A947 ROUTE IMPROVEMENT STRATEGY

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Executive Summary

Introduction

The A947 between Aberdeen and Banff is characterised by many bends, poor visibility and frequent minor and agricultural accesses. Although the overall accident rate for the road is below national levels, the proportion of fatal and serious accidents is around 60% higher. In recent years, Aberdeenshire Council has commissioned several route accident studies, which have identified various solutions to address specific local road safety issues.

In August 2014, a report was submitted to the Council's Infrastructure Services Committee outlining recent progress with regards to improving road safety on the A947 and seeking approval for the development of a long term Route Improvement Strategy. Specifically, it was noted that whilst work on local engineering interventions and route enforcement will continue in order to reduce the accident rates, it is appropriate to develop a long term strategy for the A947 to cover the next 20 years. In setting such a strategy the following questions should be considered:

- What is the role/purpose of the route and how will this change in the future, particularly post construction of the AWPR, the proposals to fully dual the A96 between Aberdeen and Inverness and taking on board wider development pressures/aspirations?
- What potential improvements are required to address the strategic objectives of the route (for increased safety and improved journey times/journey time reliability)?
- How could these improvements be progressed in the form of a business case?

In response to this, AECOM was commissioned by Aberdeenshire Council to undertake a preliminary piece of work focused on reviewing previous studies and key policy documents and setting out an approach towards the development of a Route Improvement Strategy for the A947.

This study has been taken forward in line with the appraisal principles described in STAG (Scottish Transport Appraisal Guidance) comprising the following approach:

- Review of previous studies and key documents;
- Review of the key problems and opportunities on the corridor;
- Development of transport planning objectives for the study;
- Generation of a long list of options; and
- A high level appraisal to sift the long list of options into a shorter list for more detailed consideration.

Problems and Opportunities

A review has been undertaken of key problems and opportunities affecting the route based on a review of previous studies and analysis of travel demand and traffic data from various sources including the latest census results, accident statistics, journey time and vehicle platoon surveys.

To support the identification of issues, an extensive consultation programme was undertaken throughout the latter half of 2015 comprising a range of approaches to engage with community and stakeholder groups, including an online survey, roadside interview surveys, workshop meetings and events, and business interviews amongst others.

Based on the review, a number of key issues have been identified, as follows:

- The route is characterised by frequent bends and poor visibility and for a long time has held a reputation as a dangerous and frustrating route to drive. Previous detailed study into the infrastructure standard of the route highlighted various issues including little or no consistency in provision of bend related signage and sign markings, junctions not complying with visibility standards, poor drainage, and sub-standard geometry.
- Average annual daily traffic flows along the route range from between 3,500 north of Turriff to just under 10,500 south of Newmachar (2014 data).
- A wide range of driver behaviour issues were highlighted during consultation, including speeding, use of mobile phones, and risky overtaking manoeuvres. A common message from the consultation was that behaviours were perhaps most prevalent in motorists who use the route on a daily basis and hence may be complacent.
- Driver frustration issues were raised repeatedly during consultation particularly associated with slow moving vehicles and limited overtaking opportunities. Traffic surveys showed a high level of platooning along the route, with over one in five (23%) of the lead vehicles in platoons identified as a slow moving vehicle.
- Despite a reduction in accident numbers in recent years, the route continues to experience accidents with review of accident rates and cluster data suggesting a particular issue between Fyvie and Turriff.
- While journey times are relatively reliable between Banff and the Aberdeen/Aberdeenshire boundary (54 minutes), the section between Newmachar and Dyce shows high levels of variability between peak and inter-peak periods associated with congestion issues. High car dependency contributes to queuing and congestion during peak travel times, particularly south of Newmachar.
- Census results demonstrate that a significantly higher percentage of residents living in settlements closest to Aberdeen City travel there to work or study. For example, in Newmachar, 62% of residents travel to Aberdeen to work or study, while over a third (37%) do so from Oldmeldrum, in contrast to only 13% and 7% of Turriff and Banff residents respectively.
- Sizeable proportions of local communities along the route, particularly in Banff (32%) and Turriff (20%), do not have access to a car and for whom public transport will play a vital role in their access requirements.
- In the future, it has been estimated that development aspirations could see an extra 2,200 trips added to the network during peak periods which may exacerbate existing issues.
- Development of the AWPR, which will see the A947 realigned from the north side of the Parkhill Bridge to a point north of the AWPR, will change patterns of traffic on the route with previous traffic modelling exercises anticipating that traffic volumes will increase south of Newmachar post AWPR-construction.
- In both the short and longer term, other roads in the north east of Scotland, such as the A90 north and A96 trunk roads, are due to see significant investment and upgrade which could highlight a growing disparity with the A947, which sits between them, and the requirement for future investment to the route.

Transport Planning Objectives

The ultimate goal of the A947 Route Improvement Strategy and subsequent interventions is “To develop a route which is fit for purpose of connecting the communities along the route in safe, effective and sustainable manner, while fully supporting the regeneration activity in north Aberdeenshire.”

Based on this vision, and informed by the identified problems and opportunities, a number of transport planning objectives have been developed to guide the study, as follows:

- TPO1 – Deliver improvements on the A947 which contribute to a reduction in the number of accidents on the Corridor in line with national reduction targets.
- TPO2 – Improve through-corridor journey times and journey time reliability between 2015 and 2025/2035.
- TPO3 – Enable proposed housing, employment and retail growth to take place along the Corridor without undue congestion.
- TPO4 – Improve access by public transport between settlements and employment areas along the route, including Aberdeen City.
- TPO5 – Improve perceptions of safety and reduce feelings of driver frustration through development of a consistent, enhanced route standard.

Option Generation and Appraisal

An option generation process has been undertaken principally focused on infrastructure measures to address identified problems and opportunities on the A947 over the long term. A total of twenty options were identified ranging from major infrastructure improvements such as road standard upgrade, overtaking lanes, and alignment improvements to increased enforcement and education campaigns.

Key findings from the appraisal, which comprised a high level assessment of the performance of each of the options against the transport planning objectives, STAG implementability criteria (feasibility, affordability and public acceptability) and national transport criteria (environment, safety, economy, integration, and accessibility and social inclusion) were as follows:

- Route upgrade and realignment options have the potential to address a number of the study objectives, particularly on the busiest sections of the route south of Oldmeldrum. The A947 between Dyce and Newmachar currently experiences traffic queuing and delays during peak commuter periods and while current traffic flows are slightly below the levels recommended for upgrade to dual carriageway by definition of the Design Manual for Roads and Bridges (DMRB), they are suitable for upgrade to single carriageway ('S2') or wide single carriageway ('WS2') standard, while increased traffic associated with the AWPR could support the case, potentially to dualling standard (D2AP). The same could be said for the section of route between Newmachar and Oldmeldrum. The DMRB establishes that for the purpose of dualling, daily traffic volumes should be between 11,000 and 39,000 vehicles on the opening year with current flows currently around 10,500 between Dyce and Newmachar, and 8,000 between Newmachar and Oldmeldrum. The development of such options would be complemented by the provision of a Newmachar bypass. Accordingly, and in the context of the twenty year vision for this work, it is considered that route upgrade and realignment options between Newmachar and Oldmeldrum are kept under review. While route upgrade options along the entirety of the route also have the potential to satisfy a number of the study objectives, on the basis of current traffic demand it may be more difficult to justify a case for the significant investment associated with route upgrade interventions north of Oldmeldrum and instead it is recommended that upgrades between Oldmeldrum and Banff focus on localised improvements.
- A number of route-wide localised engineering measures such as climbing and/or overtaking lanes, localised alignment improvements, bend mitigation measures and junction improvements perform strongly against the transport planning objectives and are recommended for more detailed investigation. Specifically, to address

issues of driver frustration, as commonly cited during consultation, improved overtaking opportunities via the introduction of climbing or overtaking lanes could assist. This option would require more detailed site investigation of appropriate locations. Localised alignment improvements, as identified from earlier studies, also present an opportunity to improve safety at previously identified accident hotspots, alongside a review of bend mitigation measures.

- While this study is focused on longer term improvements, the review identified a number of interventions which perform positively against the objectives and could provide 'quick wins' for immediate implementation. Specifically, a number of consultees highlighted that relatively minor, straightforward improvements such as a review of signage, white line resurfacing and improved vegetation maintenance to increase visibility could deliver noticeable improvements. Driver behaviour was identified as the number one problem during consultation and the introduction of education and awareness campaigns alongside police and community planning partners to promote desired behaviours and engender safer, more responsible driving should support wider route improvements over the long term.

Summary

In the context of a 20 year vision, based on the appraisal recommendations, the following action plan has been developed to set out a series of actions for consideration and to guide the implementation of future improvements.

Intervention	Actions	Timescale[1]
Localised Route Improvements	• Undertake a route audit to identify improvements focused on signage, white line surfacing and verge maintenance.	Short
Education and Engagement Programme	• Development of a Communications and Engagement Plan with partners outlining approaches for the implementation of education and engagement campaigns and measures along the route. • Work with partners to develop campaign messages to target identified behaviours including: appropriate travel speeds, dangerous overtaking, and the use of laybys by slower moving vehicles. • Future infrastructure improvements along the route would also benefit from being taken forward alongside / reinforced with campaigns e.g. safe use of climbing/overtaking lanes, the importance of using laybys.	Short
Enforcement	• Development of a Statement with partners to outline aspirations for increased enforcement along the route. • Continue to work through NESCAMP to enforce speeds along the route.	Ongoing
Maintenance	• Development of a Statement to outline proposals for the implementation of an effective, prioritised maintenance regime for the A947 Corridor in line with the Council's Road Asset Management Plan.	Ongoing
Active Travel	• Development of a Statement with partners to promote the use of active travel modes within communities along the A947 Corridor. Works to include an audit of existing facilities and identification of enhanced infrastructure and campaigns to encourage increased use of sustainable	Short - Medium

[1] Short term actions comprise 0-2 years; medium term actions comprise 2-5 years, long term actions consider 5+ years.

Intervention	Actions	Timescale[1]
	transport modes, including walking and cycling.	
Public Transport	• Development of a Statement to outline aspirations for bus service development along the route, working alongside bus operators. Within this, consideration will be given to priority measures and opportunities for enhanced services associated with the AWPR.	Short - Medium
Climbing / Overtaking Lanes	• Undertake a robust economic assessment of the benefits of identified potential climbing / overtaking lanes. • Progress conceptual designs in line with design principles and standards, with locations assessed to consider their benefits, with the ultimate aim to identify what combination of widened sections could be proposed. Consult with relevant stakeholders and landowners, and also evaluate the engineering challenges. • Develop plans into a detailed design.	Short - Medium
Localised Alignment Improvements	• Review previous work into alignment improvements and update economic assessments.	Short - Medium
Bend Mitigation Measures	• Undertake a detailed review of specific locations along the route which would benefit from improvement works, and consider appropriate solutions e.g. bend signage, intelligent road studs.	Short - Medium
Junction Improvements	• Undertake traffic and road safety assessments of identified junctions along the route with a view to introducing ghost islands where justifiable.	Short
Slow Moving Vehicle Laybys	• Review of previous locations and potential new sites for extended laybys based on the results from the platoon surveys and site safety assessments. • Develop a campaign with partners and other stakeholders (such as the farming industry, businesses that involve HGVs travelling on the route on a daily basis etc.) to remind them that drivers are legally obliged to pull in if they are holding up traffic.	Short - Medium
Route Upgrade and Realignment	• Undertake a review and monitor traffic conditions on the A947 following opening of the AWPR with a view to developing a business case for route upgrade in the future. • Assess most suitable route upgrade and realignment options along the A947 i.e. improvement to S2, WS2 or D2AP, in line with the DMRB guidance.	Long
Annual Progress Report	• Development of an annual progress report to Members outlining progress with the implementation of the Strategy. The report should also be promoted via the Council's website to ensure the wider public and interested stakeholders are kept fully informed of progress.	Ongoing

Complementary to the above, a number of the issues along the route are common across the corridor and should be taken forward as part of ongoing work. Measures relate to the promotion of walking and cycling, public transport enhancements, and ongoing investigation and remedial works at identified accident cluster sites.

The information presented in this report is considered to provide a strong evidence base for the further development of options, and if required, future business cases to support option investment. While this report has presented qualitative benefits and high level cost estimates associated with a number of potential options, an assessment of the quantifiable benefits (in terms of, for example, potential accident savings and journey time savings) would be recommended in order to help direct focus on the most promising options. This would require options to be worked up to a level of detail appropriate to enable transport modelling exercises to be undertaken and benefits to be more comprehensively understood. Following identification of the most promising options, work should focus on the development of detailed designs and costings to enable the Council to put forward a robust case for investment.

Finally, a common point raised during consultation related to the importance of ensuring communities are kept up to date on the progress of this study and future works to upgrade the A947. The study's consultation programme has engaged a wide range of public and community groups along the route and it will be important to build on this momentum by keeping stakeholders up to date as specific proposals emerging from this work are progressed.

Introduction

1 Introduction

1.1 Introduction

In August 2014, a report was submitted to Aberdeenshire Council's Infrastructure Services Committee (ISC) outlining progress with regards to improving road safety on the A947 and seeking approval for the development of a long term Route Improvement Strategy for the route. Specifically, it was noted that the A947 has been subject to various studies in recent years and that while work on local engineering interventions and route enforcement will continue in order to reduce the accident rates, it is also considered appropriate to develop a long term strategy for the A947 to cover the next 20 years.

To assist the development of the Route Improvement Strategy, AECOM has been requested to undertake a preliminary piece of work focused on reviewing work undertaken to date and setting out an approach towards the robust development of a Route Improvement Strategy. This will be further supported by analysis of additional sources to identify and aid the greater understanding of problems and opportunities along the route, based on the appraisal principles described in Scottish Transport Appraisal Guidance (STAG).

1.2 Route Characteristics

The A947 is the principal road link between Aberdeen City and the settlements of Newmachar, Oldmeldrum, Turriff and Banff. The road is approximately 41 miles in length, of which approximately 38 miles lies within the Aberdeenshire Council boundary. The route is characterised by frequent bends and poor visibility. Although the overall accident rate for the road is below national levels, the proportion of fatal and serious accidents is around 60% higher.

The route has been highlighted as an important strategic road within the Nestrans Regional Transport Strategy, which further states that capacity and safety constraints at local road junctions on the A947 need to be addressed. However, compared to other strategic routes, such as the A90 and A96 trunk road routes which are due to see significant investment and upgrade[2], there are concerns that the A947 will become increasingly sub-standard and will require future investment.

The study area for this appraisal including some key details is shown in Figure 1.1.

1.3 Structure of Report

This report is structured as follows:

- Chapter 2 – Review of Previous Studies and Key Documents;
- Chapter 3 – Review of Problems and Opportunities;
- Chapter 4 – Objective Setting;
- Chapter 5 – Option Generation;
- Chapter 6 – Option Appraisal;
- Chapter 7 – Summary and Next Steps.

A number of appendices also support the report.

[2] The A90 is in the process of being upgraded as part of the Aberdeen Western Peripheral Route, a section of which will involve the upgrade of the Balmedie to Tipperty stretch of the A90 north of Aberdeen to dual carriageway standard by 2018. Likewise, the Scottish Government has made a commitment to dual the A96 by 2030.

Figure 1.1 – A947 Route Characteristics

Route Study Area
• 41 miles long, 38 miles of which lies within the Aberdeenshire boundary. Primarily agricultural land adjacent to the road.
• Single carriageway with width varying between 6.5m and 7m, having no hardstrip or hard shoulder.
• Subject to national speed limit with reductions between 30mph and 50mph through towns and villages along the route.
• Characterised by frequent bends of tight radii and poor visibility. Route used by high proportion of slow moving agricultural vehicles and HGVs and the road geometry limits overtaking opportunities for faster moving traffic.
• Daily traffic flows vary from approximately 3,500 vehicles north of Turriff to just under 10,500 south of Newmachar.
• Average journey times between Banff and Aberdeen is 54 minutes. However, journey time variability is apparent during morning and evening peaks between Newmachar and Dyce.
• Accident numbers have decreased year on year although issues remain on specific sections of the route, particularly between Fyvie and Turriff.
• Part of the route will be realigned as part of the AWPR, which intersects the route north of the River Don at Goval junction.
• There are several environmental designations within the vicinity of the route including SSSIs, listed building, battlefields, conservation areas, gardens and planned landscapes, Schedules Monuments and ancient woodland.

Review of Previous Studies and Key Documents

2 Review of Previous Studies and Key Documents

2.1 Introduction

This chapter sets out the review undertaken of previous A947 studies and key policy documents. A wider review of objectives identified in these previous studies and documents has also been undertaken.

2.2 Previous Route Studies

2.2.1 Overview

Previous studies summarised in this section include the following.

- A947 Route Analysis Primary Study, September 2009 (AECOM)
- A947 Parkhill to Banff Route Study Report, March 2011 (Grontmij)
    - In addition to the Route Study, three Major Project Investigation (MPI) reports were also prepared covering:
        - MPI Location 1 – Goval Burn.
        - MPI Location 2 – South of Turriff.
        - MPI Location 3 – Plaidy.

The main findings from each report are set out in the sections below while a detailed list of options which have been identified from previous study is included in Appendix A.

2.2.2 A947 Route Analysis Primary Study, September 2009 (AECOM)

In 2009, on the back of safety concerns, AECOM were tasked to produce a preliminary route report which investigated locations and causes of collisions on the A947 and proposed measures to improve the safety of the route. Key findings are presented below.

- There may be many reasons for the contributory factors associated with collisions, but the report notes that a closer look at drainage issues and road surface conditions may be merited.
- The vast majority of collisions on the A947 are caused by human error.
- A visual survey was undertaken along the route, which noted problems associated with poor maintenance, including:
    - Edge of carriageway and centre white lining on the route suffers from wear and tear.
    - Polished and damaged road surfaces were common place throughout the route.

Several recommendations were made in this report, which were categorised into ‘do minimum’, ‘do medium’ and ‘do maximum’ option scenarios.

- The ‘do minimum option’ recommended improvements to existing lining, improvements to signing, the installation of verge marker posts and maintenance of vegetation.
- The ‘do medium’ option recommended Intelligent Road Studs, chevrons (both intelligent and standard), surfacing, gateway and safety barriers.
- The ‘do maximum’ option investigated the possibility of implementing average speed cameras at two cluster sites. However, it was noted that it is unlikely that they would address the accident problem

as the causations within these cluster sights are not linked with excessive speed, but that of inappropriate speed.

2.2.3 A947 Parkhill to Banff Route Study Report, March 2011 (Grontmij)

In 2010, Grontmij was commissioned by Aberdeenshire Council to undertake a Route Study of the A947, focused on accident reduction measures. The specific objectives of the study were to:

- Take a holistic approach to analysing and assessing existing route conditions;
- Identify measures (Engineering; Enforcement; Education; Encouragement) which could enable the reduction in accident numbers to meet Scottish and government identified 2020 targets; and
- Promote a partnering approach amongst key stakeholders across the route.

Key findings from the study (published in 2011) are summarised below.

- The overall Route Study found that over a five year period between 2005 and 2009, the A947 performed poorly in comparison with other comparable 'A' class roads in Aberdeenshire and in Scotland. Furthermore, the A947 did not meet the set Scottish Government targets (for 2010 or 2015/2020) for accident reduction.
- The condition of existing pavements was assessed using SCRIM[3] and SRMCS[4] data. The Road Maintenance Condition Survey found that little over 70% of the route was in a satisfactory condition and the SCRIM survey found many locations where the pavement was considerably below the required investigatory levels.
- There was little or no consistency in the current provision of bend related signage or sign markings along the length of the route.
- The majority of junctions on the A947 do not comply with current standards in regard to visibility.
- The existing provision of drainage was assessed and it was found that the existing drainage was inadequate for a majority of the route and was in poor condition due to lack of maintenance. Sub-standard geometry is another factor for drainage problems such as ponding.
- The study produced an extensive list of proposed interventions, including both infrastructure and soft measures.

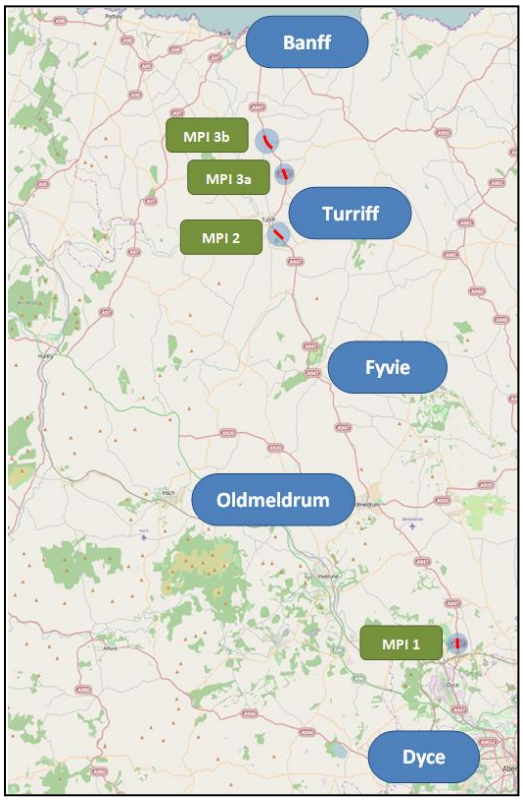
Several recommendations were made in the report, including:

- The 'Four 'E's'; engineering, enforcement, education and encouragement. Enforcement measures have been identified as vital in seeking to reduce accident rates on the A947, although as noted in the MPI reports, engineering measures also feature extensively.
- Planning and methodology for the surface course treatment to improve the texture of the pavement.
- The provision of new gullies and verge drainage to improve drainage throughout the route.

[3] SCRIM: Sideway-force Coefficient Routine Investigation Machine
[4] SRMCS: Scottish Road Maintenance Condition Survey

- Following a desktop double white line survey, additional slow moving vehicle lay-bys were proposed to ease driver frustration in areas where there are limited overtaking opportunities.
- Provision of junction marker posts throughout the scheme at all unsigned junctions.
- Increasing the frequency of verge maintenance and providing 'clear zones' adjacent to the carriageway.
- An upgrade of existing signs.

Figure 2.1 – MPI Locations



Major Project Investigations

Following an analysis of accident statistics and accident factor grids for the route, three sites were identified for improvements; Goval Burn (MPI 1), South of Turriff (MPI 2) and Plaidy (MPI 3a&b) as shown in Figure 2.1.

Preliminary Design Reports were prepared for each scheme. The MPI reports proposed realignment of the considered sections to improve sub-standard radii and safety for road users.

A Bend Assessment was carried out to identify mitigation measures (signs, road markings etc.) that were consistent with the rest of the route.

