



CÒMHDHAIL TRANSPORT  
ALBA SCOTLAND

**TRANSPORT SCOTLAND**  
**SCOTTISH TRUNK ROAD INFRASTRUCTURE**  
**PROJECT EVALUATION**

3YA Evaluation Report for A7(T) Auchenrivock



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3YA Evaluation Report for A7(T) Auchenvivock

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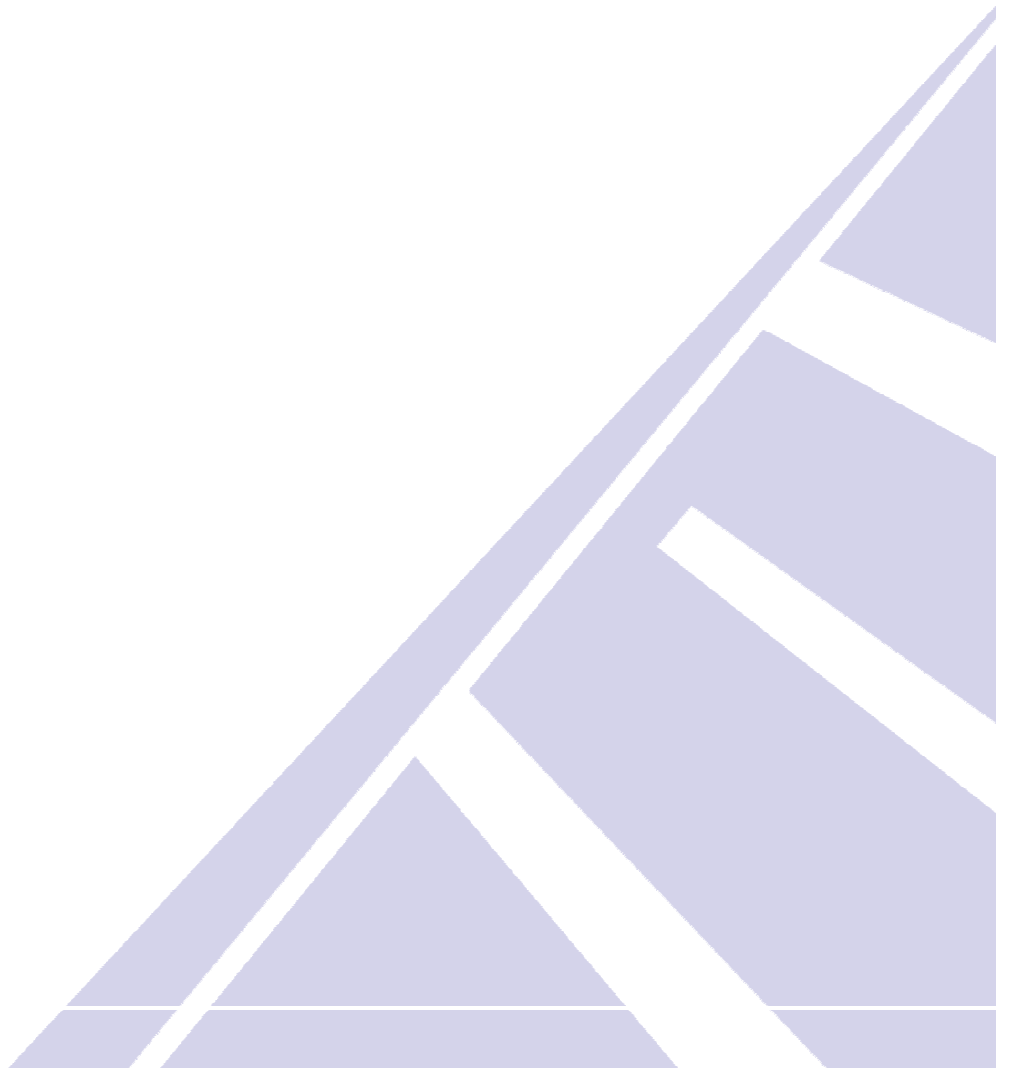
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## **GLOSSARY**

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
STAG	Scottish Transport Appraisal Guidance
WS2	Wide Single 2-Lane Carriageway

# **SUMMARY OF IMPACTS**



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## **1 SUMMARY OF IMPACTS**

This section provides a short summary of the key elements contained within this Three Year After Evaluation report of the A7(T) Auchenrivock 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 project. Given the improvement incorporates an 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. Fewer platoons of vehicles are exiting the survey site than entering due to the improved overtaking opportunities.

The project is operating safely in the first three years of operation, with only two slight accidents occurring within the vicinity of the project. The accidents were 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.

Construction of the project commenced in early 2008 and the project was opened to traffic in June 2009. The cost of construction of the project was greater than that predicted during the appraisal by approximately £1.0m (21%). It should be noted, however, that the predicted costs used within the cost comparison are derived from the costs estimated at the project's pre-tender stage. Variations in actual and predicted project cost comparisons can occur due to issues identified during the tendering process.

Based on the project's discounted tender cost of approximately £8m, the comparison of out-turn and tender costs suggests that the project has been delivered approximately £1.3m over the tender cost. The project's tender cost is broadly comparable with the cost predicted at the project's pre-tender stage.

The mitigation that was included within the Environmental Statement has been implemented on site (other than a removal of a SuDS pond, which had been agreed by all parties prior to construction and not considered to be a detrimental change). The mitigation is generally in good condition, however, the failure of vegetation on the steep slopes where macmatr was used and the dominance of bracken in areas were observed and will reduce the value to biodiversity.



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A Stage 5 Road Safety Audit was carried out within the vicinity of the project and confirmed that two slight accidents had occurred in the period three years after opening, however, the accidents were not attributable to the design or layout of the project.

## **1.3 Forecasting – How accurate were predictions?**

Traffic flows on the A7(T) in the vicinity of the project are lower than forecast, and have been reducing for a number of years. The predicted 2013 flow was approximately 11% greater than the observed 2013 flow under the 60/40 traffic forecast scenario<sup>1</sup>. It is acknowledged, however, that the economic downturn has seen a widespread reduction in traffic flows across the Scottish road network.

As noted in Section 1.2, the cost of construction of the combined project was greater than that predicted during the appraisal by approximately £1.0m (21%).

## **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 A7(T).

The nature of the project (a wide single carriageway) has provided enhanced 'opportunistic' overtaking opportunities in both directions of travel and subsequently will have helped to reduce driver frustration through the dispersion of platoons.

Mean vehicle speed data is used as a proxy for journey time data for the project, the analysis of which suggests that mean vehicle speeds have been estimated to exceed the national speed limit in force over the extent of the survey site. There is no available evidence, however, to suggest that there are any speed related safety issues within the vicinity of the project.

The project is operating safely in the first three years of operation with only two slight accidents occurring within the vicinity of the project. The Stage 5 Road Safety Audit concluded that the road layout at Auchenvick continues to operate safely and efficiently.

