# A82 Tarbet to Inverarnan Upgrade

## Strategic Business Case

Transport Scotland

March 2014

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# Document history

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Strategic Business Case

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# Executive Summary

## Introduction

The Strategic Transport Projects Review (STPR), prepared by Transport Scotland in 2009, includes locations where Scotland's strategic transport network can be improved by implementing targeted infrastructure enhancements. STPR Intervention 3 – "Targeted Programme of Measures to Improve Road Standards between Glasgow and Oban/Fort William (A82)" recommends improvements in road standard along the A82 Trunk Road, to improve journey times and to reduce the accident severity rates on the route.

Transport Scotland has commissioned an A82 Tarbet to Inverarnan Upgrade project to review the current operation of this section of the A82 and develop proposed improvements.

The STPR effectively provides a high level Strategic Business Case for all 29 interventions set out in the STPR, including the A82 route. As the final report of the STPR was published in October 2009, an early stage of the current commission is to prepare a Strategic Business Case (SBC) for the A82 Tarbet to Inverarnan Upgrade scheme that sets out a high level assessment and re-confirms justification for implementing significant road improvements on this section of the A82.

For transport schemes, a Scottish Transport Appraisal Guidance (STAG) assessment should demonstrate a sufficient level of detail to effectively provide the SBC. Following early discussions with Transport Scotland, it was considered previous STPR work was consistent with STAG appraisal requirements and, therefore, it was more appropriate that a verification and validation be undertaken for the Tarbet to Inverarnan section of the A82, complying with STAG, to confirm previous problems, issues and constraints are still valid, in order to support a SBC for the scheme.

This document sets out a Strategic Business Case that seeks to justify the approval for taking the proposed A82 Tarbet to Inverarnan Upgrade scheme forward to Design Manual for Road and Bridges (DMRB) Stage 2.

## Background

The A82 trunk road runs in a general northerly direction between Glasgow and Fort William and is the main road link to the north west of Scotland. The route is approximately 108 kilometres long and is generally rural in nature between Tarbet and Fort William, consisting of a single carriageway of varying standards. Along the route, the principal communities are Tarbet, Inveruglas, Ardlui, Crianlarich, Tyndrum, Bridge of Orchy, Glencoe, Ballachulish, Onich and Fort William. As well as being a vital economic and social link, the road also serves as a significant tourist route.

The scheme under consideration relates to the section of the A82 between Tarbet and Inverarnan and covers a length of approximately 17 kilometres, starting from a point just south of Tarbet (south of the junction with the A83) to a point approximately 800 metres north of Inverarnan. The A82 between Tarbet and Inverarnan is a single carriageway road with a substandard cross-section width and alignment over most of the route, in terms of Design Manual for Road and Bridges (DMRB) standards. This section of road also has a poor road traffic accident record.

The road runs south to north alongside Loch Lomond passing through Tarbet, Inveruglas, Ardlui and Inverarnan. The majority of this section is constrained to the west by mountains and to the east by Loch Lomond. In addition, the West Highland railway line runs close to the road, to the west, coming within 25 metres in certain locations. The presence of numerous steep rock

outcrops to the west and loch foreshore to the east result in the road layout having an overall cross-section that is often little more than the surfaced carriageway width. In addition, the road also has numerous low radius curves and bends that limit forward visibility. As a result, these characteristics combine to reduce the average speed of vehicles on the route and often prevent vehicles from passing each other safely without having to slow down, especially large vehicles.

A 'snapshot' of journey times between Tarbet and Inverarnan gives a 'free flow' journey time of approximately 15 minutes, which equates to an average speed of approximately 40mph, and an average journey time of approximately 19.5 minutes, including travel through the current Pulpit Rock Scheme traffic signals, with an associated average vehicle speed of 27mph. There is significant variation in journey times, ranging between approximately 14 minutes and 27 minutes, as it is influenced by factors like the presence of slow moving vehicles, such as caravans or large vehicles that have difficulty negotiating the sub-standard geometry of the road.

The number of traffic accidents resulting in personal injury on this section of the A82 has been fairly consistent during the past five years, based on 2008 – 2012 data. For this 17 kilometres length, there has been a total of 53 injury accidents during this period, with 3 fatal, 16 serious and 34 minor. Killed or seriously injured (KSI) accident rates on this section of road are over four times the national average for such KSI accidents on the Scottish trunk road network.

### Previous Studies

A number of relevant previous studies have been carried out on the A82 corridor. In addition, Transport Scotland commissioned a review of the speed limits on Scottish trunk roads, including the A82, and results were published in 2012, as part of the Speed Limit Review. Proposed improvements to the A82 are included in the following Scottish Government strategic level documents:

- Strategic Transport Projects Review (2009); and
- Infrastructure Investment Plan (2011).

### Identified Problems

Previous studies identified a number of key problems that can be summarised as follows:

- Sub-standard road geometry;
- Un-reliable journey times; and
- Road traffic accidents.

In addition to these key problems, previous studies have also noted the following issues, which have subsequently been confirmed by various stakeholders:

- Informal and sub-standard parking facilities (in terms of DMRB design standards); and
- Poor accessibility for non-motorised users (NMUs).

An early task of the commission has validated the above existing problems are still present. As a result, the impact of no change to the existing situation is likely to result in the following:

- No improvement to the existing sub-standard road geometry, thereby not meeting STPR Intervention 3 objectives;
- No reduction in number of RTAs, with rates for fatal and serious injuries likely to remain high, thereby not meeting STPR Intervention 3 objectives;

- No improvement in vehicle speeds and average journey times;
- No improvement in existing parking facilities along this section of the A82; and
- No improvement in accessibility for NMUs along this section of the A82.

### Constraints

At this early stage of the project, a number of potential high-level constraints have been identified under four headings and these would be considered in more detail as the scheme is developed.

- Buildability – the existing topography of the existing road corridor will create significant engineering challenges and also impact on the operation of the existing road during construction. Land would need to be acquired.
- Environmental – any major improvements could have significant environmental impacts. The scheme is within a National Park National Scenic Area, two Sites of Special Scientific Interest are nearby, Loch Lomond and its water courses are graded as high water quality and the West Highland Railway runs close to the existing road.
- Financial – issues raised under the Buildability and Environmental headings suggest extensive road geometry improvements are likely to be potentially expensive to deliver.
- Delivery Timescales – the above three constraints suggest any major improvement could take some time to develop from design, through statutory procedures to implementation.

### Stakeholders

Successful delivery of the Upgrade scheme will be influenced through engagement with key stakeholders and their involvement through consultation. The aims for consultation and engagement are to:

- Engage and inform interested parties to allow their expertise and knowledge to influence considerations during assessments;
- Promote consultation with the community and their representatives so as to allow issues and concerns to be understood and addressed; and
- Help de-risk the scheme promotion process.

Key stakeholders, statutory consultees and interested parties have been identified. To help focus consultation, it is proposed to establish an A82 Stakeholder Forum. This Forum would act as a focus through which consultation and engagement workshops can be structured and will allow thematic approaches to be promoted and easily organised.

### Transport Planning Objectives

It is important that the scheme-specific Transport Planning Objectives (TPOs) should be based on evidence gathered through the problems, opportunities and constraints review. Initially, the CFJV transport planning team identified a number of potential TPOs that were then assessed, resulting in three draft TPOs proposed for consultation. A Stakeholder Workshop (Workshop 1) was held with key stakeholders on 2 October 2013 and one of its breakout sessions was designed to discuss and develop TPOs for the scheme. All feedback and comments from Workshop 1 were considered and the draft TPOs reviewed, together with suggested additional ones. As a result, amended TPOs were recommended and a final five TPOs subsequently agreed.

### Option Generation and Appraisal

All potential route corridor options were derived through consultation with stakeholders, including Workshop 1 (held with key stakeholders), or identified by the CFJV design team. Account was also taken of the key objectives of STPR Intervention 3, together with existing corridor options identified through previous studies. An initial list of 10 potential corridor options was drafted by the CFJV design team, after reviewing previous studies, assessing known problems and using professional judgement and then presented to stakeholders at Workshop 1 for discussion. From the workshop, an additional corridor option was identified and added to give a finalised 'long list' of 11 route corridor options. The 'Do Nothing' option was added, in order to provide a base scenario.

An initial assessment of the 12 options concluded that five would not achieve all five of the TPOs and, therefore, it was recommended these five options should not be taken forward for appraisal and scoring.

Following the initial sift, the next stage was to analyse the remaining options and this was undertaken by scoring each option against criteria, including the scheme-specific TPOs and the main STAG criteria. For the purpose of the appraisal, a bespoke Appraisal Summary Table (AST) to encompass elements of both STAG and DMRB was developed. The criteria for assessment within the AST were as follows:

- established policy directives;
- agreed transport planning objectives;
- main STAG criteria, being:
  - environment
  - safety
  - economy
  - integration
  - accessibility and social inclusion
- engineering;
- affordability; and
- public acceptability.

An assessment of the remaining seven corridor options was undertaken, being consistent with a STAG Part 1 Appraisal. Starting from a 'long list' of 11 proposed corridor options then adding the 'Do Nothing' option, the two STAG appraisal sifting reviews rejected nine options, leaving three corridor options recommended for further development and subject to DMRB Stage 1 assessment. The recommended three corridor options are as follows:

**Option 1 Existing A82 Corridor**

**Option 2 Arrochar – Inveruglas – Inverarnan**

**Option 11 High Road**

### Traffic and Economic Appraisal

At this stage, a high level economic appraisal of the three recommended corridor options has been undertaken based on the following assumptions:

- Fixed trip methodologies;
- NRTF (1997) central traffic growth projections;
- Local accident rates;
- Optimism bias included;
- Construction commencing in 2017 with a 3-year construction period; and
- Typical maintenance profiles and works costs.

Total scheme costs have been developed for the three corridor options based on average 2012 prices and include optimism bias uplift. The total scheme cost estimates for typical alignments for each of the proposed corridors are set out in Table ES.1.

*Table ES.1: Short-listed corridor options – outline cost estimates*

| Reference | Corridor Option | Total scheme cost estimate |
|---|---|---|
| Option 1 | Existing A82 Corridor | £216.45m |
| Option 2 | Arrochar to Inveruglas to Inverarnan | £253.89m |
| Option 3 | High Road | £425.88m |

A summary of the combined NESA and QUADRO assessments results are set out in Table ES.2, summarising Present Value of Benefits (PVB), Present Value of Costs (PVC), Net Present Value (NPV) and Benefits to Cost Ratio (BCR) values for the three corridor options.

*Table ES.2: Combined NESA and QUADRO assessment results*

| Reference | Corridor Option | PVB | PVC | NPV | BCR |
|---|---|---|---|---|---|
| Option 1 | Existing A82 Corridor | £23.00m | £111.34m | -£88.34m | 0.21 |
| Option 2 | Arrochar to Inveruglas to Inverarnan | £8.51m | £132.52m | -£124.01m | 0.06 |
| Option 3 | High Road | £39.11m | £225.51m | -£186.40m | 0.17 |

Based on the results of the comparative appraisal, Option 1 (Existing A82 Corridor) is expected to deliver the greatest level of economic return, with an estimated NPV of -£88.34 million and a BCR of 0.21.

Whilst the current traffic and economic appraisal suggests the Corridor Options are not expected to provide Transport Economic Efficiency benefits that outweigh their costs, the Upgrade would result in wider economic benefits, albeit their overall scale of impacts is anticipated to be moderate. It should be noted that this factor will be influenced by the design approach adopted. In parts of this section of the A82, the road itself could be an attraction to visitors if, for example,

'iconic' features are incorporated. Should this be the case, a greater scale of benefit may be anticipated across the A82 generally, with a heightened focus on the upgraded corridor itself.

A more detailed economic case would be set out in the subsequent Outline Business Case (OBC), prepared to support the DMRB Stage 2 assessment. The OBC would also develop the commercial, financial and management cases for the scheme.

# 1 Introduction

## 1.1 Introduction

The Strategic Transport Projects Review (STPR), prepared by Transport Scotland in 2009, identifies locations where Scotland's strategic transport network can be improved through more efficient operation or maintenance, making better use of capacity or by implementing targeted infrastructure enhancements.

STPR Intervention 3 – "Targeted Programme of Measures to Improve Road Standards between Glasgow and Oban/Fort William (A82)" supports the objectives to provide a significant improvement in road standard along the A82 Trunk Road and to reduce the accident severity rates on the route. In addition to a general upgrade of the route, the intervention proposes a number of specific measures including:

"*carriageway widening at selected locations between Tarbet and Inverarnan*".

Transport Scotland has commissioned an A82 Tarbet to Inverarnan Upgrade project to review the current operation of this section of the A82 and develop proposed improvements. It is envisaged the improvement would be consistent with the objectives of STPR Intervention 3.

The STPR effectively provides a high level Strategic Business Case for all 29 interventions set out in the STPR, including the A82 route. As the final report of the STPR was published in October 2009, an early stage of the current commission is to prepare a Strategic Business Case (SBC) for the A82 Tarbet to Inverarnan Upgrade scheme that sets out a high level assessment and re-confirms justification for implementing significant road improvements on this section of the A82.

For transport schemes, a Scottish Transport Appraisal Guidance (STAG) assessment should demonstrate a sufficient level of detail to effectively provide the SBC. For the A82 Tarbet to Inverarnan Upgrade scheme, early discussions with Transport Scotland have concluded that previous preliminary assessment work undertaken to support the STPR identification of potential interventions for the A82 was consistent with STAG appraisal requirements and there is no need, therefore, to undertake a further full STAG appraisal for the Tarbet to Inverarnan section of the A82. It is considered more appropriate that a verification and validation is undertaken, complying with STAG, to confirm previous problems, issues and constraints are still valid, in order to support a SBC for the scheme.

## 1.2 Background

CH2M HILL Fairhurst Joint Venture (CFJV) was appointed by Transport Scotland in June 2013, under the 'A82 Tarbet to Inverarnan, A Single-Supplier Framework Agreement for Provision of the Design, Investigative and Environmental Services', to carry out the necessary works to complete a Design Manual for Roads and Bridges (DMRB) Stage 1 and Stage 2 Assessment for the proposed upgrade of a section of the A82 Trunk Road between Tarbet and north of Inverarnan. The framework agreement allows for further stages to be undertaken pending availability of funding and appropriate commitment from Scottish Ministers.

The requirements of the Scheme Brief are as follows:

- review of existing information;
- conduct a problems and opportunities validation consistent with STAG appraisal procedures, assess traffic and economics and prepare a supporting SBC;
- deliver an Inception Report;
- assist in the preparation and maintenance of a Project Execution Plan and a Risk Register;
- deliver a DMRB Stage 1 Assessment Report;
- undertake an Environmental Assessment of the baseline condition over the area which could be significantly affected by any route corridors;
- undertake the procurement, supervision and reporting of any topographical, bathymetric, ground and pavement investigations, traffic and environmental surveys as required;
- deliver a DMRB Stage 2 Scheme Assessment Report;
- deliver a Stage 2 Environmental Assessment and Record of Determination;
- give presentations to Key Investment Decision Makers;
- procure Road Safety Audits;
- arrange and attend a public exhibition for the scheme as required;
- assess and report on responses to consultation exercises;
- assist in the preparation and publication of impact assessments as required;
- assist with workshops as required; and
- undertake the duties of Construction Design Management (CDM) Co-ordinator.

There will be a specific hold point in the scheme development following submission of the Scheme Brief requirements listed above. Progress beyond this stage will depend on the receipt of approval from Transport Scotland to proceed to the next stage in the scheme development. Following this specific hold point, the requirements of the Scheme Brief are as follows:

- provide a DMRB Stage 3 Scheme Assessment Report for the preferred scheme option and prepare a Record of Determination to determine whether or not an Environmental Statement is required;
- prepare appropriate preliminary or detailed designs, and prepare and update cost estimates as necessary;
- prepare all necessary consultation documentation required in connection with any Scottish Statutory Instruments (SSIs) for the scheme;
- assist in the preparation and publication of the SSIs;

- assist with all aspects of the Public Local Inquiry;
- assist with the preparation of Tender and Contract documents;
- assist with the procurement and award of the construction contract;
- carry out site supervision activities during the construction of the scheme; and
- undertake post construction monitoring and evaluation of the scheme.

The programme for the current commission for the A82 Tarbet to Inverarnan Upgrade scheme has the following key milestones:

- DMRB Stage 1 Scheme Assessment (Preferred Corridor Recommendation) Report – 31 December 2013; and
- DMRB Stage 2 Scheme Assessment (Preferred Route Recommendation) Report – 31 March 2015.

## 1.3 A82 Tarbet to Inverarnan Upgrade

The study area covers a length of approximately 16 kilometres from a point just south of Tarbet to a point just north of Inverarnan where the carriageway cross-section widens to 7.3 metres with near DMRB standard verge widths of 2.5 metres. Figure 1.1 indicates the extents of the area to be assessed.

The design of the scheme shall be in accordance with the Government's appraisal criteria for the assessment of trunk road schemes, which take account of integration, economy, safety, environment, social inclusion and accessibility impacts. The key issues and opportunities on the existing route to be reviewed in a manner consistent with the STAG and DMRB processes include:

- addressing the causes of road traffic accidents;
- widening the carriageway and improving the line of sight;
- improving the maintainability of the road;
- improving drainage;
- enhancing access to Loch Lomond and the Trossachs National Park, Oban, Fort William and beyond;
- delivering improved journey time reliability;
- considering the extent of rock cuts and earthworks;
- consider options for minimising disruption to existing traffic; and
- improving pedestrian and cycle access, car parking and lay-by provision.

An important requirement of the commission is for CFJV to work closely with Transport Scotland, contractors, consultants, third parties and other stakeholders who may be involved or have an interest in some aspect of the Services, in order to deliver a successful scheme through consensus.

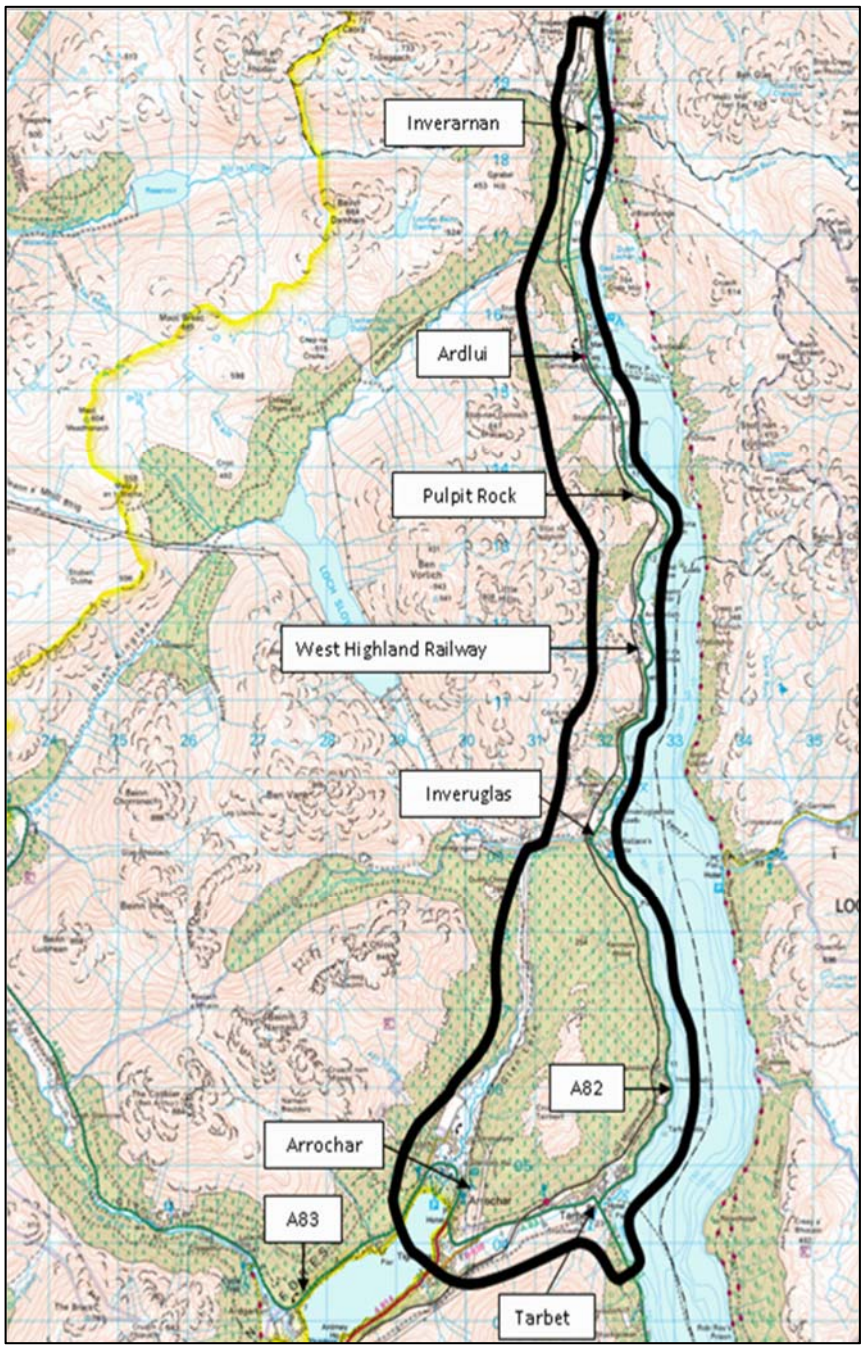


*Figure 1.1: A82 Tarbet to Inverarnan upgrade Study Area*

## 1.4 Purpose of Strategic Business Case

The Scottish Government sets out its transport objectives in its National Transport Strategy that is then supported by a number of individual and specific policy documents and initiatives. Scottish Ministers take decisions, with regard to investment in transport, that support these national objectives and are often informed by evidence set out in a business case.

This approach will show whether schemes:

- are supported by a strong need for change;

- can demonstrate value for money; and
- are deliverable.

The level of detail set out within a business case is likely to vary depending on the size of project, level of investment or degree of risk associated with a scheme. This helps ensure that the associated appraisal process is also proportionate.

For major schemes, there are often three phases in the development of the business case:

- phase one – preparing the strategic business case;
- phase two – preparing the outline business case; and
- phase three – preparing the full business case.

Previous development work has already identified the need for general intervention on the A82 Trunk Road, including a specific improvement of the section between Tarbet and Inverarnan that can be developed as a stand-alone scheme. As mentioned in Section 1.1, the STPR is considered to provide a high level SBC for general improvements to the A82. It is now considered appropriate to prepare a SBC for the Tarbet to Inverarnan section. This involves undertaking the following key tasks:

(i) review current and future problems associated with the Tarbet to Inverarnan section of the A82 if no improvements were undertaken;

(ii) undertake an appraisal of identified corridor options; and

(iii) set out a high level assessment and re-confirm justification for implementing significant road improvements.

