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TRANSPORT SCOTLAND
SCOTTISH TRUNK ROAD INFRASTRUCTURE PROJECT EVALUATION

3YA Evaluation Report for A77(T) Glen App

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The following abbreviations have been used in this report:

AADT	Annual Average Daily Traffic
ATC	Automatic Traffic Counter
BCR	Benefit to Cost Ratio
DMRB	Design Manual for Roads and Bridges
ES	Environmental Statement
NPV	Net Present Value
NRTF	National Road Traffic Forecasts
RSA	Road Safety Audit
S2	Single 2-Lane Carriageway
STAG	Scottish Transport Appraisal Guidance
WS2	Wide Single 2-Lane Carriageway

SUMMARY OF IMPACTS

1 SUMMARY OF IMPACTS

This section provides a short summary of the key elements contained within this Three Year After Evaluation report of the A77(T) Glen App project.

1.1 Operational Indicators – How is the project operating?

The project has had no significant impact on traffic volumes within the vicinity of the improvement. Given the improvement incorporates an on-line upgrade of the existing carriageway from single to wide single carriageway, this is as expected.

Post-opening surveys of speed and overtaking conditions suggest the project is operating as expected. Overall, fewer platoons of vehicles are exiting the survey site than entering due to the improved overtaking opportunities for vehicles resulting in platoons dispersing. It is important to recognise the A77(T) Glen App project forms part of a wider programme of upgrades which also include provision for overtaking manoeuvres in the eastbound direction of travel.

The project is operating safely in the first three years after opening, with only one accident occurring within the vicinity of the project. This accident was not attributable to the design or layout of the project.

1.2 Process Indicators – How well was the project implemented?

Process Indicators provide evaluation across the key elements of programme, project cost and process.

The A77(T) Haggstone and A77(T) Glen App projects were constructed under a single Design and Build contract. Construction commenced in October 2007 and the project was opened to traffic in December 2008. The cost of construction of the combined projects was £3.4m (23%) lower than predicted during the appraisal.

In terms of process, the majority of the mitigation which was included within the Environmental Statement has been implemented on site, is in good condition and performing as expected.

A Stage 5 RSA was carried out within the vicinity of the project and confirmed that one slight accident occurred in the period three years after opening, however, no conclusions can be drawn that would suggest road safety deficiencies in the project.

1.3 Forecasting – How accurate were predictions?

Traffic flows on the A77(T) in the vicinity of the project are lower than forecast, and have been falling for a number of years. It is acknowledged, however, that the economic downturn has seen a widespread reduction in traffic flows across the Scottish road network and the reduced flows observed in the vicinity of the project are consistent with national trends.

As noted in Section 1.2, the cost of construction of the combined projects was lower than that predicted during the appraisal.

1.4 Objectives – Is the project on track to meet its objectives?

The project's objectives, in relation to the operation of the project, focussed on the improvement and increase in the number of overtaking opportunities and improving the level of service and safety by reducing the effects of driver stress and journey times on this section of the A77(T).

The nature of the project (a wide single carriageway) has provided enhanced overtaking opportunities and subsequently will have helped to reduce driver frustration through the dispersion of platoons as a result of the available opportunities to overtake. As mentioned previously in Section 1.1, it is important to recognise the project forms part of a series of improvements along the A77(T) which combine to provide overtaking opportunities in both directions of travel.

Mean vehicle speed data is used as a proxy for journey time data for the project, the analysis of which suggests that journey times are consistent with average speeds to be expected on this route.

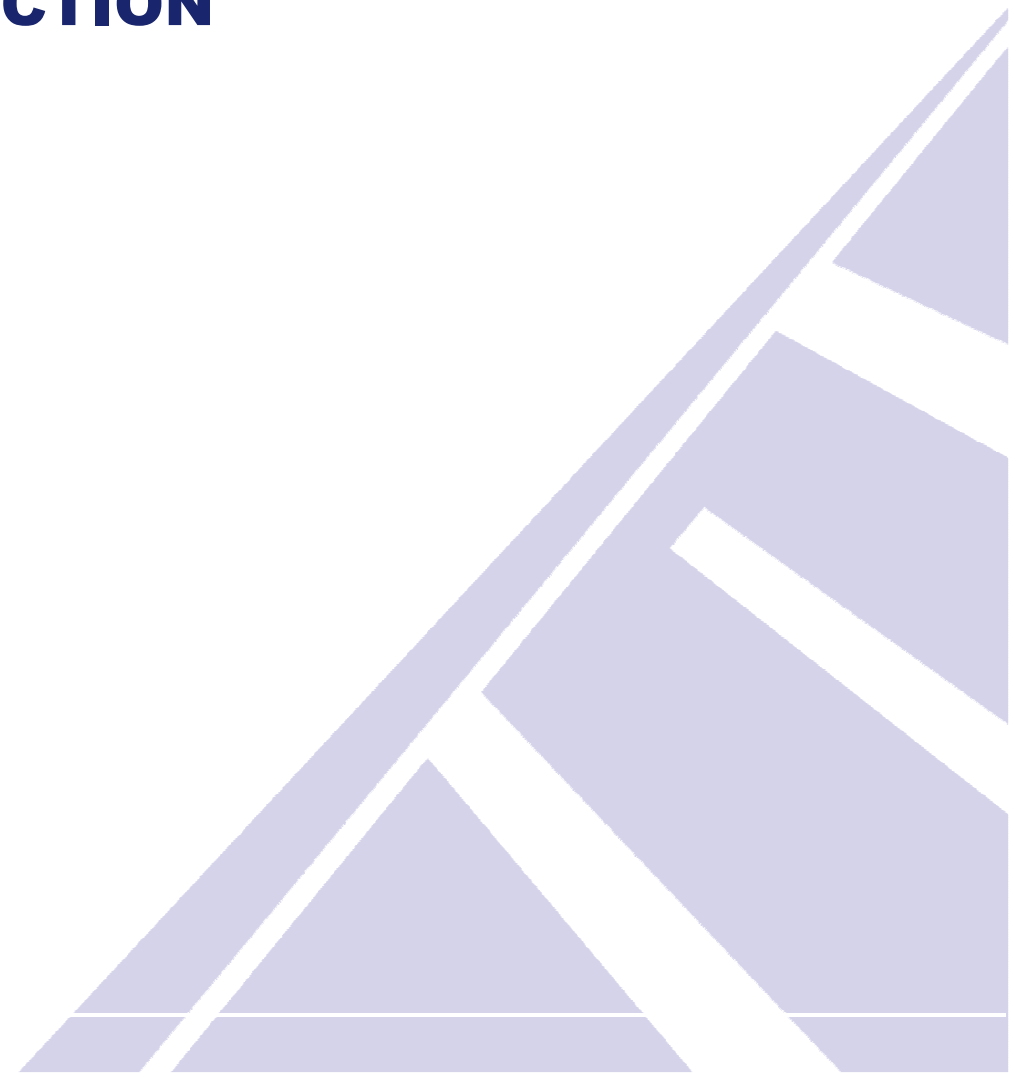
As noted in Section 1.2, the Stage 5 RSA report confirmed that one slight accident had occurred following opening and the project can be judged to be operating safely in the first three years of operation.

1.5 Costs to Government – Is the project delivering value for money?

Based on the evaluation of value for money at the time of the project's 3YA Evaluation, the Net Present Value (NPV) of -£9.69m and Benefit to Cost Ratio (BCR) of 0.54 for the combined A77(T) Haggstone and A77(T) Glen App projects are unlikely to be greater than predicted at the time of assessment. This reflects the combined effect of the lower than predicted project costs, as referred to in Section 1.2, and the lower than forecast traffic flows, which will have resulted in the overestimation of the predicted project benefits. The lower than forecast traffic flows are seen to be as a result of external factors related to the economic downturn which could not have been foreseen at the time the forecasting was undertaken.

While there is variation expected on the NPV and BCR forecasts, the Glen App project forms part of the Route Action Plan for the A77(T) comprising a series of improvements which can be expected to provide benefits to transport users and help support economic development within south-west Scotland and beyond. In particular, the project positively contributes to improving the operation of a key strategic route connecting to key ferry terminals in the region.

INTRODUCTION



2 INTRODUCTION

2.1 Background to Project Evaluation

Road infrastructure projects normally take a minimum of five to seven years to plan prior to the commencement of construction and it is not possible to know exactly what will happen when a project is opened, nor what would have happened had the project not been built, particularly when the project is opened a number of years after its assessment.

The aims of evaluation, as set out in the Design Manual for Roads and Bridges (DMRB), Volume 5, SH 1/97 'Traffic and Economic Assessment of Road Schemes in Scotland', are as follows:

- To satisfy the demands of good management and public accountability by providing the answers to questions about the effects of a new or improved road;
- To identify the strengths and weaknesses in the techniques used for appraising projects, so that confidence in the roads programme is maintained;
- To allow the predictive ability of the traffic or transport models used to be monitored to establish whether any particular form of model is consistently more reliable than others when applied to particular types of projects; and
- To assist in the assessment of compensation under Part 1 of the Land Compensation (Scotland) Act 1973 for depreciation due to the physical factors caused by the use of public works.

The evaluation of trunk road projects is evolving as Transport Scotland improves its process and reporting to reflect the principles of monitoring and evaluation set out in the Scottish Transport Appraisal Guidance (STAG).

STAG advocates evaluation against indicators and targets derived for the Transport Planning Objectives originally set for the project, STAG criteria (Environment, Safety, Economy, Integration and Accessibility & Social Inclusion) and relevant policy directives, the aim of which is to identify:

- Whether the project is performing as originally intended;
- Whether, and to what extent, it is contributing to established policy directives; and
- Whether the implemented project continues to represent value for money.

Furthermore, Scottish Trunk Road Infrastructure Project Evaluation (STRIPE) by Transport Scotland sets out the requirements for evaluation which draws on DMRB and STAG. This document was finalised in 2013 and acts as a guide to evaluation for relevant projects. STRIPE states that two programmed evaluations should be carried out on relevant projects, as follows:

- A one-year after Evaluation (1YA) – prepared one year after opening, this report should "provide Transport Scotland with an early indication (as far as is practicable) that the project is operating as planned and is on-track to achieve its objectives. The 1YA evaluation also provides a Process Evaluation including an assessment of actual vs. forecast project cost, and programme together with reasons for variance". STRIPE also states that a stand-alone report should be prepared on each individual project. Information gathering should be supported by a site visit and stakeholder interviews.
- A Detailed Evaluation – evaluated three or five years after opening. This second evaluation "considers a project's impacts, whether it has achieved its objectives and reviews the actual impacts against forecasts and determines the causes of any variances".

