



CÒMHDHAIL TRANSPORT
ALBA SCOTLAND

TRANSPORT SCOTLAND
SCOTTISH TRUNK ROAD INFRASTRUCTURE
PROJECT EVALUATION

3YA Evaluation Report for A9(T) Bankfoot



TRANSPORT SCOTLAND
SCOTTISH TRUNK ROAD INFRASTRUCTURE
PROJECT EVALUATION

3YA Evaluation Report for A9(T) Bankfoot

CONTENTS

	Page
1 SUMMARY OF IMPACTS	1
1.1 Operational Indicators – How is the project operating?	1
1.2 Process Indicators – How well was the project implemented?	1
1.3 Forecasting – How accurate were predictions?	1
1.4 Objectives – Is the project on track to meet its objectives?	2
1.5 Costs to Government – Is the project delivering value for money?	2
2 INTRODUCTION	4
2.1 Background to Project Evaluation	4
2.2 Evaluation Reporting	5
2.3 Previous Evaluations	6
3 PROJECT EVALUATION	10
3.1 Introduction	10
3.2 Evaluation Methodology	10
3.3 The operation of the project and process evaluation	12
3.4 Environment	15
3.5 Safety	17
3.6 Economy	20
3.7 Cost to Government	22
3.8 Value for Money	23
3.9 Progress Towards Achieving Objectives	23
3.10 Evaluation Summary	26
A ENVIRONMENT	28
A.1 Introduction	28
A.2 Environmental Findings	29
A.3 Three-Year After Review Findings	30
B METHODOLOGY AND DATA SOURCES	44
B.1 Overview	44
B.2 Network Traffic Indicators	44
B.3 Environmental	46
B.4 Safety	46
B.5 Economy	47
B.6 Costs to Government	48
B.7 Value for Money	48
B.8 Achievement of Objectives	49

TABLES

	Page
Table 2.1: Project Summary Details	5
Table 3.1: Traffic Analysis Summary	14
Table 3.2: Accident Data Summary	19
Table 3.3: Progress Towards Achieving Objectives	24

FIGURES

Figure 2.1: Project Location Plan

Figure 3.1: General Location Plan

Figure 3.2: Long Term ATC Data

Figure 3.3a: 3 Years Before Opening Accidents

Figure 3.3b: 3 Years After Opening Accidents

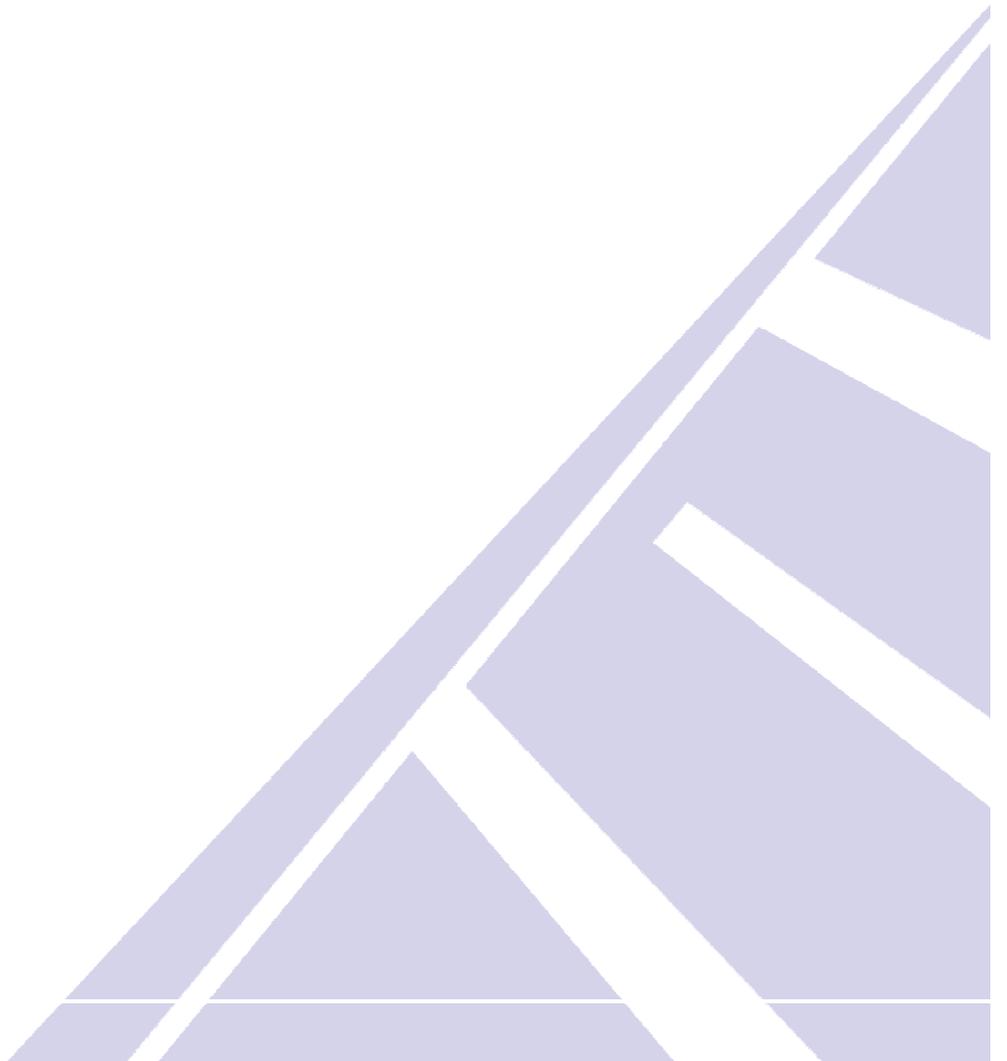
Figure 3.4: Project Cost Summary

GLOSSARY

The following abbreviations have been used in this report:

AADT	Annual Average Daily Traffic
ATC	Automatic Traffic Counter
BCR	Benefit to Cost Ratio
D2AP	Dual 2-Lane All Purpose Carriageway
DMRB	Design Manual for Roads and Bridges
NPV	Net Present Value
NRTF	National Road Traffic Forecasts
RoD	Record of Determination
RSA	Road Safety Audit
S2	Single 2-Lane Carriageway
SNH	Scottish National Heritage
STAG	Scottish Transport Appraisal Guidance

SUMMARY OF IMPACTS



SCOTTISH TRUNK ROAD INFRASTRUCTURE **PROJECT EVALUATION**

TRANSPORT **SCOTLAND**

1 SUMMARY OF IMPACTS

This section provides a short summary of the key elements contained within this Three Year After Evaluation report of the A9(T) Bankfoot 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 project incorporates localised junction improvements only, this is as expected.

The project is operating safely in the first three years of operation, 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 project cost, programme and process.

Construction of the A9(T) Bankfoot project commenced in early 2009 and the project was opened to traffic in August 2009. The cost of construction of the project was approximately £0.8m greater than predicted during the appraisal. 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. As such, variations in actual and predicted project cost comparisons can occur due to issues identified during the tendering process.

The majority of the mitigation which was included within the Environmental Record of Determination (RoD) has been implemented on site, is in good condition and is operating as expected.

A Stage 5 RSA was carried out within the vicinity of the project and confirmed that one slight accident had occurred in the period three years after opening. The RSA suggested that the accident was not as a result of the design or layout of the project.

1.3 Forecasting – How accurate were predictions?

Traffic flows on the A9(T) in the vicinity of the project are higher than forecast which can be attributed to an underestimation of future traffic flows on the A9(T) as part of the project's economic assessment.

As noted in Section 1.2, the cost of construction of the project was greater than that predicted during the appraisal by approximately £0.8m.

SCOTTISH TRUNK ROAD INFRASTRUCTURE PROJECT EVALUATION

TRANSPORT **SCOTLAND**

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 of road safety and provision of a good, quick and reliable road link.