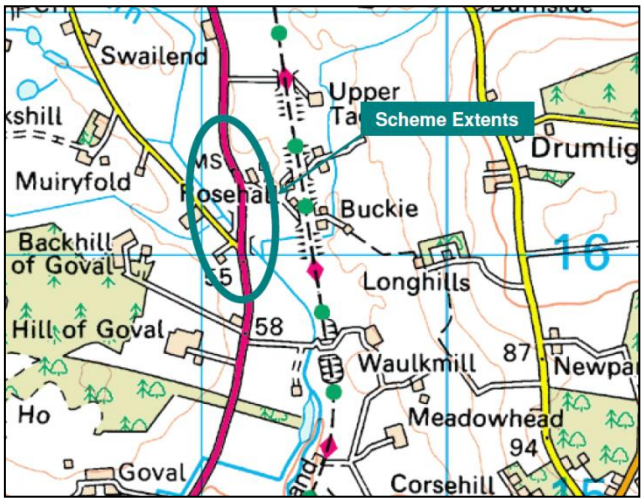
The preliminary design also included geotechnical investigation, consultation with statutory undertakers, identification of landowners affected by the scheme and preparation of cost estimate for the schemes.

- **MPI Location 1 – Goval Burn**

The scheme comprised the realignment and improvement of the existing A947 from a point north of the Hill of Goval access road to a point approximately 300m north of the Mill of Rosehall. The length of the scheme was approximately 660m.

The proposal involved realignment of a section of the carriageway, new single span bridge over the Elrick Burn, embankments of up to 3.5m height, provision of kerb & gully drainage to collect surface run-off from the carriageway along the realigned A947 and installation of new signs and line markings.

Figure 2.2 – MPI 1 (extracted from Grontmij report)

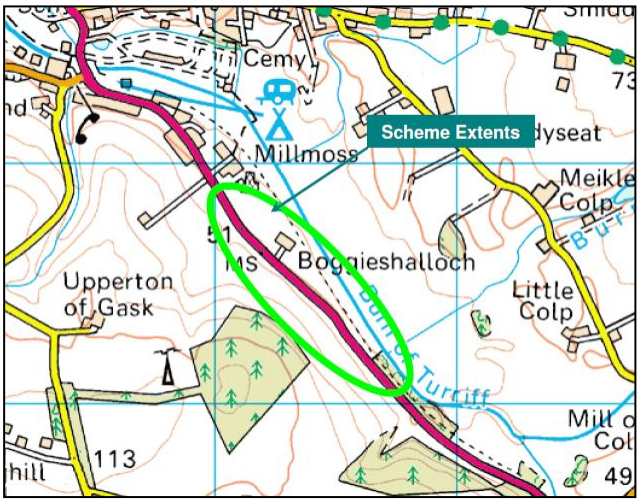


Two realigned junctions (one at private access) were also proposed to provide access to Newmachar Golf Course and B979 and to the properties at the Mill of Rosehall.

- **MPI Location 2 – South of Turriff**

The scheme comprised the realignment and improvement of the existing A947 from a starting point approximately 1100m north of the junction of the B917 to a point 150m south of the Milmoss Nurseries access junction. The length of the scheme was approximately 1250m.

Figure 2.3 – MPI 2 (extracted from Grontmij report)



The proposal involved realignment of a section of the carriageway, provision of kerb & gully drainage to collect surface run-off from the carriageway along the realigned A947 and installation of new signs and line markings.

An assessment of the proposed realignment, in accordance with TD19/06 of the DMRB and Aberdeenshire Council's design guidelines, was also undertaken in the preliminary design to establish requirement of vehicle restraint systems in order to protect road users from potential hazards.

- **MPI Location 3 – Plaidy**

Two sections of the existing road were identified for improvement at Plaidy, due to the high rate of accidents at each location, referred to as sections 3A and 3B. MPI 3A was approximately 675m in length and MPI 3B was approximately 633m long. Both proposed carriageways were 7.3m wide comprising of a 3.65m wide lane in each direction.

Figure 2.4 – MPI 3a (extracted from Grontmij report)

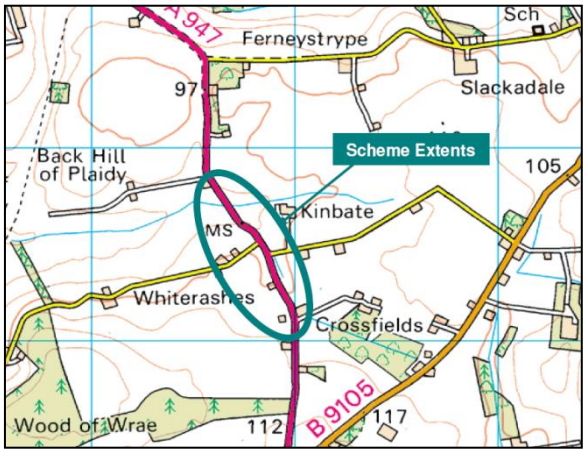
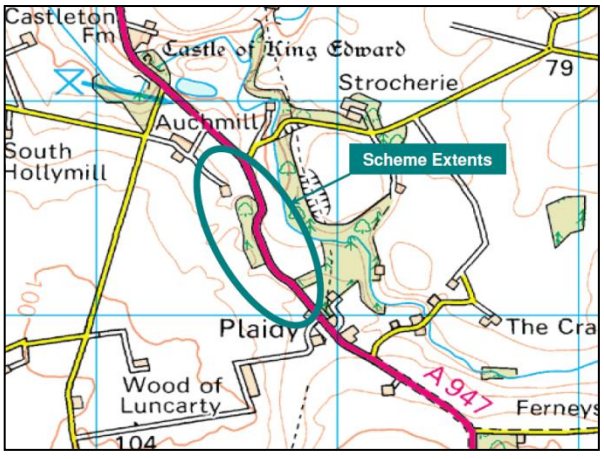


Figure 2.5 – MPI 3b (extracted from Grontmij report)



The proposal involved realignment of a section of the carriageway, provision of kerb & gully drainage to collect surface run off from the carriageway along the realigned A947 and installation of new signs and line markings.

An assessment of the proposed realignment for both sections, in accordance with TD19/06 of the DMRB and Aberdeenshire Council's design guidelines, was also undertaken in the preliminary design to establish requirement of vehicle restraint systems in order to protect road users from potential hazards.

2.3 Policy Context

2.3.1 Overview

A number of local and regional plans provide useful policy context for the development of the Route Improvement Strategy. These include:

- Nestrans Regional Transport Strategy, 2013
- Aberdeenshire Local Transport Strategy, 2012
- Aberdeen City, Aberdeenshire and Moray Road Safety Plan, 2011-2015
- North East Scotland Road Casualty Reduction Strategy, 2009
- Aberdeen City and Shire Strategic Development Plan, 2014

2.3.2 Nestrans Regional Transport Strategy, 2013

Improving the safety and security of travel is an important element of the RTS, with one of its four strategic objectives being *to "enhance choice, accessibility and safety of transport for all in the north east, particularly for disadvantaged and vulnerable members of society and those living in areas where transport options are limited*." Several references are made to the A947, highlighting the issue of safety, in particular how capacity and safety constraints at local road junctions on the A947 need to be addressed. It also notes that the A947 has been identified by Nestrans as a part of the road network to be prioritised for action.

2.3.3 Aberdeenshire Local Transport Strategy, 2012

The guiding principle of the strategy is to encourage individuals and businesses to consider ways to travel less, travel more actively and where vehicular travel is necessary, how journeys could be undertaken more effectively. The strategy notes that if these guiding principles are to be successful, people must feel comfortable and safe whether that be walking, cycling or using public transport or choosing to drive.

No specific references are made to the A947 or any of the key settlements located on the corridor, however safety is highlighted as one of the main issues in the LTS.

2.3.4 Aberdeen City, Aberdeenshire and Moray Road Safety Plan, 2011-2015

The Road Safety Plan was produced jointly by Aberdeen City, Aberdeenshire and Moray Councils and complements road safety policy at a national and regional level. It identifies behaviours, actions and conditions which increase risk on the road, highlighting rural roads as having many hazards.

No specific references are made to the A947 or any of the key settlements located on the corridor.

2.3.5 Aberdeen City and Shire Strategic Development Plan, 2014

The Strategic Development Plan aims to provide a strong framework for investment decisions which help grow and diversify the regional economy, as well as taking on the urgent challenges of sustainable development and climate change. The focus is on Strategic Growth Areas (which does not include the A947 corridor), with targets for 75% of all new homes built and employment land developed to be in the Strategic Growth Areas. It is estimated that there will be a need for 54,000 new homes in the region by 2035.

The plan does not place significant emphasis on the A947 corridor, though it notes that better links to the trunk road network, such as improvements to the A947 from Banff, will help improve access to markets.

2.3.6 Aberdeen City Region Deal, 2015

In March 2015, Aberdeen City and Aberdeenshire Councils began negotiations with the UK and Scottish Governments to secure an Aberdeen City Region Deal – the most ambitious investment and development programme developed by the public sector, industry and academia in Aberdeen and Aberdeenshire. The City Region Deal aims to release approximately £2.9 billion for infrastructure improvements over the next twenty years.

Transport connectivity is at the centre of the proposals, which are focused on the development of cross-city rapid transit schemes linking major employment and housing areas around the City, creation of a suburban rail network, and strategic road and junction improvements. There is no specific mention of potential A947 improvements in the City Region Deal proposal, although improvements to the wider road network and the construction of the AWPR in particular have the potential to impact upon the A947 Corridor.

2.4 Summary

This chapter has summarised the main findings from previous studies, underlining that work previously undertaken on the route has concentrated primarily on road safety issues. The importance of road safety is also outlined in local and regional policy documents. Several options have been listed in the reviews of previous studies, including improvements to existing lining and signing, and implementation of measures such as chevrons, safety barriers, localised route realignment and average speed cameras.

The linkage between the A947 and economic development for local communities, through for instance enhancing journey times, has however played a less prominent role in these studies and policy documents, although they are noted.

This previous work will be used to inform the longer term strategy for improving the A947.

Review of Problems and Opportunities

3 Review of Problems and Opportunities

3.1 Introduction

This chapter brings together the principal problems and opportunities identified for the A947 based on a review of the following:

- Transport Provision – Existing Infrastructure and Service Provision;
- Current Demand and Travel Patterns
- Current Trends and Issues;
- Future Impacts on the Corridor;
- Committed Transport Interventions;
- Wider Constraints and Uncertainties; and
- Consultations;

A summary of the main problems, issues, constraints and opportunities identified through the above reviews and research is outlined at the end of the chapter.

3.2 Transport Provision – Existing Infrastructure and Service Provision

3.2.1 Road

The A947 is the primary route between Dyce in Aberdeen City and Banff in the north of Aberdeenshire, extending to approximately 41 miles in length. Routeing south-east to north-west, the majority of the route (38 miles) lies within Aberdeenshire Council's area.

The route is characterised by bends and visibility issues, and has a number of minor accesses across its length. The width of the carriageway ranges between approx.6.5m (between Parkhill and Newmachar) and 7m (between Oldmeldrum and Turriff)[5].

The route passes through a number of built-up areas where standard 30mph speed limits apply carriageway roads[6] is typically in effect. 50mph speed limit applies through smaller on-road settlements, including at Fyvie and Whiterashes.

3.2.2 Public Transport

The principal bus service which operates along the entirety of the A947 is the Stagecoach No. 35 service, operating between Aberdeen, Oldmeldrum, Banff before continuing to Elgin. Services 235 and 305A operate for a shorter section of the A947. As is common practice for services operating on comparable corridors across Aberdeenshire, hail and ride operates on rural sections of the route (i.e. outside of the main towns).

Within the main settlements, Aberdeenshire Council maintains bus stop information. Bus stops have varying levels of infrastructure provision but include dropped kerbs, raised kerbs, shelters, and poles. Real Time Passenger Information (RTPI) operates at interchange points on the corridor.

Table 3.1 summarises the principal bus services operating on the A947. These services are supplemented by local services. These routes are also detailed on Public Transport guides produced by Aberdeenshire Council for the largest settlements in the region. School bus services also use the A947.

[5] *A947 Parkhill to Banff Route Study Report* (Grontmij, March 2011

[6] 60mph for cars / 50mph for goods vehicles, buses/coaches and vehicles towing caravans and trailers / 40mph for goods vehicles more than 7.5 tonnes maximum laden weight.

Table 3.1 – Principal Bus Services Operating on the A947 Corridor

Service	Destinations	Frequency	Operator
35/35A[7]	Banff, Fyvie, Turriff, Oldmeldrum and Newmachar	Between two and three per hour (Monday to Friday), hourly (Saturday & Sunday)	Stagecoach
235	Oldmeldrum and Newmachar	Four services per day (Monday to Saturday)	Stagecoach
305A	Oldmeldrum and Newmachar	Four services per day, mostly AM (Monday to Friday)	Bains Coaches

Stagecoach service 35 runs between Aberdeen and Elgin. The typical journey time along the A947, between Dyce and Banff takes close to 1 hour and 30 minutes (this includes stops at Macduff before arrival to Banff's Interchange).

In addition to the existing public transport network, there are plans to create mini-interchange hubs on the A947 at Fyvie (17 spaces), Oldmeldrum (40-60 spaces) and Newmachar (21 spaces). The hubs are proposed to act as small Park and Ride sites, aimed at residents in rural areas that do not have direct access to public transport. It is proposed that all three hubs will be located adjacent to the A947.

3.2.3 Active Travel

Given the distances between settlements on the A947, walking and cycling opportunities are limited on the route. There are some short stretches of footways that run along the road as it approaches / travels through built up areas but on the whole there is no dedicated provision for pedestrians or cyclists.

There are limited cycling opportunities on the A947 corridor itself, with only small sections forming part of recreational cycle routes as identified by Aberdeenshire Council. These include the Turriff Circular[8] and Fyvie to Turriff[9] routes. Although there are limited facilities on the corridor, the key settlements provide local amenities. Off route, the Formartine and Buchan Way offers an off-road foot/cycleway to the east of Newmachar.

The Sustrans National Cycle Route 1 crosses the A947 close to the Aberdeen City / Aberdeenshire boundary north of Dyce, and also passes to the east of Newmachar before routeing via Tarves and Maud. It then passes through Turriff before joining the A947 on approach to Banff, south of Macduff.

3.3 Current Demand and Travel Patterns

This section assesses current demand and travel patterns. Analysis has been undertaken based on the results from a Roadside Interview Survey undertaken on the corridor in April 2015 supplemented with a review of relevant data from the 2011 Census.

3.3.1 Census 2011 Data

Table 3.2 outlines the socio-economic profile for the main settlements located on the A947.

[7] Stagecoach service 35/35A: http://92.52.88.74/publictransport/timetables/pdf/35Ane.pdf
[8] https://www.aberdeenshire.gov.uk/transportation/cycling/Route5_002.pdf
[9] https://www.aberdeenshire.gov.uk/transportation/cycling/Route4_002.pdf

Table 3.2 – Socio-Economic Profile of the A947

A947 Corridor: Socio-Economic Profile						
		Banff	**Turriff**	**Oldmeldrum**	**Newmachar**	**Aberdeenshire**
Population		4,082	5,177	3,212	2,460	252,973
10 Year Population Change (2001-2011)		+2.3%	+16.2%	+60.4%	+6.1%	+11.5%[10]
Age	Under 16 years old (%)	17.4	17.2	22.5	21.0	18.7
	16 to 64 years old (%)	61.8	60.1	64.7	66.9	65.2
	65 years old and over (%)	20.8	22.7	12.8	12.2	16.1
Unemployment (%)		4.2	2.9	2.4	2.0	2.5
Retired (%)		17.0	17.0	10.3	11.4	13.6
Student (%)		3.9	2.5	3.7	2.5	3.1
Key employment sectors (Top 3)		1. Human health and social work activities 19.9%) 2. Wholesale and retail trade; repair of motor vehicles (12.5%) 3. Manufacturing (11.5%)	1. Wholesale and retail trade; repair of motor vehicles 17.6%) 2. Manufacturing (15.6%) 3. Construction (11.6%)	1. Wholesale and retail trade; repair of motor vehicles (14.6%) 2. Human health and social work activities (11.5%) 3. Professional scientific and technical activities (10.9%)	1. Wholesale and retail trade; repair of motor vehicles (13.7%) 2. Human health and social work activities (13.1%) 3. Professional scientific and technical activities (10.7%)	1. Wholesale and retail trade; repair of motor vehicles (14.4%) 2. Human health and social work activities (11.8%) 3. Manufacturing (10.2%)
Car Ownership	No car or van (%)	31.9	20.3	11.4	8.6	14.3
	1 car or van (%)	44.1	49.4	36.2	38.6	40.2
	2 cars or van (%)	19.6	24.7	41.0	41.9	33.7
	3 or more cars or vans (%)	4.4	5.6	11.4	10.9	11.8

(Source: 2011 Census)

Key observations from Table 3.2 are as follows:

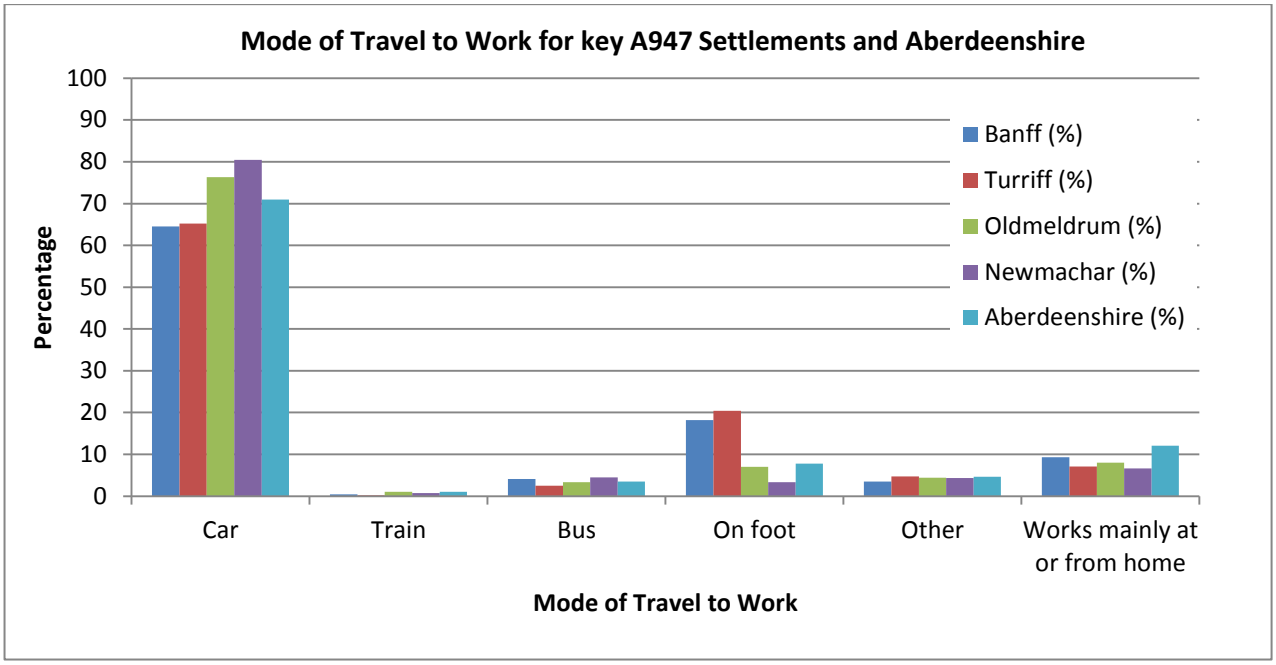
- Banff is the second largest town on the route. Unemployment is above the Aberdeenshire average, as is the number of retired residents and students (the latter may be due to its proximity to the North East Scotland College campus in nearby Fraserburgh). The number of residents without access to a car or van is twice as high as the Aberdeenshire average.
- Turriff is the largest town on the A947 and displays similar characteristics to Banff in terms of an ageing population and lower than average car ownership level (compared to Aberdeenshire as a whole).
- Oldmeldrum and Newmachar display trends of a younger population, with a low number of retired residents and above average rates of car ownership. Less than 9% of residents in Newmachar do not have access to a car compared to the Aberdeenshire average of 14%.

[10] Population change for Aberdeenshire is for between 2003 and 2011, not 2001 and 2011.

3.3.2 Mode of Travel to Work

Travel to work data has been obtained from the 2011 census for the main settlements on the A947, as presented in Figure 3.1.

Figure 3.1 – Mode of Travel to Work for A947 Settlements



(Source: 2011 Census)

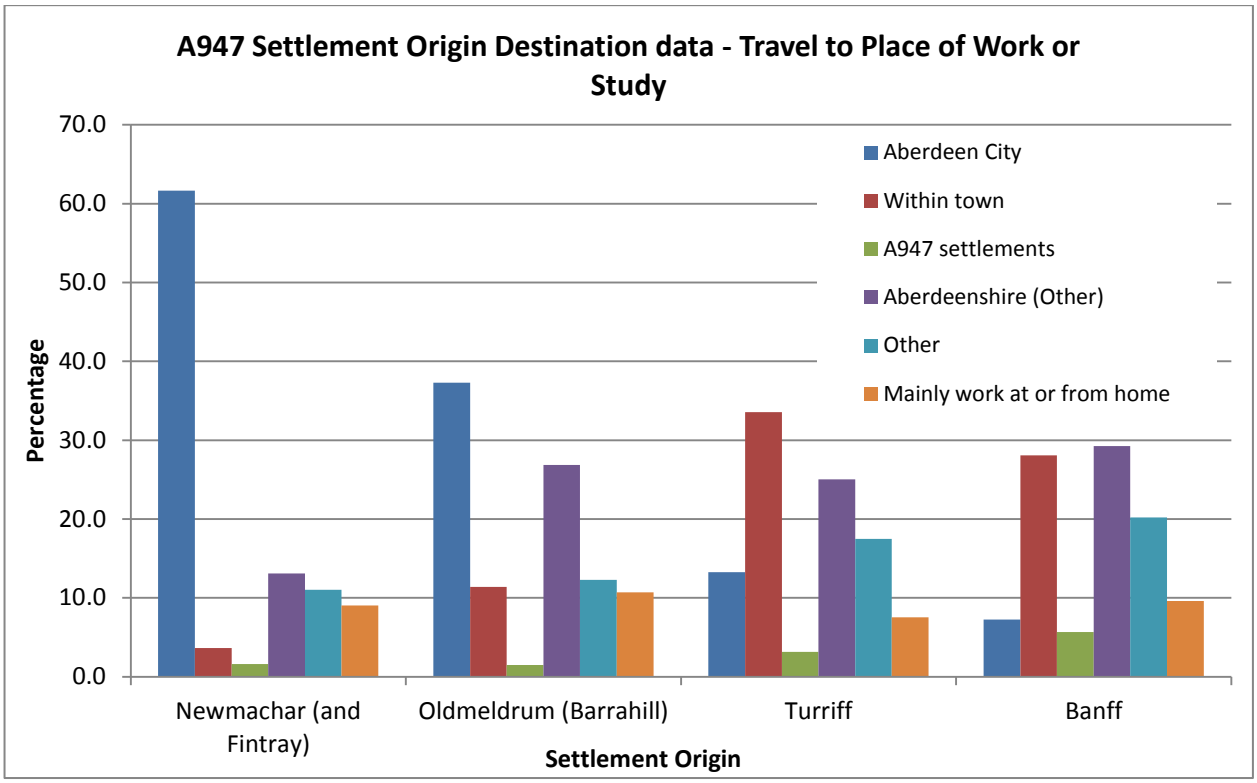
Figure 3.1 offers an insight into travel patterns on the A947 Corridor and the degree to which patterns differ depending on relative proximity to Aberdeen City. The key findings are summarised below.