2.2 Evaluation Reporting

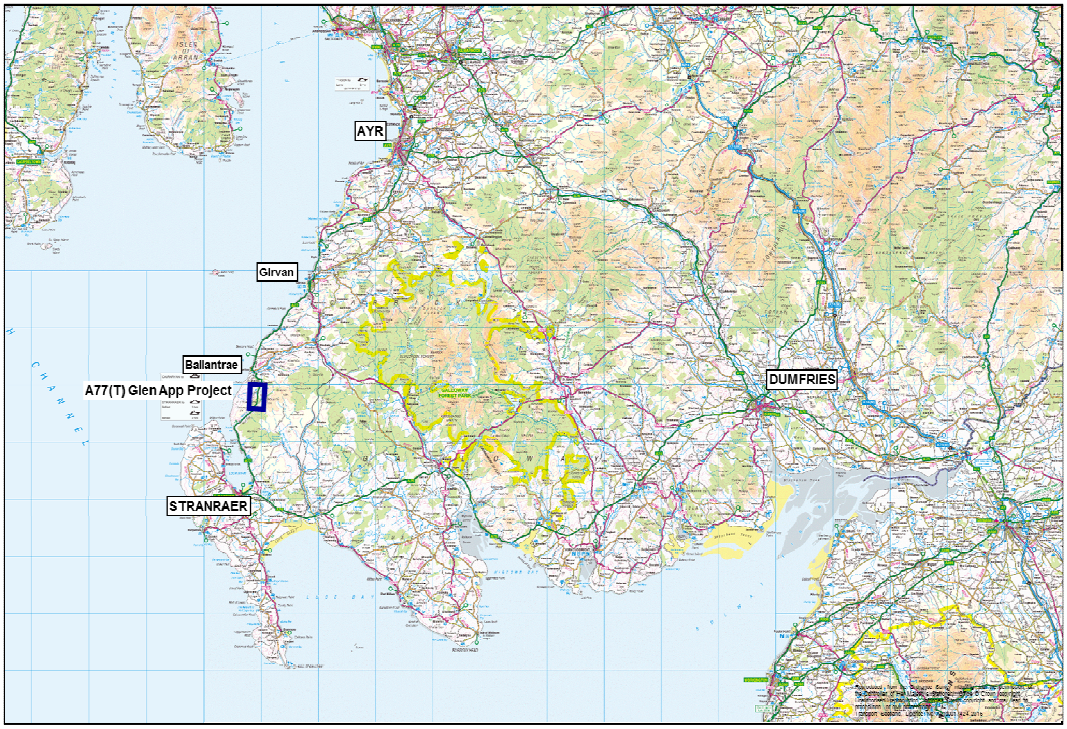
As recommended in STRIPE, this report constitutes a Detailed Evaluation Report at the Three Year After (3YA) Stage. It is a standalone report on the A77(T) Glen App Project. This project fits the criteria for evaluation at this stage, as it cost over £5m and has previously been evaluated at the One Year After (1YA) Stage. The location of the project is presented in Figure 2.1.

Table 2.1: Project Summary Details

Route	Project Name	Standard	Length (km)	Open to Traffic
A77(T)	Glen App	WS2	1.0	December 08

Key: WS2 Wide Single Carriageway

Figure 2.1: Project Location Plan



2.3 Previous Evaluations

A 1YA Evaluation was carried out for the A77(T) Glen App project and was reported within the *Evaluation Report for Trunk Road Projects Opened between April 2007 and March 2009* report, dated January 2013.

The key findings from the 1YA Evaluation report were as follows:

Operational Indicators

Comparison Between Pre and Post Opening Traffic Flows

The comparison between pre and post project opening traffic volumes on the A77(T) at Auchencrosh indicated that traffic flows in 2009 were around 100 vehicles per day (vpd) (4%) lower than 2005 flow levels. Traffic volumes between 2009 and 2011 were broadly consistent.

Comparison Between Predicted and Actual Traffic Flows

The comparison between predicted and actual AADT flows indicated that the predicted 2009 flow (derived by interpolating between the modelled assessment year traffic flows) was 13% and 17% greater than the observed 2009 flows under low and high traffic forecast scenarios respectively.

Post Opening Overtaking Opportunities

The comparison between pre and post opening overtaking surveys indicated that:

- Approximately 20% of vehicles travelling through the survey site in the northbound direction, in both the AM and PM survey periods, carried out an overtaking manoeuvre prior to the opening of the project compared to approximately 17% and 26% of vehicles, in the AM and PM survey periods respectively, following opening of the project.
- Approximately 14% and 19% of vehicles in the AM and PM survey periods respectively, travelling through the survey site in the southbound direction, carried out an overtaking manoeuvre prior to the opening of the project compared to approximately 20% and 21% of vehicles, in the AM and PM survey periods respectively, following opening of the project.
- As a consequence of the increased overtaking in both directions of travel, a greater number of platoons were dispersed over the survey site post opening compared to the level of platoons dispersed during the pre opening survey.

Change in Travel Times

The comparison between mean vehicle speeds over the extents of the survey site indicated that speeds in both directions of travel have not been significantly affected by the project.

Environment

The implementation of mitigation measures committed within the Environmental Statement were investigated and it was deemed that these had been implemented to a satisfactory level. It was observed, however, that much of the planting provided as part of the project was in poor condition. Whilst some variations from the proposed mitigation measures had been identified, these were not considered to have had a material detrimental impact on the general integration of the project into its surrounding.

Safety

An assessment of the one year post opening personal injury accidents and a review of the Stage 4 RSA report, suggested that the project is operating safely.

Economy

A difference between predicted and actual AADT flows of this magnitude suggested that the economic benefits of the combined projects will have been

overestimated due to external factors that could not have readily been foreseen at the time of assessment.

Cost to Government

The combined out-turn cost of the two A77(T) projects is approximately £3.2m (22%) lower than was predicted.

Value for Money

The NPV and BCR of the combined A77(T) projects are unlikely to be significantly greater than predicted at the time of assessment, although it is judged that the projects will continue to provide a benefit to road users and will help encourage economic development within south west Scotland and beyond.

Achievement of Objectives

The initial indications noted within the 1YA Evaluation Report suggested that the majority of the project's objectives may be achieved. It was noted, however, that at the 1YA Evaluation stage it could not be confirmed whether the project would achieve good value for money although it could be expected that the project would continue to provide benefits to transport users and may help to encourage economic development within south-west Scotland and beyond.

DETAIL OF EVALUATION

3 PROJECT EVALUATION

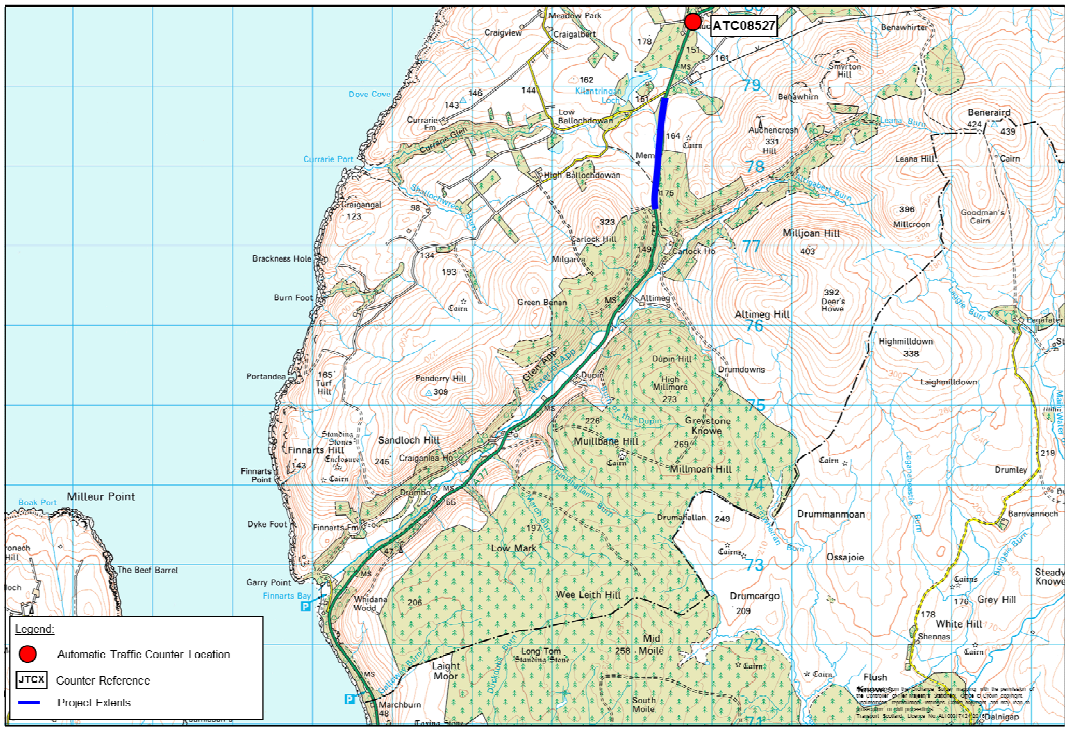
3.1 Introduction

Project Description

The project involved the construction of approximately 1.0 kilometre of off-line wide single carriageway (WS2) in addition to approximately 250 metres of on-line improvement. The project was officially opened to traffic on 22nd December 2008.

The project was implemented as part of a wider Route Action Plan including the adjacent A77(T) Haggstone project. The general location of the project is shown in Figure 3.1.

Figure 3.1: Project General Location Plan



Project Objectives

The objectives of the A77(T) Glen App project were set as follows:

- To improve and increase the number of overtaking opportunities to eradicate the conflicts between long distance users and local / agricultural traffic;
- To improve the operational performance and level of services and safety on the A77(T) by reducing the effects of driver stress and journey times

by constructing dedicated overtaking sections designed to break up the effects of convoys / platoons;

- To maintain the asset value of the A77(T) route;
- To mitigate the environmental impact of the new works where possible; and
- To achieve good value for money for both taxpayers and transport users.

3.2 Evaluation Methodology

As set out in Section 2.1, this Three Year After report presents the results of a Three Year Evaluation of the A77(T) Glen App project, focusing on:

- The operation of the project: how the project is operating (in terms of traffic and safety in particular); and
- Objectives: whether the project has met or will meet its objectives.