The nature of the project (a junction improvement removing right turn manoeuvres across the A9(T) carriageway) has improved safety at this location of the A9(T). There are likely, however, to be dis-benefits for local movements which require to travel longer distances to access the A9(T) as a result of the project.

The project is operating safely in the first three years of operation with only one slight accident occurring within the vicinity of the project. The Stage 5 Road Safety Audit concluded that the road layout at Bankfoot continues to operate safely and efficiently and it can, therefore, be judged that the project has provided an improvement in road safety.

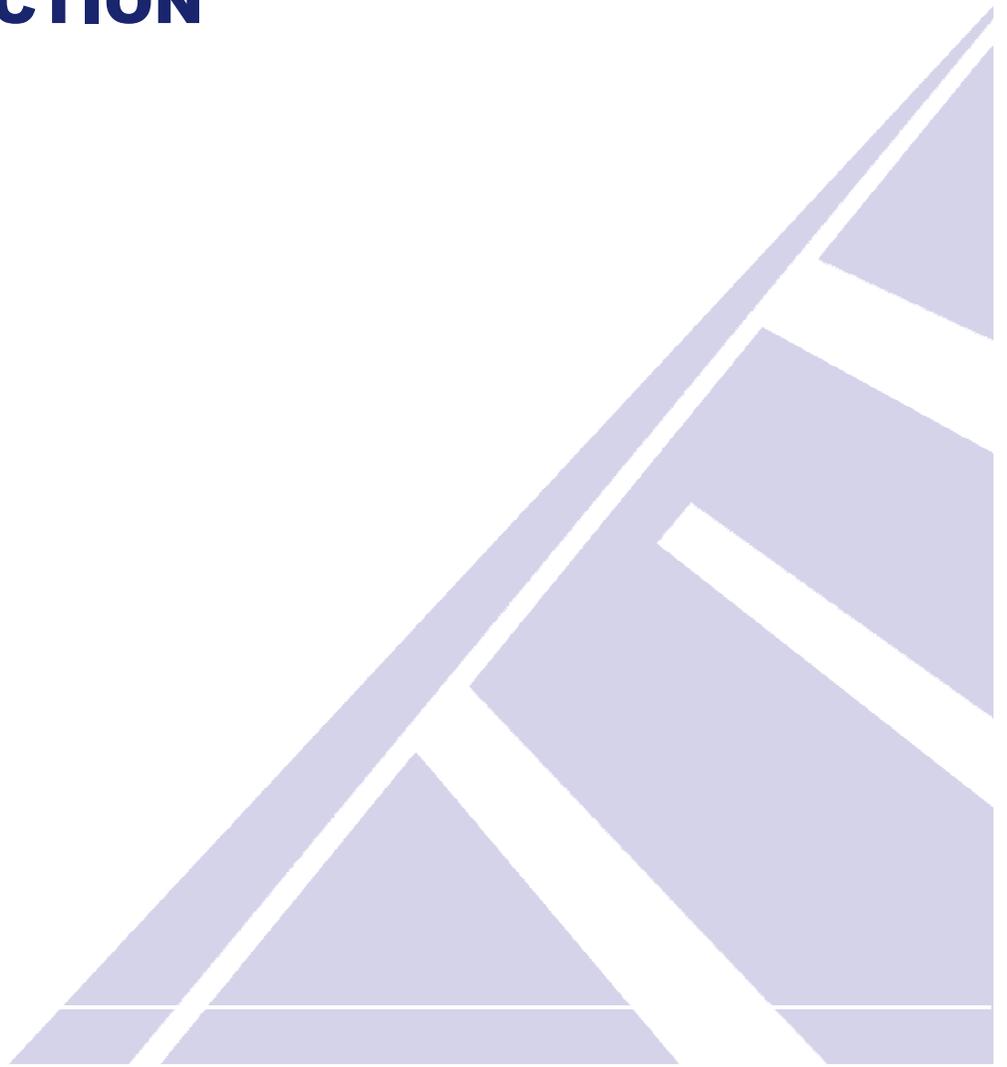
1.5 Costs to Government – Is the project delivering value for money?

Based on the evaluation of value for money at the time of the project's 3YA Evaluation, the Net Present Value (NPV) of 0.97 and Benefit to Cost Ratio (BCR) of 1.97 for the project is likely to be less than predicted at the time of assessment. This reflects higher than predicted costs which will impact on the project's value for money.

In combination with other projects previously implemented on the A9(T), such as the improvement at Ballinluig and the strategic dualling programme of the route currently being progressed by Transport Scotland, the Bankfoot project can be expected to provide improvements in road safety and, more generally, benefits to transport users and will help support future economic development within central and northern Scotland.

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

INTRODUCTION



SCOTTISH TRUNK ROAD INFRASTRUCTURE PROJECT EVALUATION

TRANSPORT **SCOTLAND**

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.

SCOTTISH TRUNK ROAD INFRASTRUCTURE PROJECT EVALUATION

TRANSPORT **SCOTLAND**

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 – 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 A9(T) Bankfoot 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.

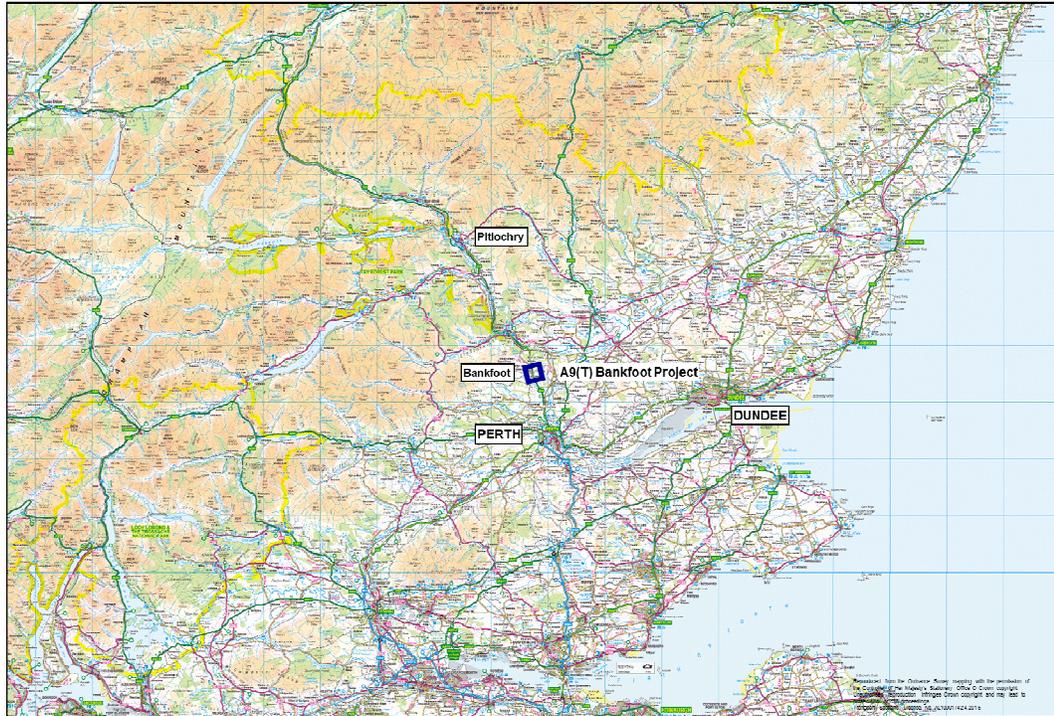
Table 2.1: Project Summary Details

Route	Project Name	Standard	Length (km)	Open to Traffic
A9(T)	Bankfoot	Junction Improvement		August 09

SCOTTISH TRUNK ROAD INFRASTRUCTURE PROJECT EVALUATION

TRANSPORT SCOTLAND

Figure 2.1: Project Location Plan



2.3 Previous Evaluations

A 1YA Evaluation was carried out for the A9(T) Bankfoot 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:

Comparison Between Pre and Post Opening Traffic Flows

The comparison between pre and post opening traffic volumes on the A9(T) north of Luncarty indicated that traffic flows in 2010 were around 200 vehicles per day (vpd) (approximately 1%) lower than 2008 flow levels. Flows in 2011 were marginally higher than 2008 levels. Traffic volumes on the A9(T) at Dunkeld have seen a reduction of around 600 vpd (approximately 4%) between 2008 and 2010 with flows in 2011 around 200 vpd (approximately 2%) higher than 2008 levels.

