A82 Tarbet to Inverarnan Upgrade

DMRB Stage 1 Environmental Assessment: Scoping Report

Transport Scotland

February 2014

TRANSPORT SCOTLAND

CH2MHILL

FAIRHURST

This page is blank.

A82 Tarbet to Inverarnan Upgrade

DMRB Stage 1 Environmental Assessment: Scoping Report

Transport Scotland

February 2014

CH2M HILL Fairhurst JV
City Park, 368 Alexandra Parade, Glasgow G31 3AU
tel 0141 552 2000 fax 0141 552 2525

This page is blank.

Document history

A82 Tarbet to Inverarnan Upgrade

DMRB Stage 1 Environmental Assessment: Scoping Report

Document No. 476416-016

This document has been issued and amended as follows:

Version	Date	Description	Created by	Verified by	Approved by
1.0	22/11/13	Draft for client review	[REDACTED]	[REDACTED]	
2.0	05/02/14	Final draft for client review	[REDACTED]	[REDACTED]	
3.0	28.02.2014	FINAL	[REDACTED]	[REDACTED]	[REDACTED]

This page is blank.

Contents

Appendices

Figures

Tables

This page is blank.

1 Introduction

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 Design Manual for Roads and Bridges (DMRB) Stage 1 and Stage 2 assessments for the proposed upgrade of the A82 Trunk Road between Tarbet and Inverarnan.

This document sets out the DMRB Stage 1 environmental assessment for the A82 Tarbet to Inverarnan Upgrade Scheme. The report has been prepared in accordance with DMRB Volume 11: Environmental Assessment, Section 2: General Principles of Environmental Assessment, Part 4: Scoping of Environmental Impact Assessments (HA204/08).

1.1 Introduction to the Environmental Assessment Process for Road Projects

The environmental assessment of road projects is undertaken in accordance with Volume 11 of the DMRB. Figure 1.1 of DMRB Volume 11, Section 2, Part 1 (HA201/08) provides an overview of the environmental impact assessment process for road projects. This figure is reproduced below.

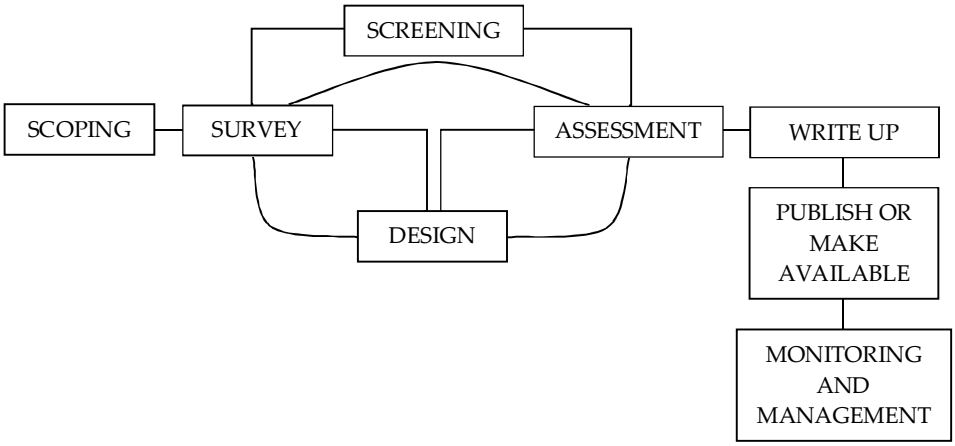


Figure 1.1: Overview of the environmental impact assessment process

The figure illustrates the activities undertaken within the environmental impact assessment process:

- screening the project by determining whether statutory Environmental Impact Assessment (EIA) needs to be completed or not (see section 1.1.1 for further details);
- scoping the topics and the level of assessment needed (the subject of this report);
- an iterative consideration of survey, assessment and design; and
- reporting the findings and follow-up.

The design and assessment processes are interwoven and will involve repeatedly going through the cycle of design and assessment until the design fulfils the objectives of the project.

The level of assessment deemed necessary is based upon a number factors: the potential environmental effects, the stage of project planning and the next project decision. The DMRB identifies the following assessment levels:

- scoping (or stage 1);
- simple (or stage 2); and
- detailed (or stage 3).

The levels of assessment do not necessarily follow one after the other; the results of one assessment level determine what, if any, further assessment work is required. Which level of assessment to apply at any stage in the design process will be informed by the scoping results, the project planning stage and options, and the environmental issues identified.