A process evaluation has also been carried out, which considers how the project was implemented across the elements of project cost, programme and key processes. The main aspects of the process evaluation are summarised in Section 1 of this report and commentary included within this section under the appropriate criteria. For example, the RSA process is considered as part of the discussion on how the project is operating in terms of Safety.

This 3YA evaluation has been informed by the analysis of survey data supported by a site visit carried out in June 2014. External stakeholder views were also invited. Feedback was received from a variety of respondents, which is presented within the report.

Appendix B provides further information on the methodology employed and data sources used to inform this 3YA Evaluation.

3.3 The operation of the project and process evaluation

Network Traffic

The evaluation is supported by the consideration of pre and post opening comparison of operational indicators, which focuses on network traffic indicators including traffic volumes and travel times, presented in the following section.

Traffic Volumes

The Automatic Traffic Counters (ATC) located within the study area are as follows:

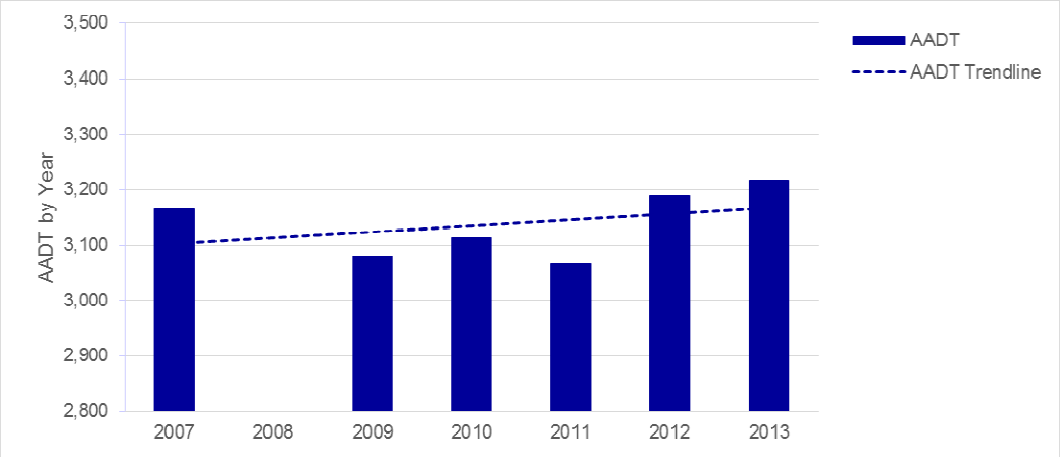
- ATC08527 A77 at Auchencrosh

The locations of the ATC used to record traffic flows within the study area are shown in Figure 3.1.

Comparison Between Pre and Post Opening Traffic Flows

The Annual Average Daily Traffic (AADT) flows pre and post project opening on the A77(T) route within the vicinity of the project are presented in Figure 3.2. The percentage of Heavy Goods Vehicles (HGVs) are not available as classified traffic data by vehicle type is not available from the ATC within the vicinity of the project.

Figure 3.2: Long Term ATC Data



The ***1YA Evaluation*** indicated that traffic flows in 2009 were around 100 vehicles per day (vpd) (4%) lower than 2005 flow levels. Traffic volumes between 2009 and 2011 were broadly consistent and given the nature of the project, changes in traffic are not likely to be as a consequence of changes to the carriageway standard and may be as a result of reductions in traffic volumes across the wider trunk road network due to the economic downturn experienced during the evaluation period.

A comparison between the latest available pre and post opening traffic volumes on the A77(T) within the vicinity of the project indicates that traffic flows in 2013 were approximately 60 vehicles per day (vpd) higher than 2007 flow levels. Traffic volumes between 2009 and 2013 increased by approximately 150 vpd (5%), however, analysis of the long term trends in traffic flows on the A77(T) route suggests that traffic flows have been broadly stable.

Comparison Between Predicted and Actual Traffic Flows

The latest flow comparisons for the project are based on AADT flows from 2013 as this was the latest full year of reliable traffic data available from Transport Scotland's traffic counters within the vicinity of the project. As part of the project's appraisal, National Road Traffic Forecasts (NRTF) low and high growth factors were applied to the observed 2004 base year traffic flows to derive opening and future modelled assessment year traffic flows.

Predicted traffic flows for 2013 were derived by interpolating between the modelled assessment year design network flows. A summary of the actual and predicted traffic data is shown in Table 3.1 below.

Table 3.1: Traffic Analysis Summary

ATC Ref	Actual AADT*	Predicted AADT			% Difference (Predicted – Actual) / Actual		
		Low	60/40	High	Low	60/40	High
A77(T) at Auchencrosh							
ATC08527	3,218	3,603	3,685	3,809	12.0%	14.5%	18.4%

* 2013 flows (latest full year of ATC data available)

The comparison between predicted and actual AADT flows in Table 3.1 indicates that the predicted 2013 flow (derived by interpolating between the modelled assessment year traffic flows) was approximately 12% and 18% greater than the observed 2013 flow under low and high traffic forecast scenarios respectively. The ***1YA Evaluation*** indicated that the predicted 2009 flow (derived by interpolating between the modelled assessment year traffic flows) was approximately 13% and 17% greater than the observed 2009 flows under low and high traffic forecast scenarios respectively

Whilst the latest comparison indicates that traffic growth on the A77(T) has fallen significantly short of the assumed NRTF forecasts, it is recognised that there has been a general fall in traffic volumes across the wider trunk road network in recent years due to the economic downturn that may in part account for the difference.

Changes in Irish Sea Ferry operations since the original assessment in 2004 coupled with an overall reduction in the total number of cars using the ferry services of approximately 25% between 2004 and 2012 (*Ref. Scottish Transport Statistics No 32: 2013 Edition*), which may also have contributed to observed flows being lower than forecast.

Traffic Volumes: Key Findings

Observed traffic flows are on average 15% lower than forecast flows. This is in part attributed to the overall decline in traffic observed across the trunk road network during the economic downturn which coincided with the project opening in 2008. Changes in Irish Sea Ferry operations may also be a contributing factor.

A comparison between the 1YA and 3YA after evaluation shows the variation between forecast and predicted traffic flows is broadly stable. If this magnitude of difference were to continue throughout the project's appraisal period, it would impact on the overall economic performance of the project which is discussed further in Section 3.6.

Overtaking Opportunities

Comparison Between Pre and Post Opening Overtaking Opportunities

A post opening overtaking survey was undertaken on the A77(T) in November 2011 to provide an indication of conditions at Glen App as part of the project's ***1YA Evaluation***.

The results from the post opening survey were compared against the results from a pre opening survey undertaken in March 2004 to provide an indication of the effect that the project has had on overtaking conditions.

Analysis of the results from the post opening survey undertaken as part of the ***1YA Evaluation*** indicated that the percentage of northbound vehicles that carried out an overtaking manoeuvre during both the pre opening AM and PM survey periods was 20%, which can be compared to 26% and 17% respectively during the post opening survey. The comparison indicates that the level of northbound overtaking had reduced during the PM period. This was judged to potentially be as a result of the higher opposing traffic flows on the route during the post opening PM survey period when compared with the pre opening survey, which may present fewer opportunities for northbound vehicles to carry out an overtaking manoeuvre.

In the southbound direction, 14% and 19% of all southbound vehicles that travelled through the survey site during the pre opening AM and PM survey periods respectively carried out an overtaking manoeuvre, which can be compared against 20% and 21% respectively during the post opening survey. This suggests that the project had increased overtaking in the southbound direction of travel.

A further post opening overtaking survey was undertaken on the A77(T) in June 2014 to provide an indication of any changes in conditions as part of the project's 3YA Evaluation. The post opening surveys recorded the number of overtaking manoeuvres, platooning and vehicle speeds on the A77(T) in both directions of travel within the direct vicinity of the project.

The results from the June 2014 post opening survey were compared against the results from the post opening survey undertaken in November 2011 to provide an indication of the effect that the project has had on overtaking conditions and any changes in overtaking levels that may have occurred during the period following opening of the scheme in April 2008. The comparison of the results from the pre and post opening surveys, undertaken in November 2011 and June 2014, is presented in Table 3.2 below.

Table 3.2: Level of Overtaking

	AM Survey Period		PM Survey Period	
	Northbound	Southbound	Northbound	Southbound
Pre Opening (2004)	20%	14%	20%	19%
Post Opening (2011)	26%	20%	17%	21%
Post Opening (2014)	16%	16%	17%	12%

Analysis of the results from the post opening survey indicates that approximately 16% and 17% of vehicles that travelled through the survey site in the 1-lane northbound direction during the AM and PM survey periods carried out an overtaking manoeuvre. In the 1-lane southbound direction, approximately 16% and 12% of vehicles that travelled through the survey site during the AM and PM survey periods respectively.

The variation in the level of overtaking undertaken in both directions, particularly within the AM and PM survey periods, may be as a result of the lower volumes of traffic recorded during the June 2014 survey compared to the November 2011 survey (traffic volumes during the June 2014 survey periods were up to approximately 10% lower). However, the observed variation in overtaking levels may be an isolated case making it impossible to draw any significant conclusion from this data.

Comparison Between Pre and Post Opening Vehicle Platoons

Post opening platooning data, collected as part of the post opening overtaking surveys, was available for the AM and PM survey periods. The ***1YA Evaluation*** noted that, as a consequence of the increased overtaking in both directions of travel, a greater number of platoons were dispersed over the survey site post opening compared to the level of platoons dispersed during the pre opening survey.

The results from the June 2014 post opening survey were compared against the results from the post opening survey undertaken in November 2011 to provide an indication of the effect that the project has had on platooning conditions and any changes in platooning levels that may have occurred during the period following opening of the project in December 2008. The comparison of the results from the post opening surveys undertaken in November 2011 and June 2014 is presented in Figure 3.3a and Figure 3.3b below. "Enter" indicates the point at which vehicles enter the survey site whereas "Exit" indicates the point at which vehicles leave the survey site.

Analysis of the results presented in Figure 3.3a and Figure 3.3b indicates that the platooning conditions recorded in June 2014 are broadly comparable with those recorded in November 2011 and suggests that as a consequence of the increased overtaking in both directions of travel, a greater number of platoons were dispersed over the survey site. It is noted, however, that in the northbound direction during the AM and PM survey periods, the number of platoons with fewer than three vehicles exiting the survey site was greater than entering the survey site, suggesting that larger platoons may be dispersed over the extents of the survey site, resulting in the formation of greater numbers of smaller platoons.