The purpose of the SBC is to:

- define the scope of the project and its outputs and benefits;
- establish the need for change;
- confirm the strategic fit with Scottish Government policies and specific STPR objectives;
- set out any scheme assumptions;
- highlight existing problems;
- outline improvement options to address existing problems and undertake an initial sift of options;
- an assessment of options, consistent with the STAG process;
- consider and confirm that an appropriate and robust project government structure is in place;
- summarise identified benefits and disbenefits;
- outline a proposed project programme;
- set out what monitoring will be undertaken; and
- identify stakeholders.

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# 2 Existing Conditions

## 2.1 Introduction

The A82 trunk road runs in a general northerly direction between Glasgow and Fort William and is the main road link to the north west of Scotland. The route is approximately 108 kilometres long and is generally rural in nature between Tarbet and Fort William, consisting of a single carriageway of varying standards.

Along the route, the principal communities are Tarbet, Inveruglas, Ardlui, Crianlarich, Tyndrum, Bridge of Orchy, Glencoe, Ballachulish, Onich and Fort William. As well as being a vital economic and social link, the road also serves as a significant tourist route.

For the majority of the route, the national speed limit of 60mph applies, except where the road passes through the communities of Tarbet, Crianlarich, Tyndrum, Onich and the approach to Fort William. On some sections of the route, localised 40mph speed limits are also in place for heavy goods vehicles (HGVs).

Much of the existing carriageway is less than 7.3 metres wide. In addition, many sections do not have carriageway hardstrips or suitable verges that provide clearance from boundary features. The overall road width is constrained over some sections due to the close proximity of lochs, railway line, narrow bridges/structures and rock outcrops. Local topography constrains the road on (i) sections between Tarbet and Inverarnan, (ii) through the Pass of Glencoe and (iii) between the Corran Ferry junction and Fort William.

There are no alternative routes within the immediate A82 corridor, resulting in diversion routes adding significant time and distance to a journey.

## 2.2 A82 Tarbet to Inverarnan Section Description

The A82 improvement scheme under consideration relates to the section of the A82 between Tarbet and Inverarnan and covers a length of approximately 16 kilometres, starting from a point just south of Tarbet (south of the junction with the A83) to a point approximately 800 metres north of Inverarnan, where the existing carriageway cross-section widens to 7.3 metres with near standard verge widths.

The A82 between Tarbet and Inverarnan is a single carriageway road with a substandard cross-section width and alignment, in terms of DMRB standards. This section of road also has a poor road traffic accident record.

The road runs south to north alongside Loch Lomond passing through Tarbet, Inveruglas, Ardlui and Inverarnan. The majority of this section is constrained to the west by mountains (Cruach Tairbeit and Ben Vorlich) and to the east by Loch Lomond. In addition, the West Highland railway line runs close to the road, to the west, coming within 25 metres in certain locations. The presence of numerous steep rock outcrops to the west and loch foreshore to the east result in the road layout having an overall cross-section that is often little more than the surfaced carriageway width.

In addition to a substandard carriageway width, the road also has numerous low radius curves and bends that limit forward visibility. As a result, these characteristics combine to reduce the average speed of vehicles on the route and often prevent

vehicles from passing each other safely without having to slow down, especially large vehicles. At Pulpit Rock, this has resulted in the provision of traffic signals to control traffic flows through a particularly narrow section.

## 2.3 Operating Conditions

### 2.3.1 Role of the A82

The A82 has a number of roles and these are essentially:

- provides local access;
- a principal road link between the north west of Scotland and Central Belt for strategic traffic;
- a tourist and scenic route – (i) Loch Lomond area, (ii) wider National Park area and (iii) North West Scotland; and
- a freight route.

### 2.3.2 Road Characteristics

The A82 has a number of road characteristics including the following:

- single carriageway road – less than 6.0 metres wide in places;
- general lack of hardstrips and road verges;
- lots of bends with poor forward visibility – 50% below design standards;
- 60mph speed limit (Speed Limit Review recommends 50mph limit);
- very few sections of footways/footpaths;
- parking is mix of formal and informal areas, with lay-bys not meeting design standards;
- poor drainage – road surface often wet even during dry weather;
- narrow road affects maintenance activities – need for closures;
- bounded to east by Loch Lomond; and
- bounded to west by mountains, rock outcrops and railway line.

### 2.3.3 Traffic Volumes

The 2012 2-way 24-hour Average Annual Daily Traffic (AADT) flows on this section of the A82 is approximately 3,500 vehicles, although there are significantly higher levels in summer months and lower levels in winter months. A82 vehicle flows have remained fairly consistent, with only a 2.5% rise (less than 100 vehicles) in 2012 levels over 2008 levels. However, it should be noted that some sections of the Scottish trunk road network have seen a reduction in traffic flows over the same period.

In terms of daily flow profiles, there are broadly similar profiles for both weekdays and weekends, with the weekday peak periods being typically 11:00 – 12:00 and 16:00 – 17:00. Traffic flows at the weekends are significantly higher than weekdays, especially on Saturdays, by approximately 50%, mainly considered to be due to an

influx of visitors and tourists. There is significant seasonality impact on the A82, with both northbound and southbound flows peaking in August at more than double the January flows.

### 2.3.4 Existing Journey Times

Based on recent Automatic Number Plate Recognition (ANPR) survey data, a 'snapshot' of journey times between Tarbet and Inverarnan gives the journey time in free flow conditions (assumed to be around 7:00am) as approximately 15 minutes, which equates to an average speed of approximately 40mph, with an average journey time over the 16 kilometres section of approximately 19.5 minutes, including travel through the current Pulpit Rock Scheme traffic signals, with an associated average vehicle speed of 27mph. There is significant variation in journey times, ranging between approximately 14 minutes and 27 minutes, as it is influenced by factors like the presence of slow moving vehicles, such as caravans or large vehicles that have difficulty negotiating the sub-standard geometry of the road and timing of approach to the Pulpit Rock traffic signals. Survey results do show the common effect of platooning due to large slow vehicles. The existing geometry does not provide many overtaking opportunities.

### 2.3.5 Vehicle Composition

The 2012 2-way 24-hour AADT flow of 3,500 vehicles has a composition of:

- car/van 83%
- car & trailer 2%
- LGV/rigid HGV 11%
- large HGV 1%
- motorcycle 2%
- bus/coach 1%

This mode share is broadly consistent with Department of Transport (DfT) census count data albeit with the exclusion of 'car & trailer' (http://www.dft.gov.uk/traffic-counts/cp.php?la=Argyll+%26+Bute). DfT data count information does present a lower level of AADT flow, being in the region of 2,800 vehicles per day, with the following composition:

- car/van 81%;
- LGV/rigid HGV 14%;
- large HGV 1%;
- motorcycle 2%; and
- bus/coach 2%.

### 2.3.6 Maintenance

The existing restricted geometry along the Tarbet to Inverarnan section of the A82 results in routine maintenance being difficult to undertake without the need for an associated road closure. Such road closures are disruptive and cause significant inconvenience to road users, as diversion routes are lengthy. For example, diverting via the current promoted diversion A83-A819-A85 route increases journeys between Glasgow and Fort William by approximately 30 miles (from 110 miles to 140 miles), which can add approximately 40 minutes to a typical journey time of 2 hours 30 minutes. In addition, if travelling north to Crainlarich from Glasgow, travellers could alternatively route via the M80 and M9 to Stirling then the A84 to Crianlarich, which is some 71 miles, comparable to a 50-mile journey from Glasgow on the A82 to Crianlarich.

There is also the likelihood that the need to implement an overnight road closure can result in maintenance tasks being more expensive to undertake than if works were carried out during the day with more basic traffic management arrangements.

## 2.4 Road Safety Conditions

The number of traffic accidents resulting in personal injury on this section of the A82 has been fairly consistent during the past five years, based on 2008 – 2012 data. For this 16 kilometres length, there has been a total of 53 injury accidents during this period, with 3 fatal, 16 serious and 34 minor. This is consistent with the 2004 – 2009 period assessed in previous studies, which had 57 injury accidents, supporting the view this section of the A82 has a significant road safety problem. Killed or seriously injured (KSI) accident rates on this section of road are over four times the national average for such KSI accidents on the Scottish trunk road network (based on the values for non-built-up A-class trunk roads reported in Road Casualties Scotland 2012).

The accidents are generally spread along the 16 kilometres route, with only a few clusters occurring; one cluster at a sharp bend in the vicinity of Inveruglas Holiday Centre and a second one just to the north of Pulpit Rock.

With regard to the 2008 – 2012 injury accidents, key aspects are:

- 53% of accidents occurred on a bend;
- 34% of accidents involved a vehicle leaving the road and hitting an object;
- 10 accidents involved a motorcycle; and
- 9 of these were killed or serious injury (KSI) accidents.

(2004 - 2009 data recorded 23 motorcycle accidents, so there has been a noticeable reduction during the 2008 – 2012 period, which is consistent with the general trends on the wider Scottish road network reported in Road Casualties Scotland 2012.)

From the accident reports, the main contributory factors were recorded as being:

- 30% slippery road surface (16);
- 9% travelling too fast (5);
- 8% poor turn or manoeuvre (4);

- 6% road layout (3);
- 6% deposit on road (3);
- 6% failed to look properly (3);
- 6% loss of control (3); and
- 6% sudden braking (3).

## 2.5 Environmental Conditions

Engineering and environmental surveys, undertaken in 2011 – 2012, and summarised in the A82 Engineering and Environmental Surveys Report, dated March 2012, considered existing environmental conditions on the Tarbet to Inverarnan section. Output from this report has been validated and updated with further data collection by the CFJV design team.

The Report provides an initial study of the nature of the landscape resource and sets out key objectives which should be considered by any significant road improvement. The Report sets out main challenges associated with the site and suggests what measures should be considered to deliver the key objectives. The Report summarises what surveys were carried out and provides guidance on additional surveys that will be required. The Report focuses on the landscape resource but does also make brief reference to visual issues, including the nature and locations of likely close range visual receptors.

Key environmental considerations are set out below.

Issues specific to the Tarbet to Inverarnan route of the A82:

- high value tourist route through sensitive semi-wild landscape within the Loch Lomond and the Trossachs National Park;
- lies within a National Scenic Area (NSA);
- 21 listed buildings and 3 scheduled monuments along the scheme extents. These features of cultural heritage are mainly around the villages of Tarbet, Inveruglas, and Inverarnan; and
- the area is valued for its traditional rural character and special qualities creating a relatively unspoilt environment.

Main challenges an improvement scheme will need to consider:

- presence of mature broad-leafed woodland with roots within 30 metres of the existing carriageway;
- high level of otter actions within the watercourse near the shoreline of Loch Lomond;
- presence of Japanese Knotweed adjacent to the carriageway;
- presence of memorial stones and milestones within the area;
- large number of deer on site;
- presence of inland cliff rock exposures;

- high value landscape - NSA, the National Park;
- number of sites of special scientific interest in the area; and
- Value of site and adjacent habitats is considered to be of national value for fish, including Atlantic salmon, sea trout, brown trout, European eel, river lamprey, brook lamprey and powan.

Key environmental objectives:

- that the proposals taken forward do not compromise the unique landscape of Loch Lomond or its tourist value;
- that the proposals are developed to least impact on local properties, businesses and tourists;
- that proposals are developed which least compromise the natural and cultural heritage of the area as far as is practical; and
- that a sustainable approach to the proposals underpins their development at all stages.

Proposals should consider the following:

- naturalness of the route;
- retention of scenic views and scenic beauty providing parking opportunities along the route to allow views to areas of the loch;
- retention of variations in landform;
- minimising man-made influences incorporating sympathetic engineering solutions;
- avoiding over engineered stabilisation solutions ensuring sympathetic design of rock cuttings;
- balance of good cost effective design;
- ensuring minimal intrusion into the landscape during the design process;
- variations along the route responding to the different landscape character between the north section of the route and the south section of the route;
- re-coppicing woodland to maximise views of the loch; and
- cumulative impacts especially if improvements will take the form of smaller individual schemes between Tarbet and Inverarnan, as there is potential for negative cumulative impact on different receptors.

In addition, future improvement should:

- not compromise Loch Lomond and its tourist value;
- result in the least possible impact on properties, business and the natural and cultural heritage;
- adopt a sustainable approach;

- promote natural regeneration and should look at retaining resident turfs and seeds;
- encourage healthy forms of travel, such as cycling;
- improve the ecological quality of the water from effects of travel;
- use more sympathetic design solutions such as wooden clad barrier systems where possible;
- provide opportunities to highlight tourist spots but at the same time minimise road signage clutter;
- utilise permeable surfaces that will not detract from visual amenity;
- manage existing trees and utilise special no dig construction methods within root protection areas of existing trees;
- be prudent in the use of natural materials and seek to utilise recycled materials. Local materials should be used where possible;
- incorporate deer fencing due to the large number of deer on site; and
- provide opportunities to improve intermittent walking and cycling due to the importance of the Loch Lomond area for tourism and recreation.

The Report recommends that ongoing consultation and workshops should be undertaken with the National Park Authority, Scottish Natural Heritage, Historic Scotland and SEPA. The views of these stakeholders are considered critical to the delivery of future design solutions that mitigate any detrimental environmental impact.

## 2.6 Previous Studies

Relevant previous studies carried out in the A82 corridor include the following: -

- A82 Route Action Plan Study (2006);
- STPR A82 Technical Reports (2010); and
- Engineering and Environmental Surveys (2012).

In addition, Transport Scotland commissioned the trunk road operating companies to review the speed limits on Scottish trunk roads, including the A82, and results were published in 2012, as part of the Speed Limit Review.

Proposed improvements to the A82 are included in the following Scottish Government strategic level documents:-

- Strategic Transport Projects Review (2009); and
- Infrastructure Investment Plan (2011).

An improvement to a section of the route known as Pulpit Rock, which is located within the Tarbet to Inverarnan section, has been progressed independently of the current commission and site works commenced in May 2013 and is scheduled to take approximately 12 months to complete. The improvement at Pulpit Rock will see the removal of existing traffic signals and the section of road widened to provide a two-

way single carriageway by constructing a new viaduct running parallel with Loch Lomond.

### 2.6.1 A82 Route Action Plan Study (2006)

The report considered the A82 between Tarbet and Fort William, identified existing and emerging problems and proposed a package of improvement measures.

This report provides a broad summary of the problems encountered by road users along the existing route as well as presenting a study of the road conditions in 2006, including traffic volumes recorded in 2004. Road traffic accidents on the A82 involving personal injury for the 5-year period between 1999 and 2003 were analysed for the corridor up to Fort William and showed accident rates higher than the Scottish national average, especially on the Tarbet to Crianlarich section. In summary, the report noted problems on the Tarbet to Inverarnan section relating to (i) sub-standard road geometry; (ii) high accident levels, including fatal and serious injuries and (iii) unreliable journey times.

The report did identify the Tarbet to Inverarnan section in particular need of improvement. It split the section into three distinct stages which were experiencing operational stress as follows:-

- Loch Lomond between Tarbet and Pulpit Rock due to the poor alignment along the side of the loch and the narrow carriageway width;
- Pulpit Rock due to the long-term traffic signals; and
- Loch Lomond between Pulpit Rock and Inverarnan due to the poor alignment along the side of the loch and the narrow carriageway width on some sections.

Traffic flow data was obtained and showed significant seasonal variation, with 2-way 12-hour traffic flows to the south of Crianlarich increasing by 54% from 2,800 vehicles in May 2004 (weekday) to 4,300 vehicles in August 2004 (weekday) with a further increase of 79% to 7,700 in August 2004 during the weekend. Increased journey times are noted due to the high number of tourists that are attracted to the route during the summer months and when heavy goods vehicles are required to negotiate the tight horizontal bends and the narrow carriageway width.

The report discussed and assessed a number of localised improvements, both online and offline, including a detailed discussion of the options at Pulpit Rock. Outline construction cost estimates were provided. The report noted that a more detailed assessment in accordance with DMRB would be required to fully assess the costs and benefits of either a 6.0 metre or 7.3 metre wide carriageway layout; however, the information presented in the report indicated that the provision of a 6.0 metre wide carriageway with 1.0 metre wide hard strips and 2.5 metre wide verges, with an overall width of 13.0 metres, provides a better economic return in terms of net present value and benefit to cost ratio than the 7.3 metre option. It is also likely to have less impact on the sensitive environment.

It was noted that if the 6.0 metre wide carriageway option was taken forward, it is likely that localised carriageway curve widening would be required on some of the tighter horizontal radii to minimise the risk of collision between northbound and southbound heavy vehicles and coaches.

Construction of online improvements was acknowledged to be challenging due to the lack of local diversion routes along Loch Lomond with a likelihood of traffic management challenges resulting in significant delays to road users and potential major disruption to the local community.

### 2.6.2 STPR Technical Reports (2010)

Four associated technical reports were drafted, the purpose of which was to take forward and update outputs from the earlier A82 Route Action Plan Study.

Report 1 is an accident analysis of the A82 between Tarbet and Fort William. The accident analysis was carried out using information for the five year period 1 November 2004 - 31 October 2009. The recorded accidents between Tarbet and Inverarnan consisted of 34 slight, 16 serious and 7 fatal.

The report noted that the Tarbet to Inverarnan section of the A82 has an accident rate which is more than three times the Scottish national average and fatal accident rates which are more than double the national levels, whilst the Tarbet to Inverarnan KSI rate is more than five times the national rate.

Report 2 is an engineering assessment of the section of the A82 between Tarbet and Crianlarich. The purpose of the assessment is to consider various alternative engineering measures that would enhance the level of service and improve road safety between the areas served by the Tarbet to Crianlarich road corridor.

The alignment and layout constraints for the A82 were derived in accordance with the DMRB, TD9/93, Section 1. For the A82 between Tarbet and Crianlarich, the calculated Design Speed was 85B kph.

Seven improvement options were proposed and assessed, both online and offline. The report provides engineering comment on each option together with indicative cost estimates at 2009 prices. It also discusses the merit of each option before recommending a number of options be taken forward for DMRB Stage 1 assessment.

Report 3 is an engineering assessment of the section of the A82 between Crianlarich and Glencoe.

Report 4 is a summary of the first three reports and also provides an overall vision for the A82 Corridor between Tarbet and Fort William. Key transportation points are:-

- the road has a national speed limit of 60mph except through some communities, including Tarbet;
- HGVs should travel at a maximum 40mph speed limit;
- the free flow journey time between Glasgow and Fort William is approximately 2 hours, while alignment constraints along the route affect journey times such that the average journey time is approximately 2 hours 40 minutes, based on Transport Model for Scotland (TMfS) calculations;
- average journey time northbound between Tarbet and Fort William is 1 hour 40 minutes, with southbound being 1 hour 30 minutes, based on observed times;
- the route carries a slightly higher volume of LGVs than the average for a rural trunk road;

- there is a slight variation in volumes of HGVs, with 7.0% present south of Crianlarich and 8-10% present to the north;
- the Tarbet to Inverarnan section has an accident rate that is higher than the Scottish national rate, with severe accidents being some five times the Scottish national rate;
- drainage is an issue, especially between Tarbet and Inverarnan;
- lay-by frequency is within the recommended DMRB standard; and
- providing an overall vision with a better understanding of the improvements deemed necessary on the A82 corridor that would significantly reduce accident severity and improve the standard of the carriageway.

These reports also noted problems on the Tarbet to Inverarnan section relating to (i) sub-standard road geometry; (ii) high accident levels, including fatal and serious injuries; and (iii) unreliable journey times.

### 2.6.3 Engineering and Environmental Surveys (2012)

This report was commissioned with a view to gather engineering and environmental data to support future DMRB design and assessment of improvements to the Tarbet to Inverarnan section of the A82 route. The draft report reviews previous studies and alignment options which considered both online and offline alternatives.

The report noted that the existing A82 carriageway between Tarbet and Inverarnan is below standard due to topographical constraints and offers limited cross-sectional width with frequent low radius curves that limit forward visibility. In addition, a number of localised 'pinch points' have been identified, typically at bridges, where the width of the carriageway reduces significantly.

The design speed for the corridor was calculated to be 85B kph. Consultation with Transport Scotland's Standards Branch (TSSB) in 2012 noted the past assessments and advised TSSB would prefer 100kph but that an appropriate design speed would have to be determined. It was acknowledged that any design following the existing alignment would be significantly below standard given the radii of the curves.

An updated review of accident records covering the period 1 January 2008 to 31 December 2011 recorded 48 accidents of which 6% were fatal, 27% serious and 67% slight and noted that the Fatal and Serious rate was significantly higher than the national average. The main contributing factors resulting in the high severity of accidents include unsafe overtaking manoeuvres and excessive speed through the bends along with vehicles striking carriageway hazards.

Consultation with the Loch Lomond and Trossachs National Park Authority (NPA) in 2011 highlighted a number of matters including:-

- NPA view the current layby provision, which is understood to consist of 29 formal and informal parking areas, to be of poor quality and in some cases dangerous;
- the lack of dedicated parking areas was contributing to anti-social behaviour and a poor overall experience within the park;

- NPA has an aspiration for dangerous/informal laybys to be stopped up and better dedicated parking provided in areas where a purpose for stopping could be established e.g. viewpoints;
- any new lay-bys should incorporate measures that prevent vehicles from being taken off road; and
- there is a desire to promote cycling along the corridor. This may include off carriageway paths around Ardlui.

Whilst the report did not consider traffic flows and journey times specifically, commentary on the road geometry does include some comments that the sub-standard alignment at certain locations is affecting vehicle speeds and restricting overtaking opportunities.

The report recommends that emerging design options, being essentially variations of on-line improvement, should be tested against the key constraints of each section of the route between Tarbet and Inverarnan. Minimal intrusion into the landscape should be foremost in the design process.

The report is consistent with the other studies in noting problems on the Tarbet to Inverarnan section relating to (i) sub-standard road geometry and (ii) high accident levels, including fatal and serious injuries. It also identifies low mean vehicle speeds, which would result in unreliable journey times.

### 2.6.4 Speed Limit Review (2012)

The review of existing speed limits on the Scottish trunk road network was completed in 2012 and findings were published on the Transport Scotland website. The A82 was assessed, with the route considered in distinct sections, one being Tarbet to Inverarnan.

The assessment noted the character of the road through this 16 kilometres section is generally not representative of a national speed limit and the low mean free-flow speed of 44.1mph suggests the driver's perception of route hazards requires travelling at a reduced speed. No common causation factors were established when assessing accident data that might have been addressed by accident remedial measures. The 3-year accident rate was calculated at 55 accidents per 100 million vehicle kilometres.