For the purposes of the A82 Tarbet to Inverarnan Upgrade Scheme, the scoping (stage 1) assessment has considered three alternative route corridor options (see drawing 476416-0000-016 in Appendix A) and selected a preferred corridor. The simple (stage 2) assessment will consider a series of route alignment options within the preferred corridor selected at scoping (stage 1). The aim of the simple (stage 2) assessment will be to selected a preferred route alignment within the preferred corridor which will then be considered in detail during the detailed (stage 3) assessment process.

1.1.1 DMRB Scoping (stage 1) Assessment

The objective of scoping as set out in HA204/08, is to determine the level of assessment (simple (Stage 2) and / or detailed (Stage 3) required to support the development of the project. This may vary for each environmental topic area. The scoping process may indicate that for a particular topic no further assessment is necessary, or that a simple or detailed assessment (or both) (as defined in the DMRB) is required in order to appropriately investigate the nature of any potential impacts and to inform the project's design.

The scoping exercise involves the collection of baseline data and the identification of potential environmental impacts which the project could give rise to. At this stage, mitigation is also identified where possible, in order to inform good design and decision making.

This report describes the DMRB scoping (stage 1) assessment for the A82 Tarbet to Inverarnan Upgrade Scheme and is based upon the information available at the time of writing (the early stages of design). Should any proposals change, this assessment may need to be revisited.

1.1.2 Determination of Road Projects in Scotland for Statutory Environmental Impact Assessment

Screening of a road project aims to identify whether it falls within Annex I or Annex II of the Environmental Impact Assessment (EIA) Directive (2011/92/EU) (referred to as the "EIA Directive") and depending upon the likely significant environment effects, whether a statutory EIA will be required. The screening process is described in Table 1.1 of HD47/08.

Annex I projects have a mandatory requirement for EIA and preparation of an Environmental Statement (ES). Annex I projects include construction of a new road

of four or more lanes, or realignment and/or widening of existing roads of two lanes or less, to provide four lanes or more, where such new roads or realigned and/or widened sections of road would be 10 kilometres or more in a continuous length.

Under the Environmental Impact Assessment (Scotland) Regulations 1999 (as amended) (referred to as the "EIA Regulations"), only those Annex II projects deemed to have environmental sensitivities (i.e. when the area is situated in whole or in part in a sensitive area) or be over a certain threshold in size (1ha) are considered to be "relevant" and require determination for an EIA[1]. The thresholds identified in the guidance are not absolute (HD47/08) and the focus of the determination is based on the question 'Is the project being considered likely to have a significant effect on the environment?' The judgement as to whether the project is likely to have a significant effect is informed by the selection criteria in Annex III of the EIA Directive. The selection criteria from the EIA Directive are summarised below:

- characteristics of the project;
- location of the project; and
- characteristics of the potential impacts.

At this stage, the judgement on the requirement for EIA revolves around the following considerations:

- what is proposed?;
- what could be affected?; and
- whether the effects could be significant?

A formal screening decision for the A82 Tarbet to Inverarnan Improvements scheme, to determine whether it is an Annex I or Annex II project and whether a statutory EIA is required, will be dependent upon the final road alignment chosen.

1.2 Location of the Project

Initially the brief was to consider the section of A82 from a point just to the north of Tarbet (end of 30mph speed limit) to just north of Inverarnan. However, following a query from stakeholders about the extent of the study, Transport Scotland subsequently confirmed that the study will extend to the south of the A82/A83 junction at Tarbet. The data on the existing route gathered to date is predominantly for the section of A82 covered by the original brief. However, updates to include Tarbet have been provided where possible. A more detailed assessment in this vicinity will be considered as part of the Stage 2 Assessment process.

The revised study area therefore covers a length of approximately 17 kilometres from a point just south of Tarbet (start of 30mph speed restriction) to a point north of

[1] Where a road is classed or is to be classed as a Special Road, Annex II projects shall be treated as having characteristics that require it to be made subject to an environmental impact assessment and as such no determination is required.

Inverarnan where the carriageway cross-section widens to 7.3 metres with near standard verge widths.