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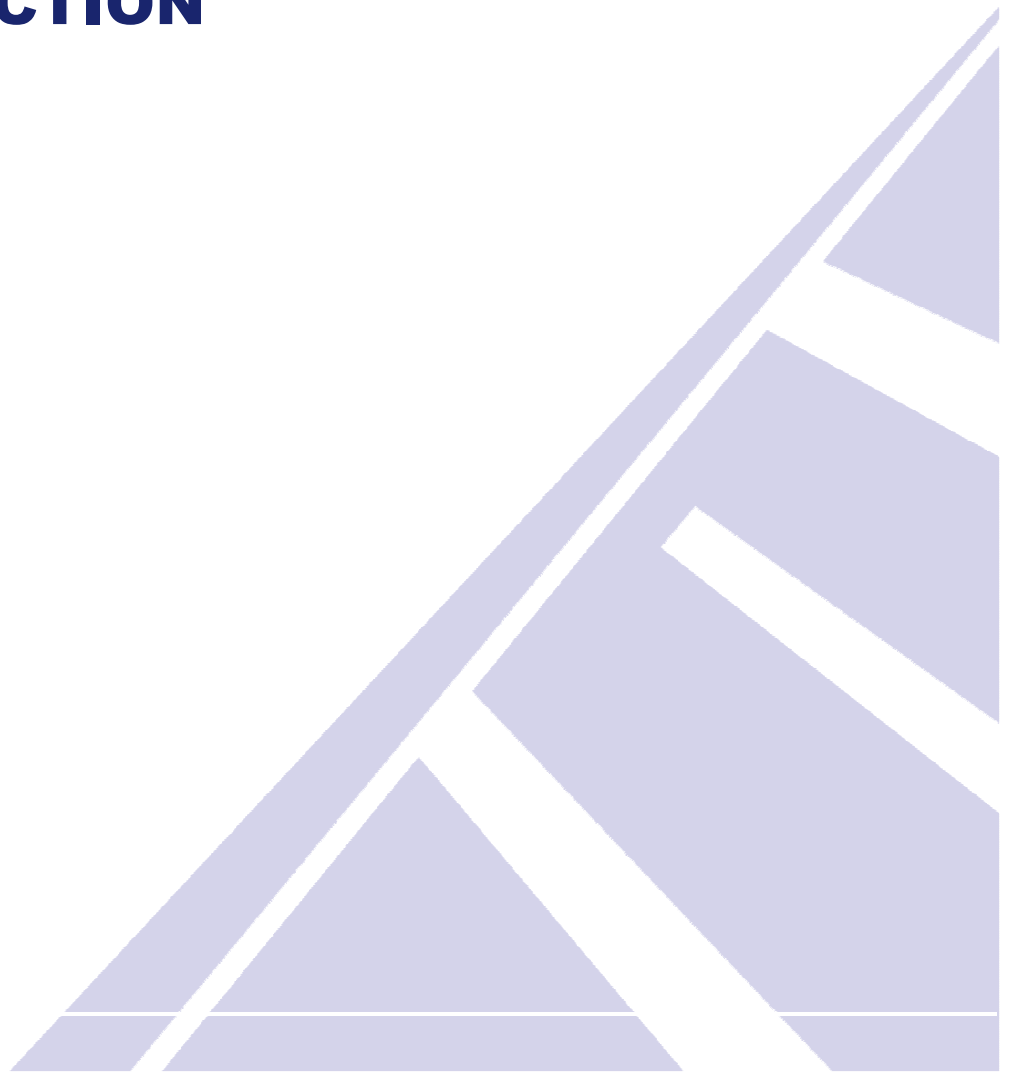
<sup>1</sup> 60/40 traffic forecast scenario calculated through factoring results of low and high traffic forecast scenarios by 0.6 and 0.4 respectively

### **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 £1.19 and Benefit to Cost Ratio (BCR) of 1.19 for the project are likely to be less than predicted at the time of assessment. This reflects higher than predicted construction costs which will impact on the project's value for money.

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# INTRODUCTION



# SCOTTISH TRUNK ROAD INFRASTRUCTURE PROJECT EVALUATION

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## 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.

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Furthermore, Scottish Trunk Road Infrastructure Project Evaluation (STRIPE) prepared 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 – undertaken 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 A7(T) Auchenrivock 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**

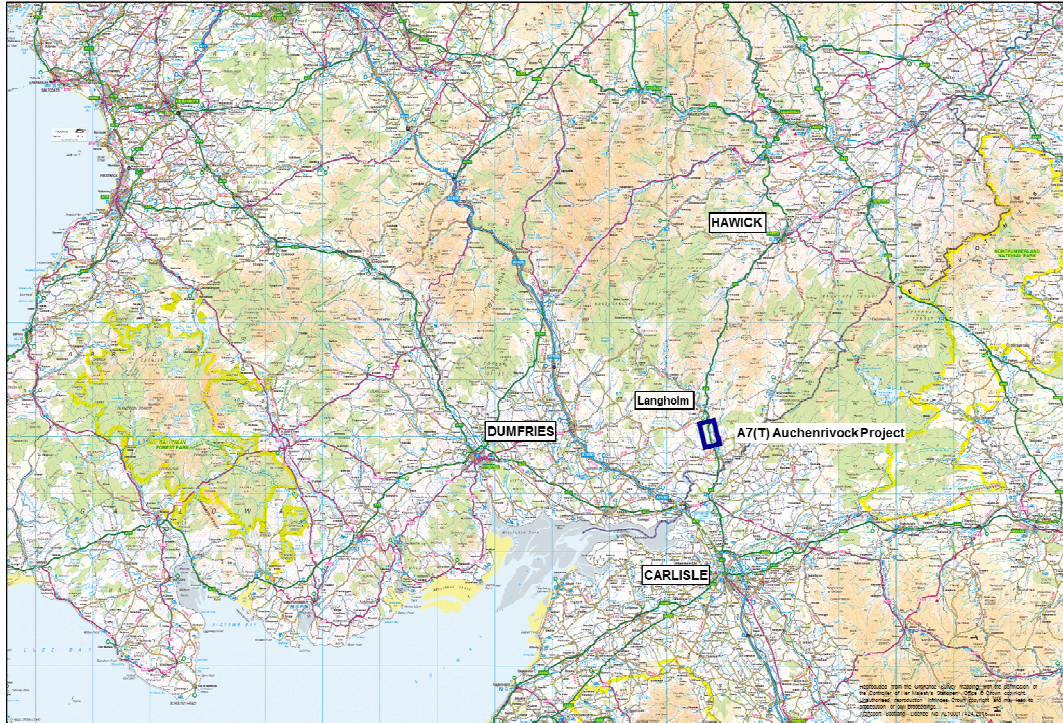
Route	Project Name	Standard	Length (km)	Open to Traffic
A7(T)	Auchenrivock	S2 & WS2	3.3	June 09

Key: S2 Single 2-Lane Carriageway  
WS2 Wide Single Carriageway

# SCOTTISH TRUNK ROAD INFRASTRUCTURE PROJECT EVALUATION

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Figure 2.1: Project Location Plan



## 2.3 Previous Evaluations

A 1YA Evaluation was carried out for the A7(T) Auchenrivock project and findings reported within the *Evaluation Report for Trunk Road Projects Opened between April 2009 and March 2010* report, dated December 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 A7(T) south of Langholm indicated that traffic flows in 2010 were around 150 vehicles per day (approximately 4%) lower than 2008 flow levels. Flows in 2011 were consistent with 2010 levels.

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## *Comparison Between Predicted and Actual Traffic Flows*

The comparison between predicted and actual AADT flows indicated that the predicted 2010 flow (derived by interpolating between the modelled assessment year traffic flows) was 5% and 14% greater than the observed 2010 flow under low and high traffic growth forecast scenarios respectively.

## *Post Opening Overtaking Opportunities*

Based on the evaluation of other projects with a comparable standard of carriageway for which overtaking surveys have been carried out, the provision of the wide single two-lane carriageway is judged to have had a positive impact on the number of overtaking manoeuvres. As a consequence of providing overtaking opportunities, the project is also likely to help reduce platooning. One respondent commented after consultation that overtaking opportunities had increased significantly as a result of the project.

## *Change in Travel Times*

Based on the evaluation of other projects with a comparable standard of carriageway for which journey time data is available, the provision of the wide single two-lane carriageway is judged to have reduced journey times. Dumfries and Galloway Council indicated that the project has had a positive impact on journey times and journey time reliability.

## ***Environment***

The review of mitigation measures implemented for the project confirmed that the measures committed within the Environmental Statement were in place (other than a removal of a SuDS pond, which had been agreed by all parties prior to construction and not considered to be a detrimental change). Whilst this variation from the proposed mitigation measures was noted and some vegetation had failed or was dominated by bracken, these were not considered to have had a material detrimental impact on the general integration of the project into its surroundings.

## ***Safety***

An assessment of the one year post opening personal injury accidents and a review of the Stage 4 RSA report, suggested that while an issue surrounding the speed of vehicles on the new section had been noted, the project was operating safely.

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## ***Economy***

The difference between predicted and actual AADT flows suggested that, due to external factors that could not have readily been foreseen at the time of assessment, the economic benefits of the project will have been over estimated.

