : 0.9 Accidents High: 0.9 Accidents	Low £964,827 High: £1,174,869
ECONOMY	Journey times & VOCs	Slight decrease in journey time. Construction and maintenance periods have not been assessed.	Trunk road journey time savings:	Low: £37,709 High: £773,479
	Cost	Revised junction layout may lead to increased maintenance costs due to increased pavement area and additional road signs.	Not Applicable	PVC £885,710
	Journey time reliability	Reduction in accidents should improve reliability in the long term.	Not Applicable	Not Applicable
	Regeneration	The village is not a designated regeneration area and there are no developments conditional in the scheme.	Not Applicable	Neutral
ACCESSIBILITY	Pedestrians and others	Footway added to W side of junction. Existing footways on other sides of junction retained. Pedestrian pelican crossing added to junction.	Not Applicable	Slight Benefit

	Access to public transport	Existing bus stops reinstated on realigned roads. Additional puffin crossing increases ease of access to bus stops.	Not Applicable	Slight Benefit
	Community severance	General pattern of movement unaffected, but additional puffin crossing and parking/drop off bays provide some benefit for local residents and users of the primary school.	Not Applicable	Slight Benefit
INTEGRATION		Conforms to policies to make best use of strategic road network and protect heritage, but some conflict with AONB and countryside protection policies.	Not Applicable	Neutral
Version of 04/04/01	Cost Benefit Analysis		Low: PVB £1,002,536 PVC £885,710 NPV £0.117m BCR 1.13 High: £1,948,348 PVC £885,710 NPV £1.062m BCR 2.20	

All costs and benefits are in 1994 prices discounted to 1994 at 6%