Comparison Between Predicted and Actual Traffic Flows

The comparison between predicted and actual AADT flows indicated that the predicted 2010 flows were between 15% and 25% lower than the observed 2010 flows.

SCOTTISH TRUNK ROAD INFRASTRUCTURE PROJECT EVALUATION

TRANSPORT **SCOTLAND**

Change in Travel Times

Whilst journey times for some local trips accessing the A9(T) may have marginally increased as a result of the revised junction layout due to the removal of right-turns to / from Bankfoot village, it can be expected that journey times on the A9(T) carriageway itself over the extents of the improvement will have reduced. Journey time reliability is also expected to have improved in both directions of travel as a result of removing delays to mainline traffic caused by right turning vehicles.

Environment

The review of mitigation measures for the project confirmed that the mitigation measures committed within the RoD were in place. However, deficiencies were noted as the otter fencing at Garry Burn (the need was identified following the RoD) did not meet DMRB specification, and some of the planting had failed. Whilst the implementation of these proposed mitigation measures were not to the required standard and recommendations are made to investigate them further, overall, these are not considered to have had a material detrimental impact on the general integration of the project into its surrounding. Maintenance was identified as a requirement to avoid any significant reduction in the ecological benefit from ponds and planting within the vicinity of the project.

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. A skid risk from vehicles over running the filter drain and scattering debris onto the carriageway surface was noted.

Economy

The difference in predicted and actual traffic flows indicated that the predicted 2010 flows were 15% to 25% lower than the observed 2010 flows on the A9(T). The project may, therefore, deliver additional benefits to road users than those predicted as part of the project's appraisal.

Cost to Government

The out-turn cost of the project was approximately £0.8m greater than was predicted at the time of the assessment.

SCOTTISH TRUNK ROAD INFRASTRUCTURE **PROJECT EVALUATION**

TRANSPORT **SCOTLAND**

Value for Money

Whilst the project benefits may have been under estimated, the NPV and BCR are unlikely to be as great as predicted at the time of assessment as a result of the higher out-turn cost. The project is, however expected to continue to provide a benefit to road users.

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 was judged that the project may not achieve good value for money although it could be expected that the project would continue to provide benefits to transport users.

DETAIL OF EVALUATION



SCOTTISH TRUNK ROAD INFRASTRUCTURE PROJECT EVALUATION

TRANSPORT **SCOTLAND**

3 PROJECT EVALUATION

3.1 Introduction

Project Description

The project involved removing right-turn manoeuvres across the main A9(T) carriageway to / from the B867 and Bankfoot village. This was delivered through improvements to the existing A9(T) / B867 junction and the realignment of a minor road to the north, providing left-in / left-out junctions on the A9(T) for both northbound and southbound traffic. The project was officially opened to traffic on 28th August 2009. The general location of the project is shown in Figure 3.1.

Project Objectives

The objectives of the A9(T) Bankfoot project reflect those set for the A9(T) route, which were as follows:

- To provide a good, quick and reliable inter urban road link;
- To improve road safety;
- To minimise the intrusion of the road and traffic on the environment; and
- To achieve good value for money.

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 A9(T) Bankfoot project, focusing on:

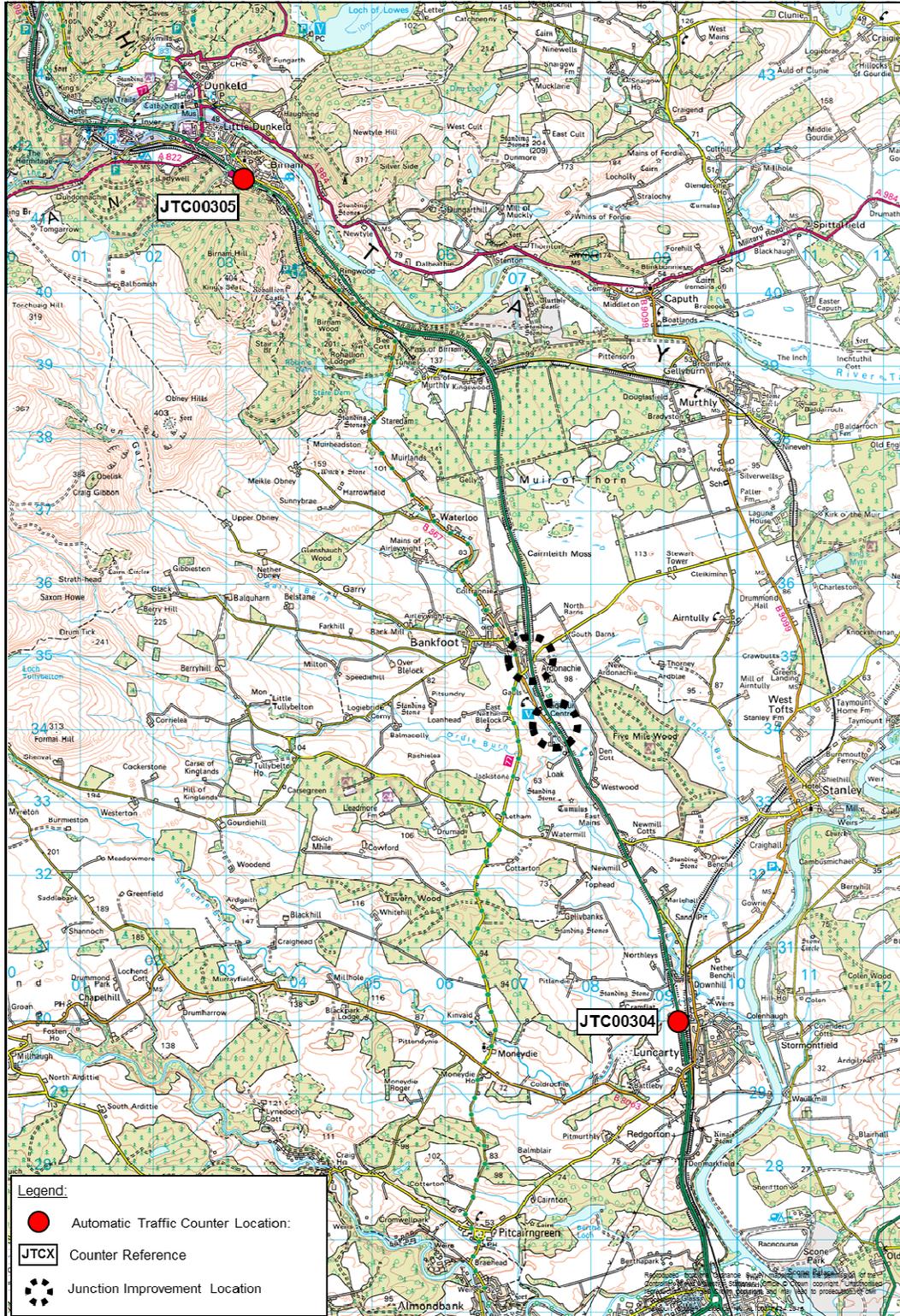
- The operation of the project: how the project is operating (in terms of traffic and safety in particular); and
- Objectives: whether the project has met or will meet its objectives.

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.