In summary, the review noted problems on the Tarbet to Inverarnan section relating to (i) a 3-year accident rate of 55 accidents per 100 million vehicle kilometres; and (ii) a low mean free-flow speed. The assessment recommends consideration be given to reducing the speed limit for this section from 60mph to 50mph.

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# 3 Future Operating Conditions

## 3.1 Introduction

This chapter summarises the envisaged future operating conditions of the Tarbet to Inverarnan section of the A82 and takes account of relevant policy and plans which will directly influence the future traffic demand on the A82. The future operation of the A82 and, specifically, the level of traffic which uses the route is anticipated to be constrained due to the existing poor standard of the road between Tarbet and Inverarnan. This constraint should be seen against a backdrop of the Scottish Government's economic strategy of promoting sustainable economic growth, combined with a Local Plan which encompasses a range of land use aspirations that aim to encourage sustainable economic growth in an appropriate manner sensitive to the nature of the National Park. Land Use Planning

The National Planning Framework 2 identifies the A82 as a key strategic route for the Highlands and Islands and recognises the inclusion of the route within the STPR. Work is currently underway to produce a Local Development Plan for the National Park but it is not envisaged to be adopted until October 2016, hence the Argyll and Bute Structure Plan remains the relevant strategic land use plan for the area of the A82 between Tarbet and Inverarnan. The Argyll and Bute Structure Plan was adopted in November 2002 and highlights that the need to improve the A82 trunk road is of strategic importance in terms of its trunk road function and describes the route north of Tarbet as not fit for purpose.

The A82 Tarbet to Inverarnan section rests within the Loch Lomond and Trossachs National Park and, as a consequence, the National Park Authority (NPA) is the local planning authority. The current National Park Local Plan 2010-2015 was adopted by the National Park Board in December of 2011 and has put in place a strategy for land use planning in the National Park area. The Local Plan has a particular focus on development aspirations by 2015, although also encompasses a more strategic vision of land use beyond 2015. The Local Plan will be replaced by the Local Development Plan. The National Park adopted Local Plan states that the National Parks (Scotland) Act 2000 sets out four statutory aims for National Parks in Scotland, which extend to:-

- the conservation and enhancement of the natural and cultural heritage of the area;
- the promotion of sustainable use of the natural resources of the area;
- the promotion of understanding and enjoyment (including enjoyment in the form of recreation) of the special qualities of the area by the public; and
- the promotion of sustainable economic and social development of the area's communities.

Relevant transport infrastructure proposals for the A82 within the Local Plan include:-

- Pulpit Rock; and
- Stuckendroin Bridge and sections south of Inverarnan, to Ardlui and Inveruglas to north of Loch Sloy.

Whilst the Local Plan identifies specific proposals for the A82, land use allocations within the vicinity of the route between Tarbet to Inverarnan that may induce increases in traffic volumes are limited. Tourism opportunities are identified around Tarbet, making use of existing sites, such as the rear of the Tarbet Hotel, lochside frontage and the former Harvey's garage site. Whilst the land allocations in the Local Plan remain sensitive to the nature of the area, it is likely that the standard of the A82 may have been a constraint in determining land use allocations north of Tarbet.

Given the current Local Plan, it is evident that seasonality is likely to remain on the A82 with local traffic generation being mainly associated with tourism, however the aspirations of the current Local Plan are unlikely to place significant undue pressure in capacity terms on the A82. Trips on the A82 are anticipated to remain mainly strategic in nature, however traffic growth is likely to remain constrained given the poor standard of the route north of Tarbet.

## 3.2 Forecasting Future Traffic Growth

For the purpose of assessing the comparative impact of the A82 Tarbet to Inverarnan Upgrade corridor options, the application of national road traffic forecasts (NRTF (1997)) under the Central Growth scenario has been used.

As traffic flows on the A82 over the 5-year period, from 2008 to 2012 inclusive, indicate that traffic levels have remained fairly consistent and, given the poor geometry of the route due to its constrained nature that gives rise to journey time variability combined with a lack of proposed significant new trip generating developments in the area, it does not seem unreasonable to assume that there will be little traffic growth between Tarbet and Inverarnan (at least in the short term).

To assess the impact of limited growth along the corridor, the application of NRTF (1997) traffic growth forecasts under the Low Growth scenario has been reported as a sensitivity test. This test may also be considered a proxy for a scenario whereby no growth continues for another five years, thereafter traffic grows in line with Central Growth projections. Zero growth has been assumed post 2031 in line with NRTF (1997).

## 3.3 Future Network Changes

In terms of trunk road network improvement plans, in the vicinity of Tarbet to Inverarnan, changes to the A82 will take place as there are, at the time of writing, two committed schemes that are both currently under construction. The following text provides a descriptive summary.

### Pulpit Rock Scheme

A Transport Scotland led on-line improvement to a section of the A82 route known as Pulpit Rock has been progressed independently of the Tarbet to Inverarnan commission. Site works commenced in May 2013 and are scheduled to take approximately 12 months to complete. The Pulpit Rock Scheme is located within the Tarbet to Inverarnan section.

The improvements at Pulpit Rock will see the removal of existing traffic signals and the section of road widened to provide a two-lane carriageway by constructing a new viaduct running parallel with Loch Lomond. Benefits resulting from the scheme are

expected to include, improvements to journey times, a reduction in accidents and reduced driver frustration.

### Crianlarich Bypass

A Transport Scotland promoted off-line improvement known as Crianlarich Bypass. During the busy summer tourist season, the existing junction within Crianlarich, where the A82 and A85 meet, can experience significant delays in the village and the construction of a bypass around Crianlarich will provide a solution to these problems. This scheme is located north of the Tarbet to Inverarnan section.

The bypass will be a new 1.3 kilometre single two-lane carriageway road to the west of the village, enabling A82 users to avoid the low bridges in the village. The majority of the work will take place off the line of the current A82, so road closures beyond tie-in construction works are not anticipated and any disruption should be minimal. Construction work commenced on site in September 2013 and will take approximately 12 months to complete.

## 3.4 Future Operating Conditions

If the A82 Tarbet to Inverarnan Upgrade scheme were not to be implemented, future operating conditions on this section of the trunk road are unlikely to significantly change from current conditions. Whilst completion of the Pulpit Rock scheme will see some improvement in overall journey times between Tarbet and Inverarnan, the majority of the road will continue to experience low speeds and delay for the majority of traffic.

This section of road is forecast to have some minor increase in traffic flows, as discussed in Section 3.2, which could exacerbate existing problems, in regard to journey time variability, slow-moving vehicles, platooning and increased conflicts at particularly narrow sections.

Road safety is likely to remain a significant issue and any increase in traffic flows could see an associated increase in traffic accidents, including personal injury accidents. The Trunk Road Speed Limit Review has recommended this section have its current speed limit of 60mph reduced to 50mph. This might help prevent some future accidents but is unlikely to see a major reduction, given the low average speed of the majority of vehicles that is already well below 50mph.

Routine maintenance would continue to be generally problematic and road closures for maintenance works or other events, such as accidents, would continue to create significant delay and inconvenience. Some isolated improvements to surface water drainage may be implemented but are likely to be more basic in nature than what would be implemented as part of the Upgrade scheme, which would seek to introduce SUDs measures where feasible.

Parking would continue to be a problem although some measures might be introduced to prevent the use of informal parking areas, particularly at any locations that are considered to have safety issues. In addition, there is unlikely to be any significant improvement in accessibility for non-motorised users, especially pedestrians and cyclists.

Development and construction of the A82 Tarbet to Inverarnan Upgrade scheme would address the above issues and problems to varying degrees, depending on what finalised design was taken forward.

# 4 The Investment Case

## 4.1 Introduction

A key section of any Business Case is the investment case, which demonstrates whether or not an investment is needed, either immediately or in the future. It should support the case for change, showing a clear rationale for making the investment; and strategic fit, how the investment will meet the aims and objectives of the responsible organisation. The investment case provides the greatest emphasis for proceeding with a project at an early stage and should provide a shortlist of options that are taken through the STAG process at the SBC stage.

The investment case should specify the business need for a project. What will be achieved by the project and why is it needed now. This should be put into context by examining existing conditions and be used to identify a series of investment aims. These investment aims are then assessed against what the responsible organisation (and wider Government) wants to achieve as a whole.

Determining the need for change and strategic fit should be an iterative process as the business case develops and should always be supported by robust evidence, such as identifying key problems, risks and constraints. Consulting key stakeholders is an important step in identifying aims.

Whilst a STAG assessment of potential route options corridor can be deemed sufficient to provide the SBC for the project, an introductory supporting investment case is considered beneficial. The following sections seek to set out an initial investment case for implementing improvements to the A82 Tarbet to Inverarnan section. The investment case will subsequently be reviewed and updated, becoming detailed as the project moves to OBC stage and then, if approved, to FBC stage.

## 4.2 Business Strategy

Transport Scotland is the national transport agency for Scotland, an agency of the Scottish Government and accountable to Parliament and the public through Scottish Ministers. Transport underpins how Scotland works and performs. Through the development of transport projects and policies, Transport Scotland supports Scottish businesses, communities and services, connecting people across Scotland and beyond. Transport is a vital feature of the Scottish Government's focus on increasing sustainable economic growth. Transport Scotland is responsible for helping to deliver the Scottish Government's capital investment programme for transport.

Transport Scotland's remit incorporates:-

- Rail and trunk road networks;
- Major public transport projects;
- National concessionary travel schemes;
- Impartial travel services;
- Coordinating the National Transport Strategy for Scotland;
- Liaising with regional transport partnerships, including monitoring of funding;

- Sustainable transport, road safety and accessibility;
- Local roads policy;
- Aviation, bus, freight and taxi policy;
- Ferries, ports and harbours; and
- The Blue Badge Scheme.

Scotland's trunk road network currently measures 3,405 kilometres in length and has a gross asset value of over £18 billion. The network is of national importance by connecting major cities, towns, airports and ports enabling the movement of people, goods and services.

## 4.3 Problem Identified

As discussed in Chapter 2, a number of previous studies have considered the Tarbet to Inverarnan section of the A82 and identified a number of key problems that can be summarised as follows:-

- sub-standard road geometry;
- unreliable journey times; and
- road traffic accidents.

In addition to these key problems, previous studies have also noted the following issues, which have subsequently been confirmed by various stakeholders:-

- informal and sub-standard parking facilities (in terms of DMRB design standards); and
- poor accessibility for non-motorised users.

In terms of the SBC, it is important to validate existing problems are still present and identify any additional ones. This is the initial stage of a STAG appraisal.

### Sub-standard Road Geometry

Since the A82 Route Action Plan was produced in 2006, no significant improvements have yet been implemented on the A82 Tarbet to Inverarnan section to address its sub-standard road geometry. It should be noted that the A82 Pulpit Rock scheme commenced construction in May 2013 and is due for completion during summer 2014, which will widen a short section of the existing road and remove the current traffic signals located within this section.

Previous problems identified in relation to sub-standard road geometry are considered to still apply on the Tarbet to Inverarnan section and, therefore, still need to be addressed. The design process should be taken forward to consider options to address this problem.

### Un-reliable Journey Times

Since the A82 RAP was produced in 2006, no significant improvements have been implemented on the A82 Tarbet to Inverarnan section to address its unreliable journey times. The A82 Pulpit Rock scheme will improve an element of existing journey times by removing the current traffic signals located within this section.

ANPR data, from surveys undertaken during August 2013, produced an average journey time of 19.5 minutes for the approximate 16 kilometre route, resulting in an average vehicle speed of 27mph over this section. Hence, previous problems identified in relation to un-reliable journey times are considered to still apply on the Tarbet to Inverarnan section and, therefore, still need to be addressed. The design process should be taken forward to consider options that provide improved journey times.

### Accidents

Previous studies noted some reduction in the numbers of road traffic accidents (RTAs), resulting in personal injury, between Tarbet and Fort William from 1999 to 2003. However, subsequent analysis suggests this number has then remained fairly consistent thereafter. The Tarbet to Inverarnan section continues to see a high number of RTAs when compared with the national averages for similar rural trunk roads, with a high proportion of serious or fatal personal injury accidents occurring.

The most recent 5-year accident data (2008 – 2012) shows RTA rates on the Tarbet to Inverarnan section are still significantly higher than the Scottish average for non-built up trunk roads, in terms of serious and fatal injuries. As a result, previous problems identified in relation to accident rates are considered to still apply on the Tarbet to Inverarnan section and, therefore, still need to be addressed. The design process should be taken forward to consider options that improve road safety.

### Other Issues

In terms of other issues, existing parking lay-bys on the A82 between Tarbet and Inverarnan are considered to be sub-standard, in terms of DMRB design standards for a trunk road, including insufficient diverge and merge tapers and visibility. In addition, this section of the A82 also has a number of informal parking areas, such as sections of verges, which have unsafe access. Parking surveys are to be undertaken during summer 2014 in order to identify maximum capacity and demand requirements.

In addition, this section of the A82 has no significant sections of footway/footpath or any continuous off-road cycle routes, resulting in accessibility for non-motorised users (NMUs) being poor, including users of public transport, particularly buses. Whilst, at this time, it is not clear if there is latent demand for such facilities, it is a policy for Transport Scotland to seek to improve accessibility for NMUs when upgrading existing sections of the trunk road network.

## 4.4 Impact of No Change

The impact of a 'Do Nothing' scenario that would see no change to the existing situation is likely to result in the following:-

- no improvement to the existing sub-standard road geometry of the Tarbet to Inverarnan section of the trunk road, thereby not meeting STPR Intervention 3 objectives;
- no reduction in number of RTAs, with rates for fatal and serious injuries likely to remain high, thereby not meeting STPR Intervention 3 objectives;

- no improvement in vehicle speeds and average journey times along this section of the A82;
- no improvement in existing parking facilities along this section of the A82; and
- no improvement in accessibility for NMUs along this section of the A82.

## 4.5 Drivers for Change

### Internal

The main internal driver for change to the Tarbet to Inverarnan section of the A82 is STPR, which considered an extensive list of potential improvements to the strategic transport network and, through a STAG appraisal, recommended improvements to the A82 route as one of the key projects (Intervention 3). Changes are required in order to (i) improve journey times and (ii) reduce traffic accidents.

As a result, improvements to the A82 route are included in the Scottish Government's Infrastructure Investment Plan 2011, which identifies a whole A82 route budget estimate of £200 to £250 million and a programme covering the 2015-2019 and 2020-2025 periods (http://www.scotland.gov.uk/Publications/2011/12/05141922/0).

### External

Transport Scotland's vision is guided by the Scottish Government's overarching purpose:-

*"To focus government and public services on creating a more successful country, with opportunities for all of Scotland to flourish, through increasing sustainable economic growth."*

Upgrading the A82 will help improve connectivity by reducing average journey times and increasing journey time reliability that could help reduce transportation costs and aid stimulation of economic investment.

In addition, numerous stakeholders are supportive of upgrading proposals and have called for improvements to the A82 for a number of years. These include public bodies, business organisations, professional organisations, local residents/businesses and action groups, specifically the A82 Partnership.

## 4.6 Objectives

### High Level Objectives

The Scottish Government's Purpose is supported by five specific Strategic Objectives for Scotland, being:-

1. Wealthier & Fairer – increase wealth and share fairly
2. Smarter – expand opportunities to succeed
3. Healthier – help sustain and improve health
4. Safer & Stronger – stronger, safer places to live and better quality of life
5. Greener – improve natural and built environments

In addition, the National Transport Strategy (NTS) has three Key Strategic Outcomes:

1. Improve journey times and connections
2. Reduce emissions
3. Improve quality, accessibility and affordability

These influence Transport Scotland's purpose and it has two High Level Objectives, namely:-

1. Focus investment on improving journey times and connections across Scotland, cutting congestion and emissions, and maximising the opportunities for employment, business, leisure and tourism.

2. Focus on providing sustainable, integrated and cost-effective public transport alternatives to the private car, connecting people, places and work across Scotland.

Transport projects, from feasibility to implementation, should be consistent with the above high level objectives when appropriate.

### Project Specific Objectives

As mentioned already, STRP Intervention 3 has two A82 specific objectives, being:

- STPR Objective 7.1 – to provide improved road standards and overtaking opportunities; and
- STPR Objective 7.2 – to reduce accident severity to the national average.

It is a key requirement of the STAG appraisal to set specific objectives for any project so that proposals and outcomes can be assessed against them. For the appraisal of transportation schemes, it is usual to set Transport Planning Objectives (TPOs) to ensure the appraisal is objective-led and not solution-led. It is important that proposed TPOs for the A82 Tarbet to Inverarnan Upgrade scheme can be mapped back to STPR objectives and also more strategic ones, in order to help demonstrate why the project should be taken forward.

The project specific TPOs are discussed in detail in Chapter 5, with the option generation and appraisal then discussed in Chapter 6.

## 4.7 Constraints

At this early stage of the project, a number of potential high-level constraints have been identified from previous studies and by the CFJV design team under four headings and these would be considered in more detail as the scheme is developed:-

- buildability: the existing topography of the existing road corridor will create significant engineering challenges and also impact on the operation of the existing road during construction. Land would need to be acquired;
- environmental: any major improvements will have significant environmental impacts. The scheme is within a National Park National Scenic Area, two Sites of Special Scientific Interest are nearby, Loch Lomond and its water courses are graded as high water quality and the West Highland Railway runs close to the existing road;
- financial: issues raised under the Buildability and Environmental headings suggest extensive road geometry improvements are likely to be potentially expensive to deliver; and

- delivery timescales: the above three constraints suggest any major improvement could take some time to develop from design, through statutory procedures to implementation.

## 4.8 Stakeholders

Successful delivery of the Tarbet to Inverarnan Upgrade scheme will be influenced through engagement with key stakeholders and their involvement through consultation. The aims for consultation and engagement are to:-

- engage and inform interested parties to allow their expertise and knowledge to influence considerations during assessments;
- promote consultation with the community and their representatives so as to allow issues and concerns to be understood and addressed; and
- help de-risk the scheme promotion process.

### Key stakeholders and statutory consultees

Key stakeholders and statutory consultees for the project have been identified as being the following:-

- Argyll and Bute Council (Development and Infrastructure Services);
- Forestry Commission Scotland;
- Highlands and Islands Transport Partnership (HITRANS);
- Historic Scotland;
- Loch Lomond and Trossachs National Park Authority (NPA);
- National Trust for Scotland;
- Network Rail;
- Police Scotland and other emergency services;
- Scottish Environment Protection Agency (SEPA);
- Scottish Natural Heritage (SNH);
- The Highland Council;
- Transport Scotland.
- Utilities (Scottish Gas Networks, Scottish Power, Scottish Water and Scottish and Southern Energy as well as telecoms networks); and
- Visit Scotland; and
- West of Scotland Archaeological Service;

### Interested parties

Interested parties include the community and its representatives and other bodies that have an interest in the project, either directly or indirectly. The following parties have been identified within this category:-

- AA/RAC;
- Arrochar and Tarbet Community Council;
- BEAR Scotland Limited;
- Fort William & District Chamber of Commerce;
- Freight Transport Association;
- Friends of Loch Lomond and The Trossachs – an independent conservation and heritage charity;
- Land owners and business interests dependant on the A82 (including bus operators such as Scottish Citylink and rail operators such as ScotRail);
- Loch Lomond Association;
- Loch Lomond Bat Group;
- Loch Lomond Fisheries Trust;
- Members of the Scottish Parliament (MSPs) and Argyll and Bute Councillors for Lomond North (three councillors).
- Mid Argyll Chamber of Commerce;
- Residents of Tarbet, Inverarnan and along the route;
- Road Haulage Association (Scotland and Northern Ireland);
- Royal Society for the Protection of Birds (RSPB);
- Scottish Enterprise;
- Scottish Rights of Way and Access Society;
- Scottish Wildlife Trust;
- Strathfillan Community Council;
- Sustrans; and
- The A82 Partnership – an umbrella group campaigning for upgrading of the A82.

Stakeholder engagement shall commence early and pro-actively inform, engage, listen, communicate and address issues for consultees and stakeholders in the considerations of the A82 Upgrade. It is important to build on previous communications and discussions undertaken in 2012 as part of the engineering and environmental surveys, during key stages of the project. These are:-

1. Project commencement;
2. DMRB Stage 1 preferred corridor assessment;
3. DMRB Stage 2 preferred route assessment;
4. DMRB Stage 3 preferred scheme assessment;
5. Draft Orders; and
6. Implementation.

Initial feedback suggests there is general support for improvements to this section of the A82 and any future potential conflicts are likely to focus on specific design and mitigation issues. To help focus consultation, it is proposed to establish an A82 Stakeholder Forum. This Forum would act as a focus through which consultation and engagement workshops can be structured and will allow thematic approaches to be promoted and easily organised.

## 4.9 Options

At the SBC stage, the identification and consideration of potential improvement options should focus on possible route corridors. A list of potential corridor options should be developed by the Design Team and through consultation. It is important to consider the 'Do Nothing' option, as a base. Options are then subject to appraisal with the aim of recommending which should be taken forward for DMRB Stage 1 assessment that will select a preferred route corridor. Details of identified corridor options and their appraisal, consistent with STAG, are discussed in detail in Chapter 6.

Other than the 'Do Nothing' option, it is considered the corridor options have common potential risks, including (i) increase in construction costs; (ii) significant environmental impact; and (iii) delay to implementation during statutory procedures due to objections, including land acquisition. Risks will be managed during the lifecycle of the scheme development and promotion.

# 5 Transport Planning Objectives

## 5.1 Introduction

As discussed in Chapter 1, the A82 Tarbet to Inverarnan Upgrade scheme is being developed in order to address requirements within STPR Intervention 3 – "Targeted Programme of Measures to Improve Road Standards between Glasgow and Oban/Fort William (A82)". The key STPR Intervention 3 requirements for this section of the A82 are:-

- improve the general standard of the road;
- reduce accident rates; and
- improve journey time reliability.

Development of the scheme has adopted an objective-led approach, in order to comply with Scottish Government requirements and, therefore, TPO setting is a key stage in the development process. Following the identification of problems and their validation, as discussed in Chapter 4, the next stage involves objective setting. Initial proposed TPOs were informed by consideration of the problems and constraints identified as well as the wider transport and land use planning context. These TPOs were then developed with key stakeholders via a Stakeholder Workshop, held on 2 October 2013, then finalised and agreed with Transport Scotland, as client.

It is important that the scheme-specific TPOs should be based on evidence gathered through the problems, opportunities and constraints review. The STAG process also requires the objectives to be SMART:-

- **S**pecific – it will say in precise terms what is sought;
- **M**easurable – there will exist means to establish to stakeholders' satisfaction whether or not the objective has been achieved;
- **A**ttainable – there is general agreement that the objectives set can be reached;
- **R**ealistic – the objective is a sensible indicator or proxy for the change which is sought; and
- **T**imed – the objective will be associated with an agreed point in time by which it will have been met.