## ***Accessibility & Social Inclusion***

The Cycle Audit carried out as part of the RSA for the project provided recommendations to address potential issues with the measures provided for cyclists. Feedback from stakeholders identified the project to be having positive benefits for the local community. This was particularly evident in terms of removing through traffic from the village to the benefit of bus passengers and enhancing opportunities for walking and cycling.

## ***Cost to Government***

The outturn cost of the project was approximately £1.0m (21%) greater than was predicted at the time of assessment.

## ***Value for Money***

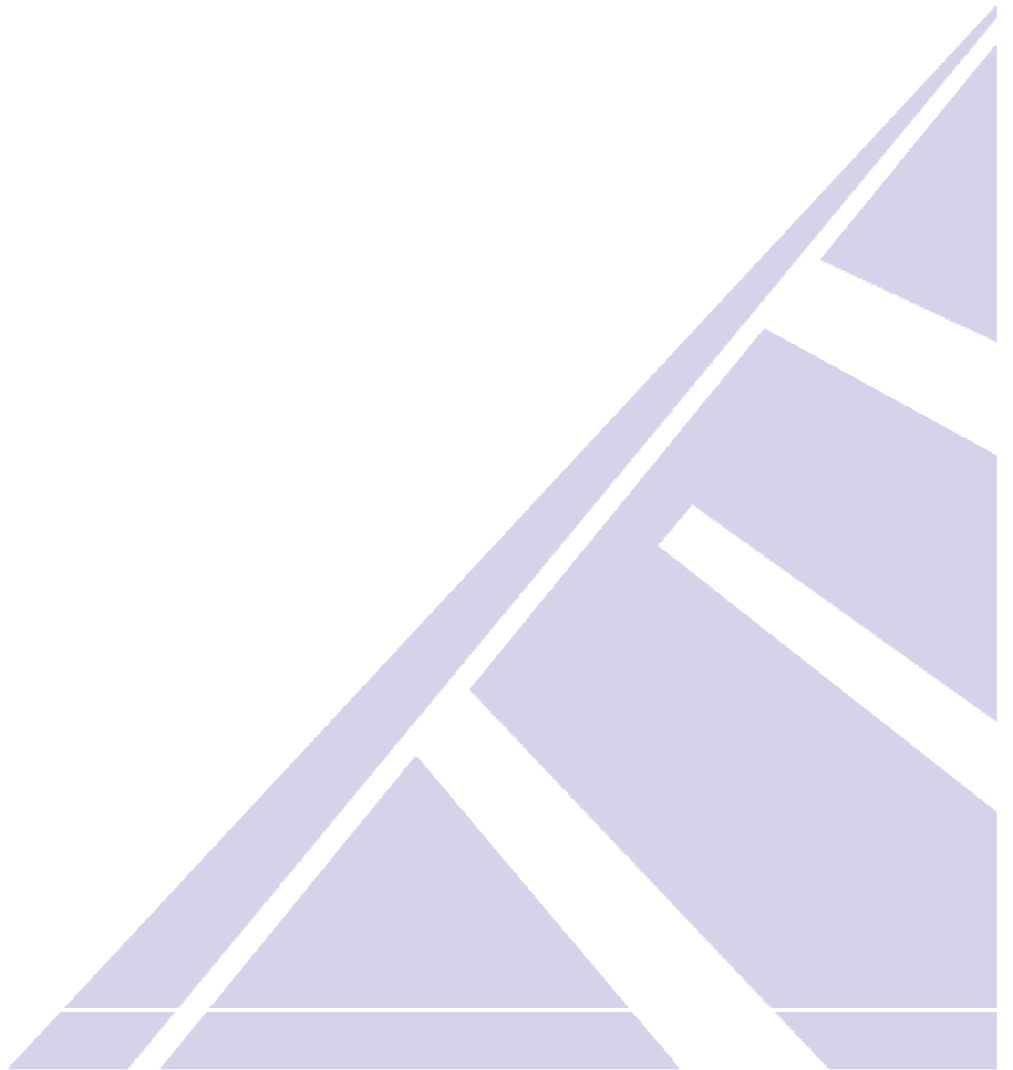
Although the NPV and BCR were unlikely to be as great as predicted at the time of assessment, it was judged that the project would continue to provide benefits to road users.

## ***Achievement of Objectives***

The initial indications noted within the 1YA Evaluation Report suggested that the majority of the project's objectives were likely to be achieved. It was noted, however, that at the 1YA Evaluation stage, it was judged that the project was unlikely to achieve good value for money although it was recognised that the project would continue to provide benefits to transport users.



# **DETAIL OF EVALUATION**



# SCOTTISH TRUNK ROAD INFRASTRUCTURE PROJECT EVALUATION

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## 3 PROJECT EVALUATION

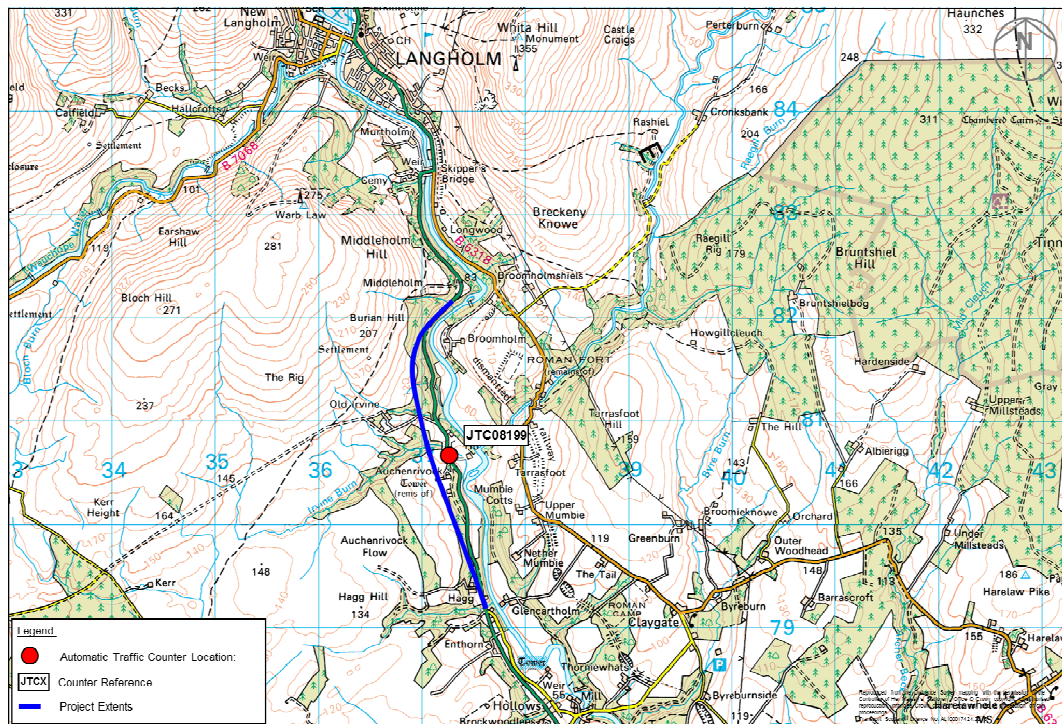
### 3.1 Introduction

#### *Project Description*

The project, located on the A7(T) approximately 3 kilometres south of Langholm, involved the off-line construction of 1.6 kilometres of single two-lane carriageway and 1.7 kilometres of wide single two-lane carriageway to improve overtaking opportunities on the A7(T). The project also included two dedicated right-turn ghost island junctions allowing access to Langholm. The project was officially opened to traffic on 18th June 2009.

The existing route was de-trunked, with part of the carriageway converted into a cycleway / footpath, with the intention of providing local residents and visitors with improved cycling and walking facilities. The general location of the project is shown in Figure 3.1.

Figure 3.1: General Location Plan



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## *Project Objectives*

The objectives of the A7(T) Auchenrivock project were set as follows:

- To improve the operational performance, level of service and road safety on the A7 by reducing the effects of driver stress and journey times;
- To improve and increase the number of overtaking opportunities to eradicate the conflicts between long distance users, local and agricultural traffic;
- To incorporate measures for non-motorised users;
- 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 A7(T) Auchenrivock 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 and supported by a site visit carried out in June 2014. External stakeholder views were 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.