- A higher percentage of residents in those settlements closest to Aberdeen City travel to work by car, indicating the dominance of private transport for commuting journeys. Both Oldmeldrum (76.3%) and Newmachar (80.5%) have higher rates of travel to work by car than the average for Aberdeenshire, whereas Banff and Turriff have lower than average rates.
- Towns located further away from Aberdeen City have a significantly higher proportion of residents who work from home, or travel to work on foot. In Banff, for example, 9.3% of the working population work from home. This figure is almost 50% higher than those residing in Newmachar.
- Given that the A947 route is not on a rail line, rail is the least popular mode of travel to work across all four settlements; Oldmeldrum records the highest percentage at 1% – which may reflect some use of Inverurie station by residents commuting to work from the town.

3.3.3 Origin Destination Data

Origin destination data from the 2011 Census has been analysed to provides an insight into where people on the A947 Corridor travel to for work or study. The four largest settlements on the A947 Corridor lie within the Intermediate Zones of Banff, Turriff, Barrahill (for Oldmeldrum) and Newmachar and Fintray.

Figure 3.2 – A947 Settlement Origin Destination Data



(Source: 2011 Census)

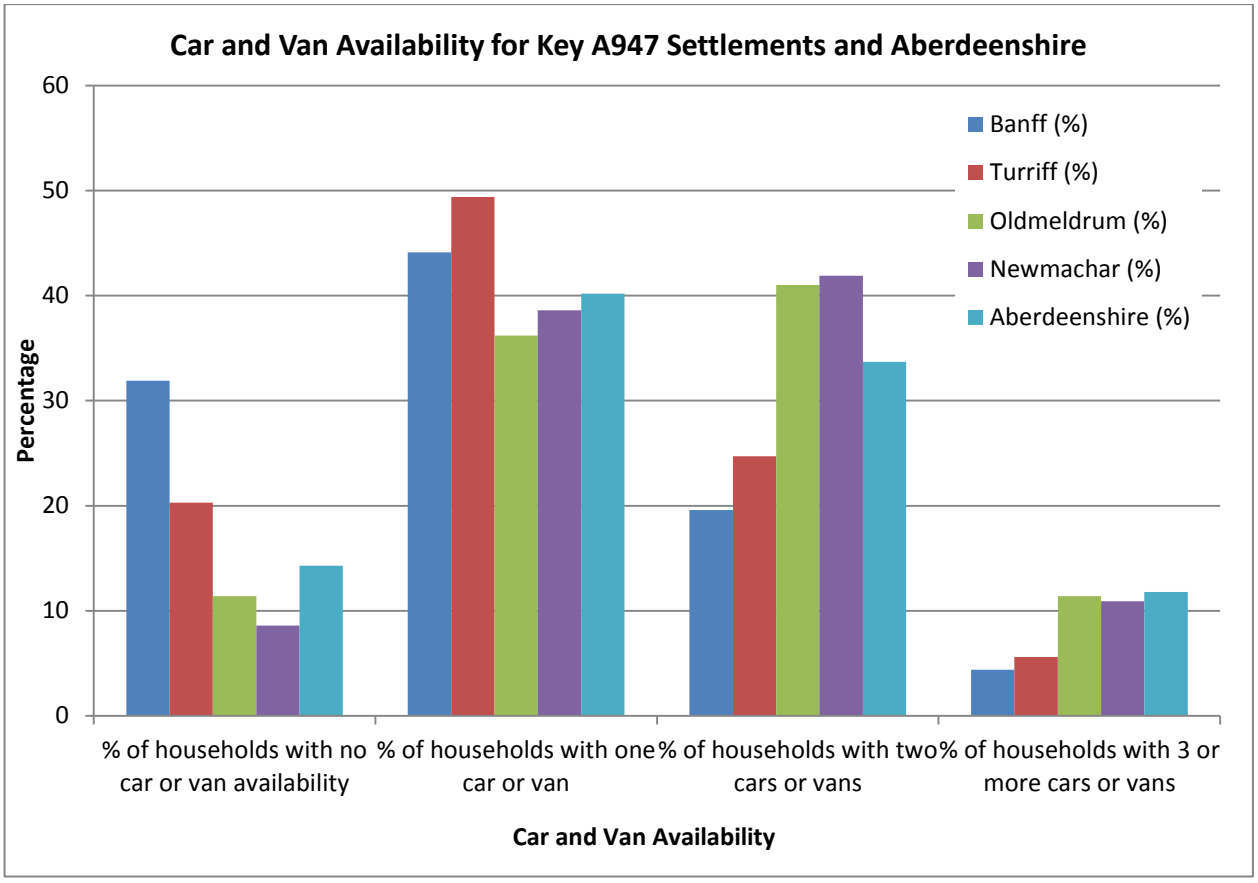
Figure 3.2 presents the results of the Origin Destination analysis, with key findings set out below.

- There is a clear pattern demonstrating that a far higher percentage of residents living in settlements closest to Aberdeen City travel there to work or study. In Newmachar, 61.7% of residents travel to Aberdeen City to work or study, while over a third (37.3%) travel to Aberdeen City from Oldmeldrum. This is in contrast to only 13.3% and 7.3% of residents in Turriff and Banff respectively travelling to Aberdeen City to work or study. Within Aberdeen City itself, Bucksburn North (containing the industrial estates of Kirkhill and Wellheads) is the key travel to work zone for residents of settlements on the A947 accounting for between 21%-25% of all trips made to the city from each settlement.
- A greater percentage of residents living in settlements further away from Aberdeen City work or study within the same town. Turriff recorded the highest percentage, with 33.6% of residents living and working or studying within the settlement, followed by Banff (28.1%).
- A similar percentage of people mainly work at or from home across all four zones (9% in Newmachar and Fintray, 10.7% in Barrahill, 7.5% in Turriff and 9.6% in Banff).

3.3.4 Car or Van Availability

Car or van availability data has been obtained from the 2011 census. This is presented in Figure 3.3.

Figure 3.3 – Car and Van Availability



(Source: 2011 Census)

Figure 3.3 shows levels of car ownership for settlements on the A947. Key findings are summarised below.

- The percentage of households which have no car or van availability is significantly higher in Banff (31.9%) and Turriff (20.3%) compared to Oldmeldrum (11.4%) and Newmachar (8.6%). This corresponds with data in Figure 3.1 which shows that the percentage of workers travelling to work by car is higher in Oldmeldrum and Newmachar.
- The percentage of households in Banff with no car or van available (31.9%) is over 50% higher than the Aberdeenshire average of 14.3%. The percentage of households in Newmachar with no car or van availability (8.6%) is almost half the Aberdeenshire average of 14.3%.

3.3.5 Roadside Interview Surveys

In April 2015, Roadside Interview Surveys (RSIs) were undertaken on the A947 as part of wider work being completed by Transport Scotland associated with the A96 Dualling Project. Origin destination results are shown in Figure 3.4.

Figure 3.4 – Origin and Destination Survey Results

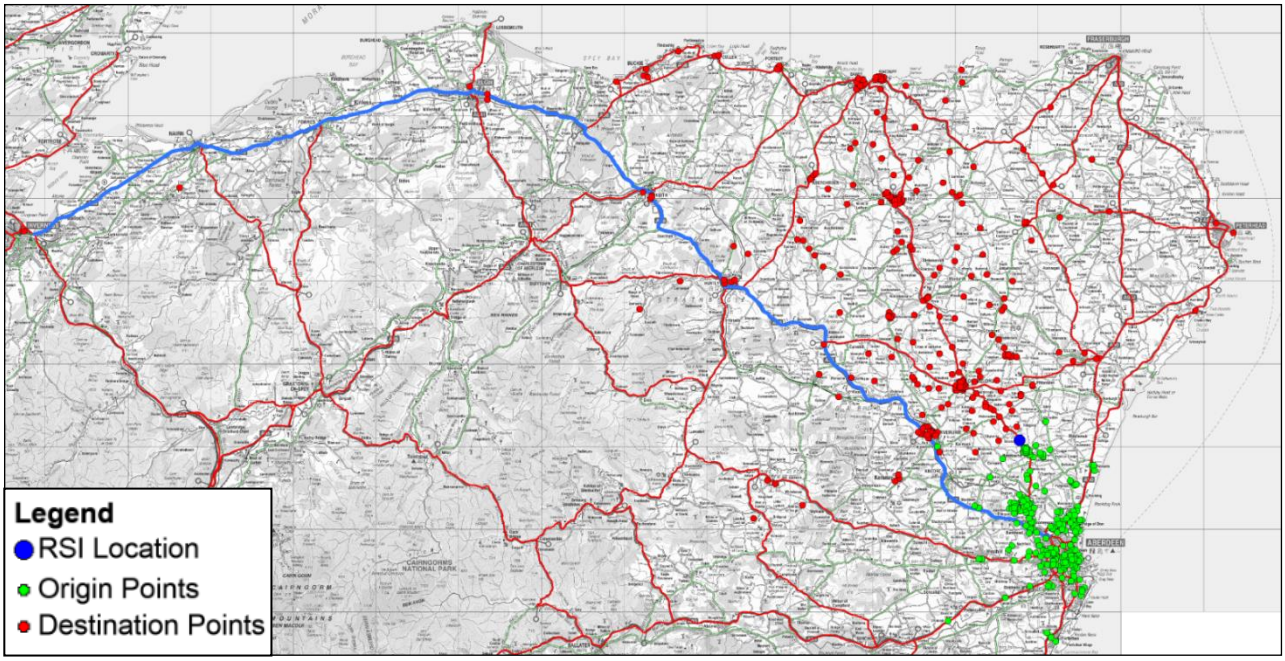


Figure 3.4 indicates the origin and destination points recorded from the 570 roadside interviews undertaken on the A947 north of Newmachar. It is to be noted that this data covers northbound traffic only. The figure illustrates that the vast majority of origins were located within Aberdeen, mostly on the north side of the city. In terms of destination points, clear clustering can be observed for the key settlements on the A947 (Oldmeldrum, Turriff and Banff) and settlements within the immediate vicinity of the corridor. In addition, a clustering of destination points is also apparent at Inverurie. This broadly corresponds with the census origin and destination information presented in Figure 3.2.

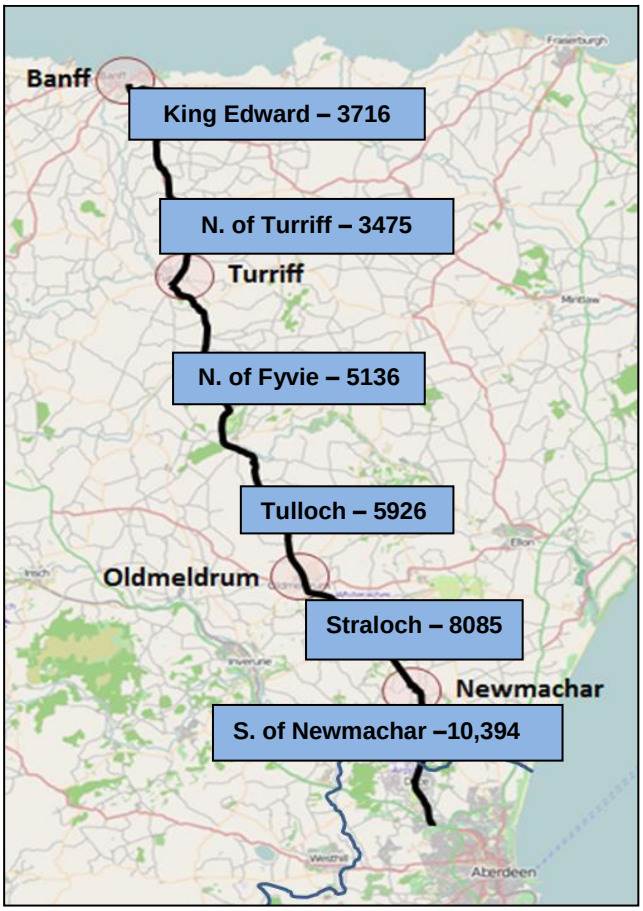
3.4 Current Trends and Issues

This section presents current trends and issues on the A947 based on analysis of traffic and accident data provided by Aberdeenshire Council as well as review of journey time and platoon data commissioned for this study.

3.4.1 Traffic Data

Aberdeenshire Council has provided traffic count data for six counters located on the A947 Corridor. Figure 3.5 presents the 2014 average annual daily traffic (AADT) flows along the route. This shows that daily traffic flows range between 3,500 north of Turriff to just under 10,500 south of Newmachar.

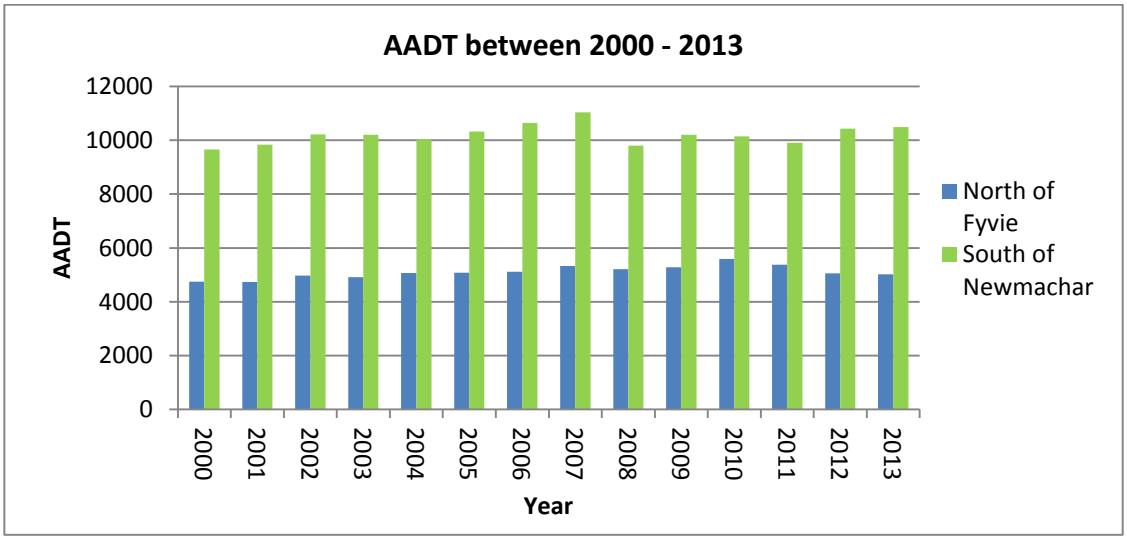
Figure 3.5 – 2014 Annual Average Daily Traffic Data



(Source: Aberdeenshire Council AADT data)

A longer term analysis of traffic volumes is presented in Figure 3.6 for sites north of Fyvie and south of Newmachar. This indicates that traffic flows between 2000 and 2013 have increased at both sites.

Figure 3.6 – Annual Average Daily Traffic Data between 2000 and 2013



(Source: Aberdeenshire Council AADT Data)

Despite fluctuations, flows south of Newmachar have generally been on the increase, recording an 8.6% rise since 2000. Most recent figures suggest traffic is continuing to increase on this part of the route. In contrast, although the site north of Fyvie has recorded an overall increase of 5.7% since 2000, flows have been reducing in more recent years. These trends are shown in Table 3.3 below.

Table 3.3 – Trends in Average Annual Daily Traffic Flow

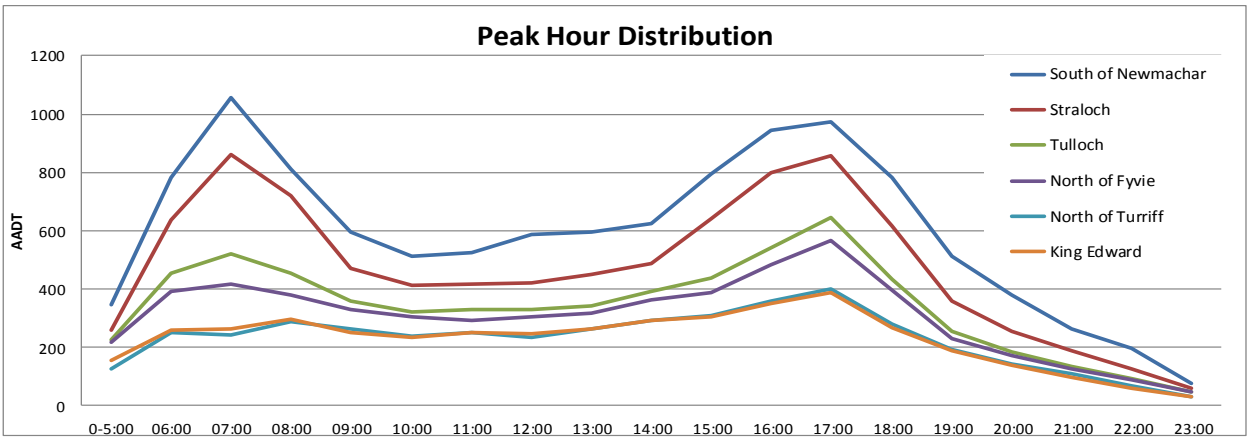
	North of Fyvie	South Of Newmachar
	% change	% change
13 year change	5.7%	8.6%
5 year change	-5.0%	2.7%
2 year change	-6.6%	5.8%

(Source: Aberdeenshire Council ATC Data)

Analysis has also been undertaken of historic traffic flow information from the Department for Transport[11] to understand long term traffic flow trends along the route, as presented in Appendix B. This also indicates that traffic levels appear to have fluctuated along the route over the last 13 years[12].

In terms of the peak travel hour on the A947, Figure 3.7 presents the peak periods for each of the traffic counter sites on the A947 based on analysis of September 2014 averages. Across the route, the peak periods appear to be in the regions of 0630 to 0730 in the morning and 1600 to 1700 in the evening. The data also reaffirms that traffic flows are higher in proximity to Aberdeen and that there is a more pronounced peak traffic periods in the south of the corridor which it is assumed relates to the commuter relationship between towns south of Oldmeldrum and Aberdeen. In comparison, further north, near Turriff and King Edward, the peak traffic period is less pronounced.

Figure 3.7 – Historic AADT Flows



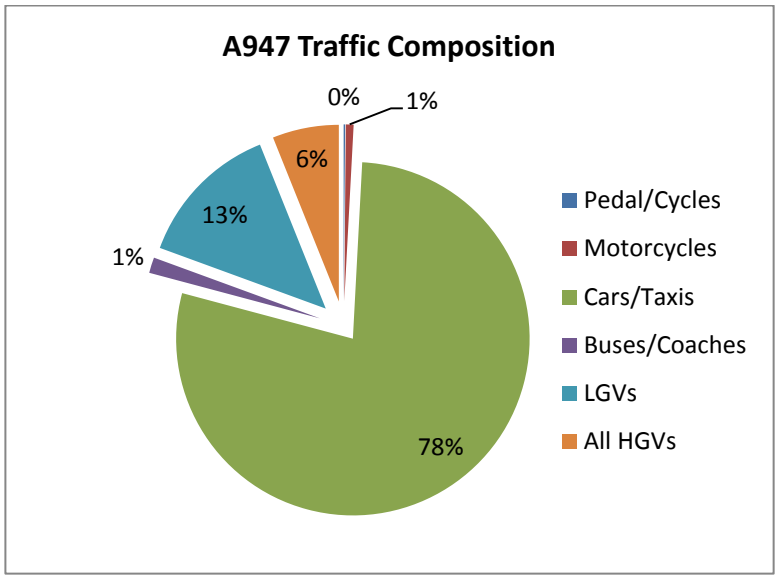
(Source: Aberdeenshire ATC Data, September 2014)

[11] Further information on DfT provided at http://www.dft.gov.uk/traffic-counts/about.php

[12] It is to be highlighted that the DfT's traffic volume information is based on 12 hour surveys undertaken on one day per year and growthed; as such a level of caution is required when analysing this data.

In terms of the composition of vehicles along the route, cars make up on average 78% of all traffic that use the route, with LGVs comprising 13%, HGVs 6% and buses and cyclists only 1% each respectively[13]. This is shown in Figure 3.8.

Figure 3.8 – Traffic Composition on the A947



(Source: DfT, 2013 data)

3.4.2 Traffic Speeds

Table 3.4 presents 85th percentile data on the A947. The data demonstrates that average speeds have increased at all four sites, although in most instances the increase is marginal. At King Edward for instance, the average speed increased by 0.4mph between 2012 and 2014. It is to be noted that although the data provides a useful snapshot of speeds at specific points on the A947, these speeds are not necessarily indicative of the entire route. It is also to be noted that counters north of Fyvie and King Edward are located on relatively straight sections of road, where anecdotally there is a level of faster traffic due to overtaking opportunities. Nevertheless, the data does demonstrate that average speeds are above the limit north of Fyvie and King Edward and have seen year on year increases.

Table 3.4 – Historic Traffic Speed Data

Location of Counter:	85%ile 2010	85%ile 2011	85%ile 2012	85%ile 2013	85%ile 2014
South of Newmachar	54.0	55.7	55.5	54.7	56.0
North of Fyvie	62.2	64.1	64.0	64.2	64.8
North of Turriff	-	58.9	59.0	59.0	59.3
King Edward	-	-	65.0	65.2	65.4

(Source: Aberdeenshire Council)

[13] http://www.dft.gov.uk/traffic-counts/about.php

Further assessment of traffic speeds has been made based on the results of vehicle by vehicle traffic survey data, collected in October 2015 as part of an exercise to understand the extent of vehicle platooning along the route (discussed in Section 3.4.3). Automatic Traffic Counters (ATCs) were placed at five sites along the route, with results presented in Table 3.5.