As well as being SMART, the TPOs for the scheme should also be "Additional". This can be defined as "*the indicator will be additional to the STAG criteria or will provide a clear focus for the appraisal*".

The finalised TPOs have provided a framework against which corridor options have been assessed in terms of their performance in meeting the objectives. The TPOs will also be used for future phases when route options are being considered and appraised.

## 5.2 Draft Transport Planning Objectives

Initially, the CFJV transport planning team identified a number of potential TPOs that were then assessed, resulting in three draft TPOs proposed for consultation, as set out in Table 5.1.

*Table 5.1: Draft transport planning objectives*

| No | Draft Transport Planning Objective | Proposed Indicator |
|---|---|---|
| 1 | To improve average journey times for A82 trunk road users between Tarbet and Inverarnan (based on observed post Pulpit Rock scheme scenario).<br>Problem: general slow speed of traffic | Average journey times versus observed data on A82 between Tarbet and Inverarnan (post Pulpit Rock scheme opening). |
| 2 | To reduce personal injury accident numbers and their severity on the A82 between Tarbet and Inverarnan to be closer to or better than national levels.<br>Problem: number of accidents and their severity | Personal injury accident numbers/severities |
| 3 | Taking account of the unique setting of the route within the National Park, seek to provide opportunities for enhanced formal parking facilities on the A82 between Tarbet and Inverarnan.<br>Problem: poor existing parking facilities | Improved formal parking facilities and opportunities versus 2013/2014 surveyed data on the A82 between Tarbet and Inverarnan Demand and user surveys |

## 5.3 Stakeholder Workshop

A Stakeholder Workshop (Workshop 1) was held with key stakeholders on 2 October 2013. One of its breakout sessions was designed to discuss and develop TPOs for the scheme. The three draft TPOs were presented and for each attendees were asked to confirm whether they:-

- Agreed: the objective is valid and they were comfortable with its wording and proposed indicators;
- partially agreed: agreed that a similar objective is required but would like the objective redrafted or indicators amended; and
- Disagreed: disagreed with the draft objective.

Once attendees had the opportunity to consider their own views, the group facilitator worked through each TPO to understand and, where possible, gain agreement from attendees. Any suggested additional objective put forward by an attendee was also discussed. Table 5.2 presents a consolidation of the feedback in relation to the three initial draft TPOs.

A separate Stakeholder Workshop Summary Report (CFJV Ref. No. 476416-001), summarising the consultation workshop event, held on 2 October 2013, has been produced.

*Table 5.2: Draft transport planning objectives – workshop 1 feedback*

| No | Draft Transport Planning Objective | Proposed Indicator | Stakeholder Feedback |
|---|---|---|---|
| 1 | To improve average journey times for A82 trunk road users between Tarbet and Inverarnan (based on observed post Pulpit Rock scheme scenario).<br>Problem: general slow speed of traffic | Average journey times versus observed data on A82 between Tarbet and Inverarnan (post Pulpit Rock scheme opening). | 13 – agree, 2 – partially, 0 – disagree<br>• Proposed indicator – average journey times for longer A82 route length of Glasgow to Fort William.<br>• Improvement provides wider benefits than just journey time savings.<br>• Could encourage more HGVs to use the route, with negative impact?<br>• Could making road faster result in more accidents?<br>*Recommendation – retain objective as currently proposed with minor text change.* |
| 2 | To reduce personal injury accident numbers and their severity on the A82 between Tarbet and Inverarnan to be closer to or better than national levels.<br>Problem: number of accidents and their severity | Personal injury accident numbers/severities | 14 – agree, 1 – partially, 0 – disagree<br>• Reduce all accidents.<br>• Could making road faster result in more accidents?<br>*Recommendation – retain objective as currently proposed.* |
| 3 | Taking account of the unique setting of the route within the National Park, seek to provide opportunities for enhanced formal parking facilities on the A82 between Tarbet and Inverarnan.<br>Problem: poor existing parking facilities | Improved formal parking facilities and opportunities versus 2013/2014 surveyed data on the A82 between Tarbet and Inverarnan<br>Demand and user surveys | 3 – agree, 12 – partially, 0 – disagree<br>• One group suggested removing first section of text referring to unique setting.<br>• Objective text to include 'appropriate', 'visitor parking', and 'managed'.<br>• What is the specific problem with present facilities?<br>• Indicators should include (i) visitor numbers; (ii) visitor duration; and (iii) visitor spend.<br>• Parking objective needs to take account of the NPA strategy and ensure specific opportunities are identified in consultation with the NPA.<br>• Parking facilities must allow for stopping for rest and relaxation.<br>• Not just parking but facilities.<br>• Closure of existing unsafe locations.<br>*Recommendation – retain principle of objective but amend its wording.* |

During the objective breakout session, a number of additional objectives were proposed by stakeholders. The CFJV team subsequently assessed these and put forward recommendations, as set out in Table 5.3.

*Table 5.3: Suggested additional objectives*

| Proposed objective | Proposed indicator | Comment | Recommendation |
|---|---|---|---|
| To improve journey time reliability.<br>Problem: not stated | Observed data for average journey time reliability<br>Seasonality | Given the high volumes of tourist traffic, with some travelling at low speeds, continuing to use this section of the A82, there is a risk that a road improvement might not significantly improve JT reliability. | No specific objective proposed. |
| Objective linked with improving conditions for NMUs.<br>Problem: not stated | Provision of segregated facilities<br>User surveys | Whilst NMU infrastructure provision can be dealt with as part of the design process, it is Transport Scotland policy (Roads for All Good Practice Guide) to consider opportunities as part of improvement schemes.<br>Provision of NMU infrastructure would not automatically lead to increase in NMU flows. | Include additional objective in relation to NMU infrastructure. |
| To increase NMU flows on this section of the A82.<br>Problem: low levels of NMU flows | Survey data | Lack of existing facilities unlikely to encourage pedestrians but unclear extent of any latent demand.<br>Stakeholder evidence route is well used by cyclists, especially clubs.<br>Consider as part of the design process but note any road improvement would not automatically lead to increase in NMU flows, especially Public Transport (PT) users accessing services. | A NMU objective proposed, as per above, in relation to infrastructure. |
| Improve accessibility for NMUs and PT users.<br>Problem: lack of existing facilities | Provision of cycle path | Similar to above. | Covered within proposed additional objective, as above |

*Table 5.3: Suggested additional objectives (Cont.)*

| Proposed objective | Proposed indicator | Comment | Recommendation |
|---|---|---|---|
| Increase PT use, consistent with Climate Change Agenda | Survey data | Currently only anecdotal evidence from stakeholders that there is poor PT use. Remit of scheme is to improve A82 route and this is not a multi-modal study.<br>Whilst road improvements may provide opportunities to improve PT infrastructure on or adjacent to the trunk road, it would not automatically lead to increase in PT users accessing services. | No specific objective proposed. |
| To increase volume of strategic traffic on this section of the A82.<br>Problem: low levels of strategic traffic using this route | Survey data | The volume of strategic traffic using this section of the A82 is not a problem in itself. Scheme should not be seeking to force traffic to use this route.<br>An improvement that addresses original objectives 1 and 2 may result in the route becoming more attractive to strategic traffic. | No specific objective proposed. |
| Promote improvement of the National Park's environmental, landscape and amenity setting.<br>Problem: Adverse impact on experience of National Park | Secured through ELA and NPA support, as well as SNH, SEPA, etc. | This relates to potential impact of any improvement. The design process requires environmental impact to be taken into account.<br>There is no existing associated problem, as issue relates more to future conditions.<br>Proposed indicator is likely to be subjective and difficult to ensure as SMART. | No specific objective proposed. |
| Improve road geometry to help routine maintenance<br>Problem: Current arrangements frequently require road closures for routine maintenance. | Reduced number of road closures. | Existing constraints affect maintenance regime, in terms of road safety requiring road closures, which result in disruption detrimental to the economy. | Include additional objective in regard to seeking reduction of road closure frequency. |

*Table 5.3: Suggested additional objectives (Cont.)*

| Proposed objective | Proposed indicator | Comment | Recommendation |
|---|---|---|---|
| Reduce number of road closures associated with maintenance and RTAs.<br>Problem: frequent road closures causing disruption. | Reduced number of road closures. | Similar to above. | Covered within proposed additional objective, as above. |
| Upgrade road to trunk road standards<br>Problem: current geometry is below current standards and has road safety issues. | Improved geometry. | Trunk Road standards are a requirement for any proposed improvement and will form part of the design process. For specific schemes, departures may be approved by Transport Scotland, where deemed necessary and appropriate. | No specific objective proposed. |
| Improve drainage<br>Problem: poor existing drainage | Survey data.<br>Infrastructure | Existing drainage problems will be included in the design process, as part of proposed improvements, in order to comply with standards. There is no need, therefore, for a related objective. | No specific objective proposed. |
| Provide added value by linking in with other road improvements, such as A82/A83 junction.<br>Problem: not stated | Not suggested | STPR Intervention 3 seeks improvements to the whole A82 route.<br>The suggested objective relates to the design assessment. | No specific objective proposed. |
| Improve negative impact the A82 currently has on the economy of the West Highlands and Islands.<br>Problem: poor road alignment increases costs and restricts investment. | Before and after surveys of economic activity | An improvement that addresses original objectives 1 and 2 should result in the route becoming more attractive to strategic traffic by reducing travel costs. Economic investment is based on a wide range of factors. Whilst an improvement may help achieve wider economic benefits, it cannot be guaranteed. | No specific objective proposed. |
| To provide opportunities for wider economic developments.<br>Problem: not stated (similar to above?) | Not suggested | Similar to above. | No specific objective proposed. |

*Table 5.3: Suggested additional objectives (Cont.)*

| Proposed objective | Proposed indicator | Comment | Recommendation |
|---|---|---|---|
| Improve connectivity/access to local destinations to improve their economic viability.<br>Problem: not stated (similar to above?) | Not suggested | An improvement that addresses original objectives 1 and 2 should result in the route improving access to local destinations. Economic viability and attractiveness of a destination is based on a range of factors. | No specific objective proposed. |

## 5.4 Finalised Transport Planning Objectives

All feedback and comments from Workshop 1 were considered and the draft TPOs reviewed, together with suggested additional ones. As a result, amended TPOs were recommended and subsequently agreed with Transport Scotland. The five finalised TPOs are set out in Table 5.4.

*Table 5.4 – Finalised transport planning objectives*

| No | Transport Planning objective | Proposed indicator |
|---|---|---|
| 1 | To improve average journey times for A82 trunk road users between Tarbet and Inverarnan (based on observed post Pulpit Rock scheme scenario).<br>**Problem:** general slow speed of traffic. | Average journey times versus observed data on A82 between Tarbet and Inverarnan (post Pulpit Rock scheme opening). |
| 2 | To reduce personal injury accident numbers and their severity on the A82 between Tarbet and Inverarnan to be closer to or better than national KPI rates.<br>**Problem:** number of accidents and their severity. | Personal injury accident numbers/severities and rates. |
| 3 | To provide appropriate stopping opportunities for visitors and for all trunk road users on the A82 between Tarbet and Inverarnan taking account of the unique setting of the route within the National Park.<br>**Problem:** a general lack of formal parking capacity with existing trunk road parking facilities sub-standard in terms of layout whilst informal parking areas create road safety issues, in terms of their access. Existing stopping places are often not in locations or designed in a way that facilitates enjoyment of the area along the road corridor. | Improved formal parking capacity, facilities and management opportunities at appropriate locations (for example, proximal to areas with recreational potential) versus pre-improvement survey data on the A82 between Tarbet and Inverarnan.<br>Demand and user surveys, with focus on use and duration. |
| 4 | Seek to provide opportunities for enhanced access by sustainable modes of travel along the A82 corridor between Tarbet and Inverarnan.<br>**Problem**: lack of/poor existing infrastructure and facilities for NMU is potentially limiting travel by sustainable modes of transport. | Improved NMU infrastructure and opportunities versus pre-improvement survey data on the A82 between Tarbet and Inverarnan.<br>Demand and user surveys. |

*Table 5.4 – Finalised transport planning objectives (Cont.)*

| No | Transport Planning objective | Proposed indicator |
|---|---|---|
| 5 | To reduce disruption to road users resulting from the undertaking of maintenance activities on the A82 between Tarbet and Inverarnan.<br>**Problem:** existing narrow carriageway results in some maintenance being delayed or requires disruptive road closures to be implemented. | Reduced delay to road users arising from maintenance activities versus pre-improvement conditions.<br>Schedule of maintenance activities and their methods of implementation. Frequency and number of road closures for routine maintenance. |

# 6 Option Generation and Appraisal

## 6.1 Introduction

The purpose of the option generation, sifting and development stage is to derive an initial range of potential route corridors that could meet the TPOs and alleviate the problems or address the opportunities identified and then assess them through a robust appraisal, consistent with the STAG process.

All corridor options were derived through consultation with stakeholders, including Workshop 1 (held with key stakeholders), or identified by the CFJV design team. Account was also taken of the key objectives of STPR Intervention 3, together with existing corridor options identified through previous studies.

## 6.2 Methodology

The option generation process involves the development of a 'long list' of potential corridor options. It is important that all possible options are identified at this early stage to ensure particular options are not ignored. All of the corridor options identified are analysed in order to ensure that all possibilities have been given due consideration.

The analysis process allows for initial option sifting to be undertaken where there is general consensus a particular option will not address the problems and/or opportunities identified or achieve the scheme-specific TPOs.

Following the first sift, remaining corridor options are appraised and scored in order to establish if any of the options are shown not to perform well and can be rejected through a second sift. This leaves a final list of corridor options for analysis through the DMRB Stage 1 assessment, which will recommend a preferred route corridor for further development.

Workshop 1 was held with key stakeholders on 2 October 2013. One of its breakout sessions was designed to identify corridor options and obtain feedback on their suitability and public acceptance.

## 6.3 Corridor Option Generation

An initial list of potential corridor options was drafted by the CFJV design team, after reviewing previous studies, assessing known problems and using professional judgement. This initial 'long list' was then presented to stakeholders at Workshop 1 to aid discussion. From the workshop, an additional corridor option was identified and added to give a finalised 'long list' of 11 corridor options, as set out and described in Table 6.1. The 11 options are also shown on a plan in Appendix A.

It should be noted that any off-line option does not include any proposed improvement to the existing A82 corridor, such as stooping opportunities or enhanced NMU infrastructure/facilities. It is proposed an off-line option would be subsequently classified as a new section of the A82 trunk road, with the existing section de-trunked to become a local road.

*Table 6.1: 'Long List' of route corridor options*

| Ref no | Corridor option name | Description |
|---|---|---|
| 1 | **Existing A82 Corridor** | From Tarbet to vicinity of Inverarnan, along existing A82 corridor that allows for off-line widening, potential tunnels and/or viaducts. |
| 2 | **Arrochar to Inveruglas to Inverarnan** | From Tarbet to Arrochar, then to Inveruglas, via Glen Loin, then continues along existing A82 corridor. Glen Loin section either ground level or tunnel sub-options. |
| 3 | **A83 to Inverarnan (Glen Kinglas)** | From Tarbet to Arrochar then further along the A83 to Butterbridge, then running north-east through Glen Kinglas to Inverarnan. May require some improvement on existing A83 from Tarbet to Butterbridge. |
| 4 | **Loch Lomond Tunnel** | From vicinity of Tarbet to vicinity of Ardlui, as a submerged tunnel. Potential for a viaduct arrangement sub-option. |
| 5 | **Tarbet to Inverarnan Land Tunnel** | From vicinity of Tarbet to south of Inverarnan as a tunnel arrangement through hillsides to west of existing A82. |
| 6 | **Loch Lomond Crossing and East Side** | From vicinity of Tarbet, a Loch Lomond crossing and a new road on the east side of the loch joining existing A82 near Inverarnan. |
| 7 | **Inveruglas to Inverarnan (Loch Sloy)** | From Inveruglas north-west adjacent to Loch Sloy, then north-east to existing A82 in vicinity of Inverarnan. |
| 8 | **Combination of Option 1 (part) and Option 5 (part)** | From vicinity of Tarbet to vicinity of Inverarnan, as a combination of part of existing A82 corridor and part new land tunnel. |
| 9 | **Combination of Option 1 (part) and Option 7** | From vicinity of Tarbet along existing A82 corridor to Inveruglas then via Loch Sloy to existing A82 in vicinity of Inverarnan. |
| 10 | **Combination of Option 2 (part) and Option 7** | From Tarbet to Arrochar then via Glen Loin to vicinity of Inveruglas then north-west via Loch Sloy then north-east to existing A82 in vicinity of Inverarnan. |
| 11 | **High Road** | An alignment to the west and above the existing A82 corridor following some existing farm tracks and forestry routes with tunnels and viaducts. |

## 6.4 Initial Sift

In taking forward the 11 corridor options for assessment, there was also a requirement to add a 'Do Nothing' option, in order to provide a base scenario. An initial assessment of these 12 options concluded that five would not achieve all five of the TPOs and, therefore, it was recommended they should not be taken forward for further appraisal and scoring. The initial sift results are shown in Table 6.2, with Options 0, 3, 4, 5 and 10 being sifted out.

*Table 6.2: Initial sift results*

| Ref no. | Corridor option name | TPO1 improve average journey times | TPO2 reduce PIA numbers & severity | TPO3 Provide appropriate stopping opportunities | TPO4 enhanced access by sustainable travel | TPO5 reduce disruption due to maintenance | Take forward recommendation |
|---|---|---|---|---|---|---|---|
| 0 | Do Nothing | X | X | X | X | X | No |
| 1 | Existing A82 Corridor | ✓ | ✓ | ✓ | ✓ | ✓ | Yes |
| 2 | Arrochar to Inveruglus to Inverarnan | ✓ | ✓ | ✓ | ✓ | ✓ | Yes |
| 3 | A83 to Inverarnan (Glen Kinglas) | X | ✓ | ✓ | ✓ | ✓ | No |
| 4 | Loch Lomond Tunnel | ✓ | ✓ | X | X | ✓ | No |
| 5 | Tarbet to Inverarnan Land Tunnel | ✓ | ✓ | X | X | ✓ | No |
| 6 | Loch Lomond Crossing and East Side | ✓ | ✓ | ✓ | ✓ | ✓ | Yes |
| 7 | Inveruglas to Inverarnan (Loch Sloy) | ✓ | ✓ | ✓ | ✓ | ✓ | Yes |
| 8 | Combination of 1 (part) and 5 (part) | ✓ | ✓ | ✓ | ✓ | ✓ | Yes |
| 9 | Combination of 1 (part) and 7 | ✓ | ✓ | ✓ | ✓ | ✓ | Yes |
| 10 | Combination of 2 (part) and 7 | X | ✓ | ✓ | ✓ | ✓ | No |
| 11 | High Road | ✓ | ✓ | ✓ | ✓ | ✓ | Yes |

Option 0 (Do Nothing) was rejected because it did not meet any of the TPOs, as no improvement would be implemented, as part of this option, and, therefore, existing problems and issues would remain.

Option 3 (A83 to Inverarnan) was rejected because it did not meet TPO1. This option would result in a longer route and increased average journey times, even with an improved standard of road. Constructing a new road through Glen Kinglas would have significant detrimental environmental impact.

Option 4 (Loch Lomond Tunnel) was rejected because it did not meet TPO3 or TPO4. A submerged tunnel would not provide stopping opportunities or any facilities for NMU (a new cyclepath or footway would not be provided within the tunnel). It is also acknowledged that construction of a significant length of submerged tunnel

would be technically challenging, complex and, therefore, very expensive. A high-level cost estimate suggests this option could be in the order of £4billion (including optimism bias). Hence, even if this option had passed the initial sift, it is likely it would have been rejected at the second sift, primarily for cost reasons. A submerged tunnel would also have significant annual operation and maintenance costs, as well as major detrimental environmental impacts on Loch Lomond.

Option 5 (Tarbet to Inverarnan Land Tunnel) was rejected because it did not meet TPO3 or TPO4. Long sections of tunnel would not provide stopping opportunities or any facilities for NMU (a new cyclepath or footway would not be provided within the tunnel). It is also acknowledged that construction of approximately 11 kilometres of tunnels through the mountains would be technically challenging, complex and, therefore, very expensive. A high-level cost estimate suggests this option could be in excess of £4billion (including optimism bias). Hence, even if this option had passed the initial sift, it is likely it would have been rejected at the second sift, primarily for cost reasons. This option would also have significant annual operation and maintenance costs. It would also have major detrimental environmental impacts with large quantities of excavated rock having to be removed and deposited elsewhere.

Option 10 (Combination of 2 (part) and 7) was rejected because it did not meet TPO1. This option would result in a longer route and increased average journey times, even with an improved standard of road. Constructing a new off-line road would have significant detrimental environmental impacts.

## 6.5 Corridor Option Appraisal

Following the initial sift, the next stage was to analyse the remaining options and this was undertaken by scoring each option against criteria, including the scheme-specific TPOs and the main STAG criteria. For the purpose of the appraisal, a bespoke Appraisal Summary Table (AST) to encompass elements of both STAG and DMRB was developed. The criteria for assessment within the AST were as follows:

- Established Policy Directives;
- Agreed Transport Planning Objectives;
- Main STAG criteria, being:
  - Environment
  - Safety
  - Economy
  - Integration
  - Accessibility and Social Inclusion
- Engineering;
- Affordability; and
- Public Acceptability.

The performance of the options in relation to the assessment criteria has been undertaken in accordance with the following scale:

- +3 Major benefit;

- +2 Moderate benefit;
- +1 Minor benefit;
- 0 Neutral;
- -1 Minor negative;
- -2 Moderate negative; and
- -3 Major negative.

An assessment of the remaining seven corridor options was undertaken, being consistent with a STAG Part 1 Appraisal. A summary scoring matrix was initially completed individually by a number of Design Team members, who completed the matrix through discussion and consensus.

The finalised scoring is summarised in Table 6.3 and this second sift resulted in further four options being rejected as it was considered appropriate to sift out those options that scored 0 or less, as such a score suggested limited overall benefit.

In addition to the summary scoring matrix, an Appraisal Summary Table (AST) was produced for each of the seven corridor options scored, providing background information and text to support the individual scores. The ASTs are consistent with STAG Stage 1 ASTs and are set out in Appendix B.