SCOTTISH TRUNK ROAD INFRASTRUCTURE PROJECT EVALUATION

TRANSPORT SCOTLAND

Figure 3.1: Project General Location Plan



SCOTTISH TRUNK ROAD INFRASTRUCTURE PROJECT EVALUATION

TRANSPORT **SCOTLAND**

This 3YA evaluation has been informed by the analysis of survey data and supported by a site visit carried out in August 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

In terms of operation, the evaluation involves the consideration of pre and post opening comparison of operational indicators, which focus on network traffic indicators including traffic volumes and travel times. The findings are presented in the following section.

Traffic Volumes

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

- JTC00304 A9 Luncarty
- JTC00305/104326 A9 Dunkeld / Birnam

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

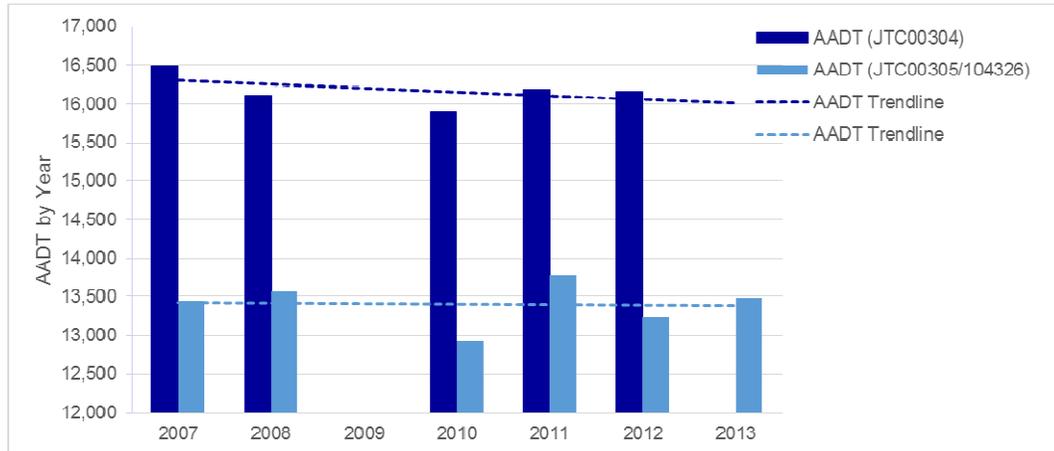
Comparison Between Pre and Post Opening Traffic Flows

The Annual Average Daily Traffic (AADT) flows pre and post project opening on the A9(T) route within the vicinity of the project are presented in Figure 3.2. The percentage of Heavy Goods Vehicles (HGVs) is not available as classified traffic data by vehicle type is not available from the ATCs within the vicinity of the project.

SCOTTISH TRUNK ROAD INFRASTRUCTURE PROJECT EVALUATION

TRANSPORT SCOTLAND

Figure 3.2: Long Term ATC Data



Notes: Incomplete data for counters JTC00304 & JTC00305 in 2012 – available data for neutral months (March, April & May) used
 Incomplete data for counter JTC00305 in 2013 – available data for neutral months (October & November) used

The **1YA Evaluation** indicated that traffic flows in 2010 were around 200 vehicles per day (approximately 1%) lower than 2008 flow levels. Flows in 2011 were marginally higher than 2008 levels. Traffic volumes on the A9(T) at Dunkeld have seen a reduction of around 600 vpd (approximately 4%) between 2008 and 2010 with flows in 2011 around 200 vpd (approximately 2%) higher than 2008 levels.

A comparison between pre and post opening traffic volumes on the A9(T) within the vicinity of the project indicates that traffic flows in 2012 / 2013 were broadly comparable with 2008 flow levels. Analysis of the long-term trends in annual traffic flows suggest that the volume of traffic on this section of the A9(T) has been broadly stable for a number of years.

Comparison Between Predicted and Actual Traffic Flows

The latest flow comparisons for the A9(T) Bankfoot project are based on AADT flows from 2012 / 2013 as this was the latest 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) high traffic growth factors were applied to the 2005 base year traffic flows to derive opening and future modelled assessment year traffic flows. Predicted traffic flows for 2012 / 2013 have been derived by factoring the 2005 base year flows used in the economic assessment with NRTF central traffic growth factors. A summary of the actual and predicted traffic data is shown in Table 3.1.

SCOTTISH TRUNK ROAD INFRASTRUCTURE PROJECT EVALUATION

TRANSPORT SCOTLAND

Table 3.1: Traffic Analysis Summary

ATC Ref	Actual AADT	Predicted AADT	% Difference (Predicted – Actual) / Actual
		Central	Central
A9(T) North of Luncarty			
JTC00304	16,168* ¹	13,913	-13.9%
A9(T) at Dunkeld			
JTC00305 / 104326	13,488* ²	10,152	-24.7%

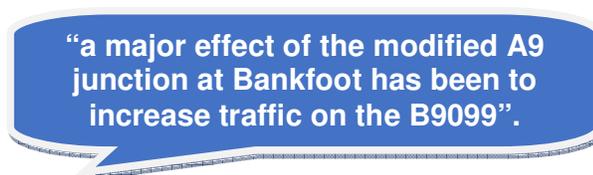
*¹ 2012 flows (latest ATC data available)

*² 2013 flows (latest ATC data available)

The comparison between predicted and actual AADT flows in Table 3.1 indicates that the predicted 2012 / 2013 flows were between approximately 14% and 25% lower than the observed 2012 / 2013 flows under the central traffic forecast scenario. The **1YA Evaluation** indicated that the predicted 2010 flows were between 15% and 25% lower than the observed 2010 flows.

Stakeholder feedback

A response indicated that following opening of the project “a major effect of the modified A9 junction at Bankfoot has been to increase traffic on the B9099”. The B9099 runs parallel to the A9(T) between Caputh and Stanley. No information was available as part of the 3YA evaluation to confirm any significant increase in traffic on this route.



Traffic Volumes: Key Findings

Observed traffic flows are between approximately 14% and 25% higher than forecast flows. This can be attributed to the traffic forecasts that were adopted as part of the project’s economic assessment significantly under estimating traffic flows on this section of the A9(T).

A comparison between the 1YA and 3YA after evaluation shows that the variation between forecast and predicted traffic flows appears to be broadly stable. The magnitude of the variation, however, will impact on the overall economic performance of the project which is discussed further in Section 3.6.

SCOTTISH TRUNK ROAD INFRASTRUCTURE PROJECT EVALUATION

TRANSPORT SCOTLAND

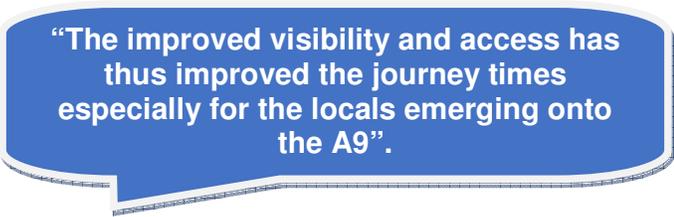
Travel Times

Change in Travel Times

The **1YA Evaluation** indicated that, whilst journey times for some local trips accessing the A9(T) may have marginally increased as a result of the revised junction layout due to the removal of right turns to / from Bankfoot village, it can be expected that journey times on the A9(T) carriageway itself over the extents of the improvement will have reduced. It is expected journey time reliability will have improved in both directions of travel as a result of removing delays to mainline traffic caused by right turning vehicles.

Stakeholder feedback

A response indicated that following opening of the project “*The improved visibility and access has thus improved the journey times especially for the locals emerging onto the A9*”.



“The improved visibility and access has thus improved the journey times especially for the locals emerging onto the A9”.

Travel Times: Key Findings

Overall, the project is considered to have had a slight positive impact on journey times on the A9(T), however, any improvement is unlikely to be significant. This is, in part, a reflection of the nature of the project which comprised localised junction improvements.