Table 3.5 – Traffic Speed Surveys, October 2015

Site	Location (Lat / Long)[14]	Speed Limit	85%ile Speeds			
			Direction	0600-0900	1600-1900	24 Hrs
1	A947 between Banff-Turriff (57.572899,-2.442622)	60mph	N'bound	54.40	55.10	55.20
			S'bound	54.95	53.11	54.0
2	A947 between Turriff-Fyvie (57.523207,-2.442340)	60mph	N'bound	60.40	58.20	59.66
			S'bound	56.80	57.70	55.40
3	A947 between Fyvie-Oldmeldrum (57.410266,-2.336184)	60mph	N'bound	56.90	56.90	55.40
			S'bound	56.50	55.90	55.70
4	A947 between Oldmeldrum-Newmachar (57.312704,-2.260775)	60mph	N'bound	56.30	57.26	54.60
			S'bound	48.70	48.50	47.40
5	A947 between Newmachar-Dyce (57.245086,-2.183619)	60mph	N'bound	54.30	55.02	53.40
			S'bound	53.20	50.90	52.30

Table 3.5 shows that an 85th percentile speed of greater than 60mph was recorded during one time period at one site; between 0600-0900 on the A947 between Turriff and Fyvie northbound, with an 85th percentile recorded speed of just over 60mph. Recorded speeds were generally between 50-60mph, the key exception to this being Site 4 southbound, with all 85th percentile speeds recorded at less than 50mph. This is likely a result of vehicles slowing down on approach to Hattoncrook, where a 50mph speed limit is enforced.

Results also demonstrate that over the 24 hour period, northbound traffic travelled at a marginally higher speed than southbound traffic. Furthermore, results show that southbound traffic recorded lower speeds during the AM period (with the exception of Banff-Turriff), possibly indicative of a greater number of vehicles on the road resulting in vehicles travelling at slower speeds.

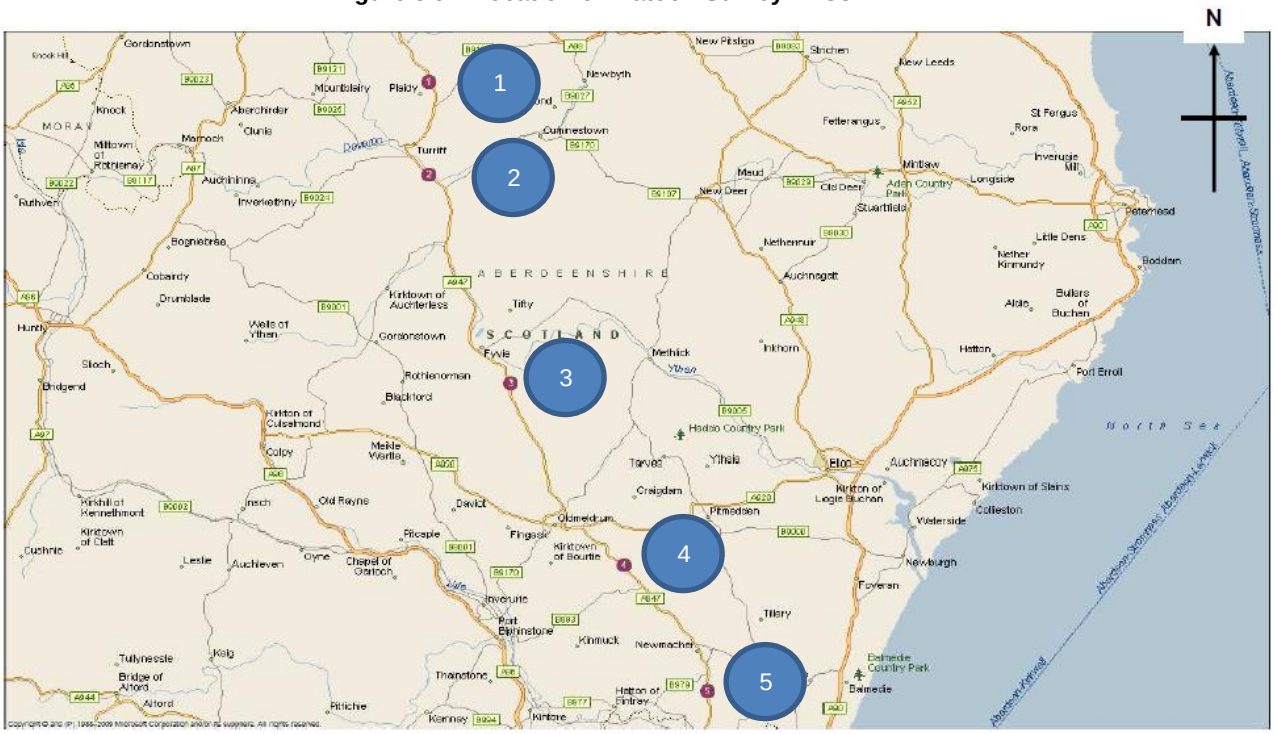
[14] See Figure 3.9

3.4.3 Platooning

Platooning (i.e. a convoy of vehicles travelling together, possibly due to a slow moving vehicle at the front), or more specifically a lack of opportunities to overtake, can lead to driver frustration and some drivers making hazardous overtaking manoeuvres. In October 2015, a survey was undertaken to record instances of platooning and to understand the nature and frequency of platoons if witnessed. This was a high level exercise based on ATC data collected over five days[15]. The data recorded headway (the time between vehicles) and vehicle class. Any vehicles travelling less than four seconds[16] behind another vehicle were regarded as part of a platoon.

A plan showing the location of the counter sites is shown as Figure 3.9 with the results, based on review of platoons consisting of three or more vehicles, summarised in Table 3.6.

Figure 3.9 – Location of Platoon Survey ATCs



[15] Surveys were undertaken from Monday 26th to Friday 30th October 2015. Due to a road closure on part of the route on Monday associated with a road traffic collision, this day's data has been excluded with results based on analysis of Tuesday to Friday data only.
[16] Professional judgement based on international research and assumptions around platooning from other studies.

Table 3.6 – Traffic Platoon Surveys, October 2015

Site	Location (Lat / Long)[17]	Direction	Total No. of Platoons (3+)[18]	Total No. of Platoons (3+) 6-9 AM	Total No. of Platoons (3+) 4-7 PM	Avg No. Platoons (3+) p/hr[19]	Avg No. Platoons (3+) p/hr 6-9 AM	Avg No. Platoons (3+) p/hr 4-7 PM	Max Platoon Size[19]	Avg Speed of Vehicles leading platoons with 3+ vehicles (mph) [19]	Proportion of platoons (3+) being led by slower moving vehicles[19]
1	A947 between Banff-Turriff (57.572899,-2.442622)	N'bound	462	28	203	8	2	17	8	46.5	23%
		S'bound	554	190	87	10	16	7	12	45	26%
2	A947 between Turriff-Fyvie (57.523207,-2.442340)	N'bound	1086	118	469	19	10	30	13	48.72	26%
		S'bound	536	233	90	10	19	8	8	46.32	28%
3	A947 between Fyvie-Oldmeldrum (57.410266,-2.336184)	N'bound	912	80	431	16	7	36	14	48.25	20%
		S'bound	1127	485	156	20	40	13	20	46.65	28%
4	A947 between Oldmeldrum-Newmachar (57.312704,-2.260775)	N'bound	1310	123	648	23	10	54	18	47.35	20%
		S'bound	1506	791	187	27	66	16	17	42.31	22%
5	A947 between Newmachar-Dyce (57.245086,-2.183619)	N'bound	1204	52	487	22	4	41	13	44.33	19%
		S'bound	1075	572	88	30	47	7	10	44.82	13%

17 See Figure 3.9

18 Based on four days counts, 6am-8pm (Tuesday 27th October-Friday 30th October).

19 Based on four days counts, 6am-8pm (Tuesday 27th October-Friday 30th October). Slower moving vehicles are defined as non-cars – 'Short Towing – Trailer, Caravan, Boat, etc.', 'Two axle truck or Bus', 'Three axle truck of Bus', 'Four axle truck', 'Three axle articulated vehicle or Rigid vehicle and trailer', 'Four axle articulated vehicle or Rigid vehicle and trailer', 'Five axle articulated vehicle or Rigid vehicle and trailer', 'Six (or more) axle articulated vehicle or Rigid vehicle and trailer',' B-Double or Heavy Truck and trailer' and 'Double or triple road train or Heavy truck and two (or more) trailers'.

The platoon survey results indicate that the majority of platoons consisted of two vehicles. As indicated, due to the significant number of platoons consisting of two vehicles recorded during the survey period, analysis has focused on platoons consisting of three or more vehicles. Key findings are discussed below.

- Sections 3, 4 and 5, present higher number of platoons formed by three or more vehicles, in comparison to other sections, which ties up with the lower average speeds registered at these sections associated with higher traffic flows.
- Sections 3, 4 and 5 register over three to four times the number of platoons (3+) during the peak periods compared to the average number of platoons (3+) per hour between 6AM and 8PM.
- As would be expected, most vehicles leading platoons along the A947 are short vehicles (i.e. cars) with the second most common vehicle type being two axle trucks or buses.
- Table 3.6 demonstrates that a sizeable proportion (on average 23% or just over one in five vehicles) of leading vehicles are 'slow moving vehicles'. The section between Newmachar and Dyce shows a lower presence of 'slow moving vehicles', with around 13-19% of platoons led by slow vehicle types.
    - Further analysis has been undertaken into leading vehicles during the peak hours (not shown in Table 3.6). This demonstrates that the AM peak presents a higher proportion of 'slow moving vehicles' leading platoons compared to the PM peak. In particular, northbound traffic shows the highest proportion of platoons led by slow moving vehicles, although absolute numbers are lower compared to southbound movements.
- The number of platoons travelling southbound is higher during the morning period for all sections whereas in the evening period, a greater number of platoons are encountered travelling northbound, coinciding with the main commuter flows.
    - One particular issue which stands out is between Turriff and Fyvie (Section 2) where data shows that the number of platoons travelling northbound during the PM peak is nearly double the number observed travelling southbound during the AM peak. In contrast, other AM/PM comparison flows are relatively balanced across the route. It is therefore considered that this may specifically highlight a lack of overtaking opportunities at Section 2 for northbound traffic.

In addition, as set out in Appendix C, more detailed analysis has been undertaken focused on platoons consisting of five or more vehicles, with results generally mirroring those identified above. The results also highlight the influence of slow moving vehicles on platoons, with the proportion of HGVs leading platoons being higher for platoons consisting of five or more vehicles – on northern sections of route (e.g. between Banff and Fyvie) the proportion of platoons led by slow moving vehicles was noted to be as high as 40%. Further information is presented in Appendix C.

3.4.4 Layby Surveys

Laybys can help to relieve platooning by allowing slower moving vehicles, such as tractors, to pull in and allow traffic to pass. An Aberdeenshire Council survey of laybys south of Oldmeldrum (Kingroodie) and south of Banff (Plaidy) in June 2014 established that these tended to be used predominantly by cars and lights goods vehicles (these made up 80% of identified vehicles), possibly stopping for example to take a phone call or for a convenience break, as opposed to larger, slower moving vehicles. The surveys also established that a considerable number of users entered the laybys from the opposite side of the road.

During consultations with the farming industry, it was acknowledged that there is a public perception that slow moving vehicles such as tractors and HGVs do not use the laybys as much as they could, leading to platooning and driver frustration. In response, it was stated that this is because existing laybys are not in appropriate locations and are not large enough.

3.4.5 Journey Time Surveys

Previous travel time surveys carried out for the route in September 2010[20] (based on three non-peak return drive-through journeys) between the A947 / Riverview Drive (Dyce) junction to the A947 / A98 junction at the north end of the scheme found that average journey times were 54 minutes northbound and 54 minutes southbound (return trip time of 1 hour 46 minutes).

In order to provide a more robust understanding of journey times, based on a higher sample rate, average journey time information has been reviewed based on TomTom® data obtained for the route. The data reviewed covered average journey time information collected between March and November 2012 from 7AM and 7PM and only included neutral days and months.

Table 3.7 provides a summary of the average journey time and corresponding average speed by direction for various sections of the route.

Table 3.7 – Journey Time and Corresponding Average Speed by section

Aberdeen-Banff (Northbound)							
Specific Section	Distance (miles)	Average Journey Time			Average Speed (mph)		
		0800-0900	1000 - 1600	1700 - 1800	0800 - 0900	1000 - 1600	1700 - 1800
Aberdeen - Dyce	2.15	13m 6s	5m 12s	5m 15s	15.0	26.0	25.7
Dyce - Newmachar	4.38	8m 36s	8m 14s	18m 2s	32.5	33.1	26.5
Newmachar - Oldmeldrum	7.38	10m 28s	10m 27s	10m 7s	39.3	39.8	41.3
Oldmeldrum - Turriff	16.19	21m 43s	21m 32s	21m 31s	41.0	40.6	41.8
Turriff - Banff	10.79	15m 16s	15m 59s	14m 57s	39.4	37.8	39.5
Banff-Aberdeen (Southbound)							
Specific Section	Distance (miles)	Average Journey Time			Average Speed (mph)		
		0800-0900	1000 - 1600	1700 - 1800	0800 - 0900	1000 - 1600	1700 - 1800
Banff - Turriff	10.79	15m 36s	15m 57s	15m 2s	38.4	37.3	38.8
Turriff - Oldmeldrum	16.19	22m 10s	21m 59s	21m 32s	40.5	40.8	41.3
Oldmeldrum - Newmachar	7.38	10m 4s	10m 18s	10m 2s	41.0	40.3	40.9
Newmachar - Dyce	4.38	11m 7s	7m 14s	8m 24s	26.7	33.2	33.2
Dyce - Aberdeen	2.15	6m 1s	5m 42s	12m 17s	23.9	24.6	17.0

[20] A947 Parkhill to Banff Route Study Report, March 2011 (Grontmij)

Table 3.7 demonstrates that the average journey time (and corresponding average speed) for the stretch of the A947 between Newmachar and Aberdeen is dependent on direction for the peak hours and that the average journey times for the stretch of the A947 north of Newmachar are consistent across time periods and by direction. The average journey time between Newmachar and Dyce, for example, is:

- For the AM Peak: 8 minutes 36 seconds (Northbound) vs 11 minutes 7 seconds (Southbound)
- For the PM Peak: 18 minutes 2 seconds (Northbound) vs 8 minutes 24 seconds (Southbound)

The main findings from the analysis of the TomTom data are highlighted below:

- Based on the assumption that greater correlation of average speeds between time periods indicates greater journey reliability, then journey reliability is lowest between Aberdeen and Newmachar (compared to the whole route);
- Average journey times for the stretch of the A947 north of Newmachar are consistent across time periods and by direction;
- Considering the whole route, the average journey time per unit of distance is consistent (across time periods) and lower for the stretch between Newmachar and Banff, and is more variable and higher for the stretch between Aberdeen and Newmachar;
- The average journey time (and corresponding average speed) for the stretch of the A947 between Aberdeen and Newmachar is dependent on direction for the peak hours;
- Excluding built up areas there are four areas where the average speed is predominantly and consistently below the UK national average speed (the latter being specific to the speed limit). The four areas are (1) between the Council boundary and Newmachar, (2) between Hattoncrook and Oldmeldrum, (3) the 3.25 mile stretch immediately south of Turriff, and (4) the 3.5 mile stretch to the north of Turriff beginning approximately 2 miles outside of Turriff. A further area exists in the southbound direction for some time periods between Fyvie and Oldmeldrum; and
- The only time that the average speed exceeds the speed limit is within built up areas (especially on the entry/exit of built up areas).

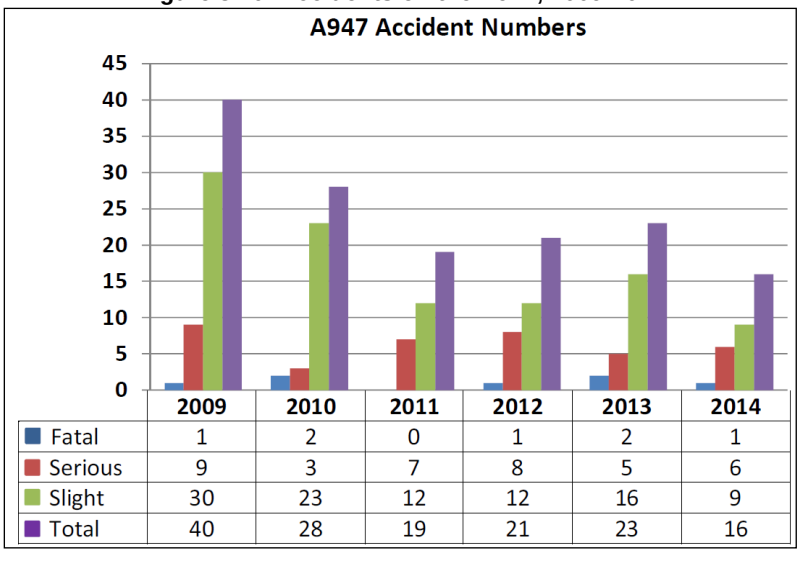
A technical note detailing the full findings from the analysis is provided in Appendix D.

3.4.6 *Accident Data Analysis*

The accident record of the A947 has provided the focus for the development of a number of previous studies on the A947 route.

Recent accident and casualty statistics for the A947 covering the five year period 2009 to 2014 are shown in Figures 3.10 and 3.11.

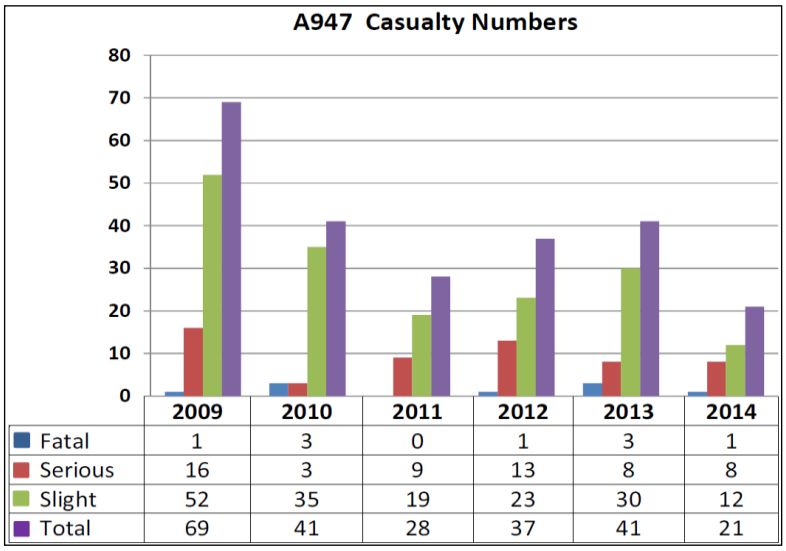
Figure 3.10: Accidents on the A947, 2009-2014



	2009	2010	2011	2012	2013	2014
Fatal	1	2	0	1	2	1
Serious	9	3	7	8	5	6
Slight	30	23	12	12	16	9
Total	40	28	19	21	23	16

(Source: Aberdeenshire Council)

Figure 3.11 – Casualties on the A947, 2009-2014



	2009	2010	2011	2012	2013	2014
Fatal	1	3	0	1	3	1
Serious	16	3	9	13	8	8
Slight	52	35	19	23	30	12
Total	69	41	28	37	41	21

(Source: Aberdeenshire Council)

Figure 3.12 – Location of Accidents by Severity, 2009-2014

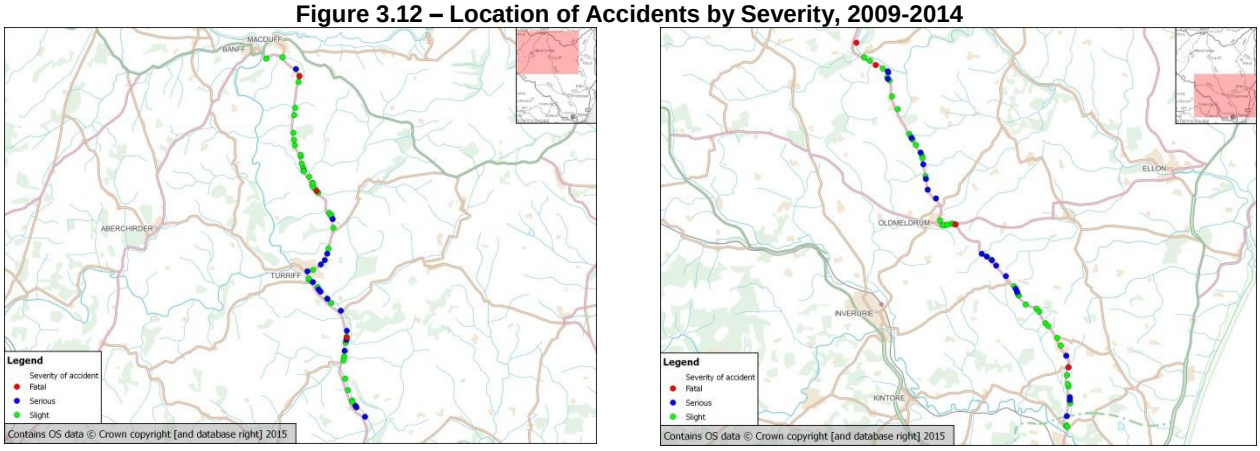


Figure 3.12 illustrates that total accident numbers on the route peaked in 2009 but has generally decreased since then. With regards to accident severity, it is difficult to draw clear conclusions given the low numbers of fatal accidents, with each fatal incident being subject to more detailed investigation by the Council's accident investigation unit and the police. 'Slight' accident numbers have generally decreased since 2009 although 'Serious' numbers are more fluctuating.

More detailed analysis of individual route sections provided by Aberdeenshire Council comparing average accident rates between 2005-2009 and recent years revealed that, post implementation of various interventions[21] in 2010/11, accident levels have generally been tracking below the 2005-09 average, although specific sections of route – namely between Oldmeldrum and Turriff – do show slight increases which require more detailed investigation.

Further analysis undertaken by Aberdeenshire Council considered how the A947 compares in road safety terms against other routes in the wider Aberdeenshire local road network. Based on accident rate analysis

[21] Interventions included the implementation of route wide safety camera signage and gateway signage at major nodal points, edgeline refreshing on all bends (total no. 108), and identification and treatment of drainage and surface issues along the route.

(i.e. number of accidents by traffic flows) the review indicated that in terms of accidents per 100 million vehicle kilometres, the A947 is ranked as the 12th highest road in Aberdeenshire, with 14.04 accidents per 100 million vehicle kilometres, which is half the figure for the highest ranked road; this is despite the corridor recording the highest daily traffic figures of all local roads in the Council area. These figures cover the period 2009 to 2014 (inclusive). Although the A947 is rated 12th when ranked against 100 million vehicle kilometres, it is ranked third when considering the rate of Personal Injury Accidents (PIAs) per kilometre.

Using the latest accident data between 2009 and 2014, more detailed review has been undertaken of accident rates on the A947. These rates have been compared against NESA[22] values. For this purpose, we have assumed the A947 as a NESA road category 26 (rural typical road 7.3m - accident type 8). Table 3.8 demonstrates accidents rates by section compared to the NESA manual.