*Table 6.3: Second sift summary scoring matrix results (note: supporting information is contained within individual ASTs)*

| Ref no. | Corridor option name | Description | Established Policy directives | TPO1 average journey times | TPO2 reduce pia numbers & severity | TPO3 stopping opportunities | TPO4 enhanced sustainable travel | TPO5 maintenance delays reduced | Environment | Safety | Economy | Integration | Accessibility and social inclusion | Engineering | Affordability | Public acceptability | Score | Take forward Recommendation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | **Existing A82 Corridor** | From Tarbet to vicinity of Inverarnan, along existing A82 corridor that allows for off-line widening, potential tunnels and/or viaducts. | 3 | 2 | 2 | 2 | 2 | 1 | -1 | 2 | 2 | 2 | 1 | -2 | -1 | 3 | 18 | Yes |
| 2 | **Arrochar to Inveruglas to Inverarnan** | From Tarbet to Arrochar, then to Inveruglas, via Glen Loin, then continues along existing A82 corridor. Glen Loin section either ground level or tunnel sub-options. | 1 | 1 | 1 | 2 | 2 | 1 | -3 | 1 | 1 | 1 | 1 | -2 | -1 | 1 | 7 | Yes |

*Table 6.3: Second sift summary scoring matrix results (note: supporting information is contained within individual ASTs)*

| Ref No. | Corridor Option Name | Description | Established Policy Directives | TPO1 Average Journey Times | TPO2 Reduce PIA Numbers & Severity | TPO3 Stopping Opportunities | TPO4 Enhanced Sustainable Travel | TPO5 Maintenance Delays Reduced | Environment | Safety | Economy | Integration | Accessibility and Social Inclusion | Engineering | Affordability | Public Acceptability | Score | Take Forward Recommendation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | **Loch Lomond Crossing and East Side** | From vicinity of Tarbet, an easterly Loch Lomond crossing and a new road on the east side of the loch joining existing A82 near Inverarnan. | -2 | 1 | 1 | 2 | 2 | 3 | -3 | 1 | 2 | 1 | 1 | -3 | -3 | -3 | 0 | **No** |
| 7 | **Inveruglas to Inverarnan (Loch Sloy)** | From Inveruglas north-west adjacent to Loch Sloy, then north-east to existing A82 in vicinity of Inverarnan. | -1 | 0 | 1 | 1 | 1 | 1 | -2 | 1 | 1 | 0 | 0 | -2 | -1 | -3 | -3 | **No** |
| 8 | **Combination of 1 (part) and 5 (part)** | From vicinity of Tarbet to vicinity of Inverarnan, as a combination of part of existing A82 corridor and part new land tunnel (either south or north of Inveruglas). | 0 | 2 | 1 | 1 | 1 | 1 | -2 | 1 | 2 | 0 | 0 | -3 | -3 | -1 | 0 | **No** |

*Table 6.3: Second sift summary scoring matrix results (note: supporting information is contained within individual ASTs)*

| Ref No. | Corridor Option Name | Description | Established Policy Directives | TPO1 Average Journey Times | TPO2 Reduce PIA Numbers & Severity | TPO3 Stopping Opportunities | TPO4 Enhanced Sustainable Travel | TPO5 Maintenance Delays Reduced | Environment | Safety | Economy | Integration | Accessibility and Social Inclusion | Engineering | Affordability | Public Acceptability | Score | Take Forward Recommendation |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 9 | **Combination of 1 (part) and 7** | From vicinity of Tarbet along existing A82 corridor to Inveruglas then via Loch Sloy to existing A82 in vicinity of Inverarnan. | 0 | 1 | 1 | 1 | 1 | 1 | -2 | 1 | 1 | 0 | 0 | -2 | -2 | -2 | -1 | **No** |
| 11 | **High Road** | An alignment to the west and above the existing A82 corridor following some existing farm tracks and forestry routes with tunnels and viaducts. | 0 | 2 | 1 | 2 | 2 | 2 | -3 | 0 | 2 | 0 | 1 | -2 | -2 | -1 | 4 | **Yes** |

## 6.6 Recommendations for DMRB Stage 1 Assessment

Starting from a 'long list' of 11 proposed corridor options then adding the 'Do Nothing' option, the two STAG appraisal sifting reviews have rejected nine options, leaving three corridor options recommended for further development and subject to DMRB Stage 1 assessment (set out in a separate report). The recommended three corridor options are as follows:

**Option 1 Existing A82 Corridor**

**Option 2 Arrochar – Inveruglas – Inverarnan**

**Option 11 High Road**

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# 7 Traffic and Economic Appraisal

## 7.1 Introduction

The quantitative assessment of the transport economic efficiency and road safety aspects of a proposed road improvement requires the development and application of various computer models. In the case of the A82 Tarbet to Inverarnan Upgrade scheme appraisal, this has involved the development of a NESA (Network Evaluation from Surveys and Assignment) model supported by a QUADRO (Queues and Delays at Roadworks) model.

The NESA model was developed to compare the costs and road user benefits of the proposed improvements taking account of both transport economic efficiency and road safety issues and the QUADRO model was developed to examine the delays and costs associated with the construction works and future road maintenance requirements.

The NESA assessment for the A82 Tarbet to Inverarnan Upgrade is based on the latest version of the program, version NESA11, which was released on behalf of Transport Scotland in March 2013. This version incorporates current national road traffic forecasts; a mid-2002 price base; and an annual discount rate of 3.5% for the first 30-years, and 3.0% for the remainder of the 60-year appraisal period.

The QUADRO assessment is based on Release 9 of the QUADRO4 program. While this is not the latest version of the software, the assessment was carried out using Release 9 due to potential bugs with later versions. The QUADRO4 Release 9 software provides results that are consistent with the NESA assessment.

This chapter summarises the economic impact of the corridor options considered during the comparative appraisal. A separate Traffic and Economic Appraisal Report (CFJV Ref. No. 476416-021) has been prepared as part of the DMRB Stage 1 assessment.

## 7.2 Options Appraised

In terms of the traffic and economic appraisal, three corridor options have been appraised, being those recommended for DMRB Stage 1 assessment as noted in Chapter 6. The three options (re-named as Option 1, Option 2 and Option 3, respectively, for future reference), shown in Appendix C, are:

- Option 1 Corridor Existing A82 Corridor;
- Option 2 Corridor Arrochar – Inveruglas – Inverarnan; and
- Option 3 Corridor High Road

## 7.3 Assumptions

At this stage, an economic appraisal has been undertaken based on the following assumptions:

- Fixed trip methodologies – whilst it is acknowledged that latent demand may be released by the A82 Tarbet to Inverarnan Upgrade scheme, this demand is considered to be limited and unlikely to have a significant impact on the comparative assessment of corridor options;

- NRTF (1997) central traffic growth projections – a NESA assessment based on the application of traffic growth forecasts under the low growth scenario, to assess the impact of limited growth along the corridor, has been reported as a sensitivity test;
- Local accident rates – a NESA assessment based on default accident rates has been reported as a sensitivity test;
- Optimism bias – the preliminary cost estimates for potential corridor options have been increased to reflect the appraisers' tendency to be overly optimistic. At this stage, a 44% uplift is applied for general road improvements, with a 66% uplift applied for major structures;
- Construction works commencing in early 2017 with a construction period of up to three years; and
- Typical maintenance profiles and works costs.

## 7.4 Appraisal Summary Table

As mentioned in Section 6.5, ASTs have been produced for the nine corridor options appraised in the second initial sift. These are set out in Appendix B.

## 7.5 Economic Impact

This section provides an overview of the main costs and benefits associated with each of the short-listed options.

Scheme costs have been developed for the options based on average 2012 prices and include optimism bias uplift but exclude VAT. The preliminary scheme cost estimates for typical alignments for each of the proposed corridors are set out in Table 7.1. The estimates include preparation costs, capital construction costs and supervision fees.

*Table 7.1: Short-listed corridor options – preliminary scheme cost estimates*

| Reference | Corridor Option | Outline Cost Estimate |
|---|---|---|
| Option 1 | Existing A82 Corridor | £216.45m |
| Option 2 | Arrochar to Inveruglas to Inverarnan | £253.89m |
| Option 3 | High Road | £425.88m |

A summary of the combined NESA and QUADRO assessments results are set out in Table 7.2, summarising Present Value of Benefits (PVB), Present Value of Costs (PVC), Net Present Value (NPV) and Benefits to Cost Ratio (BCR) values.

*Table 7.2: Combined NESA and QUADRO assessment results*

| Reference | Corridor Option | PVB | PVC | NPV | BCR |
|---|---|---|---|---|---|
| Option 1 | Existing A82 Corridor | £23.00m | £111.34m | -£88.34m | 0.21 |
| Option 2 | Arrochar to Inveruglas to Inverarnan | £8.51m | £132.52m | -£124.01m | 0.06 |
| Option 3 | High Road | £39.11m | £225.51m | -£186.40m | 0.17 |

## 7.6 Wider Benefits

The A82 is a critical link to the North West Highlands from Central Scotland. It is an essential freight route for goods produced or sourced along the West Coast to the main centres of population in Scotland and further afield. While this section of the road is itself in one of Scotland's most scenic and popular areas, the extended A82 is also the main link to the North West Highlands for tourists and for Central Belt residents accessing its attractions for outdoor recreation.

At a local level, the area through which the Tarbet to Inverarnan Upgrade passes is sparsely populated, with Tarbet and Ardlui the only settlements of any size. While there are a number of farms on the land adjacent to the road, tourism is the main focus of local business activity within the existing route corridor. Tourism is also a principal source of business activity in settlements such as Inverarnan, Tarbet, Luss, Arrochar and Killin. As a consequence of the area's low population base, local residents have to access education, health, fuel and shopping facilities (for all but everyday groceries) outside the area (the closest petrol station being in Arrochar). For local residents this section of road is essential.

This section of the A82 is affected by low average speeds, variable journey times, and limited formal parking opportunities. For local residents and businesses, a limited improvement in journey times is anticipated from the initial modelling. While the travel time effects are limited, the improvement in accessibility and the construction works themselves may have an effect on broader perceptions of the area's accessibility (to Glasgow, Dumbarton, Helensburgh and other employment focal points). There may, therefore, be limited housing market impacts in areas within a 30-45 minute drive of main employment centres, although the extent of any benefit to local areas will depend on whether this generates new housing or not.

With the possible exception of the section of A82 north of Ballachulish, this part of the route is arguably the main bottleneck between Glasgow and Fort William. While it passes through one of Scotland's most scenic areas, views from the road of the surrounding countryside are relatively restricted. Its improvement can, therefore, be expected to improve perceptions of the accessibility of areas dependent on the A82 generally. Depending on its design, the Upgrade may also afford improved views of Ben Lomond and the Loch Lomond and Trossachs National Park area. Tourism and recreation businesses (and those employed by them) are likely to be the main beneficiaries. While it is likely that related activity across the length of the route may

experience some uplift, it is likely to be more pronounced in areas to the north of the Upgrade.

Wider benefits will be assessed in more detail as the scheme develops and, where feasible, some quantative assessment incorporated into the OBC for the scheme.

## 7.7 Summary

Based on the results of the comparative appraisal, Option 1 (Existing A82 Corridor) is expected to deliver the greatest level of economic return, with an estimated NPV of - £88.34 million and a BCR of 0.21.

Whilst the current traffic and economic appraisal suggests the Corridor Options are not expected to provide Transport Economic Efficiency benefits that outweigh their costs, the Upgrade would result in wider economic benefits, albeit their overall scale of impacts is anticipated to be moderate. It should be noted that this factor will be influenced by the design approach adopted.

In parts of this section of the A82, the road itself could be an attraction to visitors if, for example, 'iconic' features are incorporated. Should this be the case, a greater scale of benefit may be anticipated across the A82 generally, with a heightened focus on the upgraded corridor itself.

A more detailed economic case will be set out in the subsequent OBC prepared to support the DMRB Stage 2 assessment.

# 8 Commercial, Financial and Management Cases

## 8.1 Introduction

The purpose of the SBC is to provide a rationale for intervention and provide enough evidence to support a decision for a scheme to be allowed to proceed to development. At this early stage of a scheme or project, it would not be appropriate to develop detailed information on the envisaged commercial, financial or management arrangements for particular interventions. However, the following sections do set out expectations for the criteria for each and how these will develop over time, as the A82 Tarbet to Inverarnan Upgrade scheme is progressed.

## 8.2 Commercial Case

The Commercial Case sets out the procurement aspects of the Business Case. It sets out the procurement scope, what services are to be procured and what procurement options are available to the Client. The Commercial Case will also set out the key principles that will be used in contracting for the scheme, the approach to any market testing, the procurement timetable and how risks are to be considered.

As the scheme is developed to the Outline Business Case stage, a number of procurement routes would be identified that potentially achieve the scheme objectives. The cost, risk and benefits associated with these different procurement routes would be analysed and presented to assist investment decision makers. At this time, there is potential for the scheme to be financed in several ways.

## 8.3 Financial Case

The purpose of the Financial Case is to summarise the forecast cost and revenue implications of the preferred route scheme, review the options for financing the costs and to consider the affordability impact. The Financial Case seeks to confirm if the project is affordable to Transport Scotland.

At this stage of the scheme, only high-level outline cost estimates have been provided and the actual capital cost to Government is unknown as a preferred route scheme has not yet been identified. This will be established through the work-stream to develop the DMRB Stage 2 report. As the scheme is developed, more accurate and robust cost estimates will be prepared.

## 8.4 Management Case

The Management Case tests the proposed project planning, governance structure, risk management, communications and stakeholder management, benefits realisation plan and monitoring arrangements. The Management Case identifies the team that will deliver the project and confirm they have the appropriate experience and skills to ensure successful delivery. As Transport Scotland is the Project Owner, acting on behalf of Scottish Ministers, and may well be the principal funder of the scheme, it is appropriate it oversees the development of the programme and Business Case and provides significant input into the development of the Management Case.

At this stage, management arrangements are unknown for the detailed design stage of the scheme and subsequent construction and, if approved, will need to be developed as the scheme progresses. However, there are management arrangements

in place in relation to the current commission for the scheme, which cover the DMRB Stage 1 and Stage 2 Scheme Assessments phases, and it is envisaged some elements of these arrangements would carry forward.

A reporting structure needs to be established for the project, detailing the roles and responsibilities of key individuals. Figure 8.1 sets out an overview summary of the governance arrangements for the current phase of the scheme. As the scheme moves forward, these arrangements would be reviewed and updated as deemed necessary.

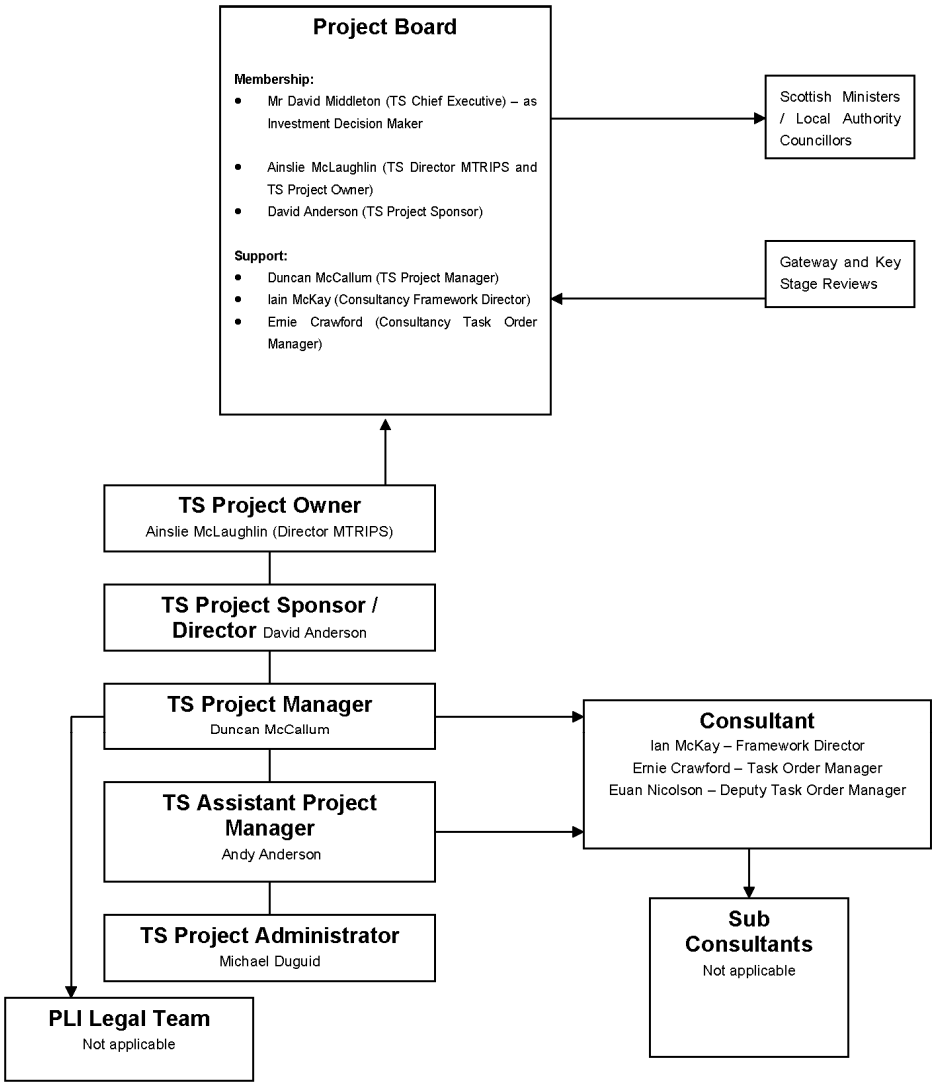


*Figure 8.1: A82 Tarbet to Inverarnan upgrade scheme – current governance overview summary*

## 8.5 Risk Management

A risk management strategy has been developed which seeks to ensure that risks are identified and managed effectively. A project risk register has been established by CFJV and will be maintained during the lifetime of the project. The register sets out an assessment of how different types of risk should best be dealt with. The general principle is that risks should be passed to the party best able to manage them effectively, subject to achieving value for money.

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# Appendix A

## Potential Route Corridor Options Plan

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Inverarnan

Pulpit Rock

A82

Inveruglas

Loch Lomond

Arrochar

A83

Tarbet

LOCH LOMOND AND THE TROSSACHS NATIONAL PARK



## SIGNIFICANT RESIDUAL RISKS

*The following list provides a cross reference between this drawing and the Designer's Health and Safety Risk Assessment, and identifies those areas of Significant Residual Risk*

| Description of Risk | Ref. No. |
|---|---|
| CLIENT OPERATIONS | 1 |
| ADJACENT ACTIVITIES | 2 |
| RESTRICTED SITE | 3 |
| TRAFFIC | 4 |
| INTERFACE WITH PUBLIC | 5 |
| NEAR TO HIGHWAYS | 6 |
| NEAR TO RAILWAYS | 7 |
| NEAR TO WATERWAYS | 8 |
| GROUND INSTABILITY | 9 |
| CONTAMINATION/SOIL GAS | 10 |
| GROUND WATER | 11 |
| INUNDATION | 12 |
| SERVICES | 13 |
| OVERHEAD CABLES | 14 |
| INSECT ATTACK (INCL. MIDGE & TICKS) | 15 |

Key:

- Option 1 - Existing A82 Corridor
- Option 2 - Arrochar to Inverarnan
- Option 3 - A83 to Inverarnan
- Option 4 - Tarbet to Inverarnan. - loch Tunnel
- Option 5 - Tarbet to Inverarnan - Land Tunnel Option.
- Option 6 - Loch Lomond Crossing.
- Option 7 - Inveruglas to Inverarnan
- Option 8 - Tarbet Tunnel to Inveruglas
- Option 9 - Tarbet to Inveruglas Bypass
- Option 10 - Arrochar to Inveruglas Bypass
- Option 11 - The High Road

| Rev | By | Chkd | Apprvd | Date | Description |
|---|---|---|---|---|---|
| 3.0 | SM | EC | EC | 05/03/14 | Drawing frame amended. |
| 2.0 | SM | RB | RB | 07/01/14 | Additional Route Options added. |
| 1.0 | SM | MD | RB | 08/10/13 | Additional Route Option 8 added. Drawing title amended. |

Client

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Project

A82 TARBET TO INVERARNAN UPGRADE

Drawing

POTENTIAL ROUTE CORRIDOR OPTIONS

| | |
|---|---|
| Drawn by: S LOCHHEAD | Date: 27.09.2013 |
| Checked by: M DINEEN | Date: 01.10.2013 |
| Approved by: R BOURNE | Date: 01.10.2013 |
| Drawing No. 476416-0000-002 | Revision 3.0 |
| Drawing Scale: N.T.S. | |
| CAD Filename: | Plot Scale: |

Drawing file path & name: T:\Transportation\Highways\A82 Tarbet to Inverarnan\Technical\Design\Drawings\0000 Plans and Profiles\Live Drawings\DRAWS Stage 1\476416-0000-002 - Potential Route Options_ Rev 3.0.dwg
Xrefs use file path: T:\Transportation\Highways\A82 Tarbet to Inverarnan\Technical\Design\Drawings\0000 Plans and Profiles\Live Drawings\DRAWS Stage 1\
User and Plot Date: WilsonKL - 5.3.2014 - 9:3 am