A comparison between the total number of platoons that entered and exited the survey site during the post opening surveys compared to the pre opening survey suggests that, overall, the project has a positive effect on the dispersion of vehicles in platoon over the extents of the survey site.

Figure 3.3a: Number of Platoons (AM Survey Period)

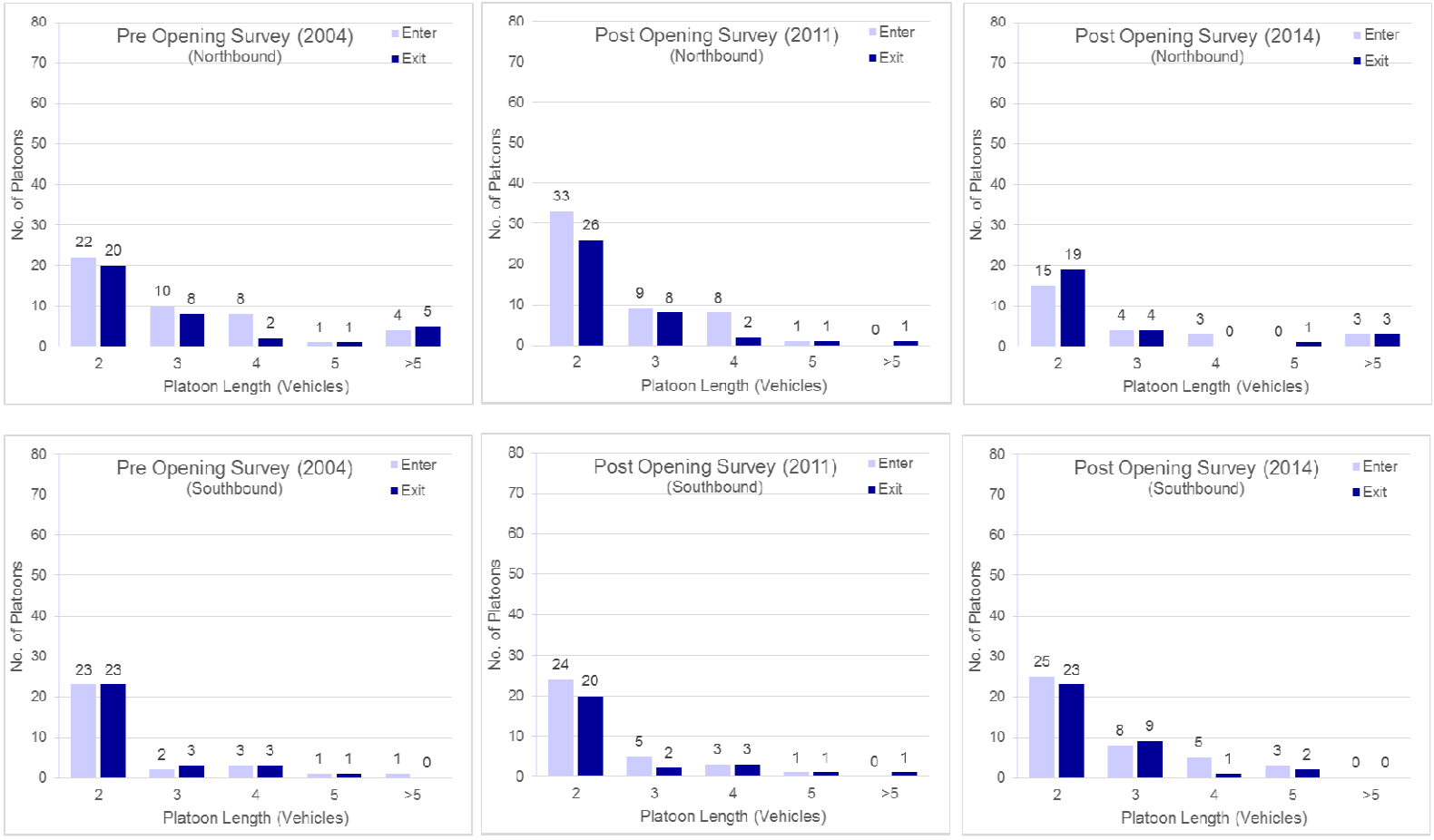
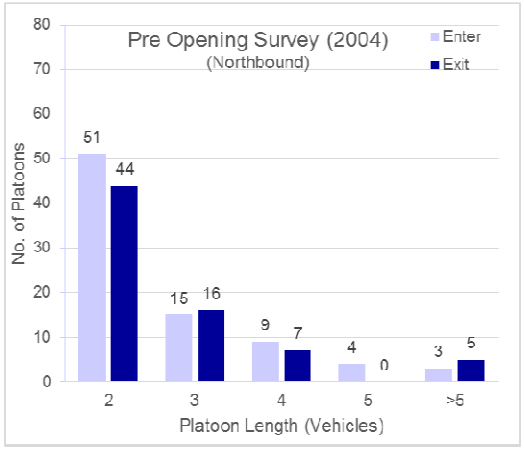
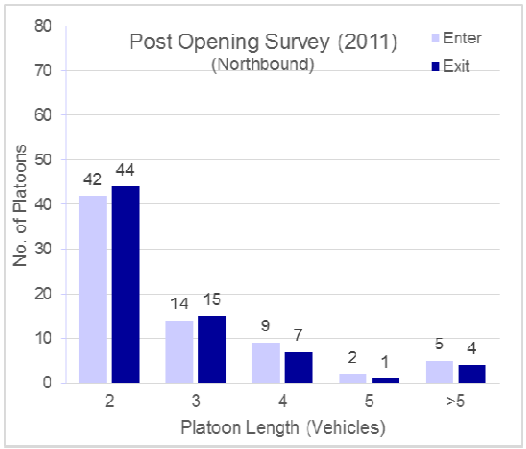
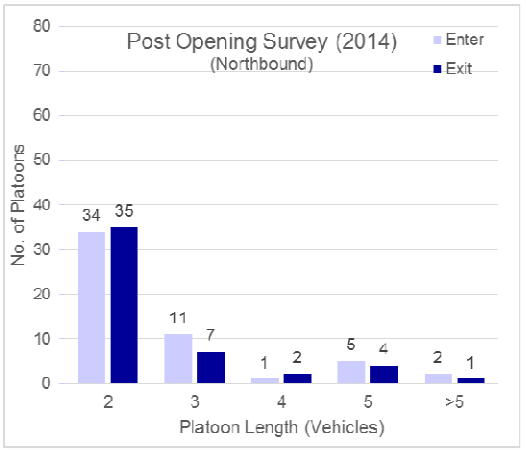
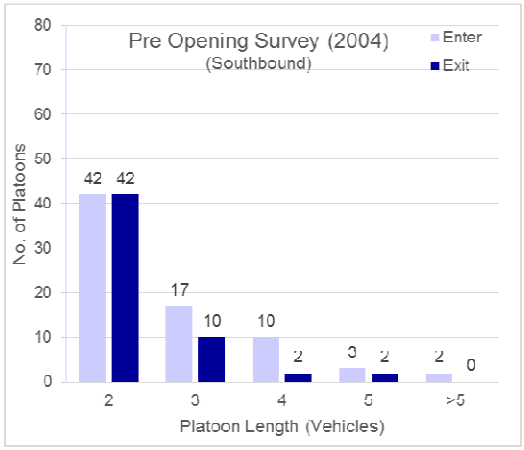


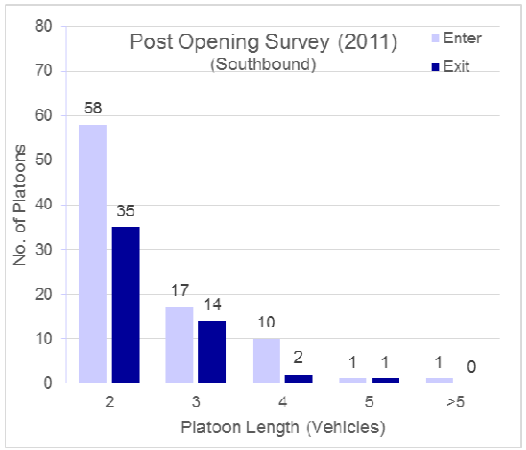
Figure 3.3b: Number of Platoons (PM Survey Period)

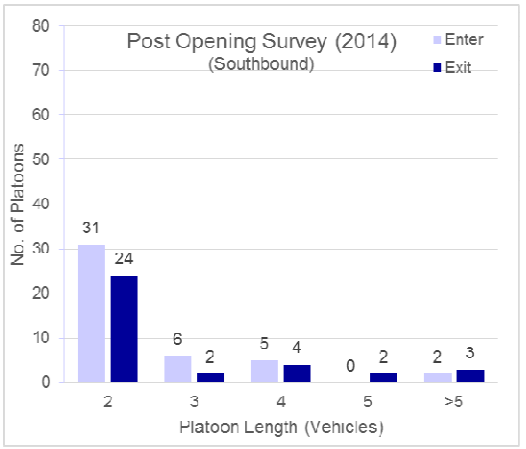












Overtaking Opportunities: Key Findings

The project has facilitated overtaking in both directions of travel with between approximately 16% to 17% and 12% to 16% of vehicles travelling through the survey site in the northbound and southbound directions of travel respectively carrying out an overtaking manoeuvre during the post project survey undertaken in June 2014.

Overall, the project has had a positive effect on the dispersion of vehicles travelling in platoon in both directions of travel over the extents of the survey site.

Vehicle Speeds

Mean vehicle speeds, estimated from the information collected as part of the pre and post opening overtaking surveys, have been used as a proxy for changes in travel times. The ***1YA Evaluation*** indicated that the comparison between mean vehicle speeds over the extents of the survey site indicate that speeds in both directions of travel had not been significantly affected by the project.

The results from the June 2014 post opening survey were compared against the results from the post opening survey undertaken in November 2011 to provide an indication of the effect that the project has had on mean vehicle speeds. The comparison of the results from the post opening surveys undertaken in November 2011 and June 2014 is presented in Table 3.3 below.

Table 3.3: Assessment of Mean Vehicle Speeds (mph)

	AM Survey Period		PM Survey Period	
	Northbound	Southbound	Northbound	Southbound
Pre Opening (2004)	56	53	58	51
Post Opening (2011)	56	50	56	50
Post Opening (2014)	51	50	54	49

Analysis of the results presented in Table 3.3 indicates that the mean vehicle speeds recorded in June 2014 are broadly comparable with those recorded in November 2011. The mean vehicle speeds in both directions of travel during both the AM and PM survey periods are also broadly comparable.