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## 3.3 The operation of the project and process evaluation

### *Network Traffic*

In terms of project operation, the evaluation is supported by the consideration of pre and post opening comparison of operational indicators, which focus 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:

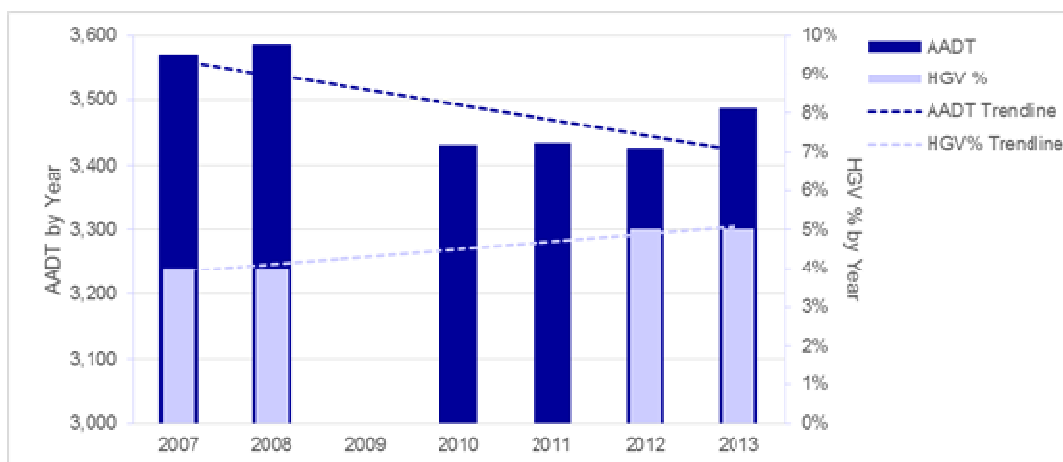
- JTC08199 A7 Langholm

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 and percentage of Heavy Goods Vehicles (HGVs) pre and post project opening on the A7(T) route within the vicinity of the project are presented in Figure 3.2.

Figure 3.2: Long Term ATC Data



Note: Incomplete data available for 2010 & 2011.

The **1YA Evaluation** indicated that traffic flows in 2010 were around 150 vehicles per day (approximately 4%) lower than 2008 flow levels. Flows in 2011 were consistent with 2010 levels.

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A comparison between the latest available pre and post opening traffic volumes on the A7(T) within the vicinity of the project indicates that traffic flows in 2013 were approximately 100 vehicles per day (vpd) lower than 2008 flow levels. Analysis, however, of the long term trends in annual traffic flows suggest that the volume of traffic on this section of the A7(T) had been falling for a number of years prior to the opening of the project. Traffic volumes between 2010 and 2013 increased by approximately 50 vpd (2%).

A comparison between pre and post opening average daily HGV percentages on the A7(T) within the vicinity of the project indicates that the percentage of HGVs has remained broadly consistent between 2007 and 2013 with a slight increase from 4% to 5% across this period. This equates to an average daily increase of approximately 60 HGVs between 2007 and 2013.

Given the nature of the project, the 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.

### *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 traffic growth factors were applied to the modelled 2009 opening year traffic flows to derive future modelled assessment year traffic flows.

Predicted traffic flows for 2013 have been derived by interpolating between the 2009 and 2027 modelled assessment year design network flows. A summary of the actual and predicted traffic data is shown in Table 3.1.

**Table 3.1: Traffic Analysis Summary**

ATC Ref	Actual AADT*	Predicted AADT			% Difference (Predicted – Actual) / Actual		
		Low	60/40	High	Low	60/40	High
<b>A7(T) South of Langholm</b>							
JTC08199	3,487	3,727	3,881	4,111	6.9%	11.3%	17.9%

\* 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 7% and 18% greater than the observed 2013 flow under low and high traffic forecast scenarios respectively.

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The **1YA Evaluation** indicated that the predicted 2010 flow (derived by interpolating between the modelled assessment year traffic flows) was 5% and 14% greater than the observed 2010 flow under low and high traffic growth forecast scenarios respectively.

Whilst the latest comparison indicates that traffic growth on the A7(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.

## **Traffic Volumes: Key Findings**

Observed traffic flows are on average 11% 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 2009.

A comparison between the 1YA and 3YA after evaluation shows increasing variation between forecast and predicted traffic flows.

## ***Overtaking Opportunities***

### *Post Opening Overtaking Opportunities*

The **1YA Evaluation** indicated that, based on the evaluation of other projects with a comparable standard of carriageway for which overtaking surveys have been carried out, the provision of the wide single two-lane carriageway is judged to have a positive impact on the number of overtaking manoeuvres. It was also noted within the **1YA Evaluation** that stakeholder feedback indicated overtaking opportunities had increased significantly as a result of the project.

While pre opening overtaking information was not available for this project, a post opening overtaking survey was undertaken on the A7(T) in June 2014 to provide an indication overtaking 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 A7(T) in both directions of travel within the direct vicinity of the project. The results from the post opening survey undertaken in June 2014 is presented in Table 3.2.

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**Table 3.2: Level of Overtaking**

	AM Survey Period		PM Survey Period	
	Northbound	Southbound	Northbound	Southbound
Post Opening (2014)	21%	14%	12%	16%

Analysis of the results from the post opening survey indicates that approximately 21% and 12% of vehicles that travelled through the survey site in the northbound direction during the AM and PM survey periods carried out an overtaking manoeuvre. The results from the post opening survey also indicated that approximately 14% and 16% of vehicles that travelled through the survey site in the southbound direction during the AM and PM survey periods carried out an overtaking manoeuvre. The higher percentage of overtaking manoeuvres carried out during the AM survey period in the northbound direction of travel is likely attributable to the lower opposing traffic flow in the southbound direction, allowing for a greater number of overtaking opportunities to be carried out in the northbound direction of travel.

### *Post Opening Vehicle Platoons*

Post opening platooning data, collected as part of the post opening overtaking survey, was available for the AM and PM survey periods. The **1YA Evaluation** suggested that, as a consequence of providing overtaking opportunities, the project is also likely to help reduce platooning.

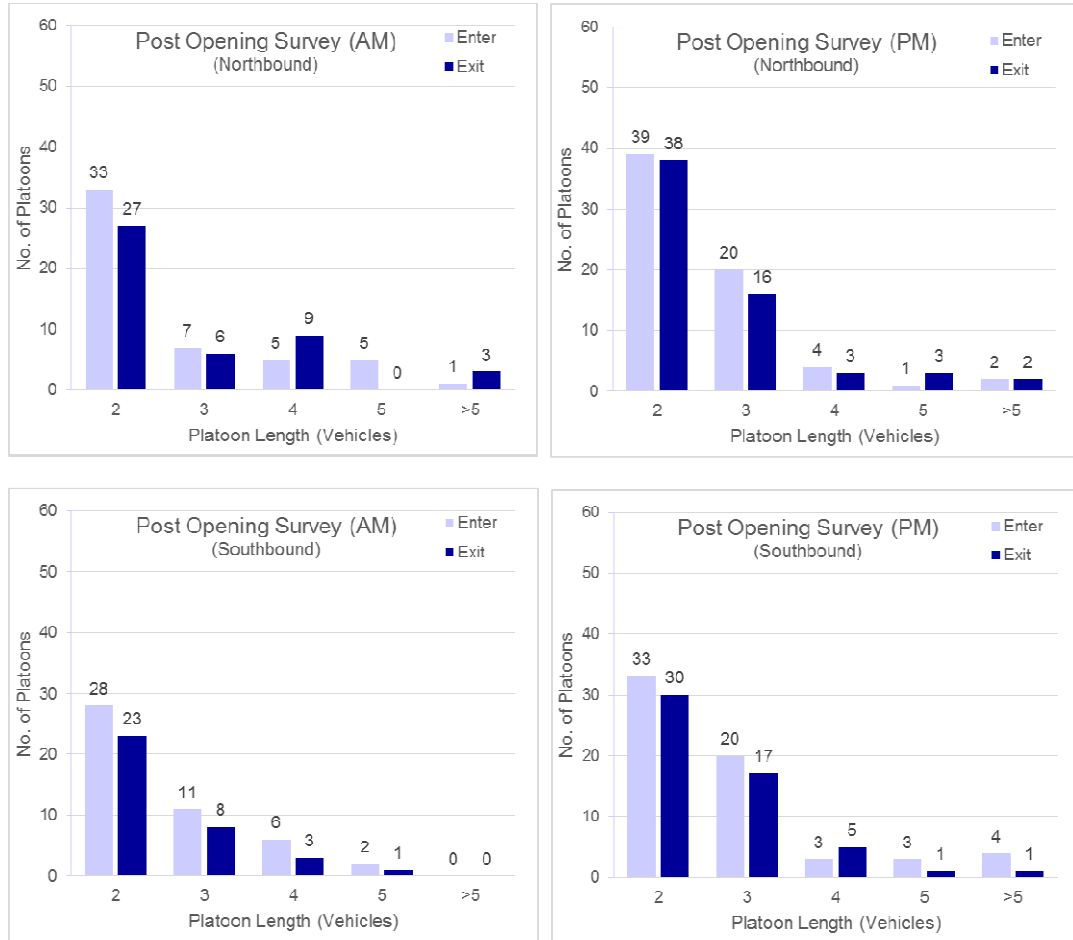
The results from the post opening survey undertaken in June 2014 is presented in Figure 3.3. “Enter” indicates the point at which vehicles enter the survey site whereas “Exit” indicates the point at which vehicles leave the survey site.