Stakeholder feedback received indicates that the improved visibility and access provided by the upgraded junctions has improved travel times for local trips accessing the A9(T). It is recognised, however, that journey times for certain local movements will have increased as a consequence of the longer travel distance from the removal of right turns to / from Bankfoot village from the A9(T).

3.4 Environment

The following section provides a summary of the assessment of environmental mitigation measures proposed for the A9(T) Bankfoot project. A full report is provided in Appendix A.

SCOTTISH TRUNK ROAD INFRASTRUCTURE PROJECT EVALUATION

TRANSPORT **SCOTLAND**

Review of Environmental Mitigation Measures

The environmental mitigation measures originally proposed for the project were obtained from the project's Environmental Record of Determination (RoD) and the findings of the project's 1YA Evaluation completed in 2011 were reviewed (see Section 2.3). As part of the 3YA Evaluation, a site visit was carried out in August 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 RoD for the project proposed mitigation measures to address impacts including:

- Ecology and Nature Conservation;
- Water Quality, Drainage and Flood Defence;
- Biodiversity and Habitats; and
- Landscape and Visual Amenity.

Findings

Two SUDS ponds were constructed at the south-west and north-east of the project. Wetland vegetation has become well established within and around the southern pond. However, there are still issues with weed growth as the pond banks are overgrown with thistles and the pond was choked with pond weed. Both the pond weed and the thistle should be managed to increase biodiversity and ensure the effectiveness of the pond.

The vegetation within and around the northern SUDS pond has established well, including thick stands of common reed and alder. However, there is a substantial number of failed trees at the northern pond and nearby embankment, where empty tree guards and redundant posts were observed. The failure of these trees may be due to the dominance of ruderal vegetation in the area. Empty tree guards and redundant posts should be removed and consideration given to implementing a programme of re-planting.

Planting throughout the rest of the project is better established although there are small areas of ragwort found across the scheme. Ragwort poisoning can be fatal to horses and damaging to other livestock. An assessment of the risk to any livestock in the area may need to be carried out. However, given time, the overall planting and natural regeneration along the length of the carriageway sits well with the greater landscape of fields and agricultural land.

SCOTTISH TRUNK ROAD INFRASTRUCTURE PROJECT EVALUATION

TRANSPORT **SCOTLAND**

The mammal fencing was located and although it was found to be in good condition the fence at Garry Burn did not meet the specification as set out in DMRB for otter mitigation. Also as in the 1YA Evaluation, no bat boxes, or other wildlife boxes specified in the RoD could be identified. However, there are a number of mature trees in the area that will likely provide natural roosting opportunities for bats.

Environment: Key Findings

The otter fencing does not meet DMRB specification. There has been mixed success with regards to the landscape planting due to failed trees and large areas dominated by ruderal vegetation. Both SUDS ponds require attention and better future maintenance to ensure the effectiveness of the ponds and to provide greater biodiversity in and around the ponds. However, the mixed native trees and grassland on the majority of the verges have established well and help to integrate the project into the surrounding farmland landscape. Where tree planting has failed, empty tubes and redundant posts should be removed and consideration given to replacing the lost trees.

Ragwort was found throughout the project and may need to be assessed and managed to prevent risk to livestock. Also, as identified in the 1YA evaluation, the wildlife boxes specified in the RoD could not be located.

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 3.3a and Figure 3.3b.

SCOTTISH TRUNK ROAD INFRASTRUCTURE PROJECT EVALUATION

TRANSPORT SCOTLAND

Figure 3.3a: 3 Years Before Opening Personal Injury Accident Numbers

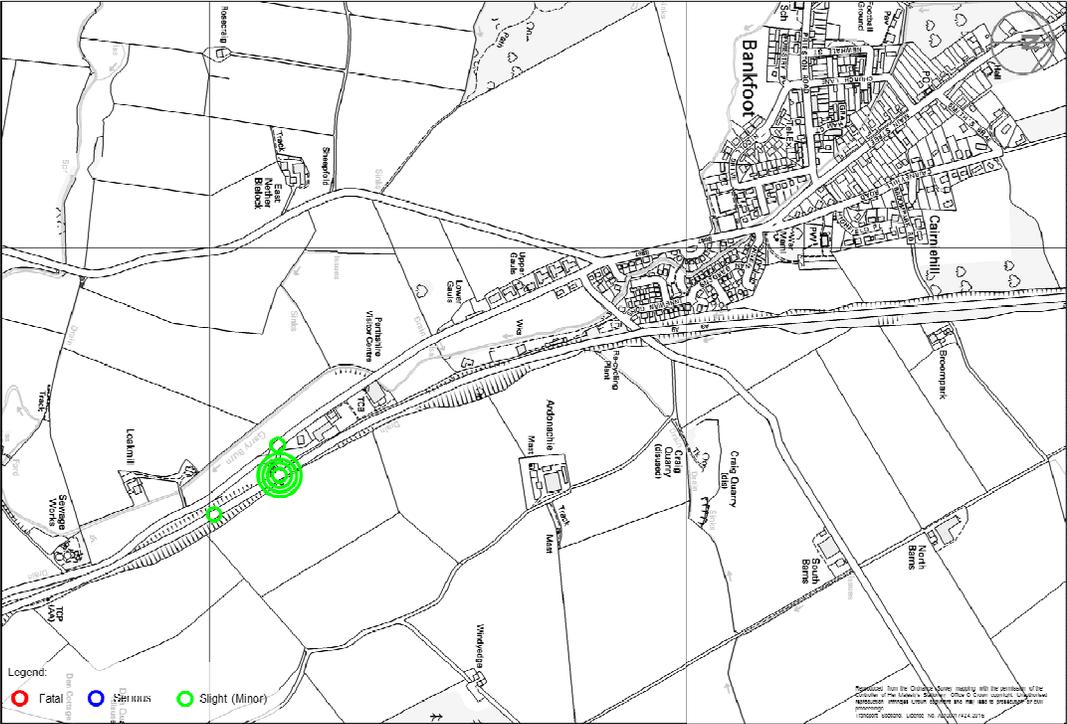
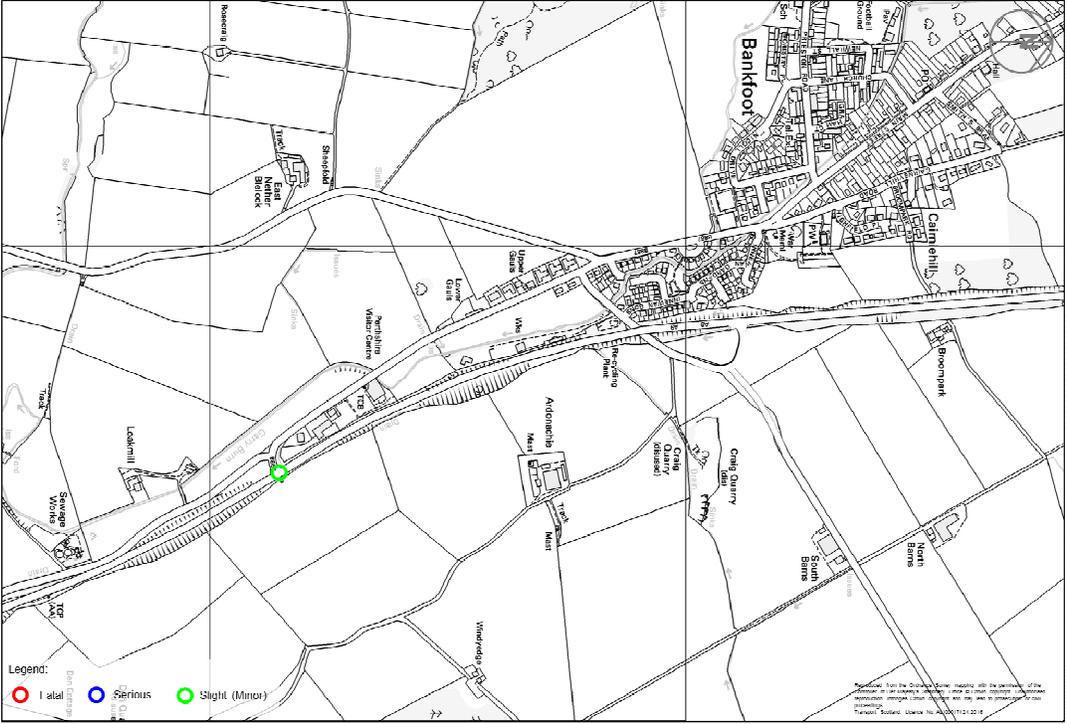


Figure 3.3b: 3 Years After Opening Personal Injury Accident Numbers



SCOTTISH TRUNK ROAD INFRASTRUCTURE PROJECT EVALUATION

TRANSPORT **SCOTLAND**

A summary of the personal injury accident data is shown in Table 3.2.