Table 3.8 – Accidents Rates by Section vs NESA

SECTION	DISTANCE (KM)	MVKM 2009 - 2014	ACCIDENT RATES (Mvkm)	% ACCIDENT BY SEVERITY			% CASUALTIES BY SEVERITY		
				% Fatal	% Serious	% Slight	% Fatal	% Serious	% Slight
Dyce – Newmachar	7.59	173.0	0.144	8%	20%	72%	0.08	0.28	0.80
Newmachar – North of Oldmeldrum	12.20	216.2	0.134	3%	24%	72%	0.03	0.38	0.90
North of Oldmeldrum – Fyvie	11.03	143.2	0.189	4%	33%	63%	0.04	0.59	0.93
Fyvie – Turriff	13.97	157.2	0.178	7%	39%	54%	0.11	0.46	0.68
Turriff – Banff	18.54	144.9	0.262	3%	16%	82%	0.05	0.26	0.89
A947	63.35	834.6	0.176	5%	26%	69%	0.06	0.39	0.84
NESA	-	-	*0.290*	*3%*	*16%*	*81%*	*0.039*	*0.222*	*1.352*

For the purpose of analysis, the A947 was split into five sections. As demonstrated above, the overall accident rate on the A947 is lower compared to the NESA figures. This is primarily because the proportion of slight accidents is lower for all sections (with the exception of Turriff to Banff) than those set out in the NESA manual. Although the overall accident rate is lower compared to the NESA values, the proportion of “fatal” and “serious” accidents along the route are generally higher than NESA values (around 60% higher). Specifically, the section between Fyvie and Turriff encounters the highest proportion of “fatal” and “serious” accidents. Further details on accident rates are shown in Appendix E.

At the national level, the Risk Rating of Britain’s Motorways and A Roads[23] demonstrates that the A947 is classified as a medium risk road. This is the same rating as the A96 and A90 trunk roads.

However, safety continues to be raised as an issue, indicating that there is a perceived problem. From discussions with the client team, and previous studies, key concerns are related to:

- Driver frustration caused by limited overtaking opportunities;
- Right turn movements;
- Speeds and bends; and
- Visibility.

[22] http://www.sias.com/2013/TS/201303NesaManual.pdf
[23] http://www.roadsafetyfoundation.org/media/30815/rrm_britain_2014_-_scotland_region.pdf

3.5 Consultations

3.5.1 Overview

Analysis of the key issues associated with the A947 has been initially informed by the review of previous studies and key documents. In order to further explore problems and opportunities on the study corridor, an extensive consultation programme was undertaken during summer 2015, comprising a wide range of approaches as set out in Figure 3.13.

Figure 3.13 – Approach to Consultation

3.5.2 Summary of Findings

A strong level of response was received to the consultation, as indicted in Figure 3.14.

Results from the consultation indicated that there are range of scenarios that lead to feelings of driver frustration on the A947, including motorists' not being able to travel at their desired speed, a lack of opportunity to overtake and a perception that journey times are taking longer than they should. Many respondents reported feeling unsafe due to the actions of other users of the road.

Furthermore, a majority of respondents reported to frequently witnessing risky overtaking manoeuvres and vehicles being tailgated along the route. It is also interesting to note that although respondents were unlikely to indicate that they sped themselves, a significant majority motorists reported to witnessing others travelling at excessive speeds.

Respondents to the Online Survey were also asked – as an open question – what they considered to be the main problems and issues on the route, and what improvements they would like to see made. Results are summarised in Tables 3.9 and 3.10.

Full results from the consultation approaches are recorded in an accompanying Consultation Report.

Figure 3.14 – A947 Consultation in Numbers

Online Survey Results: *What, if anything, do you see as the main problems and issues on the A947?*

A summary of the main problems and issues identified on the A947 is provided below. To aid the identification of issue types, responses have been categorised though it is to be noted that a high number of comments span various category types. In these instances, best judgment has been used to place the issue into the most relevant category.

Table 3.9 – Main Problems and Issues on the A947

Category	Examples of Issue Raised	Approx. No. of times raised
Driver behaviour	Speeding, drivers travelling slowly, use of mobile phones, road rage and aggression, and drivers carrying out risky manoeuvres.	**296**
Lack of overtaking opportunities	Lack of overtaking opportunities, or where overtaking opportunities are available, these can be hindered by vehicles travelling in the opposite direction, or speed enforcement.	**156**
Slow-moving vehicles	Lack of crawler lanes along the corridor, leading to driver frustration.	**121**
Slow-moving vehicles – not using lay-bys	Slow-moving vehicles failing to pull in to existing lay-bys.	**121**
Road capacity issues	Road no longer being fit for purpose and the volume of traffic leading to congestion and journey-time delays.	**55**
Road condition	Pot holes, road markings and a lack of maintenance (especially in winter).	**55**
Bend issues	High number of tight bends and corners, particularly an issue given speeding of some drivers, or when the weather is poor.	**50**
Lay-by issues	Lack of lay-by provision, existing lay-bys being too small and a lack of signage to indicate when drivers are approaching a lay-by.	**46**
Visibility issues	Overgrown vegetation, a lack of ‘cat eyes’ and several blind corners and summits.	**46**
Lack of enforcement	Perceived lack of police presence (particularly at peak times), a lack of enforcement of slow-moving vehicles using the lay-bys provided and calls for tougher penalties for drivers who are caught breaking the law (e.g. speeding, using their mobile phones).	**41**
Road improvements ***General*** ***Bypasses*** ***Dualling***	Types of suggestions included dualling of the road, bypassing certain towns along the corridor, lowering speed limits and improving signage.	**35** *8* *9* *18*
Public transport issues ***General*** ***Bus*** ***Rail***	Types of issues raised include the length of journey time by bus, the cost of public transport and the lack of rail link along the corridor.	**24** *9* *8* *7*
Sustainable Travel issues	Lack of safe opportunities for pedestrians and cyclists along the route, suggestions for a Park & Bike and car share schemes.	**9**
Speed camera issues	Lack of speed cameras and positioning of existing speed cameras.	**9**
Other	Lack of alternative routes, poor traffic signage, weather conditions, unreliable journey times, wildlife on the road and issues with school bus passes.	**8**
Development	New housing developments along the route have created more traffic, exacerbating other problems on the road.	**7**
Roadwork issues	Issues related to knock-on tail backs, diversions and a lack of information regarding why and where roadworks are ongoing.	**6**
Lack of stacking lanes	Lack of stacking lanes for right turning vehicles.	**5**
Town issues	Lack of traffic calming measures and parking issues.	**3**

Online Survey Results: *What, if anything, could Aberdeenshire Council to improve the A947?*

The table below presents a summary of findings from Q12 in response to options that respondents to the consultation would like to see considered as part of the A947 Route Improvement Strategy. Responses have been grouped into categories to aid the identification of issue types.

Table 3.10 – Options for Improvement of the A947

Category	Example of Improvement Suggested	Approx. No. of times raised
Greater opportunities for overtaking	Overtaking lanes and crawler lanes.	**111**
Route Dualling	Dualling of some sections along the corridor or dualling the whole length of the A947.	**75**
Road condition improvements	Increased road treatments in winter, improved visibility of road markings and repairing pothole issues.	**55**
Driver education	Encouragement for drivers of slow-moving vehicles to use the lay-bys provided, advertising the dangers of irresponsible driving (e.g. speeding, dangerous overtaking ('obeying solid white lines'), mobile phone use), education of the frustration created by slower drivers and those apprehensive to overtake about the dangers of travelling too close to the vehicle in front, and education campaigns for young people in schools.	**50**
Greater provision of lay-bys	Greater provision of lay-bys and an increase in the size of lay-bys.	**48**
Road realignment	Straightening of the most hazardous corners and bends on the road.	**42**
Other	Other suggestions to improve the route include restricting slow vehicle movements to certain times of day, improving links with Aberdeen City and providing alternative routes.	**41**
Public Transport improvements ***General*** ***Bus*** ***Rail***	Reinstatement of rail links, cheaper fares, improved express bus services and the introduction of Park & Ride facilities.	**39** *12* *11* *14*
Improved visibility	Greater verge maintenance, increased illumination.	**39**
Speed cameras	Greater provision of speed cameras and less visible speed cameras, either fixed-position or average speed cameras.	**38**
Greater enforcement	Greater police presence, particularly in 'unmarked' vehicles, higher penalties for those who are found to be breaking the law and enforcement of slow-moving vehicles using existing lay-bys.	**34**
Route improvements	Improvements to junctions, provision of bypasses and stacking lanes.	**32**
Traffic Signage	Variable message signs showing speeds motorists are travelling at and real-time information about the road condition ahead, signage to remind motorists of best-practice driving (i.e. speed limit signs) and signage on approach to hazardous bends and corners.	**26**
Speed enforcement	Lowering the speed limit and placing stricter controls on speeding.	**13**
Restrict new development	Restricting new housing developments as this is a contributing factor to congestion issues.	**10**
Policy change	Introducing a higher speed limit for HGVs and limiting the engine size available to new drivers.	**6**
Improved opportunities for active travel	Improved opportunities for cyclists and pedestrians.	**4**
Town improvements	Restricting parking in some areas, particularly in Newmachar.	**4**

3.6 Future Impacts on the Corridor

This section of the report considers potential future drivers of demand along the A947 and their likely impact on the transport network.

As set out in Aberdeenshire Council's proposed Local Development Plan[24], there are a number of development proposals which have the potential to generate a demand for transport on the route if they are fully developed. A high level estimation of the average number of daily journeys and average peak hour journeys for the most onerous peak period associated with potential developments has been undertaken based on trip rates obtained from the Trip Rate Information Computer System (TRICS[25]).

Table 3.11 summarises the main development sites identified as part of the process and indicates that larger settlements at Banff, Turriff and Newmachar have the potential to add up to 2,200 additional trips during peak periods.

[24] https://www.aberdeenshire.gov.uk/planning/plans_policies/ProposedPlan2016.asp
[25] TRICS database version v7.1.3 has been used.

Table 3.11 – Proposed Allocated Sites in the Study Area

Location	Development Name	End Use	Dev Size	Development Status	Timescale	Approx. Distance to A947	Est. Daily Trips[26]	Peak Flow Trips (Two Way)
Banff	Site OP1, Goldenknowes	Mixed Use (residential and other uses)	Up to 400 units	Previously allocated as Site M1 in 2012 LDP. Allocation has not progressed to a planning application.	Unconfirmed	1.2 miles	3,108	381
Banff	Site OP2, Colleonard Road	Residential	Up to 295 units	Previously allocated as Site H1 in 2012 LDP. Allocation has not progressed to a planning application.	Unconfirmed	1.4 miles	2,293	369
Turriff	Site OP1, Adjacent to Wood of Delgaty	Mixed Use (Residential and Employment Land)	Up to 450 units + 10 ha employment	Previously allocated as Site M1 in 2012 LDP. Allocation has not progressed to a planning application.	Unconfirmed	Adjacent	3,497 + 2,401	428 + 417
Turriff	Site OP2, North of Shannocks View	Residential	Up to 150 units	Previously allocated as Sites EH1 and H1 in 2012 LDP. Allocation has not progressed to a planning application.	Unconfirmed	0.5 miles	3497	428
Turriff	Site OP3, North east of Markethill Industrial Estate	Employment Land	1ha	Previously allocated as Site E1 in 2012 LDP. Allocation has not progressed to a planning application.	Unconfirmed	0.2 miles	340	42
Turriff	Site OP4, East of Markethill Industrial Estate	Employment Land	1.7ha	Previously allocated as Site E2 in 2012 LDP. Allocation has not progressed to a planning application.	Unconfirmed	Adjacent	578	71
Turriff	Site OP5, Adjacent to Broomhill Road/ Markethill Industrial Estate	Employment Land	4.5ha	Previously allocated as Site E3 in 2012 LDP. Allocation has not progressed to a planning application.	Unconfirmed	Adjacent	1,524	188
Oldmeldrum	Site OP1, Land north of Distillery Road	Mixed Use (Residential and Community Facilities)	Up to 50 units	Previously allocated as Site M1 in 2012 LDP. No formal submission, although it is understood that a masterplan is in preparation	Unconfirmed	Adjacent	389	48
Oldmeldrum	Site OP2, West of Coutens Park	Mixed Use (Residential and Employment/Retail)	Up to 50 units + 4.2 ha employment	Contained in MIR of new LDP. No formal submission, although it is understood that a masterplan is in preparation	Unconfirmed	0.5	389 + 1423	48 + 175
Oldmeldrum	Site OP3, Land South of Millburn Road	Residential	Up to 40 units	Previously allocated as Site H1 in 2012 LDP. No formal submission	Unconfirmed	0.5	311	38
Newmachar	Site OP1, Hillbrae Way	Mixed Use (Residential and Community Facilities)	Up to 300 units	Previously allocated as Site M1 in 2012 LDP.	Unconfirmed	0.2	2,332	286
Newmachar	Site OP2, Corseduick Road	Residential and Community Facilities	Up to 165 units	Previously allocated as Site H1 in 2012 LDP.	Unconfirmed	Adjacent	1,282	157
Newmachar	Site OP3, Redwood Cottage	Employment Land	5ha	Previously allocated as Site E1 in 2012 LDP.	Unconfirmed	Adjacent	1694	208

(Source: Proposed Aberdeenshire Local Development Plan 2016)

[26] To calculate the estimated daily trip rates, the Trip Rate Information Computer System (TRICS) database version v7.1.3 was used.

3.7 Committed Transport Interventions

Prior to considering potential improvements for the route, it is important to define the existing situation against which potential transport improvements can be assessed. In transport appraisal terms, this involves the setting of a "Do Minimum" scenario against which the different options derived from this study can be assessed and compared. This Do Minimum scenario in appraisal terms should include "transport improvement commitments that have policy and funding approval and from which it would be difficult to withdraw"[27]. It should also consider trends in transport and land use developments which will generate future transport demand. Table 3.12 sets out the transport commitments that make up a Do-Minimum scenario for the A947.

Table 3.12 – Committed Transport Developments and Potential Impact on the A947

Commitments	Anticipated Impact on A947
AWPR Development and Balmedie to Tipperty Dualling • Development of the AWPR and dualling of the A90 Balmedie to Tipperty route is anticipated by 2017[28].	• The A947 lies between the A96 and A90 (North) Trunk Roads; as such, any improvements made to these routes have the potential to impact on the A947 Corridor. • As part of the AWPR, the A947 will be realigned from the north side of the Parkhill Bridge to a point north of the AWPR. The realignment allows the A947 to access the Goval junction and removes the Parkhill crossroads which experiences congestion issues in peak periods and potential safety issues at all times due to low radius bends and restricted forward visibility on some approaches. • Previous transport modelling undertaken to support the PLI into the AWPR suggested that flows on the A947 at Dyce (within the city boundary) would see a 12% reduction by 2027 against a 2012 base, although the south of Newmachar (within the Aberdeenshire boundary) trip numbers were estimated to increase by 9% by 2027. • The opening of the AWPR could remove rat running on various cross country routes such as the B977 between Balmedie and Dyce and the B979 via Blackburn and Hatton of Fintray as these vehicles transfer to the AWPR. This has the potential to reduce the number of vehicles on the A947 south of Oldmeldrum.
A96 Dualling • The Scottish Government is committed to dualling the A96 between Aberdeen and Inverness by 2030.	• Capacity improvements on the A96 could reduce the number of commuters who travel on the A947 prior to using cross-country routes to get onto the A96. • Development of enhanced trunk roads may highlight a growing disparity between the corridor and the surrounding trunk road network, adding to existing perceptions held by some that the A947 is 'substandard'.
Mini-Interchange Hubs • Aberdeenshire Council is progressing plans to implement mini Park and Ride sites at various points on the A947.	• Mini Park and Ride hubs proposed at Fyvie (17 spaces), Oldmeldrum (40-60 spaces) and Newmachar (21 spaces). • Hubs should increase bus use along the route, although given overall numbers the impact on traffic flows is likely to be limited.
Road Safety Interventions • Discussions with the Council's Road	• Although there are no major transport improvements proposed for the route, minor interventions planned include 128 admiral bollards

[27] http://www.transportscotland.gov.uk/reports/stag/j9760-04.htm
[28] http://www.transportscotland.gov.uk/project/aberdeen-western-peripheral-route-balmedie-tipperty

Commitments	Anticipated Impact on A947
Safety team indicated that the Council will continue to implement local road safety improvements on the A947. • The Council continues to monitor accident blackspots and implement remedial actions where required.	and 192 Verge Markets Posts at junctions to increase safety. • Klaruw[29] surface treatment is applied where there is a specific road safety concern related to surfacing issues. • Measures should continue to improve the overall safety of the route and contribute to reduced accident levels.
Rolling Programmes of Maintenance • The Council continues to implement an annual programme of maintenance.	• The A947 will continue to benefit from annual roads and winter maintenance programmes where there is an identified need.
Aberdeenshire Council LTS • The Council's current LTS, published in 2012, sets out a strong commitment to travel behaviour change and supports a range of initiatives to increase the modal share of sustainable transport modes.	• There are no specific A947 proposals highlighted in the LTS. • Safety is highlighted as a main issue and supported initiatives will aim to reduce accident rates. • Initiatives which promote travel behaviour change will have a positive impact on congestion on the southern approach to Aberdeen, if supported by a reduction in private car trips. • Measures to improve the built environment in towns along the route, including improvements in walking and cycling networks, may occur.

3.8 Wider Constraints and Uncertainties

3.8.1 Environment

Environmental constraints have been identified in proximity to the existing A947 alignment. A study area that included a 2km buffer either side of the A947 was considered. This was a high level study that considered online sources only with no field surveys undertaken. Data sources consulted include Scottish Natural Heritage, Historic Scotland, Scottish Wildlife Trust, and Scottish Environment Protection Agency. The results from the study are shown in Appendix F.

The majority of the existing alignment does not have significant constraints immediately adjacent although there are a few pockets of ancient woodland and one battlefield adjacent to the route, the latter at Fyvie. Further desk study and field surveys, including data collection on habitats and species, landscape character, local records of archaeological importance, and potential of flood risk should be undertaken to inform the design as proposals for the A947 progress.

3.8.2 Travel Patterns Post-AWPR

Travel patterns post AWPR are challenging to predict and the impact on the A947 is unlikely to be known at this stage to any degree of certainty.

As indicated in Table 3.12, development of the AWPR will change patterns of travel on the A947 with some commuters potentially being directed off the route but others directed onto it. Overall, as indicated by previous modelling work carried out for the AWPR, it has been estimated that traffic flows south of Newmachar would increase by 9% by 2027 (against a 2012 base).

[29] http://www.klaruw.co.uk/klaruwtex.html

3.8.3 Affordability

At present, no funds have been earmarked to deliver projects emerging from this study and the availability of funding for road schemes is uncertain, particularly given the road infrastructure that is being implemented as part of the AWPR and Transport Scotland's plans to dual the A96(T). However, it is understood that the Aberdeen City and Shire regions are examining the potential for City Region Deal funding, which may be a potential funding source alongside bids to the Council's Capital Plan. Any improvement options that require land outside the ownership of the Council increases the cost of a project.

3.9 Summary of Problems, Issues, Constraints and Opportunities

Table 3.13 presents a summary of the problems and opportunities identified across the route based on the background review and analysis presented in Sections 3.2 to 3.9. In the following chapter, these have been used to inform the development of Transport Planning Objectives for this study.