It is noted, however, that the northbound mean vehicle speeds calculated from the June 2014 data set were lower by 5mph when compared to the November 2011 data, during the AM survey period. It is judged that this may reflect an isolated one-off variation as slight variations in the location of the cameras between the post opening surveys may account for slight differences in calculated mean vehicle speeds. It is therefore not possible to draw any significant conclusion from this data.

Stakeholder feedback

Two respondents considered that the A77(T) projects (Haggstone and Glen App) had improved journey times and labelled the projects as a "*major improvement*" while two other respondents noted "*no great change in the timing*". It was also noted that, although it was perceived that there had not been significant changes in journey times, "*the drive now feels easier*" and "*reliability has been improved*".

"the A77 projects had improved journey times"

"the drive now feels easier" and "reliability has been improved"

Travel Times: Key Findings

Overall, the project is considered not to have had a significant impact on journey times. This is in part a reflection of the project extending over a short section of the A77(T).

Analysis of the speed data collected as part of the overtaking surveys indicates mean speeds to be broadly comparable between the survey periods and, as such, the project is considered not to have had a material impact on the mean speed of vehicles across the survey site.

3.4 Environment

The following section provides a summary of the assessment of environmental mitigation measures proposed for the A77(T) Glen App project. A fuller report is provided in Appendix A.

Review of Environmental Mitigation Measures

The environmental mitigation measures originally proposed for the A77(T) Glen App project were obtained from the project's Environmental Statement (ES), and the findings of the project's 1YA Evaluation completed in 2010 were reviewed (see Section 2.3). As part of the 3YA Evaluation, a site visit was carried out in June 2014, to confirm the implementation and condition of the environmental mitigation measures and review any comments raised in the 1YA Evaluation about the environmental mitigation.

The ES for the project proposed mitigation measures to address impacts under the following criteria:

- Ecology and nature conservation;
- Landscape;
- Land use; and
- Water quality and drainage.

Findings

Overall the project's environmental mitigation is considered to be in good condition and where previously planting had failed, the verges now support a mix of species. Planting throughout the corridor includes a mix of wildflowers, dominated by daises which create a striking visual effect against the immediate surroundings during the spring and summer months. To the west of the project, where it is boggy in places, established species include rushes, brambles, thistles, daises and buttercups. The south east side of the scheme is less diverse. This may be due to the dominance of horsetail, an invasive species.

Around the pond there is now a mix of marginal vegetation such as sedges and flag iris, although again there is some invasive horsetail present at this location. However, on the day of inspection, the water levels were low within the pond itself and there was a high percentage cover of dying pondweed. This could lead to a drop in oxygen levels in the water and smothering effects, creating poor conditions for the pond-life which is not conducive to supporting wildlife.

There are areas where hard-standing remains on the verge, which have not been dug up or planted. Whilst in some areas other low lying ground plants have established here (such as stonecrop) creating some diversity, it also creates a visual break in the corridor. However, this will become less visible assuming establishment of further mosses and lichens given time.

The mammal tunnel and fencing was inspected and found to be in reasonable condition although one damaged fencepost was noted. Whilst not significant at the moment, this could deteriorate and become ineffective. There was no evidence that the tunnel is currently in use by mammals (such as trails in the vegetation, hairs or footprints).

Environment: Key Findings

Planting throughout the project has improved from the 1YA assessment when it was reported to be in poor condition and some saplings had died. However, there is a dominance of horsetail in some areas. This is an invasive species and may need to be managed.

At the time of the site visit the water level in the pond was low and there was a blanket of dying pondweed on the surface which could result in a drop in oxygen levels in the water. Some areas of hard-standing remain on the verges. Whilst some low lying ground plants have established in places which does create some diversity, it also creates a visual break in the corridor.

With the exception of one slightly damaged fence post, mammal tunnels and fencing were found to be in reasonable condition. There was no identifiable evidence that the tunnels are in use.

The issues that have been identified as part of the environmental evaluation process have been provided to Transport Scotland's operating companies for actioning.

3.5 Safety

Accidents

Comparison Between Pre and Post Opening Personal Injury Accident Numbers

The locations and severities of accidents occurring within the vicinity of the project three years before and three years after project completion are shown in Figure 3.4a and Figure 3.4b.

Figure 3.4a: 3 Years Before Opening Personal Injury Accident Numbers

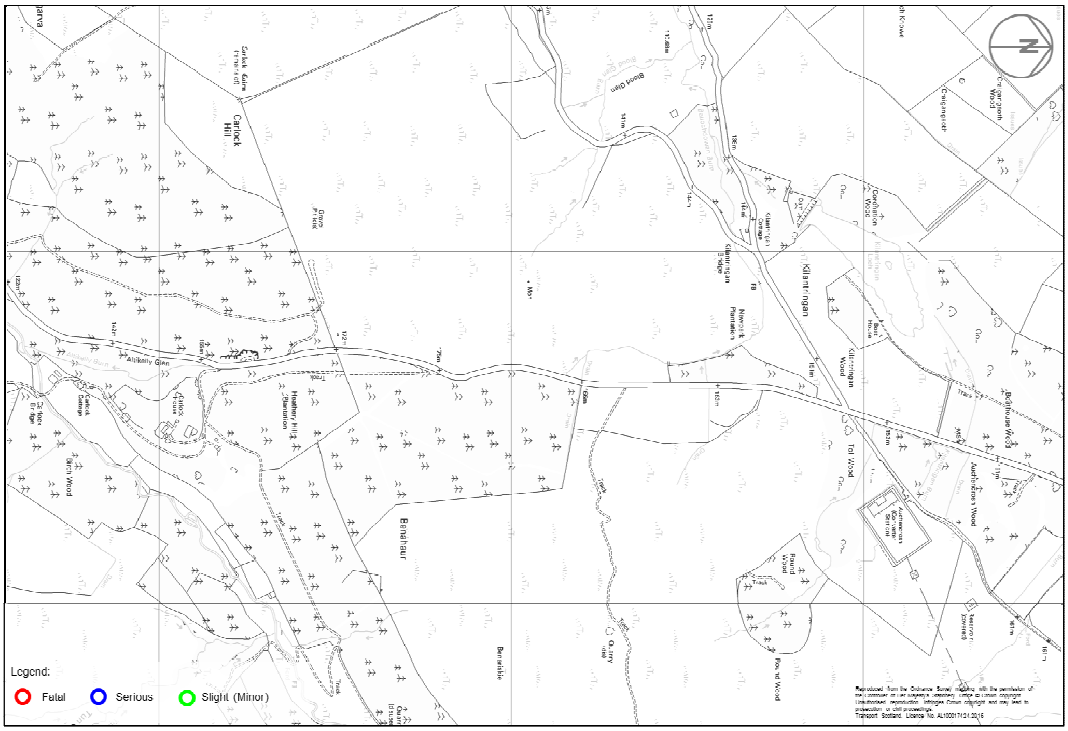
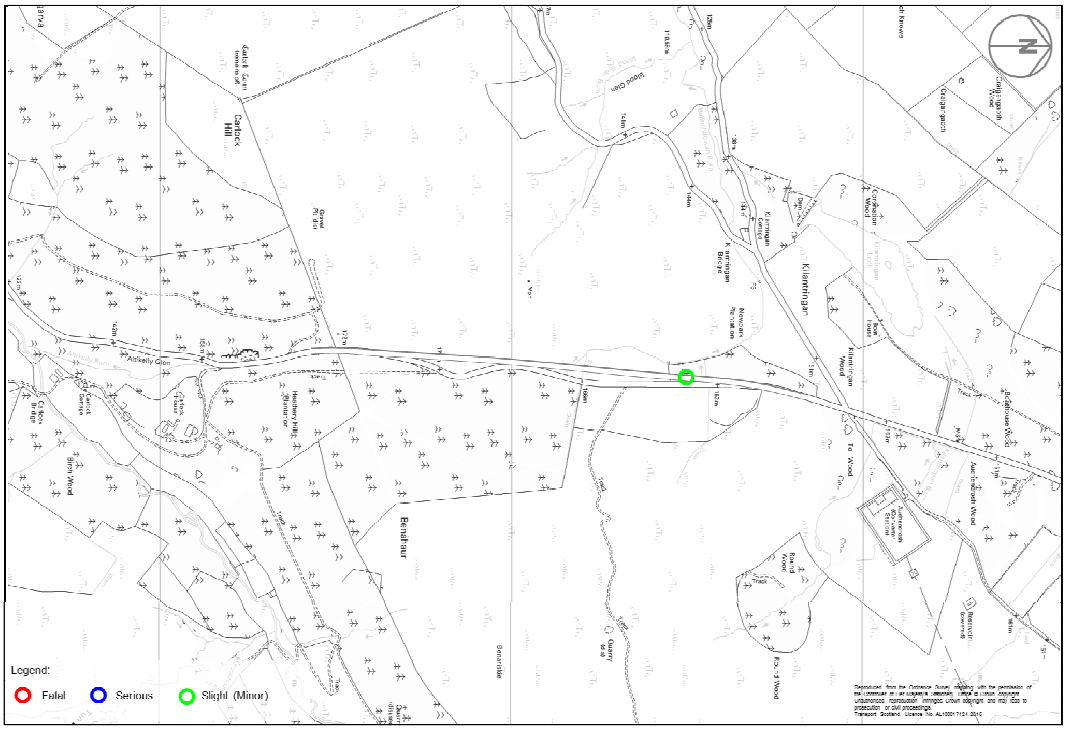


Figure 3.4b: 3 Years After Opening Personal Injury Accident Numbers



A summary of the personal injury accident data is shown in Table 3.4.

Table 3.4: Accident Data Summary

Period	Fatal	Serious	Slight	Total Accidents
3 Years Before				
A77(T)	0	0	0	0
1 Year After				
A77(T)	0	0	1	1
3 Years After				
A77(T)	0	0	1	1

As can be seen from Table 3.4, one personal injury accident (slight) occurred in the three year period following the opening of the project in comparison to no personal injury accidents in the three years before opening.