Table 3.2: Accident Data Summary

Period	Fatal	Serious	Slight	Total Accidents
3 Years Before				
A9(T)	0	0	6	6
1 Year After				
A9(T)	0	0	0	0
3 Years After				
A9(T)	0	0	1	1

As can be seen from Table 3.2, one personal injury accident (one slight) occurred in the three year period following the opening of the project in comparison to six personal injury accidents (six slight) in the three years before opening.

Of the six accidents occurring during the three year period before opening, four accidents related to collisions occurring at the A9(T) / B867 Junction. In the three year period following the opening of the project, only one accident related to a collision occurring at the A9(T) / B867 Junction, indicating an improvement in road safety at the upgraded junction.

Road Safety Audits

The RSA process has been followed, with Stage 1, 2, 3, 4 and 5 Audits carried out. The Stage 5 Audit, undertaken in April 2014, confirmed that one slight accident had occurred within the vicinity of the project in the three year period following the opening of the project and suggested that the accident was not as a result of the design or layout of the project. The Stage 5 RSA did, however, make a recommendation relating to the removal of stone filler material from a filter drain in order to prevent further scattering of loose stones onto the carriageway.

Stakeholder Feedback

A response indicated that following opening of the project there has been an improvement in the access and safety of Bankfoot junction. It was noted, however, that the C class feeder road from the B9099 is “*unsafe from the increased traffic, in particular heavy vehicles*”.

Another response acknowledged junction safety had improved following the opening of the project but noted that there has been complaints from motorists regarding the short length of the deceleration slips and as a result, motorists may not perceive there to be any actual safety enhancements.

SCOTTISH TRUNK ROAD INFRASTRUCTURE PROJECT EVALUATION

TRANSPORT SCOTLAND

“there has been an improvement in the access and safety of Bankfoot junction. However, the C class feeder road from the B9099 is “unsafe from the increased traffic, in particular heavy vehicles”.

“there have been complaints from motorists regarding the short length of the deceleration slips and as a result, motorists may not perceive there to be any actual safety enhancements”.

Safety: Key Findings

An assessment of the three year post opening personal injury accidents and the Stage 5 RSA suggests that the project is operating safely. The Stage 5 RSA recommended that the issue relating to the vehicle over-run of a filter drain be suitably addressed in order to prevent further scattering of loose stone scatter onto the carriageway.

Stakeholder comments received noted that perceived safety may be less following comments received from motorists regarding the short length of the deceleration slips.

3.6 Economy

Transport Economic Efficiency

The comparisons between predicted and actual traffic flows and travel times, 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 15% to 25% lower than the observed 2010 flows on the A9(T).

SCOTTISH TRUNK ROAD INFRASTRUCTURE PROJECT EVALUATION

TRANSPORT **SCOTLAND**

The latest comparison between predicted and actual traffic flows indicates that the predicted 2012 / 2013 flows were between approximately 14% and 25% lower than the observed 2012 / 2013 flows under the central traffic forecast scenario on the A9(T). The variation in forecast and actual traffic flows observed by the 1YA and 3YA Evaluations means the project may deliver additional benefits to road users than those predicted as part of the project's appraisal.

Stakeholder feedback

A response from a local business indicated that following the opening of the project there had been a 22% to 25% decrease in visitor footfall. Discussions had been held with Transport Scotland regarding the provision of additional signage at the northern junction to enhance motorist's awareness of the location and access to the business. At the time the comment was received (July 2014) additional signage had not yet been provided. It was also noted that other businesses within the Bankfoot area had probably experienced similar decreases in footfall, although this was not supported by any evidence.

“a local business indicated that following the opening of the project there had been a 22% to 25% decrease in visitor footfall”.

“Discussions had been held with Transport Scotland regarding the provision of additional signage at the northern junction to enhance motorist's awareness of the location and access to the business”.

“other businesses within the Bankfoot area had probably experienced similar decreases in footfall, although this was not supported by any evidence”.

SCOTTISH TRUNK ROAD INFRASTRUCTURE PROJECT EVALUATION

TRANSPORT **SCOTLAND**

Economy: Key Findings

The difference between predicted and actual AADT flows is likely to have resulted in an underestimation of road user benefits.

Anecdotal evidence provided by local stakeholders suggests that some local businesses may have experienced a reduction in trade as a result of changes in the access arrangement arising from the project.

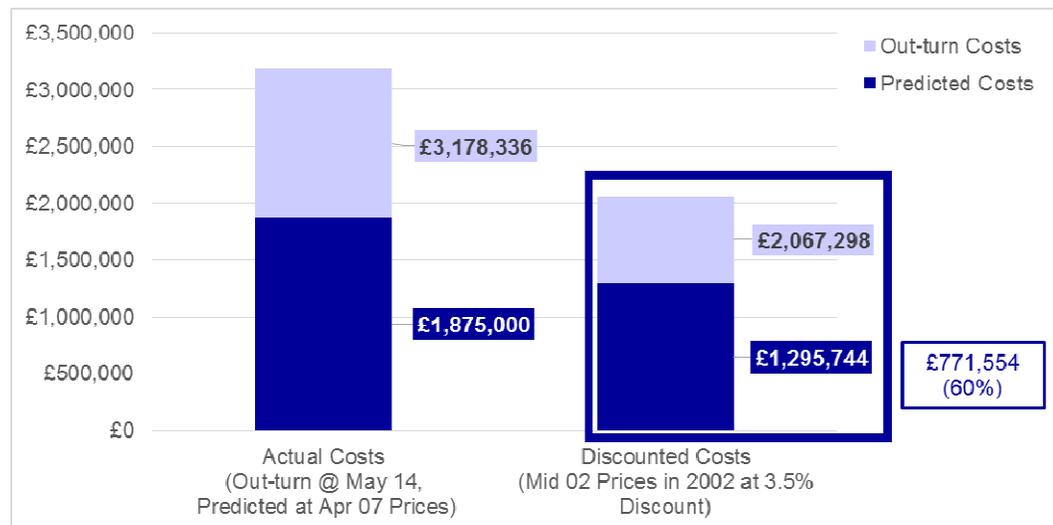
3.7 Cost to Government

Investment Costs

Comparison Between Predicted and Out-turn Costs

The out-turn and predicted project costs are shown in Figure 3.4.

Figure 3.4: Project Cost Summary



The latest comparison indicates that the current out-turn costs for the project are consistent with the out-turn costs at the time of the **1YA Evaluation**. The current out-turn costs are approximately £0.8m greater than was predicted at the time of assessment. It should be noted that the predicted costs used within the cost comparison are derived from the costs estimated at the project's pre-tender stage. As such, variations in actual and predicted project cost comparisons can occur due to issues identified during the tendering process.