Table 3.13 – PICO Summary

Ref	Problems	Source / Evidence	Category
P1	**Driver Behaviour:** Motorists driving too fast and too slow, the use of mobile phones, and risky overtaking manoeuvres were common points raised during consultation.	• A wide range of driver behaviour issues were highlighted during consultation. A common message from the consultation was that behaviours were perhaps most prevalent in motorists who use the route on a daily basis and hence may be complacent.	Driver Behaviour
P2	**Driver Frustration:** For a long time, the A947 has held a reputation as a frustrating road to drive. Agricultural and other slow moving vehicles along the route contribute to platooning, which can lead to driver frustration due to a reported lack of safe overtaking on stretches of the route.	• Consultation results indicate driver frustration to be a major issue, particularly associated with slow moving vehicles and limited overtaking opportunities. • Surveys showed a high level of platooning along the route, with one in five of the lead vehicles in platoons identified as a slow moving vehicle.	Road Safety
P3	**Accidents:** Despite a reduction in accident numbers in recent years, the route continues to experience accidents with review of accident cluster data suggesting a particular issue in terms of "serious" and "fatal" accidents between Fyvie and Turriff.	• Accident data shows that accidents have reduced since 2009 although there remain concerns along the route including between key sections. • Consultation findings highlighted a wide range of road safety related concerns ranging from issues of driver behaviour to visibility issues.	Road Safety
P4	**Journey Time and Congestion Issues** (between Dyce and Newmachar)**:** While journey times are relatively reliable between Banff and Aberdeen, the section between Newmachar and Dyce shows high levels of variability between peak and inter-peak periods associated with traffic queuing and delays.	• Journey time surveys indicate that journey times vary between Dyce and Newmachar depending on time and direction of travel. In the morning peak, travel times are 8m36secs northbound compared to 11m7secs southbound. In the evening peak, travel times are 18m2secs northbound compared to 8m24secs southbound.	Journey Times
P5	**Infrastructure Standards:** The quality of existing road infrastructure is below	• Previous detailed study into the infrastructure standard of the route	Route Standard

	standard in places.	highlighted the following: ○ little or no consistency in provision of bend related signage and road markings. ○ unsuitable junction provision with sub-standard visibility onto the mainline. ○ drainage provision inadequate and in poor condition. ○ a low standard of mainline alignment with low-radius horizontal bends with limited forward visibility ○ a varying low standard vertical profile limiting forward visibility and causing "hidden dips". • Route alignment / bend issues, and concerns over visibility standards along the route were also common problems highlighted during consultation.	
P6	**Limited local transport options:** While Newmachar and Oldmeldrum display high levels of car ownership, many residents along the route are dependent on public transport to meet their travel requirements.	• Bus journey times between Banff and Aberdeen was raised as a barrier to encouraging modal shift in the consultation. • Stagecoach Service 35 travels between Dyce and Banff in approximately 1hr 30mins. This is around half an hour more than the comparable journey time by car.	User Choice
Ref	**Issues (Uncertainties)**	**Source / Evidence**	**Category**
I1	**AWPR Impacts:** Development of the AWPR may change patterns of travel on the A947, with some commuters potentially being directed off the route but others directed onto it. Overall, the AWPR is expected to increase traffic volumes on the A947 south of Newmachar.	• Previous modelling work carried out for the AWPR suggested that traffic flows south of Newmachar would increase by 9% by 2027 (against a 2012 base).	Route Capacity
I2	**Impacts of Future Development Proposals:** Aberdeenshire's Local Plan proposes new development – while it is unclear if and when these will be built-out, new development would most likely lead to increased traffic levels across the route.	• A review of LDP allocations suggest that full build-out of allocations along the route could result in up to 2,200 additional car trips during the peak period. • The sections between Newmachar to Oldmeldrum and Oldmeldrum to Turriff are likely to experience the highest increase of trips during the peak period (Table 3.11).	Route Capacity
I3	**Land Ownership:** Certain improvement options could necessitate additional land, an issue which has not been assessed as	• High level review of options suggests that certain improvements, for example route alignment improvements, could require construction on land which lies out with	Land Ownership

	part of this work to date.	Aberdeenshire Council's ownership.	
I4	**High Car Dependency:** High car dependency contributes to queuing and congestion during peak travel times, particularly south of Newmachar.	• Census data on car ownership shows that only 8.6% of Newmachar households have no car or van availability, and over 80% of Newmachar residents travel to work by car. High rates of car ownership and use are also apparent in Oldmeldrum. • Journey time surveys indicate issues of queueing and congestion south of Newmachar on the approach to Dyce.	User Choice
I5	**Accessibility:** Sizeable proportions of local communities along the route, particularly in Banff and Turriff, do not have access to a car and for whom public transport will play a vital role in their access requirements.	• Census data on car availability shows that the levels of car ownership and travel to work by car are below the Aberdeenshire average in Banff and Turriff, suggesting a greater reliance on public transport for accessibility.	Public Transport
Ref	**Constraints**	**Source / Evidence**	**Category**
C1	**Budget Availability:** There is currently no identified funding commitment for potential interventions emerging from this study.	• Limitations and uncertainties around future funding sources. It is understood that the Aberdeen City and Shire regions are examining the potential for City Region Deal funding, which may be a potential source to deliver projects emerging from this work. • At a local level, concerns were raised during consultation that as budgets have become squeezed, there has been a scaling back of critical functions such as route maintenance and police enforcement along the route.	Funding
C2	**Environment:** Environmental constraints along the route may impact the potential feasibility of interventions depending on the scale.	• Desktop research suggests that there are a number of sites of environmental importance within a 2km buffer zone of the route, including pockets of ancient woodland and sites of historical importance (battlefields). A more detailed environmental review would be required as options are taken forward.	Environment
Ref	**Opportunities**	**Source / Evidence**	**Category**
O1	**Wider Route Improvements:** The A947 lies between the A96 and A90 Trunk Roads. As such, any improvements made to these routes have the potential to impact on the A947 Corridor. Route standard improvements proposed for these routes could increase perceptions of the A947 as an increasingly substandard route in comparison.	• Committed Scottish Government schemes, which are due for completion by late 2017 (A90) and 2030 (A96) respectively, have the potential to stimulate enhancements to the A947. • A common comparison made during consultation was that of the A96 whereby this was reportedly an equally frustrating road to drive in previous years until 2+1	Wider Route Developments

		lanes were introduced to enable safe overtaking.	
O2	**Strong Evidence Base and Previous Research:** An extensive amount of study has been undertaken of the A947 in recent years which provides a strong evidence base upon which to develop future interventions.	• Previous studies, primarily driven by road safety concerns, have identified potential improvements including three Major Project Improvement schemes. • A comprehensive programme of consultation has been carried out as part of this research which provides a strong basis upon which to implement future measures.	Evidence Base
O3	**Bus Service Enhancements:** The Council has plans for the Park & Ride proposals across the region including mini-hubs on the A947 at Fyvie, Oldmeldrum and Newmachar.	• The Council has proposals for mini interchange hubs on the corridor at Fyvie, Oldmeldrum and Newmachar which have the potential to increase the attractiveness of public transport along the route. • The AWPR should open up opportunities to enhance bus service accessibility for residents on the A947 through the potential introduction of new services to destinations across the city via the AWPR. • Improvements to service quality and frequency are operational matters which the Council has limited control over although the Council should continue to work with bus operators in the region to implement improvements where possible.	Public Transport
O4	**Partnership Working:** There is a strong ethos of partnership working in the field of road safety.	• Over many years, partnership working between the Council, police and community planning partners has been at the heart of successful safety campaigns in the North East of Scotland. Continued partnership working should provide the basis for taking forward future interventions e.g. a route specific campaign to raise awareness of A947 issues.	Partnership Working

Objective Setting

4 Objective Setting

4.1 Introduction

This chapter outlines Transport Planning Objectives (TPOs) for the A947 Route Improvement Strategy. The objectives have been informed by a review of problems, issues, constraints and opportunities on the corridor, reviews of previous studies and policy documents and discussions with key stakeholders.

4.2 Guiding Principles

Prior to developing TPOs, a set of guiding principles have been identified to ensure that objectives and options included within the Route Improvement Strategy are consistent with the expectations of Aberdeenshire Council in terms of strategic fit, value for money, affordability, deliverability and commercial viability (i.e. requirements for a successful business case).

- Study objectives need to fit with wider transport and governmental objectives including Aberdeenshire Council's LTS, Nestrans RTS and the Scottish Government's National Transport Criteria.
- Options should be based on a long term view of required improvements to the A947 over the next twenty years.
- Complementary and ongoing local transport measures will need to be considered alongside larger scale interventions for wider objectives to be realised.
- Interventions need to represent good value for money in an economic, environmental and social context and must be affordable and financially sustainable.
- Options which could attract developer or other sources of third party funding will be assessed more favourably from a financial perspective.
- Preferred options must be acceptable and deliverable over the timeframe of this study.
- As scheme designs are taken forward, they need to be consistent with the Design Manual for Roads and Bridges and relevant Aberdeenshire Council Design Standards, with details of any known departures from standards clearly set out.
- Aberdeenshire Council, as the responsible authority for the A947, needs to approve the overall strategy (and key deliverables) to enable scheme implementation to progress with minimal further work as funding opportunities arise.

4.3 Objective Development

4.3.1 Vision

The ultimate goal of the A947 Route Improvement Strategy and subsequent interventions, as outlined in the study brief, is **"*To develop a route which is fit for purpose of connecting the communities along the route in safe, effective and sustainable manner, while fully supporting the regeneration activity in north Aberdeenshire.*"**

This statement accurately reflects the aspirations for the route and provides useful direction for the study, and as such is presented as a high level vision.

4.3.3 Objectives

Based on the vision, and informed from the outcomes outlined in Chapters 2 and 3, the following TPOs have been developed for the study:

- **TPO1 –** Deliver improvements on the A947 which contribute to a reduction in the number of accidents on the Corridor in line with national reduction targets.
- **TPO2 –** Improve through-corridor journey times and journey time reliability between 2015 and 2025/2035.
- **TPO3 –** Enable proposed housing, employment and retail growth to take place along the Corridor without undue congestion.
- **TPO4 –** Improve access by public transport between settlements and employment areas along the route, including Aberdeen City.
- **TPO5 –** Improve perceptions of safety and reduce feelings of driver frustration through development of a consistent, enhanced route standard.

Furthermore, whilst not an essential part of this early stage in the appraisal process, it is often useful to develop indicators alongside the development of objectives. This process helps to identify any objectives which are not SMART (Specific, Measurable, Attainable, Relevant, Timed). An initial set of indicators is shown below.

Table 4.1 – SMART Example Indicators

TPO	Indicator
TPO1	Number, severity and type of accidents on the corridor (broken down by type of road user); *(source: accident data)*.
TPO2	% of journeys within x minutes of average journey time; (*source: journey time surveys; standard deviation)*.
TPO3	Economic development indicators (population change, unemployment rate, new business start-ups); *(source; Census data / Economic Development indices)*
TPO4	Reduction in volume of vehicles by mode. Modal share by sustainable transport along the corridor *(source: RSI surveys, operator data, census data).*
TPO5	Reduction in feelings of driver frustration; *(source: qualitative surveys against 2015 base).*

Table 4.2 demonstrates how the TPOs align with the problems and opportunities identified in Chapter 3 and their SMART credentials.

Table 4.2 – Development of SMART Objectives

TPO	Specific	Measurable	Attainable	Relevant	Timed	PICO
TPO1 – Deliver improvements on the A947 which contribute to a reduction in the number of accidents on the Corridor in line with national reduction targets.	Objective relates to reducing accident rates for all severities in line with national targets.	Analysis of accident data.	Requires implementation of a range of engineering, education, encouragement, enforcement and engagement measures.	While recent accident levels suggest road safety is improving, the route has been long associated as a dangerous road with various previous studies being undertaken to address local safety concerns.	Not possible to develop specific targets since the vision for this study is for the long-term (20 years) and the current Road Safety Framework accident reduction targets are until 2020.	P1 / P2 / P3 / P5 / O4
TPO2 – Improve through-corridor journey times and journey time reliability between 2015 and 2025/2035.	Objective relates to reducing the impacts of delays and vehicle queuing in the study area by delivering options that improve journey times for motorists and public transport users.	Journey time surveys along the study area.	Requires investment in measures to reduce levels of queuing, including both infrastructure and service improvements i.e. partnership working with public transport operators will be required.	Known congestion issues south of Newmachar. Delays associated with limited overtaking opportunities in places are also understood to be a factor in journey time reliability.	Objective is time bound.	P2 / P4 / P5 / I4 / O3
TPO3 – Enable proposed housing, employment and retail growth to take place along the Corridor without undue congestion.	Objective relates to supporting regeneration and economic development along the A947.	Development of new housing, employment and retail sites.	Delivery of an improved A947 which supports increased accessibility to/from key towns should support wider economic development aspirations.	Aspiration for route to enable local development along the route including regeneration in north Aberdeenshire.	Delivery will be monitored against the overall timeframe set for this study.	P4 / P6 / I2 / O3
TPO4 – Improve access by public transport between settlements and key employment areas along the route, including Aberdeen City.	Objective relates to modal shift and can be attributed from trips generated from specific geographical areas.	Increased levels of public transport use (Travel to Work (and school) Data from various sources).	Requires a joined-up and multi-agency approach, requiring support from transport providers and policy makers at all levels. Requires investment in both hard and soft measures to raise awareness to the availability of sustainable modes and increase their attractiveness.	This objective accords to policy at all levels seeking a transfer from car trips to other modes. Modal shift will assist in the reduction of future traffic growth during peak times. Area has a high level of car use thus it is considered relevant. Similarly, there are communities along the route which have limited access to private transport and whom rely on public transport for their access needs.	A base datum can be taken i.e. 2011, in line with the most recent travel to work data. The objective should be related to a 10/20 year period e.g. to 2025/35.	P4 / P6 / I4 / I5 / O3 / O4
TPO5 – Improve perceptions of safety and reduce feelings of driver frustration through development of a consistent, enhanced route standard.	While similar to TPO1 in that this objective should contribute to improved safety, this objective targets a specific area of concern related to driver frustration which emerged strongly in consultation.	Objective can be measured in terms of reduced perceptions of driver frustration (from surveys) and through ensuring that any interventions taken forward are delivered in line with appropriate standards.	Requires investment in measures which deliver greater overtaking opportunities and educate on safe driving along the route.	For a long time, the A947 has held a local reputation as a road associated with fatalities. Limited overtaking opportunities and driver frustration are considered to be a factor in this.	Delivery will be monitored against the overall timeframe set for this study (i.e. 10 to 20 years).	P1 / P2 / P3 / P5 / O1

Option Generation

5 Option Generation

5.1 Introduction

This section presents a list of potential improvement options for the A947 – across all modes – which have been generated in response to the identified problems and opportunities.

In keeping with the guiding principles set out in the previous chapter, the option generation process has principally focused on specific infrastructure measures to address identified problems over the long term.

Additionally, consideration has been given to options which would be appropriate as part of a 'Corridor Wide Complementary Strategy' to lock in the benefits associated with infrastructure improvements and address residual issues on the route. Complementary interventions have emerged through the analysis of wider problems and opportunities on the route, identification of problems and objectives which are unlikely to be fully addressed through specific interventions, and measures identified from previous A947 studies.

5.2 Options Generation

5.2.1 Long List of Interventions

Table 5.1 presents the options which have been identified for the purposes of the appraisal. Options have been generated at a strategic level and are not based on site specific investigation. As preferred options are identified, there would be a requirement for more detailed site specific work.

The table is broken down by mode and includes a brief definition of each of the potential options and a comment on the rationale for its consideration and its geographical focus. Consideration has also been given to whether there are any interventions which are mutually exclusive, that is, it does not make sense to deliver specific interventions together due to an overlap in impacts or due to the cost implications.

Table 5.1 - Long List of Potential Interventions

Ref	Option	Rationale for Consideration	Geographical Focus	Further Definition	Compatibility Issues	Deliverability Issues
Active Travel						
1	Improvements for Pedestrians	This option supports wider policy which aims to promote an increase in active travel for local trips.	Within towns along the A947.	Provision of improved pedestrian infrastructure to facilitate and encourage safe walking within towns on the A947. Measures could include new or improved footpaths, dropped kerb provision, and additional crossing facilities.	None identified.	No significant deliverability issues. While localised improvements will enhance pedestrian amenity and safety within towns, this option will not realistically address the wider route improvement objectives. Improved opportunities for active travel were highlighted by relatively few stakeholders during consultation.
2	Improvements for Cyclists	This option supports wider policy which aims to promote an increase in active travel for local and longer distance trips.	Localised improvements would be focused within towns along the A947, whereas long-distance path improvements would seek to link settlements along the route.	Provision of improved cycle infrastructure within towns such as cycle paths, crossing facilities and additional cycle parking. Long distance measures could include off-road cycle paths.	None identified.	There may be public acceptability issues associated with investing in long distance cycle paths given level of uptake will likely be low. Improved opportunities for active travel were highlighted by relatively few stakeholders during consultation. The Formartine & Buchan Way currently provides a high quality off-road path from Newmachar to Dyce. While localised improvements will enhance cycle amenity and safety within towns, this option will not realistically address the strategic objectives for the route.
Public Transport						
3	Rail Provision	This option would support aspirations to reduce reliance on private transport. The Council's LTS states that efforts will be made to improve access to rail services across Aberdeenshire.	Proposal would require to be worked up in detail but to maximise benefit, any potential rail link should connect the main settlements (i.e. Newmachar, Oldmeldrum, Turriff and Banff) to Aberdeen.	New rail line into Aberdeen with stations at Newmachar, Oldmeldrum, Turriff and Banff.	Would require to be incorporated into the existing rail network.	There are no existing railway lines on the corridor and the construction of a new line would face significant implementability issues. As well as being technically challenging, the provision of new rail infrastructure would be expected to incur significant capital costs. Funding mechanisms unknown.
4	Public Transport Services and Infrastructure Improvements	To encourage increased use of public transport on the corridor. The Council's LTS states that efforts will be made to improve access to bus services and contains the objective to work in partnership with local operators and communities to deliver improved services and address perceived barriers to the use of public transport. Consultation specifically highlighted a lack of express bus services as a barrier to using public transport. Consultation with bus operators highlighted specific problems north of the Parkhill Bridge where capacity is constrained.	Route Wide	This option would seek to improve the attractiveness of public transport on the A947 and within towns on the corridor. The types of measures could include: • Lobbying for bus service enhancements e.g. express, limited stop, bus services between Banff and Aberdeen. • Bus stop infrastructure improvements – improving the provision of bus stops along the route, installing shelters, improving timetable and information provision at bus stops including real time information where possible. • Provision of additional Park & Ride facilities. • Bus priority measures (i.e. infrastructure measures such as bus lanes, bus gates and bus priority at traffic lights) to facilitate better movement of buses.	Opportunities to increase the attractiveness of public transport would be enhanced with the implementation of bus priority measures and other improvements along the route, such as the proposed Park & Ride hubs. Development of dualling options could open up the potential to provide bus priority during peak times.	In terms of bus priority infrastructure, measures would deliver the greatest impact at congested parts of the network (i.e. south of Newmachar and into Dyce). However, there is a level of uncertainty as to how this section of the route will operate following construction of the AWPR and there may be insufficient road capacity to provide priority for buses. Service enhancements will require buy-in from the bus industry. Delivery of measures and service improvements could be achieved through establishment of a Statutory Quality Partnership, although there is no previous experience of such a measure within the region. Development of the AWPR should open up opportunities to enhance bus service accessibility for towns on the A947, if supported by new bus services connecting the A947 with destinations across the city via the AWPR.
Roads Based						

Ref	Option	Rationale for Consideration	Geographical Focus	Further Definition	Compatibility Issues	Deliverability Issues
5	Route Upgrade and Realignment – Dyce to Newmachar	Journey time surveys highlighted issues of traffic queueing and congestion between Dyce and Newmachar. Upgrading the route, potentially including dualling between these sections, could relieve current pressures travelling into and out of the city. Other principal roads in the area are in the process of being dualled (e.g. A96, A90 Balmedie to Tipperty) and in the context of these major projects in the vicinity of the A947, a number of consultees suggested route dualling as a means of addressing issues over the long term.	From the Aberdeen City/Aberdeenshire boundary north of Dyce (tied in with the realigned A947 at the AWPR) to Newmachar.	This option would involve upgrading the existing route to Newmachar either to a single carriageway (S2), wide single carriageway (WS2) or standard rural dual carriageway (D2AP) cross section tying in at the southern edge of the town. Due to the sub-standard horizontal alignment of the existing A947, a high level alignment review suggests that if proceeding with a dual carriageway alignment, approximately 40% of the carriageway would require being offline. Any scheme would require to be progressed in accordance with DMRB and Aberdeenshire Council's roads standards.	Any scheme would require to be complementary of the AWPR junction at Goval.	Based on traffic levels on this section of the route (AADT of around 10,500), DMRB (TA 46/97) suggests that either a standard single carriageway (S2) or a wide single carriageway (WS2) cross section would be suitable for the current traffic demand. However, projected post-AWPR flows indicate a 9% increase in traffic levels on the A947 between Dyce and Newmachar associated with demand for travel on the AWPR via the Goval junction, which could increase traffic flows to a level which could justify dualling of the route in this section. A dualled A947 between Dyce and Newmachar would provide additional capacity on the route to accommodate future demand. Appendix G sets out the DMRB standards associated with route upgrade to various standards, including dual carriageway. Affordability could be a barrier to the development of a realignment option. A high level exercise suggested that costs could range from £18M for the S2 option to £38M for the dualled option based on a number of assumptions[30]. A number of consultees raised the option of dualling during consultation, suggesting there would be high levels of public support for route upgrade options. Options are not expected to have any major interface with any of the key environmental designations along the route.
6	Route Upgrade and Realignment – Dyce to Oldmeldrum	Upgrading the route, potentially including the provision of a dual carriageway from Dyce to Oldmeldrum, could provide benefits to commuters and other route users by way of improved journey times and journey time reliability. Newmachar, for example, is subject to a 30mph speed limit and would be bypassed under this option. Provision of a bypass could also result in fewer HGVs passing through the town. Other principal roads in the area are in the process of being dualled (e.g. A96, A90 Balmedie to Tipperty) and in the context of these major projects in the vicinity of the A947, a number of consultees suggested route dualling as a means of addressing issues over the long term.	From the Aberdeen City/Aberdeenshire boundary north of Dyce (tied in with the realigned A947 at the AWPR) to Oldmeldrum.	This option would involve upgrading the existing route between Dyce and Oldmeldrum either to an S2, WS2 or D2AP standard (approx. 16km in length). Due to the sub-standard horizontal alignment of the existing A947, a high level alignment review suggests that if proceeding with a dual carriageway alignment, approximately 60% of the carriageway would require to be offline. Any scheme would require to be progressed in accordance with DMRB and Aberdeenshire Council's roads standards.	Any scheme would require to be complementary of the AWPR junction on the A947 at Goval. Provision of an upgraded route standard would reduce the need for localised measures such as overtaking lanes on this section of the route.	The AADT over the length of the alignment ranges from between around 10,500 to 8,000). DMRB (TA 46/97) suggests that either a standard single carriageway (S2) or a wide single carriageway (WS2) cross section would, however, be suitable for the current traffic demand although estimated increases in future traffic flows on the route may potentially justify dualling the route. Appendix G sets out the DMRB standards associated with route upgrade to various standards, including dual carriageway. Affordability could be a barrier to the development of a realignment option. A high level exercise suggested that costs could range from between £72M for the S2 option to £154M for the dualled option, based on a number of assumptions[30]. Due to the scale of these options, the environmental impact could be high. The alignment would potentially interface with areas of ancient woodland and a listed building. It is not however, expected to have a significant effect on any of the key environmental designations.
7	Route Upgrade and Realignment - Full Route	Upgrading the route, potentially including the provision of a dual carriageway from Dyce to Banff may provide benefits to commuters and other route users with a dualled alignment resulting in reduced journey times and improved journey time reliability. Route standard upgrade including to dual carriageway would also remove the platooning affect caused by the current sub-standard single carriageway road geometry and therefore reduce driver frustration on	Full route from the Aberdeen City/Aberdeenshire boundary north of Dyce (tied in with the realigned A947 at the AWPR) to Banff.	The option would involve upgrading the route in its entirety (approx. 54km either to an S2, WS2 or D2AP standard) and would also incorporate bypasses of Newmachar, Oldmeldrum and Turriff, providing a consistent road cross section throughout the entire route. Due to the sub-standard horizontal alignment of the existing A947, a high level alignment exercise has been undertaken which has suggested that if proceeding with a dual carriageway alignment, approximately 55% of the route	Any scheme would require to be complementary of the AWPR junction on the A947 at Goval. Provision of an upgraded route standard across the entire route would reduce the need for localised measures such as overtaking lanes.	Existing traffic levels on the A947 corridor as a whole (and post-AWPR) do not provide rationale for enhancing the capacity of the route through dualling. For example, the existing AADT over the length of the alignment is a maximum of 10,394 and a minimum of 3,716. DMRB (TA 46/97) suggests that either a standard single carriageway (S2) or a wide single carriageway (WS2) cross section would be suitable for the current level of traffic demand. Appendix G sets out the DMRB standards associated with route upgrade to various standards, including dual carriageway. Significant implementability issues would be anticipated, particularly in terms of affordability. For example, a high level

[30] The cost estimate has been built up by estimating quantities and using Spon's Civil Engineering and Highway Works Price Book 2015. These were then reviewed against known tendered costs of similar schemes being procured in Scotland now, or in the last 5 years, and modified to provide a reasonable output. The level of study undertaken to date has not allowed assessment of the routes in more detail, therefore the costs provided are indicative and highly dependent on the engineering, environmental and legal constraints found on each site. Note that the tendered costs used to appraise these costs do not include land costs, preparation & supervision costs, allowances for risk or contingency, variations following award of contract, VAT, or consultancy fees.