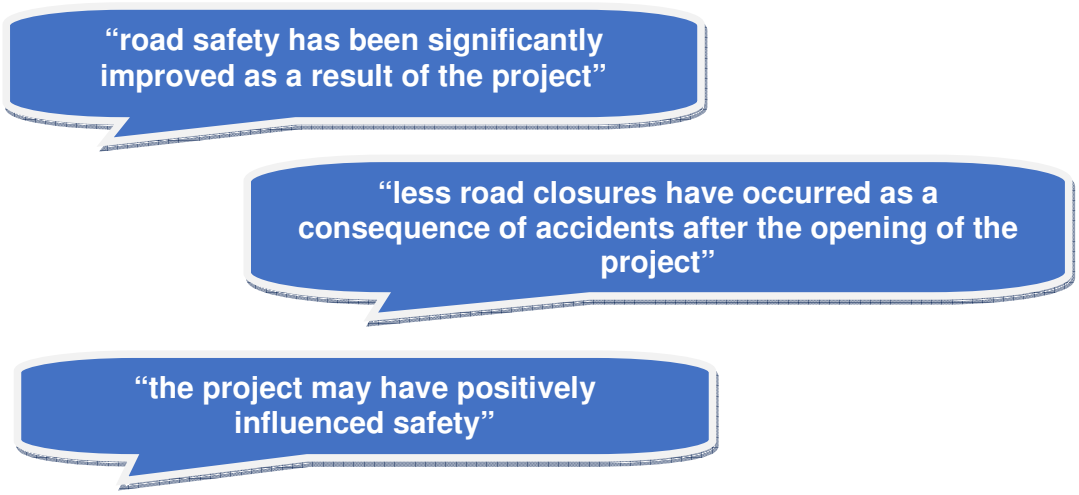
Road Safety Audits

The RSA process has been followed, with Stage 1, 2, 3, 4 and 5 Audits carried out. The Stage 4 Audit, undertaken in October 2010, confirmed that only one personal injury accident (slight) occurred in the one year period following the opening of the project and involved a collision between three vehicles. It concluded that the action of overtaking does not appear to have contributed to the cause of the slight accident and that, from the accident information provided, there is no evidence which would suggest road safety deficiencies in the design or layout of the project.

The Stage 5 RSA, undertaken in May 2014, indicated that two accidents occurred within the vicinity of the project within the period three years after opening. The RSA, however, suggested that one of the accidents recorded within the vicinity of the project may have had incorrect coordinates attributed to it and was more likely to have been located outwith the extents of the improvement and, as such, was excluded from further consideration. This accident was, therefore, excluded from the analysis presented in Table 3.4. The Stage 5 Audit concluded that there were no recommendations for remedial action and that the improvement should now be considered as part of the overall Trunk Road network for the purpose of accident cluster analysis.

Stakeholder feedback

One respondent noted that road safety has been significantly improved as a result of the project, while another respondent affirmed that less road closures have occurred as a consequence of accidents after the opening of the project. An additional respondent also affirmed that the project may have positively influenced safety.



While the stakeholder feedback received does not directly align with the findings outlined in Table 3.4, in which it was identified that one slight accident had occurred during the period three years after opening in comparison to no accidents in the three year period prior to the opening of the project, it is clearly the view of the stakeholders consulted that there has been a perceived improvement in road safety on the A77(T) within the vicinity of the project. This is likely as a result of the higher standard of carriageway that has been provided as part of the project.

Safety: Key Findings

An assessment of the 3 year post opening personal injury accidents and a review of the Stage 5 RSA suggests that the project is operating safely. The Stage 5 RSA concluded that there were no recommendations for remedial action and that the improvement should now be considered as part of the overall Trunk Road network for the purpose of accident cluster analysis.

Comments received from stakeholders suggested that the project may have resulted in a perceived improvement in road safety on the A77(T) route

3.6 Economy

Transport Economic Efficiency

The A77(T) Haggstone and A77(T) Glen App projects were constructed under a single contract with a single outturn cost. Accordingly the evaluation under the economy and cost to government criteria considers the collective performance of the projects.

Traffic flows are a key input to the economic assessment of a project. The comparisons between predicted and actual traffic flows, presented in Section 3.3, can therefore be considered a proxy for whether the predicted economic benefits of the project are likely to be realised.

Comparison Between Predicted and Actual Traffic Flows

The comparison undertaken at the ***1YA Evaluation*** stage indicated that the predicted 2009 flow was up to 17% greater than the observed 2009 flow on the A77(T). The latest comparison indicates that the predicted 2013 flows were up to 18% greater than the observed 2013 flows on the A77(T) within the vicinity of the Haggstone and Glen App projects.

The comparison between the predicted and actual traffic flows as part of the 1YA and 3YA Evaluations suggests that traffic growth on the A77(T) has and continues to fall significantly short of the assumed NRTF forecasts applied as part of the project's appraisal. It is recognised, however, that there has been a general fall in traffic volumes across the wider trunk road network in recent years due to the economic downturn that could not have been accounted for during the projects appraisal and this may in part account for the difference. Furthermore, a change in Irish Sea Ferry operations may also be a contributing factor to the changes observed.

Economy: Key Findings

The difference between predicted and actual AADT flows observed suggests that the economic benefits of the combined projects are likely to have been over estimated. This is, however, a consequence of external factors that could not have readily been foreseen at the time flows were forecast as part of the project assessment stage. The current out-turn costs are, however, approximately £3.4m (23%) lower than was predicted at the time of assessment.

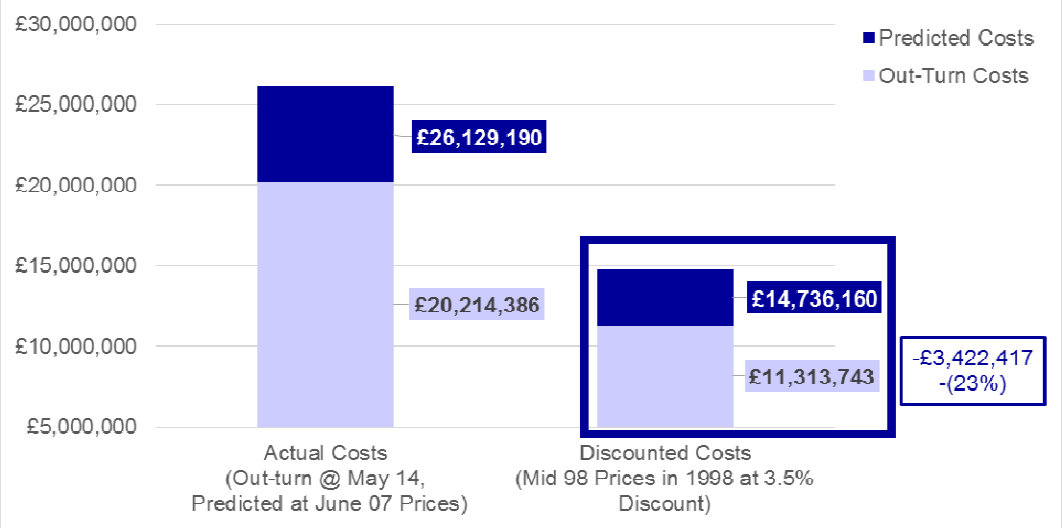
3.7 Cost to Government

Investment Costs

Comparison Between Predicted and Outturn Costs

The A77(T) Haggstone and A77(T) Glen App projects were constructed under a single contract with a single outturn cost. The predicted project costs used in the economic assessment of each project have been combined to allow the comparison between predicted and out-turn costs to be undertaken. The combined out-turn and predicted project costs for the two A77(T) projects are shown in Figure 3.5.

Figure 3.5: Project Cost Summary



The latest comparison indicates that the current outturn costs for the two A77(T) projects are comparable with the outturn costs at the time of the ***1YA Evaluation***. The current outturn costs are approximately £3.4m (23%) lower than was predicted at the time of assessment.

Cost to Government: Key Findings

The combined outturn cost of the two A77(T) projects is approximately £3.4m (23%) lower than was predicted.

3.8 Value for Money

Initial Indications

The economic appraisal results predicted a combined Net Present Value (NPV) of -£9.69m and Benefit to Cost Ratio (BCR) of 0.54 under the 60/40[1] traffic forecast scenario. The comparisons undertaken at the ***1YA Evaluation*** stage indicated that while the cost is lower than predicted, the benefits will have been overestimated as a result of the lower than predicted traffic flows, suggesting that the NPV and BCR of the combined projects are unlikely to be greater than predicted.

[1] 60/40 traffic forecast scenario calculated through factoring results of low and high traffic forecast scenarios by 0.6 and 0.4 respectively

Based on the latest comparisons presented in Sections 3.3 and 3.7, in which predicted traffic volumes are up to approximately 18% greater than observed flows and combined out-turn costs are approximately 23% lower than predicted, the NPV and BCR of the combined projects are still, therefore, unlikely to be greater than predicted. It is considered that the projects are still, therefore, unlikely to achieve value for money.

Value for Money: Key Findings

The difference between predicted and actual AADT flows suggests that the economic benefits of the project have been overestimated as a result of external factors that could not have readily been foreseen at the time the assessment was undertaken. The combined out-turn cost of the two A77(T) projects is approximately £3.4m (23%) lower than was predicted at the time of assessment.

The NPV and BCR of the combined projects are unlikely to be greater than predicted, however, it is judged that the projects will continue to provide a benefit to road users.

3.9 Progress Towards Achieving Objectives

As specific indicators to measure the performance of the project against its objectives have not been developed, an indication of whether the project has achieved its objectives is based on the pre opening data available, supplemented by post opening data collected as part of the evaluation.

Indications

A summary of the performance of the project against its objectives is presented in Table 3.5.

Table 3.5: Progress Towards Achieving Objectives

Objective	Commentary	Progress
Improve and increase the number of overtaking opportunities to eradicate the conflicts between long distance users and local / agricultural traffic.	A comparison between the results of the pre and post overtaking surveys indicate that the provision of the improved carriageway standard has, generally, increased overtaking in both directions of travel.	+ve
Improve the operational performance and level of services and safety on the A77(T) by reducing the effects of driver stress and journey times by constructing dedicated overtaking sections designed to break up the effects of convoys / platoons.	Although mean vehicle speeds in both directions of travel have not been significantly affected by the project, a comparison between the results of the pre and post overtaking surveys indicate that as a consequence of the increased overtaking in both directions of travel, a greater number of platoons are dispersed. An assessment of the 3 year post opening personal injury accidents and a review of the Stage 5 RSA report, suggests that the project is operating safely.	+ve
Maintain the asset value of the A77(T) route.	Given the nature of the project, which involved replacing 1.5 kilometres of existing single carriageway with 1.0 kilometre of off-line wide single carriageway and 250 metres of on-line improvements, the asset value of the A77(T) between the project tie-in points is likely to have increased thus maintaining the value of the route.	+ve
Mitigate the environmental impact of the new works where possible.	The majority of measures committed within the Environmental Statement are in place. Whilst some variations from the proposed mitigation measures have been identified, these are not considered to have had a material detrimental impact on the general integration of the project into its surrounding.	+ve
Achieve good value for money for both taxpayers and transport users.	The NPV and BCR are unlikely to be greater than predicted at the time of assessment due to the impact of lower than forecast traffic flows, which will have resulted in an overestimation of the predicted project benefits. Whilst lower than predicted project costs for the combined project will offset some of the impact to value for money from the lower than forecast traffic flows, the NPV and BCR are still	O

Objective	Commentary	Progress
	unlikely to be greater than those predicted as part of the combined project's assessment. The Haggstone and Glen App projects form part of a series of improvements along the A77(T) corridor that can be expected to provide benefits to transport users and help encourage economic development within south-west Scotland and beyond.	