Analysis of the results presented in Figure 3.3 suggests that vehicles in platoon travelling in both directions of travel were generally dispersed over the extents of the survey site as a consequence of vehicles carrying out overtaking manoeuvres. A comparison between the total number of platoons that entered and exited the survey site during the post opening surveys suggests that, overall, the project has a positive effect in terms of reducing and dispersing vehicles in platoons over the extents of the survey site.

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**Figure 3.3: Number of Platoons**



## Stakeholder feedback

One respondent commented upon the lack of overtaking opportunities previously at Auchenrivock and stated that “*this new very wide section gives road users that opportunity*”, which have probably contributed towards decreasing driver frustration. Two other respondents affirmed that the overtaking opportunities have been much improved and one of these respondents also noted that driver frustration has been greatly reduced.



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“One respondent commented upon the lack of overtaking opportunities previously at Aucherivock and stated that “this new very wide section gives road users that opportunity”, which have probably contributed towards decreasing driver frustration”

“the overtaking opportunities have been much improved..., and driver frustration has been greatly reduced”

## Overtaking Opportunities: Key Findings

The project has facilitated overtaking in both directions of travel with approximately 21% and 12% of vehicles travelling in the northbound direction, and approximately 14% and 16% of vehicles travelling in the southbound direction, carrying out an overtaking manoeuvre in the AM and PM periods respectively 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.

### *Travel Times*

#### *Change in Travel Times*

The **1YA Evaluation** indicated that based on the evaluation of other projects with a comparable standard of carriageway for which journey time data is available, the provision of the wide single two-lane carriageway is judged to reduce journey times. It was also noted within the **1YA Evaluation** that it was the view of stakeholders that the project had a positive impact on journey times and journey time reliability.

#### *Stakeholder feedback*

Various responses received indicated that the project has led to a reduction in journey times and one respondent indicated that the project is likely to have contributed towards a “*significant reduction in journey times*”. It was also noted that it is likely the project will “*have contributed towards improved journey times*”.

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“significant reduction in journey times”

“have contributed towards improved journey times”

## *Vehicle Speeds*

Mean vehicle speeds, estimated from the information collected as part of the post opening overtaking surveys, have been used as a proxy for travel times. The results from the post opening survey undertaken in June 2014 is presented in Table 3.3.

**Table 3.3: Assessment of Mean Vehicle Speeds (mph)**

	AM Survey Period		PM Survey Period	
	Northbound	Southbound	Northbound	Southbound
Post Opening (2014)	64	66	65	67

Analysis of the results presented in Table 3.3 indicates that mean vehicle speeds in both directions of travel are broadly comparable, which is as expected given the WS2 lane configuration of the project. Based on the distances between the cameras used for the post opening survey, mean vehicle speeds in both directions of travel have been estimated to exceed the national speed limit in force over the extent of the survey site. There is, however, no evidence to suggest that there are any speed related safety issues within the vicinity of the project.

### **Travel Times: Key Findings**

Overall, the project is considered to have had a positive impact on journey times over this section of the A7(T).

Analysis of the speed data indicates that mean speeds have been estimated to have exceeded the national speed limit in force over the extent of the survey site. The project is, however, considered not to have had a material impact on speed related safety issues.

## **3.4 Environment**

The following section provides a summary of the assessment of environmental mitigation measures proposed for the A7(T) Auchenrivock project. A fuller report is provided in Appendix A.

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## *Review of Environmental Mitigation Measures*

The environmental mitigation measures originally proposed for the project were obtained from the project's Environment 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:

- Noise and vibration;
- Water quality, drainage and flood defence;
- Biodiversity and habitats;
- Landscape and visual amenity;
- Physical fitness, pedestrians, cyclists and community effects; and
- Vehicle travellers.

## *Findings*

Much of the establishment of the planting (wildflower and mixed tree species) and natural regeneration has been successful throughout the project. This has created a natural looking landscape from the perspective of the road users.

Regeneration of the vegetation has not worked as well at the bridge widening, on the east of the carriageway, down the slope, where the plants are not growing successfully. Similarly, at the underpass the macmatr used is still visible and very little vegetation has become established on the slope after three years. Whilst this does not detract from the look of the project from the road, it does not maximise the opportunity to enhance biodiversity in the area or improve the stability of the slope.

A number of SuDS ponds were built as part of the project and vegetation surrounding and within these ponds is well established, making them generally not visible from the road and difficult to locate on foot. Marginal plant species including rushes, reeds, sedges and flag iris have been planted. The ponds built here now provide a good example of a rich and diverse wetland habitat that should support a wide variety of species.

The area to the east of the project, at the back of the embankment between the former A7 carriageway and the project (visible from the old carriageway), within the native woodland planting area, is dominated by bracken. This does not maximise the opportunity to enhance biodiversity.

# SCOTTISH TRUNK ROAD INFRASTRUCTURE PROJECT EVALUATION

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The former A7 carriageway has been retained as a local access road and also acts as a pedestrian / cycle route. Tie-in sections have been created to link the cycleways to the new section of carriageway at either end of the project and these have been well-constructed and appropriately signed.

## Environment: Key Findings

Overall the project works in fitting into the surrounding landscape. The SuDS ponds provided were considered good examples of diverse wetland habitat.

Planting and natural regeneration of vegetation, however, has failed on the steep slopes of the underpass and bridge widening where macmatr was used; and within the native woodland planting area, between the former A7 carriageway and the project, bracken has begun to dominate which may restrict opportunities to maximise biodiversity.

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 year after project completion are shown in Figure 3.4a and Figure 3.4b. 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
<b>3 Years Before</b>				
A7(T)	1	0	0	1
<b>1 Year After</b>				
A7(T)	0	0	0	0
<b>3 Years After</b>				
A7(T)	0	0	2	2

As can be seen from Table 3.4, two personal injury accidents (two slight) occurred in the three year period following the opening of the project in comparison to one personal injury accident (one fatal) in the three years before opening.