Ref	Option	Rationale for Consideration	Geographical Focus	Further Definition	Compatibility Issues	Deliverability Issues
		the route. Other principal roads in the area are in the process of being dualled (e.g. A96, A90 Balmedie to Tipperty) and in the context of these major projects in the vicinity of the A947, a number of consultees suggested route dualling as a means of addressing issues over the long term.		would be require to be offline. Any scheme would require to be progressed in accordance with DMRB and Aberdeenshire Council's roads standards.		exercise suggested the approximate cost of the options could range from between £241M for the S2 option to £514M for the dualled option, based on a number of assumptions[30]. A high level assessment has suggested that at least 55% of the route would require to be built offline, which would entail significant land acquisition, much of which will likely require the purchase of land outwith the Council's control. Given the length of the route, there would also likely be significant environmental impacts. Any new alignment would likely interface with areas of ancient woodland, dismantled railways and several listed buildings.
8	Newmachar Bypass	Newmachar is currently subject to a 30mph speed limit and journey times could be improved by bypassing this speed limit reduction. Construction of a Newmachar Bypass could alleviate congestion as traffic travels north by providing increase capacity and overtaking opportunities, and hence reducing driver frustration. The provision of a bypass could also support economic development on the corridor and facilitate more efficient movement of freight along the route by reducing the amount of HGVs travelling through the town.	A high level technical review suggests that the most likely alignment for a bypass would be to the west of Newmachar, although it is noted that an eastern bypass option has been identified as a long term improvement proposal within the Council's LDP Settlement Statement for Newmachar.[31]	This option would involve an approx. 4.5km bypass of Newmachar. The most likely potential alignment would begin to the north of the proposed A947 realignment as part of the AWPR and pass the town to the west. This would involve bisecting one B class road, four unclassified roads and one access track. Option would require to be progressed in accordance with DMRB and Aberdeenshire Council's roads standards.	Option could negate any potential requirement for town traffic calming. Option would complement proposals related to route upgrade between Dyce and Oldmeldrum.	The existing daily traffic flow on the A947 at Newmachar is around 10,500 and the existing cross section is a single carriageway with variable paved and verge width. DMRB (Table 2.1 of TA 46/97) recommends the use of either a standard single carriageway (S2) or wide single carriageway (WS2) on this section. However, development of the AWPR and future housing development along the corridor could lead to traffic flow increases which could make dualling justifiable in this area (current minimum recommended flows before consideration of dualled route are AADT >11,000). Appendix G sets out the DMRB standards associated with route upgrade to various standards, including dual carriageway. Affordability could be a barrier to development of this option. A high level exercise has suggested that the construction costs of a 4.5km bypass could range from between £20M for a single carriageway to £43M for a dual carriageway based on a number of assumptions[30]. This option may perform favourably in terms of public acceptability, particularly by commuters to Aberdeen from other settlements along the corridor, and Newmachar residents given the reduction in traffic through the town that would be anticipated with this option. There could be some environmental impact but there is not expected to be any major interface with any of the key environmental designations along the route.

[31] Within the Newmachar LDP settlement statement for Garioch, it states: *"There are concerns that the town is being divided by increasing traffic on the A947, and there are long term proposals for an **eastern relief road** to help address this. However, delivering the **eastern relief road** in full will require the release of a substantial amount of development land, and the Strategic Development Plan does not support this scale of land release within the lifetime of the Local Development Plan. Nevertheless, there remain appropriate opportunities for growth within Newmachar that will meet the need for housing and employment within the settlement, support growth within the Aberdeen Housing Market Area, provide opportunities for local employment, sustain services, and support the longer term delivery of an **eastern relief road**".*

Ref	Option	Rationale for Consideration	Geographical Focus	Further Definition	Compatibility Issues	Deliverability Issues
9	Oldmeldrum Bypass	The A947 through Oldmeldrum is subject to a 30mph speed limit and journey times could be improved by bypassing this speed limit reduction. The provision of a bypass could also result in fewer HGVs passing through Oldmeldrum. The existing route to the south of Oldmeldrum is characterised by a number of substandard bends with minimal overtaking opportunities. The provision of a bypass could also provide a road that provides opportunities for overtaking, either through suitable visibility or by means of dual carriageway or overtaking lanes on the bypass.	A high level technical review suggests that the most likely alignment for a bypass would be to the east of Oldmeldrum.	This option would involve an approx. 7km bypass Oldmeldrum. The most likely alignment would begin at Hattoncrook to the south of Oldmeldrum and continue north, bisecting the A920, the B9170, two unclassified roads and three other access tracks, passing the town on the east side and tying in after the Meldrum House Country Hotel and Golf Course. This option would require to be progressed in accordance with DMRB and Aberdeenshire Council's roads standards.	Option could negate any potential requirement for town traffic calming. Option would complement proposal related to full route upgrade.	The AADT to the north and south of Oldmeldrum is around 6,000 and 8,000 respectively. Using the advice given in DMRB (TA 46/97), a single carriageway (S2) or wide single carriageway (WS2) cross section would be suitable for a bypass in this location. However, a dual carriageway cross section may be justified through other means, such as safety, improved journey times, journey time reliability and reduced driver frustration. Appendix G sets out the DMRB standards associated with route upgrade to various standards, including dual carriageway. Affordability could be a barrier to development of this option. A high level exercise has suggested that the approximate construction costs of a 7km bypass could range from between £31M for a single carriageway to £66M for a dual carriageway, based on a number of assumptions[30]. This option may perform favourably in terms of public acceptability, particularly by commuters to Aberdeen from other settlements along the corridor, and Oldmeldrum residents given the reduction in traffic through the town that would be anticipated with this option. A high level review of environmental constraints suggests that this option may have some interface with areas of ancient woodland. There are no other conflicts with any other key environmental designations.
10	Turriff Bypass	The existing A947 passes through the centre of the town of Turriff and interacts with a roundabout, many junctions and accesses and large amounts of on street parking. The speed limit on the A947 is reduced through the town to 30mph. A bypass around the town could remove conflict between local and through traffic. The provision of a bypass could also result in fewer HGVs passing through the town.	A high level technical review suggests that the most likely alignment for a bypass would be to the east of Oldmeldrum.	This option would involve an approx. 4km bypass of Turriff. The most likely alignment for a bypass would begin at Darra to the south of Turriff and continue north, bisecting the B9170 and two unclassified roads before tying into the A947 at Little Hilton Farm. This option would require to be progressed in accordance with DMRB and Aberdeenshire Council's roads standards.	Option could negate any potential requirement for town traffic calming. Option would complement proposal related to full route upgrade.	The AADT in and around Turriff is approx. 3,500 to the north and 5,000 to the south. Using the advice given in DMRB (TA 46/97), a single carriageway (S2) cross section would be suitable for a bypass in this location. The use of a dual carriageway cross section would be an over provision on the basis of traffic capacity and justification for the use of such a cross section would have to be made on other grounds. Appendix G sets out the DMRB standards associated with route upgrade to various standards, including dual carriageway. Affordability could also be a barrier to development of this option. A high level exercise has suggested that the approximate construction costs of a 4km bypass could range from between £18M for a single carriageway to £38M for a dual carriageway, based on a number of assumptions[30]. This option may perform favourably in terms of public acceptability, particularly by commuters to Aberdeen from other settlements along the corridor, and Oldmeldrum residents given the reduction in traffic through the town that would be anticipated with this option. A high level review of environmental constraints suggests that this option may have some interface with areas of ancient woodland and listed buildings.
11	Town Traffic Calming	Town traffic calming measures would promote road safety within towns along the route.	Newmachar, Oldmeldrum and Turriff	This option would consider implementation of traffic calming measures to mitigate the effects of through traffic using the A947. Options could include road narrowing, islands, rumble strips and speed bumps.	Opportunities to introduce traffic calming measures within towns could be increased should bypass options be progressed.	Traffic calming measures may be unpopular with longer distance users of the route, particularly those associated with freight transport.
12	Climbing / Overtaking Lanes	Issues of driver frustration related to limited overtaking opportunities along the route was a common theme raised during consultation. The provision of climbing or WS 2+1 lanes to provide overtaking opportunities has the potential to reduce accidents and driver	Potential locations noted during consultation included Fyvie Brae, Andrewsford Brae and the Meldrum Straights. Further investigation using topographical	Climbing / Overtaking lanes are where the carriageway may be widened on one or both sides to create an overtaking section. DMRB (TD 9/93 and TD 70/08) describes the design principles and considerations for the introduction of climbing or overtaking lanes	Provision of climbing / overtaking lanes could reduce the requirement for other measures designed to ease driver frustration, such as slow	DMRB guidance highlights that there are a number of factors that can impact the feasibility of implementing overtaking lanes, including number of accesses, junction spacing and gradient and topography. The length of overtaking lane must also be in line with appropriate standards. Accordingly, the feasibility of overtaking lanes must be examined on a scheme by scheme

Ref	Option	Rationale for Consideration	Geographical Focus	Further Definition	Compatibility Issues	Deliverability Issues
		frustration, particularly associated with platoons building up behind slower moving vehicles.	information would be recommended in order to identify potentially suitable scheme locations.	into an existing carriageway. This includes the minimum length required for an overtaking section and the vertical alignment requirements for climbing lanes.	moving vehicle laybys.	basis. From a public acceptability perspective, this option would be expected to perform well, with a high number of consultees recommending the introduction of overtaking lanes, and drawing parallels to the A96 as a road which experienced similar frustration issues until overtaking lanes were introduced. In terms of affordability, it is estimated that the civils cost associated with the provision of overtaking or climbing lanes could be in the region of £2M for a 1km length[32]. Depending on location, land ownership and costs could also be a factor.
13	Localised Alignment Improvements	Localised alignment improvements could also be implemented in areas where a series of concurrent bends creates safety hazards or at locations where road geometry is considered a contributing factor in road accidents. These works could aim to provide sufficient overtaking sight distance to allow faster moving traffic to overtake slow moving vehicles safely.	Throughout the route, with previous work identifying alignment improvements south of Newmachar, south of Turriff and north of Turriff.	Major Project Investigations (MPI) undertaken in 2011 identified three locations where alignment improvements could be implemented at Goval, South of Turriff and at Plaidy. Each proposed scheme is approximately 800m in length and involves the realignment of the existing A947 to bring it in line with the current geometric standards. In addition to realignment, options would involve the provision of improved drainage, and installation of new signs and road markings.	Alignment improvements could enable more safe overtaking opportunities and therefore negate other options designed to support this e.g. overtaking lanes, bend mitigation measures.	The estimated cost for the MPIs is between £800,000 and £3.5million. Preliminary Design reports were produced for each of these proposed schemes and this work could be revisited with a view to progressing to detailed design and construction. From a public acceptability perspective, it is anticipated that improvements which deliver increased safety and greater overtaking opportunities would be welcomed. At the same time, a number of consultees highlighted concerns that removing bends could lead to greater speeds and in turn accidents.
14	Bend Mitigation Measures Review	The A947 is characterised by bends at several locations along the route. This option would involve assessing potential options for applying mitigation measures on bends.	Route Wide – previous work undertaken in a 2011 route study identified a total of 147 bends on the route.	A range of bend mitigation measures could be considered including barriers, rails, interactive chevrons and intelligent road studs to give motorists advance warning of corners ahead.	Requirement for improvements at bends would potentially be superseded should alignment improvements be implemented.	Aspects of technical feasibility, affordability, and public acceptability would vary according to different mitigation measures, and would be explored as part of more detailed review.
15	Slow Moving Vehicle Lay-bys	Consultation highlighted that slow moving vehicles (e.g. HGVs and agricultural vehicles) and the subsequent platoons that build up are a major source of driver frustration on the route and contribute to safety concerns related to dangerous overtaking. Additional, larger, appropriately placed lay-bys would provide slow moving vehicles the opportunity to pull in, reducing driver frustration the potential for accidents.	Route Wide	During consultation, motorists raised concerns that slow moving vehicles do not use existing lay-bys provided on the route. Consultation with the farming industry highlighted that this is because existing lay-bys are not in the appropriate locations and are not large enough. Previous survey of recently introduced lay-bys confirmed that they were not particularly well used. This option may provide an opportunity to undertake a wider review of lay-bys on the route to assess options for relocation, or introduction of additional lay-bys. Previous work undertaken in 2011 identified potential lay-by locations. Platoon survey results will assist in highlighting sections of route where laybys could be most effectively located.	The impact of this option would be greatest if supported by education materials to encourage slow moving vehicles to use the lay-bys.	From a public acceptability perspective, measures which reduce potential driver frustration would be welcomed. Limited information was however received on specific locations where motorists would find the provision of new and/or improved lay-bys would be most beneficial. Development of the AWPR could lead to hauliers travelling longer distances before stopping, and therefore potentially increasing the importance of safe stopping points on the A947.
16	Junction Improvements	To improve the safety of junctions and the potential for accidents at junctions.	Route Wide	Proposed junction improvements including renewal of road markings and right turn stacking lanes / ghost islands. Potential locations have been identified (e.g. the A920 to Ellon south of Oldmeldrum, B993 to Port Elphinstone at Whiterashes) although detailed junction traffic assessment would be required to confirm the need for these.	Requirement for junction improvements would likely be negated by major roads improvement options.	According to DMRB, ghost islands may be justifiable where the AADT of side roads is greater than 500 vehicles. Traffic assessment would therefore be required to confirm the need for this intervention. No public acceptability issues envisaged, with a number of consultees raising junction improvements as a potential improvement during consultation.

[32] This is based on the SPONs cost for the provision of a new wide single carriageway road; prices used do not include preliminaries, land costs, structures, preparation & supervision costs, allowances for risk or contingency, VAT, optimism bias or consultant fees.

Ref	Option	Rationale for Consideration	Geographical Focus	Further Definition	Compatibility Issues	Deliverability Issues
17	Localised Route Improvements	Consultation highlighted a number of potential minor or local improvements which could address existing concerns with the route and provide “quick wins” to improve the quality of the A947. Route improvements could include: • Signage and lining improvements; • Verge Works / Barrier Road Restraint Risk Assessment Process (RRRAP); • Measures to achieve SSD; • Drainage improvements; and • Surface treatments.	Route Wide	Improvements to road markings and traffic signs along the route to bring the existing arrangements in line with current standards. A signage strategy for the whole route could be developed to provide a consistent standard of road signage e.g. reviewing destination, warning and regulatory signs to ensure that a standard message is conveyed throughout the route. An example of this would be to sign all hazardous bends in a similar manner. Work could be carried out to improve the safety of the road verges, in particular the removal or protection of hazards within close proximity to the carriageway. The RRRAP could be used to assess the corridor for hazards such as high embankments, telegraph poles or lighting columns and ditches to provide recommendations for their protection through the use of safety barriers. There are sections of the A947 where full Stopping Sight Distance (SSD) is not achievable due to the route’s vertical and horizontal geometry. Steps could be taken to identify areas where modifications to the verges, through clearing or widening, would provide the necessary SSD.	These improvements could be packaged and incorporated as part of more significant infrastructure options, or progressed incrementally as “quick wins.”	No significant deliverability issues would be associated with any of these minor safety improvements. Road condition was an issue raised frequently during consultation, thus measures to improve road condition would be well-received. Cost associated with providing minor route improvements is dependent on the scale of the intervention (e.g. number of new signs etc.) but is not anticipated to be prohibitively expensive[33]. Care should be taken to use warning signs sparingly as frequent use of signage to warn of conditions that are readily apparent can bring the signs into disrepute which leads to driver complacency. As a result this may mean removing some existing warning signs. Similarly, the use of double white lines in locations where they are not necessary can lead to increased driver frustration, particularly as overtaking opportunities along the route are already limited.
18	Speed Limit Review	The introduction of reduced speed limits, if supported by appropriate enforcement, could support wider efforts to improve safety on the A947.	Specific sections of the route, particularly through villages along the route. Consultation is currently ongoing on reducing the speed limit in Whiterashes to be reduced from 50mph to 40mph.	Completion of a speed limit review along the route and introduction of reduced speeds where appropriate.	The effectiveness of this option would be increased if implemented alongside increased enforcement.	Abilities of the police to enforce reduced speed limits could be a barrier to implementation of this option.
19	Enforcement	The benefits of increased enforcement along the route, either through greater police presence or the use of speed enforcement measures such as speed cameras, was frequently highlighted during consultation as a means to improve driver behaviour and in turn reduce the risk of accidents on the route.	Route Wide	Options could potentially include the use of fixed or average speed cameras, or greater police presence along the route.	Increased enforcement measures along the route would complement other roads based options implemented on the route.	Previous study investigated the possibility of implementing average speed cameras at two cluster sites though it was noted that this would be unlikely to address issues as causations are not linked to excessive speed but that of inappropriate speed. There would also likely be public acceptability issues associated with the introduction of speed camera measures, albeit the option of average speed cameras in particular was frequently raised as an improvement option by consultees. Since the previous study, average speed cameras have been introduced on the A9 with early results suggesting that they have had a positive impact. However, such a system may be prohibitively expensive to operate for the Council without partner support. Aberdeenshire Council is only one partner in the North East Safety Camera Partnership (NESCAMP) and therefore has

[33] According to SPONs 2015, costs of standard warning signs can vary from £30 each up to £200 each depending on their size and the number of posts required. Larger direction signs are with surface areas of 4m² are approximately £1000 each. Typical road markings cost between £0.85 and £1.60 per metre. For example, to provide new centre and edgeline markings for the entire route would be estimated to cost in the region of £150,000. The cost of safety barrier is dependent on the chosen system and level of containment required. SPONs 2015 states that standard steel N2 containment barrier typically costs approximately £30 to £50 per metre plus the cost of two terminal ends per length at a cost of up to £1000 per terminal. A typical 100m length of steel safety barrier would cost approximately £5000. The cost of verge maintenance improvements is dependent on the chosen site and the length required to achieve a compliant SSD. As a guide, the cost of general site clearance for open field site is £1,700 per ha and for a medium density wooded site is £3,500 per ha. This cost does not include for land purchase or any construction works.

Ref	Option	Rationale for Consideration	Geographical Focus	Further Definition	Compatibility Issues	Deliverability Issues
						limited control over the level of police enforcement along the route.
20	Education and Engagement Programme	The most common problem raised during consultation related to driver behaviour with consultees highlighting a range of behaviours which contributed to safety concerns along the route. Opportunities to raise awareness about road safety issues through education campaigns and direct engagement campaigns with route users has the potential to improve driving standards and safety on the A947.	Route Wide	Development of campaigns etc. focussing on safety. Key messages could include: • Driver behaviour e.g. speeding, dangerous overtaking ('obeying solid white lines'), mobile phone use, dipped headlights. • The use of laybys by slower moving vehicles e.g. HGVs and agricultural vehicles. • Dangers and frustrations caused by slower drivers and those apprehensive to overtake about the dangers of travelling too close to the vehicle in front. This could involve a partnership approach between the Council and other established road safety partners as well as groups such as the Scottish National Farmers Union.	None identified. Education campaigns could be targeted around other measures introduced along the route e.g. the provision of additional laybys could be supported by an education campaign on their appropriate use.	Limited risks associated with this option. Effective campaigns require the buy-in and significant resource commitment from all partners.

Option Appraisal

6 Option Appraisal

6.1 Introduction

This chapter sets out the results of option appraisal of the long list of options presented in Table 5.1.

6.2 Option Appraisal

Table 6.1 appraises the performance of the identified options against the study TPOs, Implementability Criteria and the five National Transport Criteria as set out in STAG and described below.

Transport Planning Objectives	
TPO1	Deliver improvements on the A947 which contribute to a reduction in the number of accidents on the Corridor in line with national reduction targets.
TPO2	Improve through-corridor journey times and journey time reliability between 2015 and 2025/2035.
TPO3	Enable proposed housing, employment and retail growth to take place along the Corridor without undue congestion.
TPO4	Improve access by public transport between settlements and employment areas along the route, including Aberdeen City.
TPO5	Improve perceptions of safety and reduce feelings of driver frustration through development of a consistent, enhanced route standard.
Implementability Criteria	
Feasibility	Includes consideration of performance of options in terms of their technical and operational feasibility, including deliverability risks associated with construction and operation phases.
Affordability	Includes consideration of the potential costs and financing burden associated to each of the options.
Public Acceptability	Takes into account the public response and support to the potential delivery of respective options.
National Transport Criteria	
Environment	Includes consideration of the key environmental features and constraints identified in proximity of the A947 corridor and the associated impacts of potential options.
Safety	Includes consideration of current safety issues along the corridor and the potential benefits of respective options in terms of reducing accidents and improving perceptions of safety.
Economy	Includes an overview of benefits that may arise from the investment on each of the options, and the potential to support economic development.
Integration	Takes into account the level of transport, land-use and policy integration for each of the options and its appropriateness.
Accessibility and Social Inclusion	Includes consideration of the effect that each option will have in terms of accessibility to public transport and local services, and its distribution throughout all people groups.

The following scoring criteria, applied based on STAG principles, ensures that options are assessed on an objective basis.