Cost to Government: Key Findings

The out-turn cost of the project was approximately £0.8m greater than was predicted at the time of the assessment.

SCOTTISH TRUNK ROAD INFRASTRUCTURE PROJECT EVALUATION

TRANSPORT SCOTLAND

3.8 Value for Money

Initial Indications

The economic appraisal results for the project predicted a Net Present Value (NPV) of £0.97m and Benefit to Cost Ratio (BCR) of 1.97 under the central traffic growth forecast scenario.

The comparisons undertaken at the **1YA Evaluation** stage indicated that the benefits are likely to have been under estimated, however, the cost of the project was greater than predicted. Overall, it is therefore unlikely the NPV and BCR of the project are as great as predicted.

Based on the latest comparisons in traffic flows and costs presented in Sections 3.3 and 3.7 respectively, which suggest that the benefits are likely to have been under estimated, the increase in costs reported means the NPV and BCR of the project are 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 underestimated.

The cost of the project is approximately £0.8m greater than was predicted at the time of assessment. This is relatively unchanged from the 1YA evaluation.

While the benefits of the project are likely to have been under estimated the increase in costs means that overall the NPV and BCR are expected to be less than forecast as a result of the variation in investment costs.

Whilst the NPV and BCR are 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.

3.9 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 evaluation, providing an indication of whether the project has achieved its objectives, is presented in Table 3.3.

SCOTTISH TRUNK ROAD INFRASTRUCTURE **PROJECT EVALUATION**

TRANSPORT **SCOTLAND**

Table 3.3: Progress Towards Achieving Objectives

Objective	Commentary	Progress
To provide a good, quick and reliable inter urban road link.	<p>Whilst journey times for some local trips accessing the A9(T) may have marginally increased as a result of the revised junction layout due to the removal of right turns to / from Bankfoot village, it can be expected that journey times on the A9(T) carriageway itself over the extents of the improvement will have reduced, and journey time reliability improved, in both directions of travel.</p> <p>Stakeholder feedback received indicates that following opening of the scheme, improvements to visibility and access has improved journey times, especially for local traffic emerging onto the A9.</p>	+ve
To improve road safety.	<p>A comparison between three years before opening and three year after opening personal injury accidents occurring within the vicinity of the project indicates that six (slight) personal injury accidents occurred prior to the opening of the project in comparison to one (slight) personal injury accidents in the three year period following the opening of the project suggesting an improvement in road safety.</p> <p>An assessment of the Stage 5 RSA suggests that the project is operating safely.</p>	+ve
To minimise the intrusion of the road and traffic on the environment.	<p>Environmental and landscaping measures have been implemented to help the project fit within the existing open landscape.</p> <p>The implementation of the measures is considered to have been largely successful. However, issues relating to ongoing maintenance have been identified in relation to two of the SUDS ponds and tree planting.</p>	+ve

SCOTTISH TRUNK ROAD INFRASTRUCTURE **PROJECT EVALUATION**

TRANSPORT **SCOTLAND**

Objective	Commentary	Progress
To achieve good value for money.	<p>The variation in traffic flows between predicted and observed levels suggests benefits may have been underestimated, however out-turn costs are greater than forecast. Overall, the NPV and BCR are unlikely to be as great as predicted at the time of assessment, however it is judged that the project will continue to provide benefits to transport users.</p> <p>Stakeholder comments also raised concern with regard to the possible impact on the Visitor Centre within the vicinity of the project which reported a fall in visitor numbers attributed to the change in access arrangements. It was also suggested other local businesses may also have experienced a decline in trade, although there was no evidence to substantiate this possible impact.</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

TRANSPORT **SCOTLAND**

3.10 Evaluation Summary

The evaluation of the A9(T) Bankfoot Junction Improvement project indicates the project is considered to have had a localised positive impact on road safety on this section of the A9(T). Six accidents (slight) occurred in the three year period prior to the opening of the project in comparison to one accident (slight) in the three year period following opening of the project, suggesting an improvement in road safety within the vicinity of the project.

While the value for money of the project may be less than anticipated, it is important however to view the project in combination with other projects previously implemented on the A9(T), such as the junction improvements at Ballinluig, the extension of the dual carriageway at Crubenmore and the strategic dualling programme of the route currently being progressed by Transport Scotland. 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 improving road safety.

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 A9(T) Bankfoot. 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 October 2011, 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 STRIPE¹ 'Three Years After' methodology that comprised: A desk study review of the project objectives, RoD and 1YA environmental mitigation review to identify the likely key issues to be evaluated during the 3YA review.
- 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.

¹ Transport Scotland Scottish Trunk Road Infrastructure Project Evaluation (STRIPE). Final Guidance August 2013.

- 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.2 ENVIRONMENTAL FINDINGS

Project Objectives

The A9(T) Bankfoot project involved removing right-turn manoeuvres across the main A9(T) carriageway to / from the B867 and Bankfoot village. This was delivered through improvements to the existing A9(T) / B867 junction and the realignment of a minor road to the north, providing left-in / left-out junctions on the A9(T) for both northbound and southbound traffic.

The project objectives included improvement to road safety and traffic movement, while minimising the intrusion of the road and traffic on the environment.

Key Issues to be Reviewed

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

- Landscape/planting, mammal fencing, success of SUDs ponds and planting around ponds.
- Where the various wildlife boxes (bird, bat, insect and hedgehog) were installed.

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.3 THREE-YEAR AFTER REVIEW FINDINGS

Key issues from the desk-study

During the 1YA evaluation inspection it was evident that the landscape resource of the A9(T) Bankfoot project had not been actively maintained. There was a large amount of weed growth throughout the project which was having a significant adverse impact upon the tree and hedgerow planting. Whilst there is still an abundance of ruderal vegetation in areas this does not seem to be affecting the planting as described in the 1YA evaluation. As well as a mix of native species there is also a spread of wildflower on the verges.

The 1YA evaluation reported the SUDS ponds as being heavily overgrown with weeds, which was affecting the establishment of wetland vegetation and diversity of the vegetation around the pond. During the 3YA assessment both SUDS ponds were inspected, the first located to the south-west of the project and the other towards the northern extent of the project on the east of the carriageway.

Wetland vegetation has become established within and around the pond to the south of the project and the marginal plants include reeds and rushes. However, the observation made in 1YA regarding the domination by weed species remains. There is a dominance of thistle around the upper banks of the pond, see Figure 1. The surface of the pond appeared covered in pond weeds, although it was not possible to confirm this by close inspection as a visual inspection could only be made from behind the pond fence, see Figure 2. It would be advisable to clear out the pond weed and cut back the dominant thistle to enhance the biodiversity of the pond and surroundings.



Figure 1: Dominance of thistle around pond



Figure 2: Pond weed covering surface

To the south of this pond, the verge on the west side of the carriageway is covered in a mix of wildflower, ruderal vegetation and grasses but there is also areas of dock weed and some ragwort, see Figure 3. Ragwort was found in small patches throughout the project. Ragwort poisoning can be fatal to horses and damaging to other livestock. If not already part of an injurious weed control programme, the area around the project should be considered for inclusion in future programming, to ensure against spread to neighbouring fields and farms where it could present a problem to livestock.



Figure 3: Ragwort and dock weed



Figure 4: Mature trees by the southern pond

The RoD called for bat boxes to be positioned in mature trees on the side road opposite the pond. Similarly to the 1YA assessment, bat boxes could not be identified at this location. However, the trees themselves are mature enough that they will likely provide suitable roosting opportunities for bats, see Figure 4. Also, as in the 1YA assessment, boxes for birds, insects and hedgehogs could not be located.