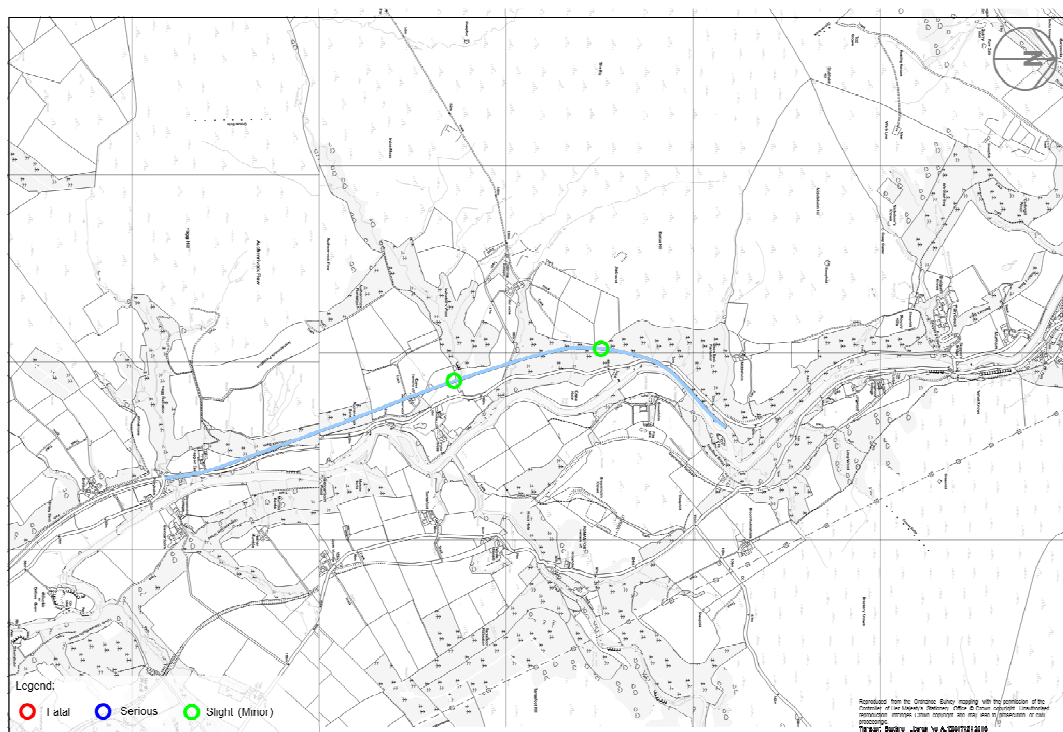
# SCOTTISH TRUNK ROAD INFRASTRUCTURE PROJECT EVALUATION

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



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



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The causation factor of the fatal accident which occurred in the three year period before opening of the project was recorded as a head on collision between a motorcyclist and a light goods vehicle, while the motorcycle was carrying out an overtaking manoeuvre. The causation factors of the two slight accidents which occurred in the three year period following opening of the project were recorded as: an inexperienced driver losing control on an icy road surface, and an alcohol impaired driver losing control and leaving the carriageway. Given the causation factors of the accidents occurring after opening of the project, it can be judged that the design or layout of the project was not a factor.

## *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 August 2010, concluded that the new road layout at Auchenrivock was operating safely and efficiently.

The Stage 5 Audit, undertaken in May 2014, confirmed that two slight accidents had occurred following the opening of the project. As mentioned previously, the causation factors of the accidents (loss of control due to icy conditions and loss of control due to impairment by alcohol) could not be attributed to the design or construction of the road.

The Stage 5 RSA noted several recommendations, including the removal of debris and temporary concrete barriers from the northern end of the project resulting from a landslip in early 2014, maintenance be undertaken to cut back vegetation obscuring road signs, maintenance of road signs which may need to be replaced due to vehicle strikes and road studs at the northern end of the project requiring replacement.

The RSA also noted that the former A7 bypassed by the project required maintenance, including the cleaning or replacement of several road signs, trimming of overhanging branches, cut-back of road verges that have crept in to cover the road edge lines and sweeping of the road surface. The RSA made further comments regarding cyclist and pedestrian usage of the bypassed A7 and stated that the route required maintenance to ensure that non-motorised users found the route an attractive and better alternative to the A7(T). The Stage 5 RSA concluded that the road layout at Auchenrivock continues to operate safely and efficiently.

# SCOTTISH TRUNK ROAD INFRASTRUCTURE PROJECT EVALUATION

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## *Stakeholder feedback*

Two respondents shared the view that the new section of the road “*is much safer*” than the old section, with a quite significant improvement in visibility. Another respondent commented that the width of the new road offered good overtaking opportunities and that, due to the improved visibility, there was a low risk of head on collisions when overtaking manoeuvres were carried out.

“is much safer than the old section, with a quite significant improvement in visibility”.

“the width of the new road offered good overtaking opportunities and that, due to the improved visibility, there was a low risk of head on collisions when overtaking manoeuvres were carried out”.

## **Safety: Key Findings**

An assessment of the one and three year post opening personal injury accidents and the Stage 5 RSA suggests that the project is operating safely.

Maintenance of the A7(T) and bypassed A7 should be carried out in-line with the recommendations raised within the Stage 5 RSA.

## **3.6 Economy**

### ***Transport Economic Efficiency***

The comparisons between predicted and actual traffic flows, presented in Section 3.3, can 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 2010 flows were between 5% and 15% greater than the observed 2010 flows on the A7(T) depending on the growth scenario considered. Traffic flows are a key input to the economic assessment of a project. The latest comparison indicates that the predicted 2013 flows were between 7% and 18% greater than the observed 2013 flows on the A7(T) within the vicinity of Auchenrivock. This overestimation is likely to be attributable to the general economic downturn over the evaluation period.

# SCOTTISH TRUNK ROAD INFRASTRUCTURE PROJECT EVALUATION

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The comparison of traffic flows as part of the 1YA and 3YA Evaluations suggest that traffic growth on the A7(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.

## **Economy: Key Findings**

The difference between predicted and actual AADT flows suggests that the economic benefits of the project will have been over estimated due to external factors that could not have readily been foreseen at the time of assessment.

### **3.7 Accessibility & Social Inclusion**

#### ***Community Accessibility***

The **1YA Evaluation** indicated that it is likely that accessibility improvements will have been felt by local active travel users in and around Auchencroft due to the provision of the new cycleway / footpath. Public transport services use the de-trunked A7 route and bus passengers are likely to feel safer and less exposed to the effects of trunk road traffic as a result.

#### *Cycling Audits*

A Cycle Audit for the project was carried out in May 2014, as part of the RSA. As noted in Section 3.5, the audit report identified maintenance works required on the former A7 bypassed by the project including the cleaning and replacement of some road signs, trimming back of vegetation and cut-back of grass verges. In terms of cyclists, the RSA observed maintenance would help to ensure the route provided an attractive alternative to cyclists and pedestrians.

#### *Stakeholder feedback*

A respondent affirmed that the new road has improved the connection with communities to the south such as Canonbie and Carlisle, with cyclists being able to travel between communities faster and more safely.

**“the new road has improved the connection with communities to the south such as Canonbie and Carlisle, with cyclists being able to travel between communities faster and more safely.”**



# SCOTTISH TRUNK ROAD INFRASTRUCTURE PROJECT EVALUATION

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## Accessibility & Social Inclusion: Key Findings

Feedback received indicated that the project has improved the connections between communities with improved safety and journey times.

The Cycle Audit carried out as part of the RSA for the project provides recommendations to address potential issues with the measures provided for cyclists.

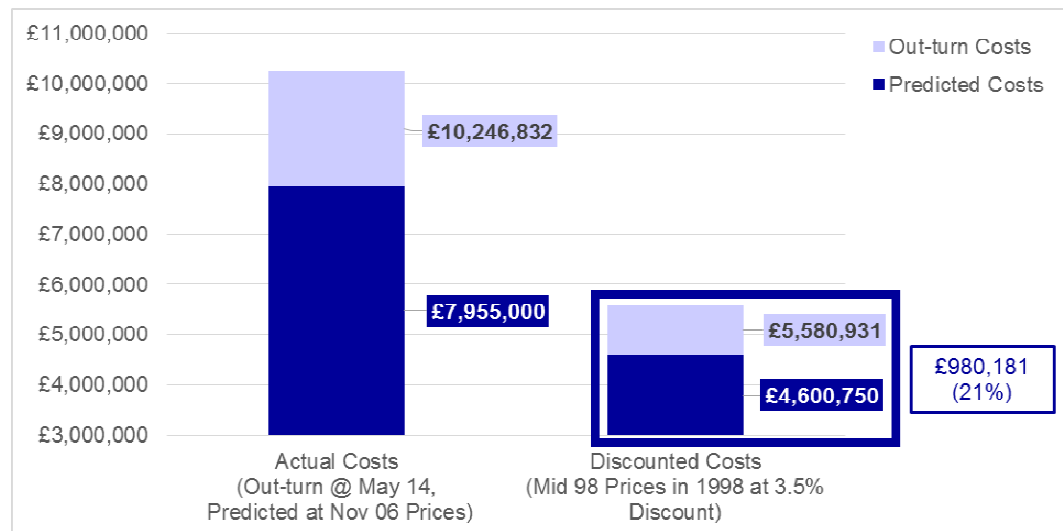
### 3.8 Cost to Government

#### *Investment Costs*

#### *Comparison Between Predicted and Out-turn Costs*

The out-turn and predicted project costs are shown in Figure 3.5.