Key:
+ve Indication(s) that objective has been / will be achieved
= Progress towards achievement of objective cannot be confirmed
O Indication(s) that objective has not / will not be achieved

3.10 Evaluation Summary

The evaluation of the A77(T) Glen App project indicates that while the project is not considered to have had a material impact on journey times, it has positively contributed to alleviating driver frustration through helping to break-up traffic travelling in platoons to complement other upgrades on the A77(T) providing overtaking opportunities. An assessment of the 3 year post opening personal injury accidents and a review of the Stage 5 RSA also suggests that the project is operating safely, which is corroborated by the stakeholder feedback received.

The variation between the actual and predicted traffic volumes, resulting from unforeseen external factors at the time of the appraisal, combined with outturn costs 23% lower than forecast, can be expected to impact on the project's value for money. The NPV and BCR of the combined A77(T) Haggstone and A77(T) Glen App projects are still unlikely to be greater than predicted.

While the combined project is still unlikely to achieve value for money, it is important however to view the project in the wider context of the A77 Route Action Plan. The project is an integral part of upgrades on this strategic corridor and, overall, it is positively contributing to improving the operation of the route through facilitating overtaking opportunities.

Appendix A: Environment

A ENVIRONMENT

This section provides details of the 3-year after evaluation undertaken for the Environment criterion in the Scottish Trunk Road Infrastructure Project Evaluations (STRIPE).

A.1 INTRODUCTION

Background

Transport Scotland has commissioned CH2M to evaluate several projects on the Scottish Trunk Road Network that were constructed and opened approximately three years ago. Part of this 'Three Year After Opening Evaluation' (3YA) comprised a review of the implementation of the projects' environmental mitigation measures.

This report presents the findings of the 3YA environmental review for the A77(T) Glen App. The project has previously been subject to a 'One Year After Opening Evaluation' (1YA) environmental review. The findings of the 1YA environmental reviews were reported in:

- Project Evaluation Environmental Mitigation Review August 2010, Report to Transport Scotland, Halcrow Group Ltd 2010
- Project Evaluation Environmental Mitigation Measures Review October 2010, Report to Transport Scotland, Halcrow Group Ltd 2010

Environmental Review Purpose and Methodology

The purpose of the 3YA environmental review is to provide a high level review of the condition of the mitigation measures that had been implemented by the project at approximately three years after opening, and make any recommendations to improve the effectiveness of the mitigation or identify trends in the issues being observed so that Transport Scotland can implement improvements in future environmental impact assessment and project design or in the operation and maintenance of the existing projects.

Environmental Review Methodology

The methodology used for the 3YA environmental review selected relevant aspects of the STRIPE[2] 'Three Years After' methodology that comprised:

- A review of the project objectives, Environmental Statement and 1YA environmental mitigation review to identify the likely key issues to be evaluated during the 3YA review and any questions remaining from the 1YA reviews.

[2] Transport Scotland Scottish Trunk Road Infrastructure Project Evaluation (STRIPE). Final Guidance August 2013.

- A site visit – to give an overview of the mitigation implemented and to focus observations on any issues raised by the 1YA reviews rather than to repeat a visit to every feature that was confirmed as being present and in good condition in the One Year After reviews.
- A short report, setting out the key issues from the 1YA review, the observations from the site visit and comments on the condition of the environmental mitigation. The report will also identify any additional issues/mitigation requirements to improve the effectiveness of the mitigation, and identify any resultant trends in the recommendations being made.

Structure of the Report

The project objectives (including any specific environmental objectives) are provided, followed by the list of likely key environmental issues that were identified during the desk study and any questions raised by the 1YA reviews. The 3YA observations on these key issues identified in the desk study are commented upon, followed by a table of all of the mitigation proposed with details of the 3YA observations and the associated 1YA observations to aid comparison.

A summary of recommendations regarding further studies or suggestions for improving the effectiveness of the environmental mitigation.

A.2 ENVIRONMENTAL FINDINGS

Project Objectives

The project involved the construction of approximately 1.0 kilometre of off-line wide single carriageway (WS2) in addition to approximately 250 metres of on-line improvement.

The project sought to increase the level of overtaking opportunity and improve the operational performance, level of service and safety while minimising the environment impacts of the new works where possible.

Key Issues to be Reviewed

The key issues identified during the desk study are summarised below:

- Landscape/planting – including around the detention pond.
- Was the reason for the omission of the woodland planting and detention pond planting established and a RoD completed?

These formed the focus of the 3YA Evaluation. It was decided not to re-visit measures that had been confirmed as being present during the 1YA site visits.

A.3 THREE-YEAR AFTER REVIEW FINDINGS

Key issues from the desk-study

The 1YA assessment highlighted where some of the mitigation set out within the Environmental Statement had not been in a condition as expected one year after the project opened and future maintenance was required to ensure the intended outcomes were realised. Planting throughout the route corridor had been reported as being in poor condition with some saplings having died. Additionally, no planting had been established around the retention pond. Since then, the observations made during the 3YA site visit confirmed that both of these issues have since been addressed with further planting and natural regeneration.

Figure 1: Looking North

Figure 2: Looking South

Based on observations during the 3YA site visit, overall the project's environmental mitigation is considered to be in good condition and where previously planting had failed, the verges now support a mix of species. Planting throughout the corridor includes a mix of wildflowers, dominated by daises which create a striking visual effect against the immediate surroundings during the spring and summer months, see Figure 3 To the west of the project, where it is boggy in places, established species include rushes, brambles, thistles, daises and buttercups. The south-east side of the project is less diverse. This may be due to the dominance of horsetail, an invasive species, see Figure 4.

Figure 3: Wildflower dominated by daises

Figure 4: Verge dominated by horsetail

Around the pond there is now a mix of marginal vegetation such as sedges and flag iris, although again there is some invasive horsetail present at this location. However, on the day of inspection, the water levels were low within the pond itself and there was a high percentage cover of dying pondweed. This could lead to a drop in oxygen levels in the water and smothering effect, creating poor conditions for the pond-life which is not conducive to supporting wildlife, see Figure 5.

There are areas where hard-standing remains on the verge and has not been dug up or planted. Whilst in some areas other low lying ground plants have established here (such as stonecrop) creating some diversity, it also creates a visual break in the corridor, see Figure 6. However, this will become less visible assuming the establishment of further mosses and lichens given time. Some invasive horsetail was also observed on the road verge area.

Figure 5: Drainage pond with marginal vegetation and pondweed

Figure 6: Hard-standing not dug up creating gap in landscape

The mammal tunnel and fencing was inspected and found to be in reasonable condition although one damaged fencepost was noted, see Figure 8. The fence has an overhang to prevent otters climbing over it, as described for otter fence specification in DMRB[3]. Whilst not significant at the moment, this could deteriorate and the fencing become ineffective as a result. There was no evidence, such as trails in the vegetation, hairs or footprints, to indicate the tunnel is currently in use by mammals.

Figure 7: Mammal tunnel

Figure 8: Damaged fence post in mammal fence

Any new issues identified

As described above, two new issues were identified in the 3YA visit: the dominance of some areas by the invasive plant horsetail on the road verge and around the pond; and damage to the mammal fencepost.

Observed traffic flows are approximately 15% lower than forecast flows and therefore the environmental assessment's forecast that noise and local air quality would not be significant issues were appropriate.

Mitigation measures – detailed observations

An update of the observations relating to individual mitigation measures provided in the 1YA report using the 3YA observations can be found in Table A1.

Recommendations

- Transport Scotland may wish to enhance biodiversity by reducing the dominance of some areas of the road verge and pond by the invasive plant horsetail before it spreads further. This is a native species but

[3] DMRB Vol 10 Sec 4 part 2 HA 81/99

can easily spread through disturbance. Also, if water levels in the drainage pond do not increase, clearing out the dying weed may be necessary.

- It may be appropriate to remove, soil and seed the last remaining areas of hard-standing along the road verge.
- Maintenance of the mammal fence should be considered to safeguard against further deterioration of a broken fencepost.
- Transport Scotland may wish to consider monitoring the use of the mammal underpasses on various projects to establish the long-term effectiveness compared with the expectations set by the environmental impact assessment. For example, this could consist of installing sand boxes at tunnel entrances or motion-operated cameras, reviewing road-kill records and possibly repeating the pre-project mammal surveys within the vicinity of the projects.

The issues that have been identified as part of the environmental evaluation process have been provided to Transport Scotland's operating companies for actioning.

Table A2: Implementation of Mitigation Proposed in the Environmental Statement and Observations at 1YA and 3YA Opening

Mitigation Measure	***1 YA Comments***	***3 YA Comments***
Ecology and Nature Conservation		
Specific design details and monitoring aimed at maintaining hydrological connectivity, specifically in relation to where bog habitat effected at southern end of scheme.	The link to the existing bog habitats are maintained	No further comment.
Installation of mammal ledges within new culverts.	No ledges were installed within the culverts for mammals to utilise, however separate dry mammal culverts were provided. No signs of mammal presence were detected. Where culverts were provided mammal fencing was also provided and was in good condition.	No further comment.
Culverts to be designed in accordance with Scottish Executive guidance of river crossings for migratory fish.	Fish passes were provided, although at the time of the site visit the burns were dry.	No further comment.
Landscape		
Earth mounding with material derived from the site will be implemented along the east of the new road and will be graded to natural looking formations to include native scrub planting.	At the southern culvert some subtle mounding has been implemented, although these are not significant features they do help to integrate the scheme into the subtle sloping of the surrounding area.	No further comment
To the west of the new road “mosaic pattern” grassland will be formed creating a mosaic of different soils and seeding with wild flower grass mixture. Mosaic also occurs at the north east end of the scheme.	The mosaic grass planting throughout the corridor is in very good condition and reflects the surrounding grassland habitat of the overall road corridor.	A mix of wildflower, dominated by daises, grass and other species has been successful.