✓	Option has a positive impact against the TPOs / Implementability / National Transport Criteria
--	Option has no/negligible impact on TPOs / Implementability / National Transport Criteria.
X	Option has a negative impact against the TPOs / Implementability / National Transport Criteria

Table 6.1 - High Level Option Appraisal

Ref	Options	Transport Planning Objectives (TPOs)					Implementability Criteria			National Transport Appraisal Criteria					Selection (S) or Rejection (R)	Comment
		TPO1	TPO2	TPO3	TPO4	TPO5	Feasible	Affordable	Publicly Acceptable	Environment	Safety	Economy	Integration	Accessibility and Social Inclusion		
Active Travel																
1	Improvements for Pedestrians	-	-	-	-	-	✓	✓	✓	✓	✓	-	✓	✓	**R**	Although scoring positive against the implementability criteria, the implementation of a series of pedestrian network improvements in towns along the A947 would be unlikely to support delivery of the TPOs, which have a greater focus on inter corridor journeys rather than local routes. As such, within the specific context of this study, it is not considered that this option should be considered further although opportunities to deliver pedestrian friendly infrastructure within towns should continue to be implemented where there is an identified need.
2	Improvements for Cyclists	-	-	-	-	-	✓	✓	X	✓	✓	-	✓	✓	**R**	Improved cycle infrastructure within towns could encourage increased uptake of cycling locally although, in the context of this study, would have a negligible impact against the TPOs. In terms of the development of longer distance routes, the Formartine & Buchan Way already provides a high quality off-road route between Newmachar and Dyce. Given current space constraints on the existing road, it is considered that any reallocation of space for cycling would only be feasible alongside options to improve the road carriageway standard. From a public acceptability perspective, investing in long distance cycle paths would be supported by cyclists but may be questioned by other route users given uptake would likely be relatively low. As such, it is recommended that this option is not taken forward for further consideration although opportunities to deliver improvements within towns should continue to be implemented where there is an identified need.
Public Transport																
3	Rail Provision	✓	✓	✓	✓	-	X	X	✓	-	✓	✓	✓	✓	**R**	This option performs strongly against the TPOs and Government appraisal criteria as a rail service linking towns along the route would provide a more reliable, safer mode of transport along the A947, while delivering capacity benefits for the road itself. However, there are significant questions over the deliverability of this option associated with the major technical, operational and financial barriers that would go with introducing new rail track and stations to serve towns along the route. Therefore, within the specific context of this study, it is not considered that this option should be considered further at this time.
4	Public Transport Services and Infrastructure Improvements	-	-	-	✓	-	-	✓	✓	✓	✓	-	✓	✓	**R**	Improvements to public transport services, such as express buses and infrastructure, will deliver accessibility improvements for those without access to private transport. If supported by modal shift from car, this option would deliver wider safety and congestion relief benefits, although given that modal shift is likely to be low, benefits are also anticipated to be relatively minor. Accordingly, it is considered that this option generally has a negligible impact against the TPOs. Delivery of service improvements will also require support from bus operators, while the potential to deliver bus priority improvements at the southern end of the corridor may be challenging given road space and capacity constraints. In the context of this study for long term improvements, it is suggested that this option is not considered further, though options for improving bus and infrastructure should continue to be implemented as resources allow and a Statement developed to guide future work. In considering potential improvements, close monitoring should be given to the impacts of the proposed mini-Park & Ride hubs. The impacts of the AWPR are also not yet fully understood and therefore it may be more appropriate to consider the potential implementation of priority measures south of Newmachar following the settling of flows. Opportunities for enhanced services will also likely be opened up with development of the AWPR and work should be undertaken with bus operator to ensure opportunities are realised.
Roads Based																

Ref	Options	Transport Planning Objectives (TPOs)					Implementability Criteria			National Transport Appraisal Criteria					Selection (S) or Rejection (R)	Comment
		TPO1	TPO2	TPO3	TPO4	TPO5	Feasible	Affordable	Publicly Acceptable	Environment	Safety	Economy	Integration	Accessibility and Social Inclusion		
5	Route Upgrade and Realignment - Dyce to Newmachar	✓	✓	✓	-	✓	✓	X	✓	X	✓	✓	-	-	S	This option performs strongly against the TPOs, particularly in the context of delivering improvements that facilitate increased capacity and benefits over the long term, in keeping with the vision of the Strategy. Current traffic flows are at the lower level of that recommended for taking forward a dualling scheme, though the impacts of the AWPR and future development could help make the case for future dualling. The option should support safety improvements and importantly would support journey time improvements on this section of the route. In terms of feasibility, while route upgrade option are considered to be technically feasible and would most likely be supported by the majority of the public, affordability could be a barrier, particularly if upgrading to dual carriageway status. Route upgrade between Dyce and Newmachar generally performs well against the Government appraisal criteria. It would therefore be recommended that this option is taken forward for further consideration, although it is to be recognised that detailed design work would be required to fully ascertain the feasibility, costs and benefits of route upgrade options.
6	Route Upgrade and Realignment - Dyce to Oldmeldrum	✓	✓	✓	-	✓	-	X	✓	X	✓	✓	-	-	S	Similar to Option 5, this option performs positively against the TPOs and would be expected to deliver capacity improvements in keeping with the long term vision of works. Current traffic flows are below the level of that recommended for taking forward a dualling scheme, though the impacts of the AWPR and future development could help make the case for future dualling. The scale of improvements required and potential costs under this option pose question marks over the options' feasibility, particularly any upgrade to dual carriageway standard. However, in the context of the twenty year strategy, it is recommended that route upgrade options between Dyce and Oldmeldrum is taken forward for further consideration, although it is to be recognised that detailed design work would be required to fully ascertain the feasibility, costs and benefits of route upgrade options.
7	Route Upgrade and Realignment - Full Route	✓	✓	✓	-	✓	X	X	✓	X	✓	✓	-	-	R	This option performs strongly against the TPOs, although the costs associated with such a project are anticipated to be prohibitive against the level of benefits likely to be gained, given the low traffic volumes along parts of the route. It is not recommended that this option be taken forward for further consideration.
8	Newmachar Bypass	-	✓	✓	-	-	✓	X	✓	X	✓	-	-	-	S	This option would likely have a positive impact against TPOs related to improving journey times and enabling development without undue congestion, while benefits could also be realised within Newmachar associated with a reduction of through traffic flows. There are a number of uncertainties around this option, and financial affordability could be a barrier. In line with the appraisal findings associated with route upgrade between Dyce and Oldmeldrum, it is recommended that this option is kept under review.
9	Oldmeldrum Bypass	-	✓	✓	-	-	✓	X	✓	X	✓	-	-	-	R	This option would likely have a positive impact against TPOs related to improving journey times and enabling development without undue congestion, while benefits could also be realised within Oldmeldrum associated with a reduction of through traffic flows. However, there are a number of uncertainties around this option, in line with the recommendations around route upgrade options to Oldmeldrum, it is recommended that this option is not taken forward for further consideration at this stage.

Ref	Options	Transport Planning Objectives (TPOs)					Implementability Criteria			National Transport Appraisal Criteria					Selection (S) or Rejection (R)	Comment
		TPO1	TPO2	TPO3	TPO4	TPO5	Feasible	Affordable	Publicly Acceptable	Environment	Safety	Economy	Integration	Accessibility and Social Inclusion		
10	Turriff Bypass	-	✓	✓	-	-	✓	X	✓	X	✓	-	-	-	R	It is anticipated that, in isolation, a bypass of Turriff could provide greater benefits than those of Newmachar and Oldmeldrum due to the route that the A947 currently travels through the Turriff. The option would be expected to have positive impacts against TPOs related to improving journey times and enabling development without undue congestion. Benefits could also be realised within Turriff associated with a reduction of through traffic although the economic impacts associated with a reduction of passing trade is an uncertainty. Financial affordability could also be a major barrier and therefore, and in keeping with the recommendations around route upgrade options above, it is recommended that this option is not taken forward.
11	Town Traffic Calming	✓	X	-	-	X	✓	✓	-	-	✓	-	-	✓	R	Although traffic calming would increase levels of safety through towns along the route, a review of accident data suggests that accidents along the route are primarily a rural as opposed to urban issue. On the whole, it is considered that this option would deliver limited benefits in the context of this study and its long term vision and as such it is recommended that this option is not taken forward. Should bypass options be taken forward, however, there could be merit in revisiting the potential of this option.
12	Climbing / Overtaking Lanes	✓	✓	-	-	✓	✓	-	✓	X	✓	✓	-	✓	S	Implementation of climbing or overtaking lanes performs positively across a number of TPOs and appraisal criteria, particularly in terms of its potential to reduce driver frustration and in turn deliver safety improvements. A lack of safe overtaking opportunities was identified in consultations as a key issue, and therefore this option would be expected to perform favourably in terms of public acceptability. Further investigation would be required to identify specific locations for overtaking lanes, but at this stage it is recommend that this option is taken forward for further consideration.
13	Localised Alignment Improvements	✓	✓	-	-	✓	✓	-	✓	X	✓	-	-	-	S	This option performs positively across a number of TPOs. Realignment of the A947 at previously identified accident cluster sites has the potential to improve safety and increase opportunities for safer overtaking thus reducing driver frustration. Detailed work has previously been undertaken to confirm the feasibility of these options, although funding availability could be a barrier to implementation. Given the potential benefits of these options, it is recommended that they are taken forward for further consideration.
14	Bend Mitigation Measures Review	✓	-	-	-	✓	✓	✓	✓	-	✓	-	-	-	S	Bends and visibility at bends was a major issue raised during consultation and it is considered that a number of potential improvements could be introduced to provide considerable improvements to motorist's visibility to bends, which would have positive safety impacts. Further investigation is required to ascertain feasibility and affordability issues, but evidence suggests that this option should be recommended for further consideration.
15	Slow Moving Vehicle Lay-bys	✓	✓	-	-	✓	✓	✓	✓	-	✓	-	✓	-	S	This option has the potential improve safety by reducing the potential of driver frustration and dangerous overtaking associated with slow moving vehicles and lengthy platoons. Benefits would only be realised if laybys are effectively used by slower moving vehicles, with consultation revealing conflicting views here. For example, motorists raised concerns that slow moving vehicles do not use the lay-bys while the farming industry highlighted that this is because they are not in appropriate locations and are not large enough. Despite previous study and work in this area, the provision of additional laybys, - and specifically larger laybys, remains an important issue as apparent through the consultation findings. Given the potential for laybys to reduce platoons along the route it is considered that this option should be considered further subject to the identification of appropriate, strategically placed safe locations.
16	Junction Improvements	✓	-	✓	-	✓	✓	✓	✓	-	✓	-	-	-	S	This option performs positively against objectives to improve safety. Journey time benefits could also be improved although impacts are likely to be negligible. This option is recommended for further consideration subject to more detailed traffic

Ref	Options	Transport Planning Objectives (TPOs)					Implementability Criteria			National Transport Appraisal Criteria					Selection (S) or Rejection (R)	Comment
		TPO1	TPO2	TPO3	TPO4	TPO5	Feasible	Affordable	Publicly Acceptable	Environment	Safety	Economy	Integration	Accessibility and Social Inclusion		
																assessment at specific junctions along the route.
17	Localised Route Improvements	✓	-	-	-	✓	✓	✓	✓	-	✓	-	-	-	**S**	This option includes a range of measures, which taken together would be anticipated to have a positive impact, particularly in terms of addressing TPOs relating to safety. A number of consultees during the public consultation highlighted that relatively minor, straightforward improvements such as a review of signage, including white line resurfacing and improved vegetation maintenance to increase visibility could deliver noticeable improvements. This option may not provide significant benefits in terms of a twenty year vision, but could provide a number of quick wins in the short term. Accordingly, it is recommended that this option is taken forward for further consideration as a short term improvement.
18	Speed Limit Review	✓	-	-	-	-	-	✓	-	-	✓	-	-	-	**R**	This option has the potential to deliver safety improvements, should it be accompanied by speed reductions along the route. However, there are concerns over the enforceability of reduced speed limits, while analysis of existing speed data suggested that there does not appear to be a speeding problem with 85% speeds typically below the speed limit. It is understood that consultation is currently being undertaken to reduce the speed limit in Whiterashes. Introduction of variable speeds across the route increases the potential for driver confusion and therefore should a wider review of speeds be undertaken, it is recommended findings are applied consistently. In the context of this study, this option is not recommended for further consideration.
19	Enforcement	✓	-	-	-	✓	-	-	-	-	✓	-	-	-	**S**	Increased enforcement across the route – either through increased police presence or the introduction of fixed or average speed camera systems – would assist in the delivery of the TPOs related to safety. However, there are feasibility issues associated with both options; increased presence of mobile enforcement units is dependent on partner resources, while introduction of speed cameras would not be favoured publically, albeit the option of average speed cameras was highlighted a number of times during consultation. Previous study has suggested that this option may not fully address safety issues given accidents along the route tend to be related to inappropriate speed rather than excessive speed. However, introduction of greater enforcement would likely engender a greater shift towards safer, more responsible driving and in turn support wider measures to improve driver behaviour along the route, which was highlighted as the major problem on the route at present. It is therefore recommended that increased enforcement is taken forward for further consideration alongside partners as part of the twenty year Strategy vision.
20	Education and Engagement Programme	✓	-	-	-	✓	✓	✓	✓	-	✓	-	✓	-	**S**	Targeted education and engagement programmes scores positively across the Government appraisal criteria, and would also support specific TPOs related to improving safety and perceptions of safety. In delivery terms, this option also performs strongly and would seek to address issues of driver behaviour, which was the major issue raised during consultation. Accordingly, it is recommended that this option is taken forward.

6.3 Summary Findings

Table 6.1 presents an appraisal of options identified to address the objectives of this study. Key findings from the appraisal are as follows:

- Route upgrade and realignment options have the potential to address a number of the study objectives, particularly on the busiest sections of the route south of Oldmeldrum. The A947 between Dyce and Newmachar currently experiences traffic queuing and delays during peak commuter periods and while current traffic flows are slightly below the levels recommended for upgrade to dual carriageway by definition of the Design Manual for Roads and Bridges (DMRB), they are suitable for upgrade to single carriageway ('S2') or wide single carriageway ('WS2') standard, while increased traffic associated with the AWPR could support the case, potentially to dualling standard (D2AP). The same could be said for the section of route between Newmachar and Oldmeldrum. The DMRB establishes that for the purpose of dualling, daily traffic volumes should be between 11,000 and 39,000 vehicles on the opening year with current flows currently around 10,500 between Dyce and Newmachar, and 8,000 between Newmachar and Oldmeldrum. The development of such options would be complemented by the provision of a Newmachar bypass. Accordingly, and in the context of the twenty year vision for this work, it is considered that route upgrade and realignment options between Newmachar and Oldmeldrum are kept under review. While route upgrade options along the entirety of the route also have the potential to satisfy a number of the study objectives, on the basis of current traffic demand it may be more difficult to justify a case for the significant investment associated with route upgrade interventions north of Oldmeldrum, and instead it is recommended that upgrades between Oldmeldrum and Banff focus on more localised improvements.
- A number of route-wide localised engineering measures such as climbing and/or overtaking lanes, localised alignment improvements, bend mitigation measures and junction improvements perform strongly against the transport planning objectives and are recommended for more detailed investigation. Specifically, to address issues of driver frustration, as commonly cited during consultation, improved overtaking opportunities via the introduction of climbing or overtaking lanes could assist. This option would require more detailed site investigation of appropriate locations. Localised alignment improvements, as identified from earlier studies, also present an opportunity to improve safety at previously identified accident hotspots, alongside a review of bend mitigation measures.
- While this study is focused on longer term improvements, the review identified a number of interventions which perform positively against the objectives and could provide 'quick wins' for immediate implementation. Specifically, a number of consultees highlighted that relatively minor, straightforward improvements such as a review of signage, white line resurfacing and improved vegetation maintenance to increase visibility could deliver noticeable improvements. Driver behaviour was identified as the number one problem during consultation and the introduction of education and awareness campaigns alongside police and community planning partners to promote desired behaviours and engender safer, more responsible driving should support wider route improvements over the long term.

The following section translates the appraisal findings into a recommended action plan to guide work going forward.

Summary and Next Steps

7 Summary and Next Steps

7.1 Summary

By way of summary, it is useful to refocus on the initial questions set at the outset of this study.

What is the role/purpose of the route and how will this change in the future, particularly post-construction of the AWPR, the dualling of the A96, and taking on board wider development pressures/aspirations?
The A947 is approximately 41 miles in length, of which approximately 38 miles lies within the Aberdeenshire Council boundary. As the principal connection between Aberdeen and Newmachar, Oldmeldrum, Turriff and Banff, the route is vital to the economic development of the area, heavily used by commuters travelling to and from Aberdeen, while commercial vehicles make up around 19% of traffic on the route. The route is characterised by frequent bends and poor visibility and for a long time has held a reputation as a dangerous and frustrating route to drive. Previous detailed study into the infrastructure standard of the route highlighted various issues including little or no consistency in provision of bend related signage and sign markings, junctions not complying with visibility standards, poor drainage provision, and sub-standard geometry. Daily traffic levels range from 3,500 vehicles north of Turriff to just under 10,500 vehicles south of Newmachar. Journey times are reliable at around 54 minutes between the Aberdeen/Aberdeenshire boundary and Banff, although during the peak morning and evening periods, queueing and delays between Dyce and Newmachar can result in increased travel times and journey time reliability issues. In safety terms, accident data shows accident numbers have reduced in recent years although there remain concerns on key sections of the route. Consultation findings highlighted a wide range of road safety related concerns ranging from issues of driver behaviour to visibility issues, and confirmed the road's reputation as a frustrating road to drive with agricultural and other slow moving contributing to platooning, which can lead to driver frustration due to a reported lack of safe overtaking on stretches of the route. Platoon survey results support this, showing that over one in five of platoons on the route were led by vehicles classifiable as slow moving vehicles. In the future, development aspirations could see an extra 2,200 trips added to the network during peak periods which may exacerbate existing issues. Development of the AWPR, which will see the A947 realigned from the north side of the Parkhill Bridge to a point north of the AWPR, could also change patterns of traffic on the route with previous modelling exercises anticipating that the AWPR would increase traffic volume on the A947 south of Newmachar. In both the short and longer term, other roads in the north east of Scotland, namely the A90 north and A96 trunk roads, are due to see significant investment and upgrade which could highlight a growing disparity with the A947 and a requirement for future investment to upgrade the route standard.

What potential improvements are required to address strategic objectives of the route (for increased safety and improved journey times/journey time reliability)?
Various improvements have been identified to address the objectives set for this study. Based on the appraisal, the following options are suggested for further investigation. • Climbing / Overtaking Lanes • Localised Alignment Improvements • Bend Mitigation Measures Review • Slow Moving Vehicle Lay-bys

- Junction Improvements
- Localised Route Improvements
- Enforcement
- Education and Engagement Programmes

Route upgrade, potentially to dual standard between Dyce and Oldmeldrum, performs positively in the appraisal and in the context of the twenty year vision for this work, it is considered that this option be kept under review. A proposed action plan to guide the implementation of future improvements is presented within this report.

How could these improvements be progressed in the form of a business case?

The information presented in this report is considered to provide a strong evidence base for the further development of options, and if required, future business cases to support option investment.

While this report has presented qualitative benefits and high levels cost estimates associated with a number of the potential options, an assessment of the quantifiable benefits (in terms of, for example, potential accident and journey time savings) would be recommended in order to help direct focus on the most promising options. This would require options to be worked up into a level of detail appropriate to enable high level transport modelling exercises to be undertaken and benefits to be more comprehensively understood.

Following identification of the most promising options, work should focus on the development of detailed designs and costings to enable the Council to put forward a robust case for funding investment.

7.2 Recommended Next Steps

In the context of a twenty year vision, based on the appraisal recommendations, the following action plan has been developed to set out a series of actions for consideration over the short, medium and longer term.

Intervention	Actions	Timescale[34]
Localised Route Improvements	• Undertake a route audit to identify improvements focused on signage, white line surfacing and verge maintenance.	Short
Education and Engagement Programme	• Development of a Communications and Engagement Plan with partners outlining approaches for the implementation of education and engagement campaigns and measures along the route. • Work with partners to develop campaign messages to target identified behaviours including: appropriate travel speeds, dangerous overtaking, and the use of laybys by slower moving vehicles. • Future infrastructure improvements along the route would also benefit from being taken forward alongside / reinforced with campaigns e.g. safe use of climbing/overtaking lanes, the importance of using laybys.	Short

[34] Short term actions comprise 0-2 years; medium term actions comprise 2-5 years, long term actions consider 5+ years.

Intervention	Actions	Timescale[34]
Enforcement	• Development of a Statement with partners to outline aspirations for increased enforcement along the route. • Continue to work through NESCAMP to enforce speeds along the route.	Ongoing
Maintenance	• Development of a Statement to outline proposals for the implementation of an effective, prioritised maintenance regime for the A947 Corridor in line with the Council's Road Asset Management Plan.	Ongoing
Active Travel	• Development of a Statement with partners to promote the use of active travel modes within communities along the A947 Corridor. Works to include an audit of existing facilities and identification of enhanced infrastructure and campaigns to encourage increased use of sustainable transport modes, including walking and cycling.	Short - Medium
Public Transport	• Development of a Statement to outline aspirations for bus service development along the route, working alongside bus operators. Within this, consideration will be given to priority measures and opportunities for enhanced services associated with the AWPR.	Short - Medium
Climbing / Overtaking Lanes	• Undertake a robust economic assessment of the benefits of identified potential climbing / overtaking lanes. • Progress conceptual designs in line with design principles and standards, with locations assessed to consider their benefits, with the ultimate aim to identify what combination of widened sections could be proposed. Consult with relevant stakeholders and landowners, and also evaluate the engineering challenges. • Develop plans into a detailed design.	Short - Medium
Localised Alignment Improvements	• Review previous work into alignment improvements and update economic assessments.	Short - Medium
Bend Mitigation Measures	• Undertake a detailed review of specific locations along the route which would benefit from improvement works, and consider appropriate solutions e.g. bend signage, intelligent road studs.	Short - Medium
Junction Improvements	• Undertake traffic and road safety assessments of identified junctions along the route with a view to introducing ghost islands where justifiable.	Short
Slow Moving Vehicle Laybys	• Review of previous locations and potential new sites for extended laybys based on the results from the platoon surveys and site safety assessments. • Develop a campaign with partners and other stakeholders (such as the farming industry, businesses that involve HGVs travelling on the route on a daily basis etc.) to remind them that drivers are legally obliged to pull in if they are holding up traffic.	Short - Medium
Route Upgrade and	• Undertake a review and monitor traffic conditions on the A947 following opening of the AWPR with a view to developing a business	Long

Intervention	Actions	Timescale[34]
Realignment	case for route upgrade in the future. • Assess most suitable route upgrade and realignment options along the A947 i.e. improvement to S2, WS2 or D2AP, in line with the DMRB guidance.	
Annual Progress Report	• Development of an annual progress report to Members outlining progress with the implementation of the Strategy. The report should also be promoted via the Council's website to ensure the wider public and interested stakeholders are kept fully informed of progress.	Ongoing

Complementary to the above, a number of the issues along the route are common across the corridor, and would benefit from being addressed through a complementary corridor-wide strategy, comprising:

- Public transport improvements; aimed at encouraging modal shift from car to public transport. Mini-hubs should be monitored and expanded if appropriate while work should continue in partnership with bus operators to seek ongoing improvements to public transport along the route, including service level improvements, information and marketing.
- Walking and cycling improvements; to promote increased active travel within communities along the route through the development of integrated facilities for pedestrians and cyclists (e.g. improved local routes, safe crossing opportunities), ongoing work with schools, employers and the wider community to encourage sustainable trips and the implementation of electric vehicle charging points in line with wider policy.
- Ongoing localised safety measures; to improve safety at identified locations on the basis of ongoing accident investigation work at identified cluster sites.

Finally, a common point raised during consultation related to the importance of ensuring communities are kept up to date on the progress of this study and future works to upgrade the A947. Many consultees during the consultation raised concerns about "yet another study". The consultation programme undertaken as part of this study has engaged a wide range of public and community groups along the route and it will be important to build on this momentum by ensuring that stakeholders are kept up to date as specific proposals emerging from this work are progressed. It is therefore proposed that an Annual Progress Update Report is prepared each year and promoted via the Council to ensure stakeholders are kept fully informed on progress with the implementation and delivery of the actions emerging from this Strategy.

In addition to the public, Aberdeenshire Council should also continue to engage with the Scottish Government and its representatives within Transport Scotland to explore opportunities to share information on the impacts of wider route improvements (e.g. A90 and A96 dualling and the AWPR) on the route. Consultation should also extend to potential funding partners as required.