# Appendix B

## Appraisal Summary Tables

| **Proposal Details** | | | |
|---|---|---|---|
| Name and address of authority or organisation promoting the proposal: (Also provide name of any subsidiary organisations also involved in promoting the proposal) | | Transport Scotland | |
| Proposal Name: | **A82 Tarbet to Inverarnan Upgrade Option 1 – Existing Corridor** | Name of Planner: | CH2M HILL Fairhurst JV |
| Proposal Description: | From Tarbet to vicinity of Inverarnan, along existing A82 corridor that allows for some off-line widening, potential tunnels and/or viaducts. | Estimated Total Public Sector Funding Requirement: | *Capital costs/grant (including OB)* £150 - £200 million<br>*Annual revenue support* None (other than routine maintenance)<br>*Present Value of Cost to Govt.* Not known at this time |
| Funding Sought From: (if applicable) | tbc | Amount of Application: | tbc |
| **Background Information** | | | |
| Geographic Context: | Tarbet and Arrochar are the largest settlements in the area, with smaller communities and individual properties mainly located along the A82 or A83. Tarbet is located at the junction of the A82 and A83. The A82 is a key transport route between the north west of Scotland and the Central Belt. Between Tarbet and Inverarnan, the A82 follows the west side of Loch Lomond, with mountains to its west and the loch foreshore to the east. The road passes through the Loch Lomond and Trossachs National Park at this location, through spectacular scenery that is a designated National Scenic Area. Any major improvement to this section of the A82 will have significant environmental impacts. | | |
| Social Context: | This area is sparsely populated, within just over 1,000 people within the area, the majority living in Arrochar or Tarbet. Historically, employment focused on fishing, farming, power, defence and an Outdoor Centre but most of these have declined to be replaced mainly by tourism. As a result, many younger people are leaving to seek work or greater choice of affordable accommodation elsewhere. Older or retired people are moving in attracted by the scenery. | | |
| Economic Context: | Principal employment/businesses relate to tourism – hotels, shops, pubs, restaurants, B&B and water-related activities. Many workers either travel in or are seasonal. Some farming remains, mainly sheep.<br>Existing public transport (bus and train) do not serve the community well enough to support commuting or main visitor numbers. The poor geometry of the A82 at this location results in poor and unreliable journey times that make the route unattractive to some users, including freight. It also has a very poor road traffic accident history and is considered unsafe. This results in a negative impact on the local and regional economies, with suggestion the sub-standard alignment of the A82 may be suppressing economic investment and restricting future development proposals. | | |

| Transport Planning Objectives | | | |
|---|---|---|---|
| Objective: | | Assessment Summary | Performance against planning objective: |
| 1 | Average Journey Time<br>To improve average journey times for A82 trunk road users between Tarbet and Inverarnan (based on observed post Pulpit Rock scheme). | 2 | An improved alignment will widen existing carriageway and remove bends, thereby improving average vehicle speeds and journey times. Existing environmental and budget constraints may restrict extent of some realignment improvements. |
| 2 | Safety<br>To reduce personal injury accident numbers and their severity on the A82 between Tarbet and Inverarnan to be closer to or better than national KSI rates. | 2 | An improved alignment will widen existing carriageway, remove bends and improve drainage, thereby helping to reduce the number of road traffic accidents along this section. |
| 3 | Facilities<br>To provide appropriate stopping opportunities for visitors and for all trunk road users on the A82 between Tarbet and Inverarnan taking account of the unique setting of the route within the National Park. | 2 | An improved alignment will widen existing carriageway and remove bends. The design can provide appropriate stopping opportunities, either through a widened cross-section, making use of any redundant areas of existing road or linking with suitable adjacent areas. Existing environmental and physical constraints may limit some potential opportunities. |
| 4 | Accessibility<br>Seek to provide opportunities for enhanced access by sustainable modes of travel along the A82 corridor between Tarbet and Inverarnan. | 2 | The design can provide opportunities for providing NMU infrastructure and facilities, either through a widened cross-section or making use of any redundant areas of existing road. |
| 5 | Maintenance<br>To reduce disruption to road users resulting from the undertaking of routine maintenance activities on the A82 between Tarbet and Inverarnan. | 1 | An improved alignment will widen existing carriageway that will permit some routine maintenance to be undertaken with simple TM. But with no alternative new route provided road closures will continue to have significant impact. |

| STAG Criteria | | |
|---|---|---|
| Criterion | Assessment Summary | Supporting Information |
| Environment: | -1 | Improved vehicle speeds can reduce CO2 emissions but enhanced attractiveness of route may increase traffic flows thereby reducing overall benefits to emissions.<br>Widened road will have impacts on environmental – landscape, biodiversity and cultural but relates to existing corridor impacts. Improved surface water drainage will reduce current detrimental impact on water run-off. |
| Safety: | 2 | An improved alignment should help to reduce number of RTAs. Improved road drainage should also help, as wet surface is currently a significant factor in RTAs.<br>This option could potentially improve conditions for pedestrians and cyclists, helping to reduce potential conflict between vulnerable users and motorised vehicles. It could also address some safety concerns with parking.<br>An improved alignment would give users a general sense this section of A82 is safer to use. |
| Economy: | 2 | This option will improve average journey times and reduce KSI accidents. It could make the route more attractive for freight traffic and also increase visitor/tourist numbers.<br>Wider economic benefits could result from more visitors contributing to the local economy, whilst improved connectivity might help economic investment and growth in both local and regional areas. |
| Integration: | 2 | This option could contribute to improved interchange with sustainable modes of travel, such as public transport (bus and train), and also water-based transport, as well as walking and cycling. This could see a minor reduction in private car trips. |
| Accessibility and Social Inclusion: | 1 | An improved alignment would enhance connectivity of local communities with wider area.<br>Opportunities for NMU infrastructure could improve accessibility by walking and cycling, although minimal for local residents, as private car probably seen as essential. |

| Deliverability Appraisal | | |
|---|---|---|
| Criterion | Assessment Summary | Supporting Information |
| Engineering: | -2 | Constructing an improvement on-line will be challenging and time-consuming, thereby affecting cost. As existing alignment is significantly below current standards, any upgrade will be affected by rock outcrops, the loch, railway and some buildings. Some major engineering solutions will be required, together with extensive environmental mitigation.<br>It is likely some Departure from Standard measures may be proposed.<br>Land acquisition is a potential deliverability risk, in terms of delay.<br>Objections from key environmental bodies is a potential deliverability risk, without close and effective consultation. |
| Affordability: | -1 | The existing topography means an on-line improvement will be expensive to implement, both in terms of engineering solutions and phased construction, as much of the route is constrained.<br>Significant road closures will be required.<br>However, cost range is one of the lowest compared to other options. |
| Public Acceptability: | 3 | This option was presented and discussed at Workshop 1 with key stakeholders. This option was preferred by nearly all attendees.<br>A leaflet drop to residents and businesses along the route generated few negative comments, with main query being the start date.<br>Given the landscape setting and based on Workshop 1 feedback, it is considered likely any off-line option will not be as acceptable due to environmental impact. |
| Established Policy Directives: | 3 | This option provides an on-line improvement that is consistent with policy that does not encourage new road build. The options provides opportunities for facilities and sustainable travel enhancements for the Loch Lomond area consistent with NPA objectives.<br>This option improves average journey times and connectivity, which are key policy objectives.<br>The improvement could lead to wider economic benefits, such as investment, land-use development, employment and economic growth. |
| Rationale for Selection or Rejection of Proposal: | **18** | This option scores positively in the majority of criteria and is the top-scoring option. It is recommended it be taken forward for DMRB Stage 1 assessment. |

| **Proposal Details** | | | |
|---|---|---|---|
| Name and address of authority or organisation promoting the proposal: (Also provide name of any subsidiary organisations also involved in promoting the proposal) | | Transport Scotland | |
| Proposal Name: | **A82 Tarbet to Inverarnan Upgrade Option 2 – Arrochar-Inveruglas-Inverarnan** | Name of Planner: | CH2M HILL Fairhurst JV |
| Proposal Description: | From Tarbet to Arrochar, then to Inveruglas, via Glen Loin, then continues along existing A82 corridor. Glen Loin section can be either ground level or tunnel sub-options. | Estimated Total Public Sector Funding Requirement: | *Capital costs/grant (including OB)* £175 - £225 million<br>*Annual revenue support* None (other than routine maintenance)<br>*Present Value of Cost to Govt.* Not known at this time |
| Funding Sought From: (if applicable) | tbc | Amount of Application: | tbc |

| **Background Information** | |
|---|---|
| Geographic Context: | Tarbet and Arrochar are the largest settlements in the area, with smaller communities and individual properties mainly located along the A82 or A83. Tarbet is located at the junction of the A82 and A83. The A82 is a key transport route between the north west of Scotland and the Central Belt. Between Tarbet and Inverarnan, the A82 follows the west side of Loch Lomond, with mountains to its west and the loch foreshore to the east. The road passes through the Loch Lomond and Trossachs National Park at this location, through spectacular scenery that is a designated National Scenic Area. Any major improvement to this section of the A82 will have significant environmental impacts. |
| Social Context: | This area is sparsely populated, within just over 1,000 people within the area, the majority living in Arrochar or Tarbet. Historically, employment focused on fishing, farming, power, defence and an Outdoor Centre but most of these have declined to be replaced mainly by tourism. As a result, many younger people are leaving to seek work or greater choice of affordable accommodation elsewhere. Older or retired people are moving in attracted by the scenery. |
| Economic Context: | Principal employment/businesses relate to tourism – hotels, shops, pubs, restaurants, B&B and water-related activities. Many workers either travel in or are seasonal. Some farming remains, mainly sheep.<br>Existing public transport (bus and train) do not serve the community well enough to support commuting or main visitor numbers. The poor geometry of the A82 at this location results in poor and unreliable journey times that make the route unattractive to some users, including freight. It also has a very poor road traffic accident history and is considered unsafe. This results in a negative impact on the local and regional economies, with suggestion the sub-standard alignment of the A82 may be suppressing economic investment and restricting future development proposals. |

| Transport Planning Objectives | | | |
|---|---|---|---|
| Objective: | | Assessment Summary | Performance against planning objective: |
| 1 | Average Journey Time<br>To improve average journey times for A82 trunk road users between Tarbet and Inverarnan (based on observed post Pulpit Rock scheme). | 1 | Total route length of option is longer than existing A82 corridor and even with an improved alignment and north section removes existing bends to a certain extent, the resulting improvement in average journey times will be less. Existing environmental and budget constraints may restrict extent of some realignment improvements. Tarbet-Arrochar section likely to need improvement. |
| 2 | Safety<br>To reduce personal injury accident numbers and their severity on the A82 between Tarbet and Inverarnan to be closer to or better than national KSI rates. | 1 | An improved alignment will widen existing carriageway, remove bends and improve drainage, thereby helping to reduce the number of road traffic accidents along the north on-line section. South off-line section should be designed to standard, thereby limiting accident potential but south section of existing A82 will retain similar accident rates. |
| 3 | Facilities<br>To provide appropriate stopping opportunities for visitors and for all trunk road users on the A82 between Tarbet and Inverarnan taking account of the unique setting of the route within the National Park. | 2 | An improved alignment will widen existing carriageway and remove bends. The design can provide opportunities for parking facilities, either through a widened cross-section or making use of any redundant areas of existing north section road or linking with suitable adjacent areas.<br>New off-line section can be design in new stopping opportunities.<br>Existing south on-line section sees no potential improvement, unless undertaken separately as traffic flows should be reduced. |
| 4 | Accessibility<br>Seek to provide opportunities for enhanced access by sustainable modes of travel along the A82 corridor between Tarbet and Inverarnan. | 2 | The design can provide opportunities for providing NMU infrastructure and facilities, either through a widened cross-section or making use of any redundant areas of existing north section road. New NMU infrastructure, to standard, can be provided as part of south off-line section. |
| 5 | Maintenance<br>To reduce disruption to road users resulting from the undertaking of routine maintenance activities on the A82 between Tarbet and Inverarnan. | 1 | Whilst south off-line section has a close alternative route via south section of existing A82 corridor, this is just partial. Widening existing north section carriageway will permit some routine maintenance to be undertaken with simple TM. But as no major alternative new route provided, most road closures will continue to have significant impact. |

| STAG Criteria | | |
|---|---|---|
| Criterion | Assessment Summary | Supporting Information |
| Environment: | -3 | Slight improved average journey time will have limited reduction in CO2 emissions<br>New south off-line section, with a new road, has a major detrimental impact on Glen Loin but no impact on Loch Lomond shoreline.<br>Widened north section of road will have impacts on environmental – landscape, biodiversity and cultural but relates to existing corridor impacts. Improved surface water drainage will reduce current detrimental impact on water run-off but new south section introduces surface water run-off, even if well treated. |
| Safety: | 1 | An improved alignment should help to reduce number of RTAs but not on existing south section of A82. Improved road drainage should also help reduce RTA numbers.<br>This option could potentially improve conditions for pedestrians and cyclists, helping to reduce potential conflict between vulnerable users and motorised vehicles. It could also address some safety concerns with parking, but only partially.<br>Only part of the existing road is improved, limiting general sense this section of A82 is safer to use. New off-line section has steep sections and may be prone to adverse weather impacts. |
| Economy: | 1 | This option will only improve average journey times and reduce KSI accidents slightly. It could make the route slightly more attractive for freight traffic and also increase visitor/tourist numbers. Some wider economic benefits could result from more visitors contributing to the local economy, whilst improved connectivity might help economic investment and growth in both local and regional areas. Growth could be focused on Arrochar. |
| Integration: | 1 | This option could contribute to improved interchange with sustainable modes of travel, such as public transport (bus and train), and also water-based transport as well as walking and cycling but only on north section of the existing route. This could see a minor reduction in private car trips. |
| Accessibility and Social Inclusion: | 1 | An improved alignment would enhance connectivity of local communities with wider area. Opportunities for NMU infrastructure could improve accessibility by walking and cycling, although minimal for local residents, as private car probably seen as essential. Does not address existing south section of on-line corridor. Improved road can benefit social inclusion within Arrochar but increased traffic flows does not help local accessibility for pedestrians the town. |

| Deliverability Appraisal | | |
|---|---|---|
| Criterion | Assessment Summary | Supporting Information |
| Engineering: | -2 | Constructing an improvement on-line will be challenging and time-consuming, thereby affecting cost but relates to north section only. As existing alignment is significantly below current standards, any upgrade will be affected by rock outcrops, the loch, railway and some buildings. Some major engineering solutions will be required, together with extensive environmental mitigation. It is likely some Departure from Standard measures may be proposed. New off-line section easier to construct, but will have some sections of steep gradients. Any tunnel option may be challenging.<br>Land acquisition is a potential deliverability risk, in terms of delay.<br>Objections from key environmental bodies is a potential deliverability risk, without close and effective consultation. |
| Affordability: | -1 | The existing topography means an on-line improvement will be expensive to implement, both in terms of engineering solutions and phased construction, as much of the route is constrained. Less road closures required, as off-line section can be constructed without impacting existing A82. But associated road improvements on A83 between Tarbet and Arrochar likely. Cost range is towards the lower end compared to other options. |
| Public Acceptability: | 1 | This option was presented and discussed at Workshop 1 with key stakeholders. This option was considered to be one of the more acceptable off-line options.<br>A leaflet drop to residents and businesses along the route generated few negative comments, with main query being the start date.<br>Given the landscape setting and based on Workshop 1 feedback, it is considered likely any off-line option will not be as acceptable to the on-line option due to environmental impact. |
| Established Policy Directives: | 1 | This option provides a partial on-line improvement that is consistent with policy that does not encourage new road build but does include a new section of road that is against policy.<br>This option only improves average journey times to a minor extent, which is a key policy objective. The options provides some opportunities for facilities and sustainable travel enhancements for the Loch Lomond area consistent with NPA objectives.<br>The improvement could lead to wider economic benefits, such as investment, land-use development, employment and economic growth but maybe more focus on Arrochar area. |
| Rationale for Selection or Rejection of Proposal: | **7** | This option scores positively in the majority of criteria, but not highly. But total score is positive so recommend it be taken forward for DMRB Stage 1 assessment. |

| **Proposal Details** | | | |
|---|---|---|---|
| Name and address of authority or organisation promoting the proposal: (Also provide name of any subsidiary organisations also involved in promoting the proposal) | | Transport Scotland | |
| Proposal Name: | **A82 Tarbet to Inverarnan Upgrade<br>Option 6 – Loch Lomond Crossing and East Side** | Name of Planner: | CH2M HILL Fairhurst JV |
| Proposal Description: | From vicinity of Tarbet, an easterly Loch Lomond crossing and a new road on the east side of the loch joining existing A82 near Inverarnan. | Estimated Total Public Sector Funding Requirement: | *Capital costs/grant (including OB)*<br>> £600 million<br>*Annual revenue support*<br>None<br>(other than routine maintenance)<br>*Present Value of Cost to Govt.*<br>Not known at this time |
| Funding Sought From: (if applicable) | tbc | Amount of Application: | tbc |
| **Background Information** | | | |
| Geographic Context: | Tarbet and Arrochar are the largest settlements in the area, with smaller communities and individual properties mainly located along the A82 or A83. Tarbet is located at the junction of the A82 and A83. The A82 is a key transport route between the north west of Scotland and the Central Belt. Between Tarbet and Inverarnan, the A82 follows the west side of Loch Lomond, with mountains to its west and the loch foreshore to the east. The road passes through the Loch Lomond and Trossachs National Park at this location, through spectacular scenery that is a designated National Scenic Area. Any major improvement to this section of the A82 will have significant environmental impacts. | | |
| Social Context: | This area is sparsely populated, within just over 1,000 people within the area, the majority living in Arrochar or Tarbet. Historically, employment focused on fishing, farming, power, defence and an Outdoor Centre but most of these have declined to be replaced mainly by tourism. As a result, many younger people are leaving to seek work or greater choice of affordable accommodation elsewhere. Older or retired people are moving in attracted by the scenery. | | |
| Economic Context: | Principal employment/businesses relate to tourism – hotels, shops, pubs, restaurants, B&B and water-related activities. Many workers either travel in or are seasonal. Some farming remains, mainly sheep.<br>Existing public transport (bus and train) do not serve the community well enough to support commuting or main visitor numbers. The poor geometry of the A82 at this location results in poor and unreliable journey times that make the route unattractive to some users, including freight. It also has a very poor road traffic accident history and is considered unsafe. This results in a negative impact on the local and regional economies, with suggestion the sub-standard alignment of the A82 may be suppressing economic investment and restricting future development proposals. | | |

| Transport Planning Objectives | | | |
|---|---|---|---|
| Objective: | | Assessment Summary | Performance against planning objective: |
| 1 | Average Journey Time<br>To improve average journey times for A82 trunk road users between Tarbet and Inverarnan (based on observed post Pulpit Rock scheme). | 1 | New off-line alignment would generally follow east lochside, which is not as bendy as west side but a slightly longer route providing some improved average journey times. Off-line option provides a potential circular route, resulting in many motorists, including visitors, travelling on the existing corridor. |
| 2 | Safety<br>To reduce personal injury accident numbers and their severity on the A82 between Tarbet and Inverarnan to be closer to or better than national KSI rates. | 1 | The off-line alignment would have improved geometry and have an envisaged lower RTA occurrence rate. However, likely significant volumes of traffic would probably continue to use the existing corridor, which, without improvement, will continue to experience high numbers of RTAs. |
| 3 | Facilities<br>To provide appropriate stopping opportunities for visitors and for all trunk road users on the A82 between Tarbet and Inverarnan taking account of the unique setting of the route within the National Park. | 2 | The off-line alignment could provide new stopping opportunities along the east side of Loch Lomond, as part of the design, which could act as alternative facilities to existing west side ones.<br>The existing on-line corridor would continue to be used but no stopping enhancements would be provided as part of this option. |
| 4 | Accessibility<br>Seek to provide opportunities for enhanced access by sustainable modes of travel along the A82 corridor between Tarbet and Inverarnan. | 2 | This off-line alignment could provide new NMU infrastructure opportunities for pedestrians and cyclists along the east side of Loch Lomond, as part of the design, including linkages with the West Highland Way, which could act as alternative facilities to the west side.<br>There are unlikely to be any improvements on the existing corridor, which would probably continue to experience significant traffic flows. |
| 5 | Maintenance<br>To reduce disruption to road users resulting from the undertaking of routine maintenance activities on the A82 between Tarbet and Inverarnan. | 3 | The off-line alignment option means a close alternative route is available via the existing A82 corridor, in the event of new east road being closed. Conversely, the new road provides a short alternative route when the existing road were closed. The viaduct across Loch Lomond would require more routine maintenance than a standard road. |

| STAG Criteria | | |
|---|---|---|
| Criterion | Assessment Summary | Supporting Information |
| Environment: | -3 | Improved average journey time will reduce CO2 emissions, although might be offset by increased traffic levels, as new road attracts more trips.<br>A crossing will have a major detrimental impact on Loch Lomond and its water quality and biodiversity during construction and some potential permanent impact thereafter. A new road along the east side will have a major detrimental environmental impact on the existing biodiversity and landscape setting.<br>The off-line route would see quality of surface water run-off on existing road slightly improve but introduce new issues along new road. |
| Safety: | 1 | The off-line alignment should be attractive for strategic traffic seeking a quicker route but significant flows of traffic likely to still use existing corridor, so overall number of RTAs may reduce but not significantly.<br>This option will provide potential stopping opportunities on the east side but not improve existing conditions for pedestrians and cyclists or address existing stopping safety concerns.<br>Likely general sense the existing section of A82 is still rather unsafe to use, given retention of existing corridor in its present condition, although the new road is close by. |
| Economy: | 2 | This option will improve average journey times, particularly for strategic traffic and but probably reduce overall KSI accidents only to a limited extent. It could make the route slightly more attractive for freight traffic but length of new road not particularly attractive.<br>Likely to see increased visitor/tourist numbers as a circular route around Loch Lomond is provided. Wider economic benefits could result from more visitors contributing to the local economy, whilst improved connectivity might help economic investment and growth in both local and regional areas, but latter likely to be limited. |
| Integration: | 1 | This option would not contribute to any improved existing interchange with sustainable modes of travel, such as public transport (bus and train) on along existing corridor but would introduce opportunities for new facilities on east side, including water-based transport.<br>The new road could encourage land-use proposals, if permitted. |
| Accessibility and Social Inclusion: | 1 | This option would do little to enhance connectivity of existing west-side local communities with wider area. However, it would radically improve access along the east side. New opportunities for NMU infrastructure to improve accessibility by walking and cycling likely, including improving links and access with the West Highland Way. |

| Deliverability Appraisal | | |
|---|---|---|
| Criterion | Assessment Summary | Supporting Information |
| Engineering: | -3 | Constructing a crossing over Loch Lomond will be very challenging, in terms of engineering solutions, thereby affecting cost. In addition, constructing a new road along the east side of the loch would also be difficult.<br>Land acquisition is a potential deliverability risk, in terms of delay.<br>Objections from key environmental bodies and other interest groups is a potential deliverability risk. |
| Affordability: | -3 | A crossing and new road are both likely to be expensive to deliver. Cost range for this option is towards the high end compared with other options. |
| Public Acceptability: | -3 | This option was presented and discussed at Workshop 1 with key stakeholders. This option was considered to be totally unacceptable, in terms of significant environmental impact, both to Loch Lomond and the east side, and because it does not address existing road conditions. |
| Established Policy Directives: | -2 | This option provides a new off-line road that is against general policy. Whilst new road provides new opportunities along east side, it provides little potential for enhancements to west side infrastructure and facilities that meet current NPA objectives.<br>This option would improve average journey times, which is a key policy objective, but only to a limited extent.<br>This option would be unlikely to see a significant reduction in RTAs on the existing road.<br>This option likely to lead to some economic benefits. |
| Rationale for Selection or Rejection of Proposal: | **0** | This option scores positively in nine criteria, including well in the TPOs. But the total score is zero, mainly due to poor delivery appraisal, including high cost, suggesting its overall benefit is poor so recommend it be rejected at this sift. |