On the eastern side of the carriageway, the vegetation on the verge is not as diverse but still comprises grassland and a variety of native trees, including ash, that are growing well. Going north from the pond there is a mix of ash, horse chestnut and hawthorn on the west side of the carriageway and more mature ash on the east side, which were protected in situ, see Figure 5 and Figure 6. All of this new planting is establishing well and together with the mature trees helps integrate the scheme effectively into the existing landscape of the carriageway and fields beyond.



Figure 5: Looking north



Figure 6: Looking north

The otter fence adjacent to the Garry Burn at the south side of the project was located and inspected. It was found to be in good condition, but does not satisfy the DMRB specification² as it does not have an overhang at the top (to stop otters climbing over it) although this is not a requirement of SNH guidance³ see Figure 7.

² DMRB Vol 10 Sec 4 part 2 HA 81/99

³ <http://www.snh.org.uk/publications/on-line/wildlife/otters/mitigation.asp> (accessed January 2016)



Figure 7: Mammal fence

The planting of the embankment and areas near the northern SUD pond has been less successful and is dominated by ruderal vegetation, see Figure 8 and Figure 9. There are a number of failed trees and empty tubes and posts remain, see Figure 10. Some of the trees towards the embankment, closer to the carriageway, have been more successful but these successful species appear mainly to be the alder, see Figure 11.



Figure 8: Dominance of ruderal vegetation



Figure 9: Dominance of ruderal vegetation & failed planting



Figure 10: Failed planting. Empty tube & post remain



Figure 11: Some planting on embankment, some of which failed to establish

The vegetation within the northern SUDS pond has established well, comprising reeds and rushes, including common reed *Phragmites australis*, leaving no open water visible (Figure 12). The pond banks comprise alder and ruderal vegetation. The reeds may crowd out other native plants if not managed sensitively, and along with the ruderal vegetation in and around the area, could reduce the capacity of the pond. As with the southern pond, all of the vegetation in this area require more maintenance and the failed tree planting needs to be reviewed, removing redundant tubes and posts and replanting where required.



Figure 122: Northern pond dominated by common reed (centre) and surround by ruderal vegetation

Overall, the project now sits well within the wider landscape, particularly with regards the view from the road. As reported above, however, further maintenance is required to both SUDS ponds and to the areas overgrown by weeds, and the failed tree planting should be reviewed so as to improve the effectiveness of the biodiversity and landscape mitigation implemented.



Figure 133: Northern extent of the project



Figure 144: Looking south

Any new issues identified

As noted, injurious weeds (common ragwort) were observed.

Observed traffic flows are approximately 14% to 25% higher than forecast. This is above the threshold identified in the STRIPE Methodology⁴ for assuming that the local air quality assessment completed for the RoD is robust, and so triggers the requirement to consider reviewing whether the environmental assessment's conclusions on air quality impacts are appropriate. The difference between actual and forecast flow is just below the threshold for reviewing the noise assessment conclusions.

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

- The effectiveness of the otter fencing at Garry Burn at preventing otters from entering the carriageway should be investigated given that it does not follow DMRB design specification (for length and overhang required, although SNH guidance does not require an overhang), and improvements to the fencing should be considered if needed. The investigation could start with an otter activity survey and review of the roadkill data.
- Where flows are 10% more than forecast, complete a simple assessment based on DMRB methodology of the potential air quality impacts on sensitive receptors (including local residents and designated nature conservation sites), to assess whether the environmental assessment's conclusions that air quality impacts are not significant are appropriate.
- The presence of ragwort across the length of the project could spread to neighbouring fields where equine and other livestock may be held. An assessment should be made to determine the risk to grazing animals and take any appropriate action (see the Scottish Governments Guidance on How to Prevent the Spread of Ragwort, published 2008).
- The wetland vegetation within both SUDS ponds and the surrounding weed-dominated areas require better management to increase the benefits to biodiversity and ensure the capacity and effectiveness of the ponds.

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

Scottish Trunk Road Infrastructure Project Evaluation - Appendix A
Environment

- Where tree planting has failed, empty tubes and redundant posts should be removed and consideration should be given to replacing the lost trees.

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

Scottish Trunk Road Infrastructure Project Evaluation - Appendix A
Environment

Table A1: Implementation of Mitigation Proposed in the RoD and Observations at 1YA and 3YA Opening

Mitigation Measure Proposed in the RoD	1 YA Comments	3 YA Comments
Ecology and Nature Conservation		
<p>The Garry Burn, part of the River Tay SAC, runs close to the scheme. Habitats present include semi-natural broadleaved woodland, farm land and hedgerows.</p> <p>Replacement planting and landscaping should include native species.</p>	<p>The standard tree planting is establishing well but many of the smaller species are struggling to establish and many more were dead. Significant maintenance is required in order to rectify the issues identified with the planting throughout the scheme.</p>	<p>Planting along the verges is now establishing well with a mix of ash, horse chestnut and hawthorn.</p> <p>Planting around the SUDS ponds has not been as effective (further details in comment below).</p> <p>Clumps of ragwort are present across the project and an assessment is required to establish the risk of this spreading and affecting any livestock.</p>
Water Quality, Drainage and Flood Defence		
<p>A SUDS compliant design will be implemented as part of the scheme to attenuate flow and improve the quality of surface-water runoff reaching the Garry Burn.</p>	<p>SUDS ponds have been incorporated, however, the area around the ponds is heavily overgrown with weeds and maintenance is required to manage the weed growth and allow the establishment of natural regeneration.</p>	<p>The surface of the southern pond was covered in pond weed and there was a dominance of thistle along the upper banks.</p> <p>The northern pond was heavily overgrown both with marginal plants but also ruderal vegetation.</p> <p>A substantial amount of the planting around the pond has failed with a number of empty tubes and redundant posts evident.</p> <p>Better maintenance of both ponds is required to increase biodiversity and ensure</p>

Scottish Trunk Road Infrastructure Project Evaluation - Appendix A
Environment

Mitigation Measure Proposed in the RoD	1 YA Comments	3 YA Comments
		the effectiveness of the ponds.
Biodiversity and Habitats		
Bird, bat, insect and hedgehog boxes to be installed along the route.	Site visit did not identify any of these boxes at specified locations and clarification should be sought regarding whether these boxes have been installed.	No boxes were identified during the 3YA assessment. Clarification should be sought regarding whether these boxes have been installed.
Following completion of the RoD the need for otter fencing adjacent to the Garry Burn along the south side of the scheme was identified.	This has been incorporated and is in good condition.	The fence was inspected and found to be in good condition. However, it does not meet the DMRB design specification for otters (should have an overhang and be at least 100m either side of the burn in length ⁵ , although overhangs are not included in SNH otter fence guidance ⁶ and may not be included for visual impact reasons.)
Landscape and Visual Amenity		
The site is in rural Perthshire an area characterised by agriculture on subdues-glacial and river-valley terrain. Encourage natural regeneration and replant local vegetation where necessary.	Planting has been swamped by weeds in various parts of the scheme. At the southern west of the scheme is an abundance of dock and thistle. Significant maintenance is required.	Other than around the ponds, planting across the project is now establishing well. Whilst there is an abundance of ruderal vegetation in areas this does not seem to be affecting the planting as described in the 1YA assessment. As well as a mix of native species there is also a spread of wildflower on the verges.

⁵ DMRB Vol 10 Sec 4 part 2 HA 81/99

⁶ <http://www.snh.org.uk/publications/on-line/wildlife/otters/mitigation.asp> (accessed January 2016)

Scottish Trunk Road Infrastructure Project Evaluation - Appendix A
Environment

<i>Mitigation Measure Proposed in the RoD</i>	<i>1 YA Comments</i>	<i>3 YA Comments</i>
		Overall the project fits within the surrounding farmland landscape.

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.

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

Change in Travel Times	Comment on likely impact on mainline travel time in the absence of pre and post opening information
Stakeholder Feedback	Obtained from Police Scotland.

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 RoD 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 years 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 RoD or Route Action Plan, where applicable.
------------	---