Mitigation Measure	***1 YA Comments***	***3 YA Comments***
Indicative landscape planting around the detention basin and access track. Species to be selected from pine, birch, alder, aspen and willow.	No planting has been undertaken around the detention basin, the addition of native planting in the areas would have helped to further integrate the scheme and basin into the wider area including the belt of woodland to the north and west.	Planting and natural regeneration around the pond now includes a mix of sedges and flag iris. It is noted a high proportion of dying pond weed in the shallow pond will likely lead to poor oxygen levels in the water creating poor conditions for the pond-life which is not conducive to supporting wildlife.
Retain as many trees from the edge of Heathery Hill plantation and also perimeter trees and new saplings at Kilantringan Bridge Wood as possible. Planting new trees at Kilantringan Bridge Wood (native species and local provenance). Planting around the SUDS pond.	Where new planting has been undertaken it is not in very good condition with some of the saplings having died. It is therefore recommended that the reason for their poor condition be ascertained. With regards the woodland at Heathery Hill it is difficult to determine how many trees have been retained as a large amount of deforestation has taken place in the area.	There does seem to have been some additional planting to replace the saplings that have died.
At the north east extent of the scheme the mosaic grassed area will also have native scrub planting including: blackthorn, quickthorn, hazel, and willow with Scots pine.	No comment made	Native scrub planting along the north east embankment was seen to be successful.
Land Use		
New field/forestry accesses at Chainage 350.	Access is in place	No further comment.
New field/forestry accesses at Chainage 870.	Access is in place	No further comment.
New field/forestry accesses at Chainage 1110.	Access is in place	No further comment.

Mitigation Measure	***1 YA Comments***	***3 YA Comments***
Water Quality and Drainage		
Best practice culvert design in accordance with Controlled Activity Regulations. Installation of otter ledges within new culverts where diameter allows. Culverts to be fish passable.	No ledges were installed within the culverts for mammals to utilise, however separate dry mammal culverts were provided. No signs of mammal presence were detected. Where culverts were provided mammal fencing was also provided and was in good condition. Fish passes were provided, although at the time of the site visit the burns were dry	No further comment.
Detention basin to the west of the A77 at Chainage 1200, also provided is a maintenance access track to the basin.	No comment made	No further comment.

Appendix B: Methodology and Data Sources

B METHODOLOGY AND DATA SOURCES

B.1 OVERVIEW

The project presented in this report has been evaluated against their objectives and the following criteria, where applicable, to support the evaluation:

- Environment;
- Safety;
- Economy;
- Costs to Government; and
- Value for Money.

As the evaluation focuses on impacts relating to the project's objectives, evaluations against all of the above criteria may not be undertaken for all projects. The evaluation is supported by the consideration of network traffic indicators, including traffic volumes and travel times, as presented in the following section.

B.2 NETWORK TRAFFIC INDICATORS

Traffic Volumes

Comparison Between Pre and Post Opening Traffic Flows

A comparison of traffic flows pre and post opening has been undertaken for all projects to provide an indication of the impact that the project has had on traffic volumes. The amount of traffic data presented is dependent upon the complexity of the project. The comparison can also serve as a proxy for the effect that the project has had on noise and air quality.

Comparison Between Predicted and Actual Traffic Flows

A comparison of predicted and actual opening year traffic flows has been undertaken for all projects to confirm the accuracy of predictions during the project's preparation. The comparison can also serve as a proxy for whether the predicted benefits of the project are likely to be realised.

Depending on the nature of the traffic modelling undertaken to assess the project, the predicted traffic flow is either derived by:

- factoring the base year or the predicted opening year, design network flows to the actual opening year using National Road Traffic Forecast (NRTF) growth factors; or
- extrapolating from, or interpolating between, the modelled assessment year, design network flows.

The difference between the actual traffic flow and the predictions has been calculated and expressed as a percentage of the actual flow. A threshold of +/-20% is generally accepted by Transport Scotland as being a reasonable range for future year forecast traffic flow comparisons.

The amount of traffic data presented is dependent upon the complexity of the project. The comparison can also serve as a proxy for the likely impact of the project on noise and air quality.

Data Sources	
Predicted Traffic Flows	Obtained/derived from the traffic/economic modelling undertaken to support the pre-tender economic assessment.
Actual Traffic Flows	Obtained from automatic traffic counters in the vicinity of the project/study area.

Overtaking Opportunities

Post Opening Overtaking Opportunities

Where no overtaking information is available, the impact of providing increased overtaking opportunities has been based on the evaluation of other projects with a comparable standard of carriageway for which overtaking surveys have been carried out.

Anecdotal, qualitative evidence from stakeholders has also been gathered, where available.

Data Sources	
Pre and Post Opening Overtaking Conditions	Obtained from pre and post opening survey information

Travel Times

Change in Travel Times

Based on the evaluation of other projects with a comparable standard of carriageway for which pre and post opening journey time data is available, supported by anecdotal evidence where available.

Comparison Between Pre and Post Opening Travel Times

A comparison between pre and post opening travel times has been carried out for projects where the change in travel times cannot be judged based on other projects of a similar nature for which an evaluation has been undertaken.

Comparison Between Predicted and Actual Travel Times

A comparison between predicted and actual opening travel times has been carried out for projects where predicted and post opening travel time information is readily available.

Data Sources	
Pre and Post Opening Travel Times	Proxy indicator of traffic speed confirmed through pre and post opening survey information collected to support the project's economic assessment.
Stakeholder Feedback	Obtained from Cairnryan and Ballantrae Community Councils and Stagecoach

B.3 ENVIRONMENTAL

Mitigation Measures

A review of the environmental mitigation measures implemented during construction has been undertaken for all projects to establish whether or not the measures proposed during the project's preparation have been introduced and to provide comment on their success. The mitigation measures implemented were confirmed through site visits.

Data Sources	
Proposed Mitigation Measures	Presented in the Environmental Statement produced during the project's preparation.
Implemented Mitigation Measures	Confirmed through site visit.

Noise and Air Quality

A review of noise and air quality has not been undertaken for the project as no significant impacts on noise and air quality were expected.

B.4 SAFETY

Accidents

Comparison Between Pre and Post Opening Personal Injury Accident Numbers

A comparison of the personal injury accident numbers pre and post opening has been undertaken for all projects to provide an early indication of whether the project is operating safely.

The number of personal injury accidents for the 3 years within the vicinity of the project prior to opening has been compared with the observed number of personal injury accidents for the project in the three year period after opening.

It is important to realise that road infrastructure projects normally take a minimum of 5 to 7 years to plan prior to the commencement of construction. Many proposed road projects are derived from safety concerns such as fatal and serious accidents and often, these are treated in terms of Accident Investigation and Prevention work prior to planning the permanent solution. The comparison between 3 year pre and post opening accidents, therefore, only demonstrate the minimum road safety improvement derived from the project.

Where the influence of a trunk road improvement project has a significant impact on the local road network, it may be appropriate to extend the scope of the accident analysis.

Road Safety Audits

Road Safety Audit (RSA) reports have been reviewed for the project, where available, to confirm whether there is any evidence that the project is not operating safely and where recommendations have been made for ameliorative measures, if appropriate.

Data Sources	
Personal Injury Accident Numbers	Obtained from the STATS19 data collection system.
Safety Issues	Detailed within RSA reports produced following audits carried out 3 year after project opening.

B.5 ECONOMY

Transport Economic Efficiency

A comparison between predicted and actual traffic flows and/or travel times has been undertaken for all projects as a proxy for whether the predicted benefits of the project are likely to be realised.

A comparison which returns a positive traffic flow difference in an uncongested situation indicates that the economic benefits of the project may have been over predicted as fewer vehicles will actually accrue journey time savings than predicted. Similarly, the economic benefits of a project may also be over predicted where actual travel times are greater (i.e. speeds lower) than predicted.

Conversely, where the comparison returns a negative traffic flow difference or actual travel times are less (i.e. speeds higher) than predicted, the economic benefits of the project may have been under predicted.

B.6 COSTS TO GOVERNMENT

Investment Costs

Comparison Between Predicted and Out-turn Costs

A comparison between predicted and out-turn costs has been undertaken for all projects to confirm the accuracy of predictions during the pre-tender stage and support the evaluation of value for money.

The project cost predicted during the pre-tender stage has been used in the evaluation as it is at this stage that the decision is taken on whether or not to proceed with the project.

One of the features of the progressive analysis of projects is that the economic assessment is undertaken at each stage based on the return on future investment. This means that project costs incurred prior to the pre-tender economic assessment, which are already spent and cannot be recovered (whether or not the project goes ahead) are excluded from the overall project costs input to the economic assessment. As such, only out-turn costs incurred after the pre-tender economic assessment have been included in the comparison.

Adjustments for Retail Price Indices and discount rates to both the predicted and out-turn costs have been made, taking expenditure by year into account, to convert the figures to a common 'present value year' for prices and values – either 1998 or 2002 depending on the 'present value year' used in the pre-tender economic assessment.

Data Sources	
Predicted Project Costs	Obtained from the pre-tender economic assessment undertaken during the project's preparation.
Out-turn Costs	Obtained from out-turn cost records.

B.7 VALUE FOR MONEY

Initial Indications

Based on the evaluation of economic benefits and project costs outlined in sections 3.6 and 3.8 respectively, a judgement in terms of the potential impact on the projects' value for money has been made.

The value for money of a project is considered to be greater than predicted where the economic benefits have been under predicted and the project costs over predicted. Conversely, the value for money of a project is considered to be lower than predicted where the economic benefits have been over predicted and the project costs under predicted.

Where both the economic benefits and project cost have been under predicted or over predicted, a judgement has been made with regards to the likely overall impact on value for money.

Data Sources	
Predicted NPV and BCR	Obtained from the pre-tender economic assessment undertaken during the project's preparation.

B.8 ACHIEVEMENT OF OBJECTIVES

Initial Indications

The evaluation includes an indication of how the project is progressing towards achieving its objectives. Where specific indicators to measure the project's performance against its objectives have not been developed, an indication of how the project is progressing towards achieving its objectives is based on the pre opening data available, supplemented by post opening data collected as part of the evaluation.

Data Sources	
Objectives	Confirmed from reported Environmental Statements or Route Action Plan, where applicable.