| **Proposal Details** | | | |
|---|---|---|---|
| Name and address of authority or organisation promoting the proposal: (Also provide name of any subsidiary organisations also involved in promoting the proposal) | | Transport Scotland | |
| Proposal Name: | **A82 Tarbet to Inverarnan Upgrade Option 7 – Inveruglas to Inverarnan (Loch Sloy)** | Name of Planner: | CH2M HILL Fairhurst JV |
| Proposal Description: | From Inveruglas north-west adjacent to Loch Sloy, then north-east to existing A82 in vicinity of Inverarnan. | Estimated Total Public Sector Funding Requirement: | *Capital costs/grant (including OB)* £175 - £200 million<br>*Annual revenue support* None (other than routine maintenance)<br>*Present Value of Cost to Govt.* Not known at this time |
| Funding Sought From: (if applicable) | tbc | Amount of Application: | tbc |
| **Background Information** | | | |
| Geographic Context: | Tarbet and Arrochar are the largest settlements in the area, with smaller communities and individual properties mainly located along the A82 or A83. Tarbet is located at the junction of the A82 and A83. The A82 is a key transport route between the north west of Scotland and the Central Belt. Between Tarbet and Inverarnan, the A82 follows the west side of Loch Lomond, with mountains to its west and the loch foreshore to the east. The road passes through the Loch Lomond and Trossachs National Park at this location, through spectacular scenery that is a designated National Scenic Area. Any major improvement to this section of the A82 will have significant environmental impacts. | | |
| Social Context: | This area is sparsely populated, within just over 1,000 people within the area, the majority living in Arrochar or Tarbet. Historically, employment focused on fishing, farming, power, defence and an Outdoor Centre but most of these have declined to be replaced mainly by tourism. As a result, many younger people are leaving to seek work or greater choice of affordable accommodation elsewhere. Older or retired people are moving in attracted by the scenery. | | |
| Economic Context: | Principal employment/businesses relate to tourism – hotels, shops, pubs, restaurants, B&B and water-related activities. Many workers either travel in or are seasonal. Some farming remains, mainly sheep.<br>Existing public transport (bus and train) do not serve the community well enough to support commuting or main visitor numbers. The poor geometry of the A82 at this location results in poor and unreliable journey times that make the route unattractive to some users, including freight. It also has a very poor road traffic accident history and is considered unsafe. This results in a negative impact on the local and regional economies, with suggestion the sub-standard alignment of the A82 may be suppressing economic investment and restricting future development proposals. | | |

| Transport Planning Objectives | | | |
|---|---|---|---|
| Objective: | | Assessment Summary | Performance against planning objective: |
| 1 | Average Journey Time<br>To improve average journey times for A82 trunk road users between Tarbet and Inverarnan (based on observed post Pulpit Rock scheme). | 0 | New off-line alignment would be longer than existing north section of the A82 and when combined with no improvement to existing south section, would see no improved average journey times. Off-line option has improved geometry that will assist strategic traffic but unlikely to be attractive for some motorists, including visitors who want to observe the scenery, so significant traffic likely to remain on existing corridor. |
| 2 | Safety<br>To reduce personal injury accident numbers and their severity on the A82 between Tarbet and Inverarnan to be closer to or better than national KSI rates. | 1 | The off-line alignment would have improved geometry and an envisaged lower RTA occurrence rate. However, likely significant volumes of traffic would continue to use the existing corridor, which, without improvement, will continue to experience high numbers of RTAs, so overall rate reduction likely to be limited. |
| 3 | Facilities<br>To provide appropriate stopping opportunities for visitors and for all trunk road users on the A82 between Tarbet and Inverarnan taking account of the unique setting of the route within the National Park. | 1 | The off-line alignment could provide stopping opportunities along its length, as part of the design, which should be attractive to some motorists, including strategic and freight traffic.<br>The existing on-line corridor would continue to be used but no stopping enhancements would be provided as part of this option, so limited benefit envisaged. |
| 4 | Accessibility<br>Seek to provide opportunities for enhanced access by sustainable modes of travel along the A82 corridor between Tarbet and Inverarnan. | 1 | The off-line alignment could provide pedestrian and cyclist facilities along its length but no existing communities on route to link up.<br>There is unlikely to be any improvements on the existing corridor, which would probably continue to experience significant traffic flows. |
| 5 | Maintenance<br>To reduce disruption to road users resulting from the undertaking of routine maintenance activities on the A82 between Tarbet and Inverarnan | 1 | The off-line alignment option has a close alternative route via north section of existing A82 corridor, in the event of new road being closed, but this is just partial. South tie-in currently proposed in vicinity of Inveruglas, which would not address road closure issues on the existing corridor section between Inveruglas and Tarbet. |

| STAG Criteria | | |
|---|---|---|
| Criterion | Assessment Summary | Supporting Information |
| Environment: | -2 | No or limited improved average journey time will see no or limited reduction in CO2 emissions.<br>The off-line alignment will have a significant detrimental impact on the Loch Sloy area, in terms of visual setting and biodiversity during construction and permanently thereafter. There is potential to adversely impact the water quality of Loch Sloy and other water courses affected by the new road. But no impact along existing Loch Lomond lochside.<br>The off-line route would see quality of surface water run-off on existing road slightly improve. |
| Safety: | 1 | The new alignment may be attractive for strategic traffic seeking a better standard of road but significant flows of traffic likely to still use existing corridor, so number of RTAs may reduce but not significantly.<br>The off-line section could provide walking and cycling facilities but is unlikely to improve conditions for pedestrians and cyclists on the existing corridor or address existing stopping safety concerns. It does not address existing surface water drainage issues.<br>Likely sense the existing A82 is still unsafe to use, given retention of existing corridor in its present condition. |
| Economy: | 1 | This option is unlikely to improve average journey times to any extent, particularly for strategic traffic and probably reduce overall KSI accidents only to a limited extent. It could make the route slightly more attractive for freight traffic as off-line section has improved geometry.<br>May see some minor increased visitor/tourist numbers as Loch Sloy area opened up and a local circular route established but limited financial benefits envisaged overall as existing corridor sees no improvements.<br>No significant improved connectivity that might help economic investment and growth in both local and regional areas. |
| Integration: | 0 | This option would not contribute to any significant improved interchange with sustainable modes of travel, such as public transport (bus and train), and also water-based transport, so would be contrary to policy. Bus services are unlikely to use the off-line alignment as no existing communities along it. |
| Accessibility and Social Inclusion: | 0 | This option would do little to enhance connectivity of existing local communities with wider area, other than those able to access the off-line route easily. Few opportunities for NMU infrastructure to improve accessibility by walking and cycling along existing corridor. |

| Deliverability Appraisal | | |
|---|---|---|
| Criterion | Assessment Summary | Supporting Information |
| Engineering: | -2 | Constructing an off-line alignment over a significant length will be quite challenging, in terms of access and construction methods that mitigate environmental impact. Land adjacent to Loch Sloy is steep. Requires crossing of railway.<br>Land acquisition is a potential deliverability risk, in terms of delay but reduced as less required.<br>Objections from key environmental bodies is a potential deliverability risk. |
| Affordability: | -1 | This option has some significant engineering solution requirements along Loch Sloy and crossing railway. Being mainly off-line, its construction has limited impact on the existing road but it is a significant length of new road. Cost range is towards the lower end compared to other options. |
| Public Acceptability: | -3 | This option was presented and discussed at Workshop 1 with key stakeholders. This option was considered to be unacceptable, in terms of significant environmental impact on a new area and because it does not address existing road conditions. |
| Established Policy Directives: | -1 | This option provides a new off-line road that is against general policy.<br>This option would be unlikely to improve average journey times to any significant extent.<br>This option would be unlikely to see a significant reduction in RTAs on the existing road.<br>This option would be unlikely to lead to any significant wider economic benefits.<br>Whilst new road provides new opportunities, these are limited and it provides little potential for enhancements to existing corridor infrastructure and facilities that meet current NPA objectives. |
| Rationale for Selection or Rejection of Proposal: | **-3** | This option scores positively in six criteria. The total score is negative, suggesting it gives few benefits so recommend it be rejected at this sift. |

| **Proposal Details** | | | |
|---|---|---|---|
| Name and address of authority or organisation promoting the proposal: (Also provide name of any subsidiary organisations also involved in promoting the proposal) | | Transport Scotland | |
| Proposal Name: | **A82 Tarbet to Inverarnan Upgrade<br>Option 8 – Combination of Option 1 (part) and Option 5 (part)** | Name of Planner: | CH2M HILL Fairhurst JV |
| Proposal Description: | From vicinity of Tarbet to vicinity of Inverarnan, as a part combination of part of existing A82 corridor and part new land tunnel (either south or north of Inveruglas). | Estimated Total Public Sector Funding Requirement: | *Capital costs/grant (including OB)*<br>£575 - £625 million<br>*Annual revenue support*<br>None<br>(other than routine maintenance)<br>*Present Value of Cost to Govt.*<br>Not known at this time |
| Funding Sought From: (if applicable) | tbc | Amount of Application: | tbc |
| **Background Information** | | | |
| Geographic Context: | Tarbet and Arrochar are the largest settlements in the area, with smaller communities and individual properties mainly located along the A82 or A83. Tarbet is located at the junction of the A82 and A83. The A82 is a key transport route between the north west of Scotland and the Central Belt. Between Tarbet and Inverarnan, the A82 follows the west side of Loch Lomond, with mountains to its west and the loch foreshore to the east. The road passes through the Loch Lomond and Trossachs National Park at this location, through spectacular scenery that is a designated National Scenic Area. Any major improvement to this section of the A82 will have significant environmental impacts. | | |
| Social Context: | This area is sparsely populated, within just over 1,000 people within the area, the majority living in Arrochar or Tarbet. Historically, employment focused on fishing, farming, power, defence and an Outdoor Centre but most of these have declined to be replaced mainly by tourism. As a result, many younger people are leaving to seek work or greater choice of affordable accommodation elsewhere. Older or retired people are moving in attracted by the scenery. | | |
| Economic Context: | Principal employment/businesses relate to tourism – hotels, shops, pubs, restaurants, B&B and water-related activities. Many workers either travel in or are seasonal. Some farming remains, mainly sheep. Existing public transport (bus and train) do not serve the community well enough to support commuting or main visitor numbers. The poor geometry of the A82 at this location results in poor and unreliable journey times that make the route unattractive to some users, including freight. It also has a very poor road traffic accident history and is considered unsafe. This results in a negative impact on the local and regional economies, with suggestion the sub-standard alignment of the A82 may be suppressing economic investment and restricting future development proposals. | | |

| Transport Planning Objectives | | | |
|---|---|---|---|
| Objective: | | Assessment Summary | Performance against planning objective: |
| 1 | Average Journey Time<br>To improve average journey times for A82 trunk road users between Tarbet and Inverarnan (based on observed post Pulpit Rock scheme). | 2 | New off-line alignment section could be relatively straight giving significant improved average journey times, when added to time savings on upgraded on-line section. However, tunnel section may not be attractive for some motorists, including visitors who want to observe all of the scenery. |
| 2 | Safety<br>To reduce personal injury accident numbers and their severity on the A82 between Tarbet and Inverarnan to be closer to or better than national KSI rates. | 1 | This option would have improved geometry and have an envisaged lower RTA occurrence rate. However, likely significant volumes of traffic would continue to use the whole length of existing corridor so section that is not improved will continue to experience high numbers of RTAs. |
| 3 | Facilities<br>To provide appropriate stopping opportunities for visitors and for all trunk road users on the A82 between Tarbet and Inverarnan taking account of the unique setting of the route within the National Park. | 1 | This option would provide stopping parking opportunities along the improved section of existing corridor through a widened cross-section, making use of any redundant areas of existing road or linking with suitable adjacent areas but unlikely as part of the tunnel section.<br>The section of existing on-line corridor that is not improved would continue to be used but no stopping enhancements would be provided as part of this option, so not achieving full benefits. |
| 4 | Accessibility<br>Seek to provide opportunities for enhanced access by sustainable modes of travel along the A82 corridor between Tarbet and Inverarnan. | 1 | This option would provide opportunities for improving NMU facilities on the section of existing corridor that is improved. It is unlikely such facilities would be provided on the tunnel section.<br>There is unlikely to be any improvements on section of the existing corridor that is not improved, which would probably continue to experience significant traffic flows. |
| 5 | Maintenance<br>To reduce disruption to road users resulting from the undertaking of routine maintenance activities on the A82 between Tarbet and Inverarnan. | 1 | Whilst relevant section of existing corridor provides an alternative route to the new off-line section of this option, this is just partial. Widening part of existing A82 section carriageway will permit some routine maintenance to be undertaken with simple traffic management. But no major alternative new route provided so some road closures will continue to have significant impact. The tunnel section would require more routine maintenance than a standard road. |

| STAG Criteria | | |
|---|---|---|
| Criterion | Assessment Summary | Supporting Information |
| Environment: | -2 | Improved average journey time will reduce CO2 emissions, although might be offset by increased traffic levels.<br>A partial land tunnel will have a limited impact on Loch Lomond, general biodiversity and landscape setting. However, rock extraction, machinery and lorry movements will cause detrimental impact during construction. Likely to require a large construction compound.<br>Operation of tunnel likely to require drainage, lighting and air circulation pumping, requiring electricity supply.<br>Widened section of part of existing road corridor will have impacts on environmental – landscape, biodiversity and cultural but relates to existing corridor impacts.<br>The off-line section may see quality of surface water run-off on existing road slightly improve. |
| Safety: | 1 | This option, especially the tunnel section, will be attractive for strategic traffic seeking fast and direct route but some traffic likely to still use existing corridor, so number of RTAs should reduce but not to major extent.<br>This option will improve conditions for pedestrians and cyclists and address safety concerns with parking but only on section of existing corridor being improved.<br>May be a sense that the section of existing A82 not improved is still unsafe to use and some users may not like driving through a long tunnel. RTAs occurring within the tunnel could become major incidents. |
| Economy: | 2 | This option will improve average journey times, particularly for strategic traffic. Will reduce overall KSI accidents to some extent. It should make the route slightly more attractive for freight traffic if willing to use section of new tunnel.<br>Some wider economic benefits could result from more visitors contributing to the local economy, whilst improved connectivity could help economic investment and growth in both local and regional areas. |
| Integration: | 0 | As a significant section will be off-line tunnel, this option is unlikely to contribute much to any improved interchange with sustainable modes of travel, such as public transport (bus and train), and also water-based transport. |
| Accessibility and Social Inclusion: | 0 | This option would do little to enhance connectivity of existing local communities with wider area, other than those able to access the tunnel section easily. Limited opportunities for NMU infrastructure to improve accessibility by walking and cycling. |

| Deliverability Appraisal | | |
|---|---|---|
| Criterion | Assessment Summary | Supporting Information |
| Engineering: | -3 | Constructing a tunnel over a significant length will be very challenging, in terms of construction solutions for material disposal, thereby affecting cost. Constructing a section of on-line corridor improvement will also be challenging and time-consuming, thereby affecting cost. As existing alignment is significantly below current standards, any upgrade will be affected by rock outcrops, the loch, railway and some buildings.<br>Land acquisition is a potential deliverability risk, in terms of delay but reduced as less required.<br>Objections from key environmental bodies should be limited but still a potential deliverability risk. |
| Affordability: | -3 | A significant section of tunnel is likely to be very expensive to deliver. The existing topography means even a partial section of on-line improvement will be expensive to implement, both in terms of engineering solutions and phased construction. Cost range for this option is towards the high end compared with other options. |
| Public Acceptability: | -1 | This option was presented and discussed at Workshop 1 with key stakeholders. This option was considered to be potentially acceptable, in terms of environmental impact, but envisaged to be too expensive to deliver. Was noted that part of existing road corridor would not be improved. |
| Established Policy Directives: | 0 | This option upgrades a section of existing road but provides a section of new off-line road that is against general policy.<br>This option would improve average journey times, which is a key policy objective and also improve general connectivity.<br>This option would result in some reduction in RTAs on the existing road.<br>Unlikely to meet many NPA objectives for enhancement of Loch Lomond area.<br>This option likely to lead to some investment and limited wider economic benefits. |
| Rationale for Selection or Rejection of Proposal: | **0** | This option scores positively in seven criteria. But the total score is zero, suggesting it gives limited benefit overall so recommend it be rejected at this sift. |

<table>
<tr><th colspan="4">Proposal Details</th></tr>
<tr><td colspan="2">Name and address of authority or organisation promoting the proposal:<br>(Also provide name of any subsidiary organisations also involved in promoting the proposal)</td><td colspan="2">Transport Scotland</td></tr>
<tr><td>Proposal Name:</td><td>A82 Tarbet to Inverarnan Upgrade<br>Option 9 – Combination of Option 1 (part) and Option 7</td><td>Name of Planner:</td><td>CH2M HILL Fairhurst JV</td></tr>
<tr><td rowspan="3">Proposal Description:</td><td rowspan="3">From vicinity of Tarbet along existing A82 corridor to Inveruglas then via Loch Sloy to existing A82 in vicinity of Inverarnan.</td><td rowspan="3">Estimated Total Public Sector Funding Requirement:</td><td>Capital costs/grant (including OB)<br>£250 - £300 million</td></tr>
<tr><td>Annual revenue support<br>None<br>(other than routine maintenance)</td></tr>
<tr><td>Present Value of Cost to Govt.<br>Not known at this time</td></tr>
<tr><td>Funding Sought From:<br>(if applicable)</td><td>tbc</td><td>Amount of Application:</td><td>tbc</td></tr>
<tr><th colspan="4">Background Information</th></tr>
<tr><td>Geographic Context:</td><td colspan="3">Tarbet and Arrochar are the largest settlements in the area, with smaller communities and individual properties mainly located along the A82 or A83. Tarbet is located at the junction of the A82 and A83. The A82 is a key transport route between the north west of Scotland and the Central Belt. Between Tarbet and Inverarnan, the A82 follows the west side of Loch Lomond, with mountains to its west and the loch foreshore to the east. The road passes through the Loch Lomond and Trossachs National Park at this location, through spectacular scenery that is a designated National Scenic Area. Any major improvement to this section of the A82 will have significant environmental impacts.</td></tr>
<tr><td>Social Context:</td><td colspan="3">This area is sparsely populated, within just over 1,000 people within the area, the majority living in Arrochar or Tarbet. Historically, employment focused on fishing, farming, power, defence and an Outdoor Centre but most of these have declined to be replaced mainly by tourism. As a result, many younger people are leaving to seek work or greater choice of affordable accommodation elsewhere. Older or retired people are moving in attracted by the scenery.</td></tr>
<tr><td>Economic Context:</td><td colspan="3">Principal employment/businesses relate to tourism – hotels, shops, pubs, restaurants, B&B and water-related activities. Many workers either travel in or are seasonal. Some farming remains, mainly sheep.<br>Existing public transport (bus and train) do not serve the community well enough to support commuting or main visitor numbers. The poor geometry of the A82 at this location results in poor and unreliable journey times that make the route unattractive to some users, including freight. It also has a very poor road traffic accident history and is considered unsafe. This results in a negative impact on the local and regional economies, with suggestion the sub-standard alignment of the A82 may be suppressing economic investment and restricting future development proposals.</td></tr>
</table>

| Transport Planning Objectives | | | |
|---|---|---|---|
| Objective: | | Assessment Summary | Performance against planning objective: |
| 1 | Average Journey Time<br>To improve average journey times for A82 trunk road users between Tarbet and Inverarnan (based on observed post Pulpit Rock scheme). | 1 | New off-line alignment section would be longer than existing north section of the A82 but when combined with improved existing south section of the A82 would see slight improved average journey times. Off-line option has improved geometry that will assist strategic traffic but unlikely to be attractive for some motorists, including visitors who want to observe the scenery, so significant traffic volumes may remain on existing north section of corridor. |
| 2 | Safety<br>To reduce personal injury accident numbers and their severity on the A82 between Tarbet and Inverarnan to be closer to or better than national KSI rates. | 1 | This option would have improved geometry and have an envisaged lower RTA occurrence rate. However, likely significant volumes of traffic would continue to use the north section of existing A82 corridor, which, without improvement, will continue to experience high numbers of RTAs, so overall rate reduction likely to be limited. |
| 3 | Facilities<br>To provide appropriate stopping opportunities for visitors and for all trunk road users on the A82 between Tarbet and Inverarnan taking account of the unique setting of the route within the National Park. | 1 | This option would provide stopping opportunities along its length, as part of the design, which should be attractive to some motorists, including strategic and freight traffic. This includes the south section of existing A82 corridor. The north section of existing on-line corridor would continue to be used but no stopping enhancements along it would be provided as part of this option. |
| 4 | Accessibility<br>Seek to provide opportunities for enhanced access by sustainable modes of travel along the A82 corridor between Tarbet and Inverarnan. | 1 | This option could provide pedestrian and cyclist facilities along its length but only existing communities on south section of existing A82 route would be linked up.<br>There is unlikely to be any improvements on the north section of existing A82 corridor, which would probably continue to experience significant traffic flows and poor NMU infrastructure. |
| 5 | Maintenance<br>To reduce disruption to road users resulting from the undertaking of routine maintenance activities on the A82 between Tarbet and Inverarnan. | 1 | The off-line alignment option has a close alternative route via north section of existing A82 corridor, in the event of new road being closed, but this is just partial South section improvement would not address road closure issues on the existing corridor section between Inveruglas and Tarbet. |

| STAG Criteria | | |
|---|---|---|
| Criterion | Assessment Summary | Supporting Information |
| Environment: | -2 | Slight improved average journey time will see limited reduction in CO2 emissions.<br>The off-line alignment will have a detrimental impact on the Loch Sloy area, in terms of visual setting and biodiversity during construction and permanently thereafter. There is potential to adversely impact the water quality of Loch Sloy and other water courses affected by the new road.<br>Existing south section of A82 will have environmental impacts but there will be no impact along existing A82 north section lochside. Option does address existing surface water drainage issues but only on south section. |
| Safety: | 1 | The new alignment may be attractive for strategic traffic seeking a more direct route but significant flows of traffic likely to still use north section of existing corridor, so number of RTAs may reduce but not to full potential.<br>This option could provide walking and cycling facilities and some enhanced stopping but is unlikely to improve such conditions on north section of existing corridor.<br>Likely sense significant part of existing A82 is still unsafe to use, given retention of north section in its present condition. |
| Economy: | 1 | This option will slightly improve average journey times, particularly for strategic traffic, and probably reduce overall KSI accidents to a limited extent. It could make the route slightly more attractive for freight traffic as off-line section has improved geometry.<br>May see some minor increased visitor/tourist numbers as Loch Sloy area opened up and a local circular route established but limited financial benefits envisaged overall as existing north section of A82 corridor sees no improvements.<br>Slight improved connectivity that might help economic investment and growth in both local and regional areas but limited. |
| Integration: | 0 | This option would be unlikely to contribute to any significant improved interchange with sustainable modes of travel, such as public transport (bus and train), and also water-based transport, along its route. Bus services are unlikely to use the off-line section as no existing communities along it. |
| Accessibility and Social Inclusion: | 0 | This option would probably do little to enhance connectivity of existing local communities with wider area, as much of alignment is off-line and fairly long while existing north section of A82 remains in current condition. No significant improvements in sustainable modes of transport for existing communities. |

| Deliverability Appraisal | | |
|---|---|---|
| Criterion | Assessment Summary | Supporting Information |
| Engineering: | -2 | Constructing an off-line alignment over a significant length will be quite challenging, in terms of access and construction methods that mitigate environmental impact. Land adjacent to Loch Sloy is steep. Requires railway crossing. Constructing a section of on-line corridor improvement will also be challenging.<br>Land acquisition is a potential deliverability risk, in terms of delay but reduced as less required.<br>Objections from key environmental bodies is a potential deliverability risk. |
| Affordability: | -2 | The off-line section has some significant engineering requirements in vicinity of Loch Sloy and crossing of railway. Its construction has limited impact on the existing road but it is a significant length of new road.<br>The existing topography means the south section of on-line improvement will be expensive to implement, both in terms of engineering solutions and phased construction.<br>Cost range is towards the middle compared to other options. |
| Public Acceptability: | -2 | This option was presented and discussed at Workshop 1 with key stakeholders. This option was considered to be fairly unacceptable, in terms of significant environmental impact on a new area and because it does not address existing north section road conditions. It does address existing south section conditions. |
| Established Policy Directives: | 0 | This option upgrades a section of existing road but provides a significant section of new off-line road that is against general policy.<br>This option would only improve average journey times to a limited extent.<br>This option would be unlikely to see a significant reduction in RTAs overall.<br>Whilst new road provides new opportunities, these are limited. It provides limited potential for enhancements to existing south section corridor infrastructure and facilities that meet current NPA objectives<br>This option would be unlikely to lead to any significant wider economic benefits. |
| Rationale for Selection or Rejection of Proposal: | **-1** | This option scores positively in seven criteria. But the total score is negative, suggesting it gives limited benefit overall so recommend it be rejected at this sift. |