**Figure 3.5: Project Cost Summary**



The latest comparison indicates that the current outturn costs for the project are consistent with the outturn costs at the time of the **1YA Evaluation**. The current out-turn costs are approximately £1.0m (21%) greater than was predicted at the time of assessment.

It should be noted, however, that the predicted costs used within the cost comparison are derived from the costs estimated at the project's pre-tender stage. Variations in actual and predicted project cost comparisons can occur due to issues identified during the tendering process.

# SCOTTISH TRUNK ROAD INFRASTRUCTURE PROJECT EVALUATION

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The project had a tender cost of approximately £8m<sup>2</sup> which, when discounted to a consistent mid 1998 price base, suggests a discounted cost of approximately £4.3m. This can be compared to the discounted out-turn cost, presented in Figure 3.5, of approximately £5.6m, suggesting that the project has been delivered approximately £1.3m over the tender cost. The project's tender cost is broadly comparable with the cost predicted at the project's pre-tender stage.

## **Cost to Government: Key Findings**

The outturn cost of the project is approximately £1.0m (21%) greater than was predicted at the time of assessment. Variations in actual and predicted project cost comparisons can occur due to issues identified during the tendering process.

Based on the project's discounted tender cost of approximately £8m, the comparison of out-turn and tender costs suggests that the project has been delivered approximately £1.3m over the tender cost. The project's tender cost is broadly comparable with the cost predicted at the project's pre-tender stage.

## **3.9 Value for Money**

### ***Initial Indications***

The economic appraisal results for the project predicted a Net Present Value (NPV) of £1.19m and Benefit to Cost Ratio (BCR) of 1.19 under the 60/40 traffic growth forecast scenario<sup>3</sup>. The comparisons undertaken at the **1YA Evaluation** stage indicated that the benefits may have been overestimated and that the outturn cost was greater than predicted suggesting that the NPV and BCR of the project are unlikely to be as great as predicted

Based on the latest comparisons presented in Sections 3.3 and 3.8 in terms of traffic flows and costs respectively, which suggest that the benefits will have been overestimated and that the cost is greater than predicted, the NPV and BCR of the project is unlikely to be as great as predicted.

## **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 noted, this is likely to be a result of external factors relating to the economic downturn coinciding with the evaluation period that could not have readily been foreseen at the time the assessment was undertaken.

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<sup>2</sup> Tender cost in 2008 / 2009 Prices

<sup>3</sup> 60/40 traffic forecast scenario calculated through factoring results of low and high traffic forecast scenarios by 0.6 and 0.4 respectively

# SCOTTISH TRUNK ROAD INFRASTRUCTURE

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The outturn cost for the project is approximately £1.0m (21%) greater than was predicted at the time of assessment. This is relatively unchanged from the 1YA evaluation.

The NPV and BCR are expected to be less than forecast as a result of the variation in traffic flows and construction costs. Although the NPV and BCR of the project is unlikely to be as great as predicted at the time of assessment, it is judged that the project will continue to provide a benefit to road users and the local community which is reflected in the comments received from stakeholders.

### 3.10 Progress Towards Achieving Objectives

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.

# SCOTTISH TRUNK ROAD INFRASTRUCTURE **PROJECT EVALUATION**

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**Table 3.5: Progress Towards Achieving Objectives**

Objective	Commentary	Progress
<p>Improve the operational performance, level of service and road safety on the A7 by reducing the effects of driver stress and journey times.</p>	<p>The results of 3YA post opening overtaking surveys suggest that platoons disperse over the section of wide single carriageway as a consequence of vehicles carrying out overtaking manoeuvres in both directions of travel.</p> <p>The provision of increased ‘opportunistic’ overtaking opportunities in both directions of travel is likely to reduce journey times.</p> <p>A comparison between three years pre and post opening accidents occurring within the vicinity of the project indicates that one personal injury accident (fatal) occurred prior to the opening of the project in comparison to two personal injury accidents (slight) in the three year period following the opening of the project. This suggests a potential reduction in the severity of accidents occurring and a potential overall improvement in road safety.</p> <p>Stakeholder feedback received indicated that the project has led to a reduction in journey times.</p>	<p>+ve</p>
<p>Improve and increase the number of overtaking opportunities to eradicate the conflicts between long distance users, local and agricultural traffic.</p>	<p>The results of the 3YA post opening overtaking survey indicates that between approximately 21% and 12% of westbound vehicles and between approximately 14% and 16% of southbound vehicles carried out an overtaking manoeuvre, which suggests that the project facilitates overtaking.</p> <p>Stakeholder feedback received indicated that the project has increased the opportunity to overtake on this section of the A7 which may have contributed towards decreasing driver frustration.</p>	<p>+ve</p>

# SCOTTISH TRUNK ROAD INFRASTRUCTURE **PROJECT EVALUATION**

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Objective	Commentary	Progress
Incorporate measures for non-motorised users.	<p>As part of the project, a shared cycle and pedestrian facility was provided which utilised the redundant section of the bypassed A7.</p> <p>Stakeholder feedback received indicated that the project has improved the connection between Langholm and communities to the south such as Canonbie and Carlise with cyclists able to travel between communities quickly and safely.</p>	+ve
Mitigate the environmental impact of the new works where possible.	<p>The measures committed within the Environmental Statement are in place (other than a SuDS pond, which had been agreed could be omitted by all parties prior to construction).</p> <p>Whilst this variation from the proposed mitigation measures was noted and some vegetation had failed or was dominated by bracken, these were not considered to have had a material detrimental impact on the general integration of the project into its surroundings.</p>	+ve
Achieve good value for money for both taxpayers and transport users.	<p>The NPV and BCR are unlikely to be as great as predicted at the time of assessment. This is in part attributable to a decline in traffic flows characteristic across the wider trunk road network as a consequence of the economic downturn which coincided with the evaluation period. The project is however delivering benefits to road users and also the local community as reflected in the feedback received from stakeholders.</p>	○

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

# SCOTTISH TRUNK ROAD INFRASTRUCTURE

## **PROJECT EVALUATION**

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### **3.11 Evaluation Summary**

The evaluation of the A7(T) Auchenrivock project indicates the project is considered to have had a localised positive impact on journey times and it has positively contributed to alleviating driver frustration through helping to break-up traffic travelling in platoon on this section of the A7(T). An assessment of the one and three year post opening personal injury accidents and the Stage 5 RSA suggests that the project is operating safely.

While the project's value for money is likely to be less than forecast, the project is impacting positively on traffic conditions on the A7(T) through providing increased 'opportunistic' overtaking opportunities. The project is also delivering benefit to the local community through, for example, the provision of increased opportunity for cycling and walking avoiding the trunk road network.

# **Appendix A: Environment**

## **A ENVIRONMENT**

### **A.1 OVERVIEW**

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.2 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 A7(T) Auchenrivock. 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 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<sup>4</sup> 'Three Years After' methodology that comprised:

- A desk study review of the project objectives, Environmental Statement and 1YA environmental mitigation review to identify the

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<sup>4</sup> Transport Scotland Scottish Trunk Road Infrastructure Project Evaluation (STRIPE). Final Guidance August 2013.



likely key issues to be evaluated during the 3YA review and any questions remaining from the 1YA reviews.

- 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 1YA 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 is provided.