<table>
<tr><th colspan="4">Proposal Details</th></tr>
<tr><td colspan="2">Name and address of authority or organisation promoting the proposal:<br>(Also provide name of any subsidiary organisations also involved in promoting the proposal)</td><td colspan="2">Transport Scotland</td></tr>
<tr><td>Proposal Name:</td><td>A82 Tarbet to Inverarnan Upgrade<br>Option 11 – High Road</td><td>Name of Planner:</td><td>CH2M HILL Fairhurst JV</td></tr>
<tr><td rowspan="3">Proposal Description:</td><td rowspan="3">An alignment to the west and above the existing A82 corridor following some existing farm tracks and forestry routes with tunnels and viaducts.</td><td rowspan="3">Estimated Total Public Sector Funding Requirement:</td><td>Capital costs/grant (including OB)<br>£325 - £375 million</td></tr>
<tr><td>Annual revenue support<br>None<br>(other than routine maintenance)</td></tr>
<tr><td>Present Value of Cost to Govt.<br>Not known at this time</td></tr>
<tr><td>Funding Sought From:<br>(if applicable)</td><td>tbc</td><td>Amount of Application:</td><td>tbc</td></tr>
<tr><th colspan="4">Background Information</th></tr>
<tr><td>Geographic Context:</td><td colspan="3">Tarbet and Arrochar are the largest settlements in the area, with smaller communities and individual properties mainly located along the A82 or A83. Tarbet is located at the junction of the A82 and A83. The A82 is a key transport route between the north west of Scotland and the Central Belt. Between Tarbet and Inverarnan, the A82 follows the west side of Loch Lomond, with mountains to its west and the loch foreshore to the east. The road passes through the Loch Lomond and Trossachs National Park at this location, through spectacular scenery that is a designated National Scenic Area. Any major improvement to this section of the A82 will have significant environmental impacts.</td></tr>
<tr><td>Social Context:</td><td colspan="3">This area is sparsely populated, within just over 1,000 people within the area, the majority living in Arrochar or Tarbet. Historically, employment focused on fishing, farming, power, defence and an Outdoor Centre but most of these have declined to be replaced mainly by tourism. As a result, many younger people are leaving to seek work or greater choice of affordable accommodation elsewhere. Older or retired people are moving in attracted by the scenery.</td></tr>
<tr><td>Economic Context:</td><td colspan="3">Principal employment/businesses relate to tourism – hotels, shops, pubs, restaurants, B&B and water-related activities. Many workers either travel in or are seasonal. Some farming remains, mainly sheep. Existing public transport (bus and train) do not serve the community well enough to support commuting or main visitor numbers. The poor geometry of the A82 at this location results in poor and unreliable journey times that make the route unattractive to some users, including freight. It also has a very poor road traffic accident history and is considered unsafe. This results in a negative impact on the local and regional economies, with suggestion the sub-standard alignment of the A82 may be suppressing economic investment and restricting future development proposals.</td></tr>
</table>

| Transport Planning Objectives | | | |
|---|---|---|---|
| Objective: | | Assessment Summary | Performance against planning objective: |
| 1 | Average Journey Time<br>To improve average journey times for A82 trunk road users between Tarbet and Inverarnan (based on observed post Pulpit Rock scheme). | 2 | New off-line alignment would seek to generally follow similar contours along the west mountain-side with a fairly straight alignment providing improved average journey times.<br>This option provides a potential circular route, resulting in some motorists, especially visitors, potentially using the existing corridor for one direction. |
| 2 | Safety<br>To reduce personal injury accident numbers and their severity on the A82 between Tarbet and Inverarnan to be closer to or better than national KSI rates. | 1 | The off-line alignment would have improved geometry and have an envisaged lower RTA occurrence rate. However, likely significant traffic would still use the existing corridor, which, without improvement, will continue to experience high numbers of RTAs. |
| 3 | Facilities<br>To provide appropriate stopping opportunities for visitors and for all trunk road users on the A82 between Tarbet and Inverarnan taking account of the unique setting of the route within the National Park. | 2 | The off-line alignment could provide new stopping opportunities along its length, as part of the design. Likely to be popular for strategic traffic and also tourists seeking enhanced views of Loch Lomond and area.<br>The existing on-line corridor would continue to be used but no stopping enhancements would probably be provided as part of this option but new alignment ones may act as acceptable alternative facilities. |
| 4 | Accessibility<br>Seek to provide opportunities for enhanced access by sustainable modes of travel along the A82 corridor between Tarbet and Inverarnan. | 2 | This off-line alignment could provide new NMU infrastructure opportunities for pedestrians and cyclists along its length, which could act as attractive alternative facilities to the existing corridor, although some steep gradients.<br>There are unlikely to be any improvements on the existing corridor, which would probably continue to experience significant traffic flows but new ones could be very attractive alternative facilities given landscape setting. |
| 5 | Maintenance<br>To reduce disruption to road users resulting from the undertaking of routine maintenance activities on the A82 between Tarbet and Inverarnan. | 2 | The off-line alignment option means a close alternative route is available via the existing A82 corridor, in event of new road being closed.<br>Steep gradients and high altitude will be affected by adverse weather.<br>Sections of tunnels require more maintenance than a standard road. |

| STAG Criteria | | |
|---|---|---|
| Criterion | Assessment Summary | Supporting Information |
| Environment: | -3 | Improved average journey time will reduce CO2 emissions, although might be offset by increased traffic levels, as new road attracts more trips.<br>The off-line route will have a major detrimental impact on the landscape setting and biodiversity during construction and will have permanent impact thereafter, especially in terms of visual impact.<br>There would be no improvement to reducing existing surface water run-off on the existing corridor but its quality would be slightly improved. |
| Safety: | 0 | The off-line alignment should be attractive for strategic traffic seeking a quicker route but significant flows of traffic likely to still use existing corridor, so overall number of RTAs should reduce but not to desirable levels.<br>This option will not improve existing conditions for pedestrians and cyclists or help address existing stopping safety concerns. May provide new facility opportunities on the off-line route.<br>Likely general sense the existing section of A82 is still rather unsafe to use, given retention of existing corridor in its present condition, although the alternative route is close by.<br>The new alignment with its elevation may have poor winter resilience. RTAs occurring within the tunnel could become major incidents. |
| Economy: | 2 | This option will improve average journey times, particularly for strategic traffic and probably reduce overall KSI accidents to some extent. It could make the route more desirable for freight traffic but steep gradients on new road not particularly attractive.<br>Likely to see increased visitor/tourist numbers as new route will provide panoramic views and a circular tourist route. Wider economic benefits could result from more visitors contributing to the local economy, whilst improved connectivity might help economic investment and growth in both local and regional areas but may be limited as existing A82 corridor is not upgraded. |
| Integration: | 0 | This option would not contribute to any improved existing interchange with sustainable modes of travel, such as public transport (bus and train) along existing corridor.<br>The new road might encourage some limited land-use proposals along its route, such as viewing facilities. |
| Accessibility and Social Inclusion: | 1 | This option would help enhance connectivity of those existing local communities near either end with wider area but no intermediate ones. New opportunities for NMU infrastructure to improve accessibility by walking and cycling possible but not along existing corridor. |

| Deliverability Appraisal | | |
|---|---|---|
| Criterion | Assessment Summary | Supporting Information |
| Engineering: | -2 | Constructing a new off-line road along the mountain-side will be challenging, in terms of engineering solutions at Inveruglas valley and steep rock outcrops, which will probably require significant viaducts and some tunnels. In addition, constructing a new road will have access and material handling issues.<br>Land acquisition is a potential deliverability risk, in terms of delay.<br>Objections from key environmental bodies and other interest groups is a potential deliverability risk. |
| Affordability: | -2 | This option has some significant engineering requirements and will be quite expensive to deliver but has limited impact on the existing A82 corridor during construction.<br>Cost range is towards the middle compared to other options. |
| Public Acceptability: | -1 | This option was proposed by a number of stakeholders at Workshop 1. Whilst it did have significant environmental impact, it could make use of some existing private vehicular and forestry routes. In addition, depending on the design, this route could create a very attractive tourist route with a potentially stunning setting and views. |
| Established Policy Directives: | 0 | This option provides a new off-line road that is against general policy.<br>This option would improve average journey times, which is a key policy objective.<br>This option would be unlikely to see a significant overall reduction in RTAs to desirable levels between Tarbet and Inverarnan.<br>The existing A82 corridor would not be improved, contrary to NPA objectives but new road could become a tourist attraction itself.<br>This option could lead to some wider economic benefits. |
| Rationale for Selection or Rejection of Proposal: | **4** | This option scores positively in seven criteria, including well in the TPOs. The total score is positive so recommend it be taken forward for DMRB Stage 1 assessment. |

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# Appendix C

## Corridor Locations Plan

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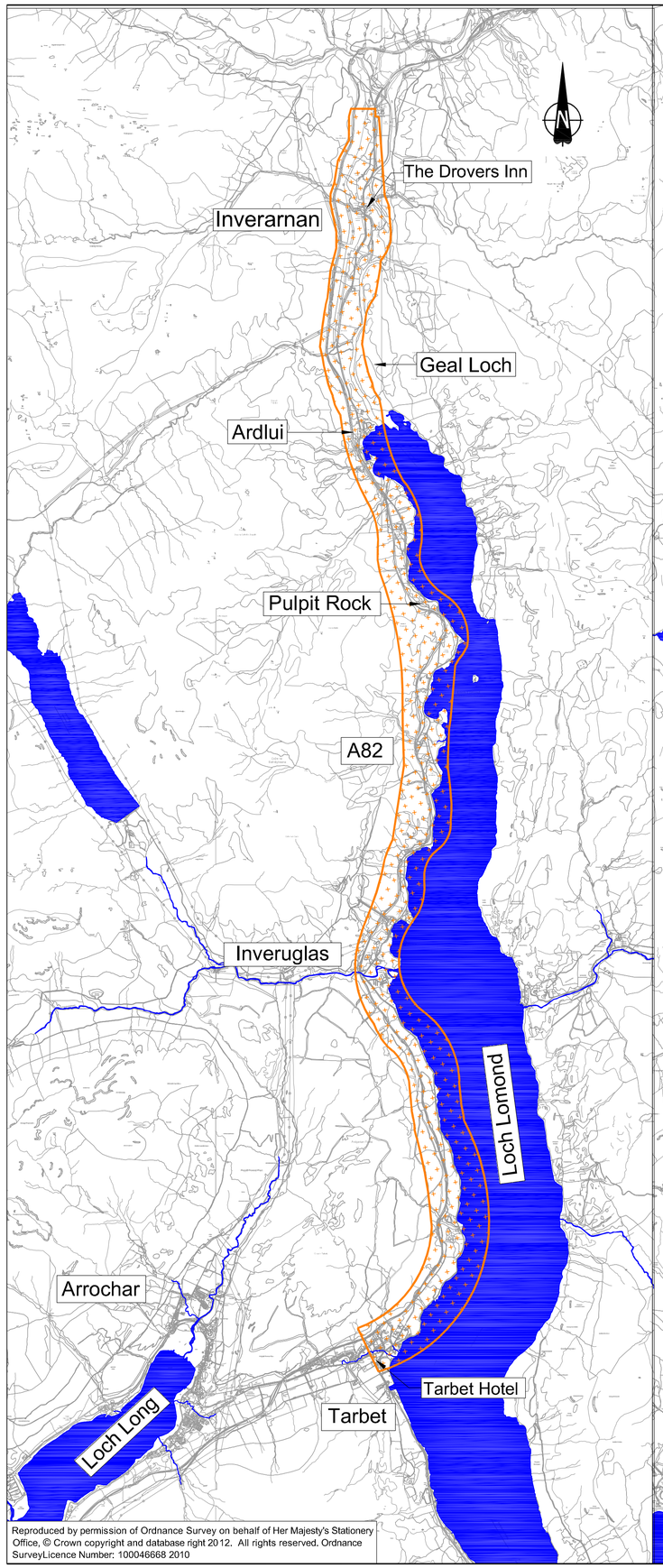




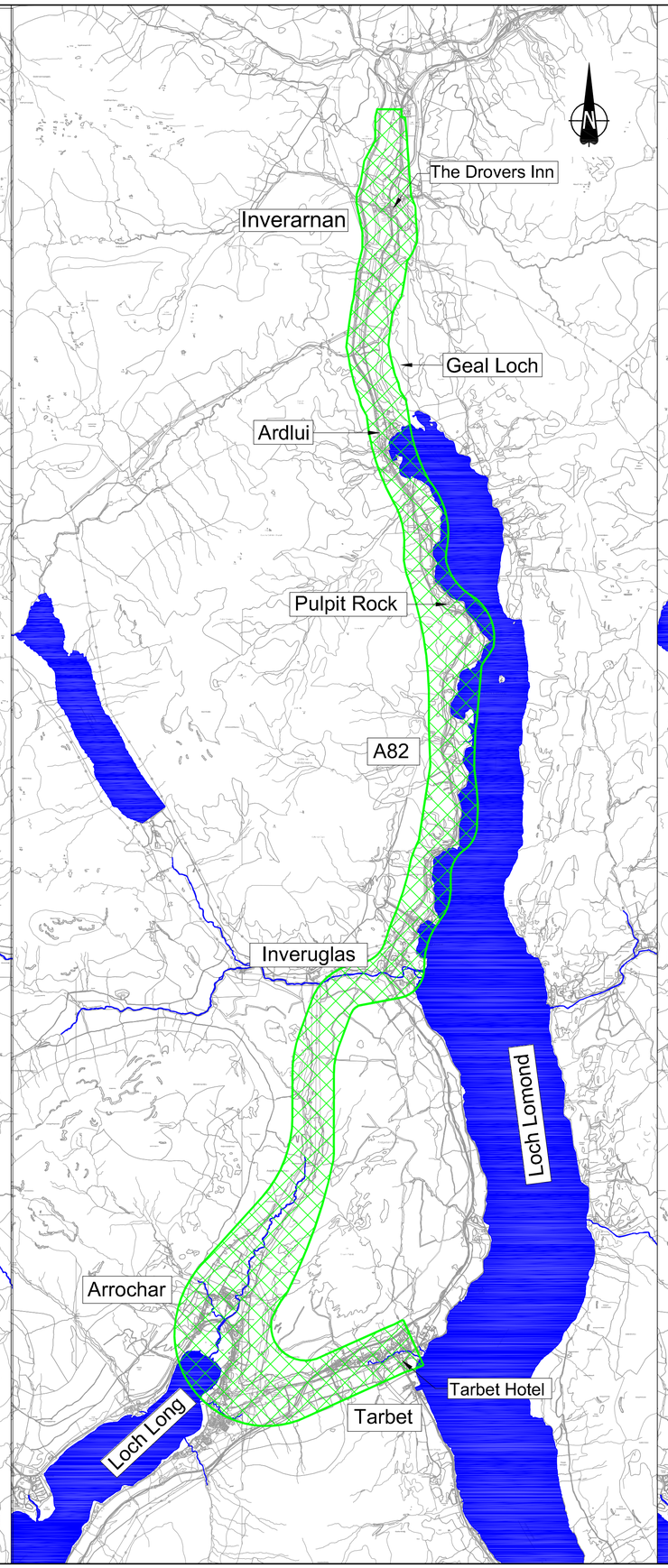


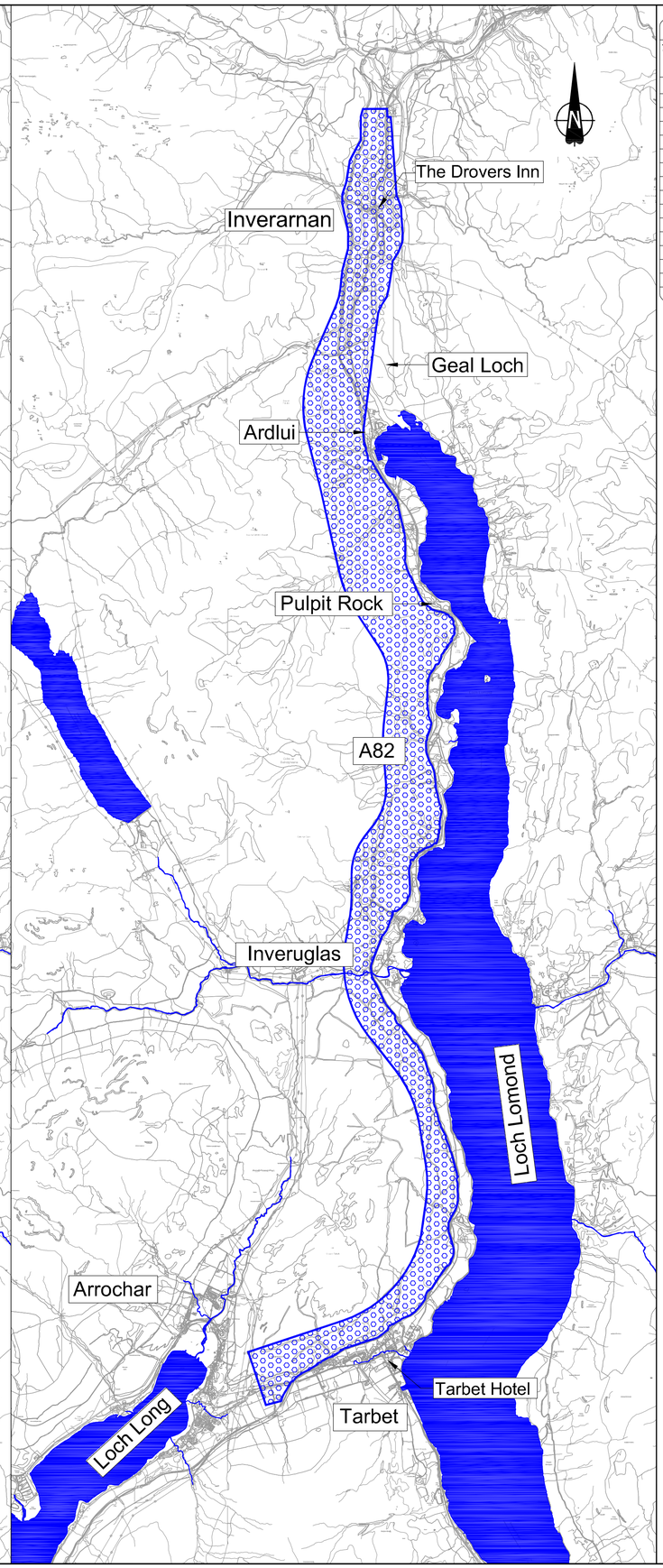


## SIGNIFICANT RESIDUAL RISKS

*The following list provides a cross reference between this drawing and the Designer's Health and Safety Risk Assessment, and identifies those areas of Significant Residual Risk*

| Description of Risk | Ref. No. |
|---|---|
| CLIENT OPERATIONS | 1 |
| ADJACENT ACTIVITIES | 2 |
| RESTRICTED SITE | 3 |
| TRAFFIC | 4 |
| INTERFACE WITH PUBLIC | 5 |
| NEAR TO HIGHWAYS | 6 |
| NEAR TO RAILWAYS | 7 |
| NEAR TO WATERWAYS | 8 |
| GROUND INSTABILITY | 9 |
| CONTAMINATION/SOIL GAS | 10 |
| GROUND WATER | 11 |
| INUNDATION | 12 |
| SERVICES | 13 |
| OVERHEAD CABLES | 14 |
| INSECT ATTACK (INCL. MIDGE & TICKS) | 15 |

Key:

- Option 1 Orange Corridor
- Option 2 Green Corridor
- Option 3 Blue Corridor

| Rev | By | Chkd | Apprvd | Date | Description |
|---|---|---|---|---|---|
| 2.0 | SMC | EN | EC | 27.02.14 | Drawing border amended. |
| 1.0 | MC | EN | EC | 11.12.13 | Draft stamp removed. |

Client

TRANSPORT SCOTLAND

The Scottish Government

CH2MHILL FAIRHURST

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Tel +44 (0)141 552 2000 Fax +44 (0)141 552 2525

Project

A82 TARBET TO INVERARNAN UPGRADE

Drawing

CORRIDOR LOCATIONS

| | | |
|---|---|---|
| Drawn by: | M COLAHAN | Date: 20.11.13 |
| Checked by: | E NICOLSON | Date: 22.11.13 |
| Approved by: | E CRAWFORD | Date: 22.11.13 |

| Drawing No. | Revision |
|---|---|
| **476416-0000-016** | **2.0** |

Drawing Scale: N.T.S.

CAD Filename: Plot Scale:

Drawing file path & name : K:\Highways\A82 Tarbet to Inverarnan\Technical\Design\Drawings\0000 Plans and Profiles\Live Projects\476416-0000-016\Rev 2.0 - Corridor Locations.dwg
Xreference file path : K:\Highways\A82 Tarbet to Inverarnan\Technical\Design\Drawings\0000 Plans and Profiles\Live Drawings\
User and Plot Date : smclean1 - 28.2.2014 - 11:2 am

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