## **A.3 ENVIRONMENTAL FINDINGS**

### ***Project Objectives***

The project, located on the A7(T) approximately 3 kilometres south of Langholm, involved the off-line construction of 1.6 kilometres of single two-lane carriageway and 1.7 kilometres of wide single two-lane carriageway to improve overtaking opportunities on the A7(T). The project also included two dedicated right-turn ghost island junctions allowing access to Langholm. The existing route was de-trunked, with part of the carriageway converted into a cycleway / footpath, with the intention of providing local residents and visitors with improved cycling and walking facilities.

The objectives of the project included setting out to improve overtaking opportunities and the operational performance, level of service and road safety by addressing driver stress and journey times, with appropriate mitigation to address the environmental impact of new works.

### ***Key Issues to be Reviewed***

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

- Landscape/planting – including grassland and wildflowers, mammal crossings and fencing, fish baffles

These formed the focus of the 3YA Evaluation instead of re-visiting everything that had been confirmed as being present during the 1YA site visits.

## **A.4 THREE-YEAR AFTER REVIEW FINDINGS**

### ***Key issues from the desk-study***

The 1YA assessment confirmed that most of the mitigation set out within the Environmental Statement had been implemented. During this 3YA assessment it was established that prior to construction all parties agreed to the use of a downstream defender in place of the north SuDS pond originally specified in the ES.

Much of the establishment of the planting (wildflower and mixed tree species) and natural regeneration has been successful throughout the project. This has created a natural looking landscape from the perspective of the road users, across what is a fairly wide open corridor with embankments rising up from the road to the west and down away from the road to the east, see Figure 1 and Figure 2.



***Figure 1: View of the project, successful planting***



***Figure 2: View of the project, successful planting***



**Figure 3: Regeneration of vegetation slow at underpass**



**Figure 4: Failed regeneration/unsuccesful planting around culvert**

Regeneration of the vegetation has not worked as well at the bridge widening, on the east of the carriageway, down the slope, where the plants are not growing successfully. Similarly, at the underpass the macmatr used is still visible and very little vegetation has become established on the slope after three years. Whilst this does not detract from the look of the project from the road, it does not maximise the opportunity to enhance biodiversity in the area or improve the stability of the slope, see Figure 3 and Figure 4.

A number of SUDS ponds were built as part of the project and vegetation surrounding and within these ponds is well established, making them generally not visible from the road and difficult to locate on foot. Marginal plant species including rushes, reeds, sedges and flag iris have been planted, see Figure 5. The ponds built here now provide a good example of a rich and diverse wetland habitat that should support a wide variety of species.

The area to the east of the project, at the back of the embankment between the old A7 carriageway and the new project (visible from the old carriageway), within the native woodland planting area, is dominated by bracken, which again does not maximise the opportunity to enhance biodiversity, see Figure 6.



**Figure 5: Well established, diverse wetland habitat at the drainage pond by Auchenrivock Cottages**



**Figure 6: Bracken at location of old A7 carriageway, which is now the cyclepath**



*Figure 7: Otter ledge*



*Figure 8: Incorporation of cycleway*

The original A7 carriageway has been retained as a local access road and also acts as a pedestrian / cycle route. Tie-in sections have been created to link the cycleways to the new section of carriageway at either end of the project and these have been well-constructed and appropriately signed, see Figure 6 and Figure 8.

#### ***Any new issues identified***

See comment above about the dominance of one area by bracken.

#### ***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***

- Consideration should be given to understanding why the planting and natural regeneration of vegetation has failed on the steep slopes of the underpass and bridge widening where macmatr was used, and further measures taken to improve the vegetation in these areas.
- Areas of bracken (visible from the old A7 carriageway) may need to be managed to reduce its spread and allow the wildflower meadow and native tree planting to thrive.

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 A1: Implementation of Mitigation Proposed in the Environmental Statement and Observations at 1YA and 3YA Opening**

<b>Mitigation Measure</b>	<b>1 YA Comments</b>	<b>3 YA Comments</b>
<b>Noise and vibration</b>		
The ES recommended that a permanent noise bund be created.	This has been implemented to the benefit of 2 Auchenvock Cottages.	Observed traffic flows are on average 11% lower than forecast flows. Following the thresholds in the STRIPE guidance, the noise mitigation is considered to have been appropriate for the volume of actual traffic.
<b>Water Quality, Drainage and Flood Defence</b>		
The ES identified several mitigation measures including the provision of SUDS and culverts.	All of these have been successfully implemented throughout the scheme. The planting associated with the two implemented ponds is establishing well and these areas have been well maintained, leading to the possibility of further habitat enhancements.	Establishment of vegetation around the drainage ponds has been very successful creating a diverse wetland habitat.
ES did recommend that a SUDS pond be implemented at Chainage 8+00	This pond was not included in the as-built scheme and the reason for its omission from the final scheme should be identified.	All parties agreed to the use of a downstream defender in place of the SuDS pond before construction.
<b>Biodiversity and Habitats</b>		
The ES identified specific measures for the protection of mammals including mammal fencing and dry culverts.	These have been provided along the route where specified and otter ledges have been constructed within the culverts where required. It could not be ascertained at the time of the site visit whether these facilities were being used.	No evidence the mammal ledge is being used was found during this assessment. Lack of evidence on site does not necessarily mean the ledge is not being used.

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Environment

<b>Mitigation Measure</b>	<b>1 YA Comments</b>	<b>3 YA Comments</b>
The culverting of the Irvine Burn included the provision of fish baffles and otter ledges due to protected species (otter and juvenile salmon) being identified during the ecological surveys undertaken.	The mitigation measures were found to be in very good condition, and the re-profiling of the Irvine Burn watercourse has also been sensitively designed and implemented effectively on site.	No further comment
<b>Landscape &amp; Visual Amenity</b>		
	The landscape and visual mitigation recommended within the ES has all been implemented and the scheme provides an excellent example of how a new road scheme can fit into the wider landscape setting.	No further comment
	Planting throughout the scheme is establishing well, however along some sections of the route trees do appear to have been planted within 5m of the road and this may require some thinning out in the future.	No further comment
<b>Physical Fitness, Pedestrians, Cyclists and Community Effects</b>		
	The former A7 carriageway has been retained as a local access road and also acts as a pedestrian / cycle route which has been well maintained. Tie-in sections have been created to link the cycleways to the new section of carriageway at either end of the scheme and these have been well-constructed and appropriately signed.	No further comment.

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Environment

<b>Mitigation Measure</b>	<b>1 YA Comments</b>	<b>3 YA Comments</b>
<b>Vehicle Travellers</b>		
<p>The ES identified that embankments and cuttings should be appropriately shaped and planted to improve views from the road.</p>	<p>The earthworks have been effectively profiled to help the road fit into the local undulating landform whilst permitting road users views across the surrounding landscape. The planting which has been implemented is establishing well throughout the scheme and there has been a good use of wildflower planting along the route which, when in flower improves the aspect for road users whilst helping to soften the impact of the embankment slopes.</p>	<p>No further comment</p>

## **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;
- Accessibility & Social Inclusion;
- 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

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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.

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### ***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

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Post Opening Overtaking Conditions	Obtained from post opening survey information
Stakeholder Feedback	Obtained from Police Scotland, Langholm Initiative and Langholm Community Council.

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***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

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Post Opening Travel Times	Proxy indicator of traffic speed confirmed through post opening survey information collected to support the project's economic assessment.
Stakeholder Feedback	Obtained from Police Scotland, Langholm Initiative and Langholm Community Council.

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### **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**

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

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#### ***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

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

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## **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 ACCESSIBILITY & SOCIAL INCLUSION**

Commentary on Community Accessibility has been provided for projects that have specific objectives relating to the Accessibility & Social Inclusion criterion, supported by anecdotal evidence where available.

Data Sources

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Provision for Non-motorised Users	Confirmed through site visits.
Cycling Provisions	Detailed within the Cycle Audit report produced during the project's preparation.

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**B.7 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

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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.

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## **B.8 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**

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Predicted NPV and BCR	Obtained from the pre-tender economic assessment undertaken during the project's preparation.
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## **B.9 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**

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