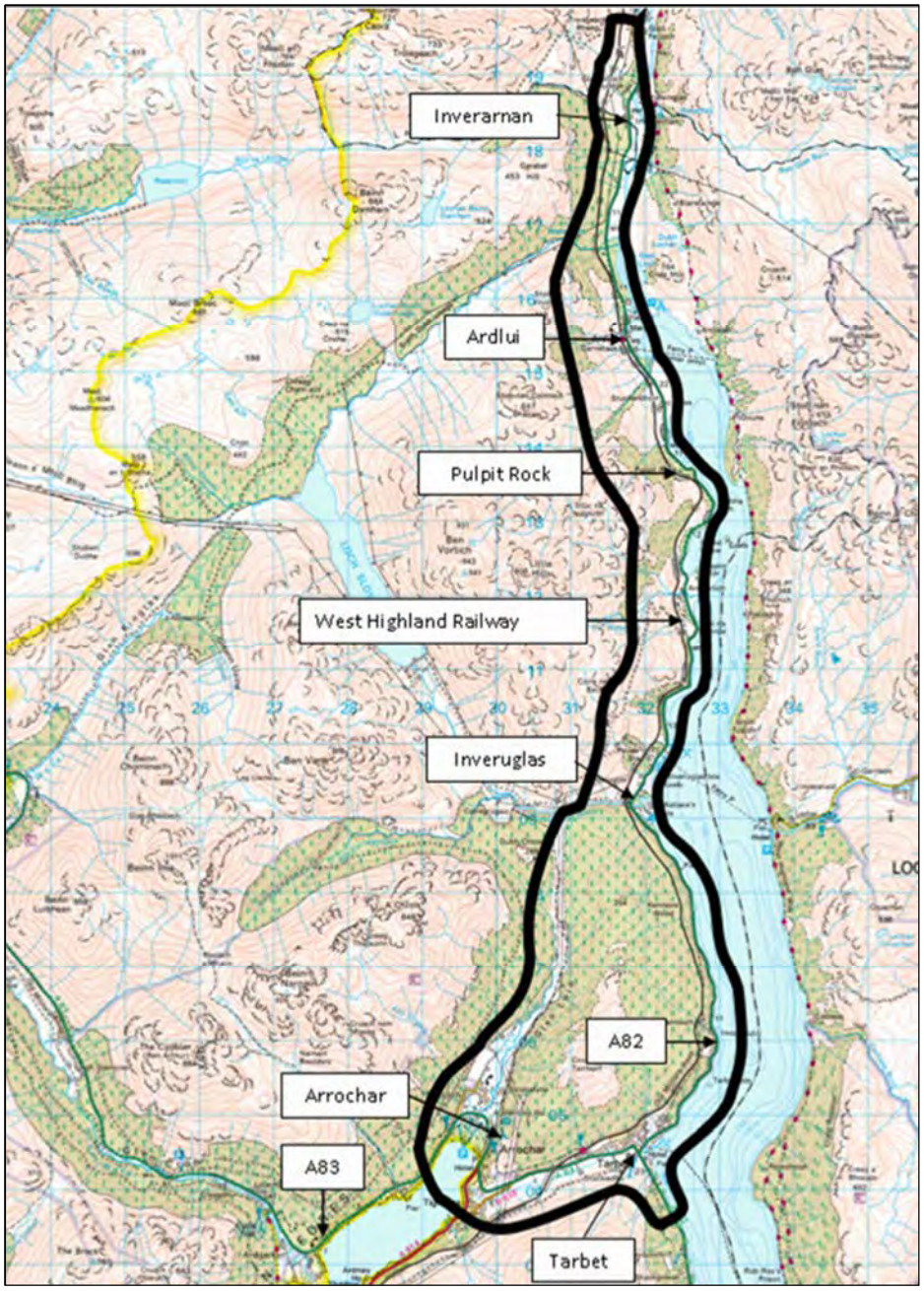


Figure 1.2: study area

1.3 The Overseeing Organisation

The proposed scheme is being promoted by the Major Transport Infrastructure Projects (MTRIPS) a Directorate of Transport Scotland. Land within the boundaries of the A82 corridor is currently owned by the Scottish Government and managed and maintained on behalf of Transport Scotland by the Operating Company, BEAR Scotland Limited, a service provider in the Scottish roads maintenance sector. As part

of the 2012 Engineering and Environmental Surveys commission (see section 3.2.3), the landownership details of lands adjoining the existing road were established.

1.4 The Assessment Team

The DMRB assessment has been undertaken, managed and compiled by CFJV.

Reviews of the assessments have been undertaken at key stages by suitably qualified individuals, to ensure robust environmental assessment procedures have been followed, which comply with requirements of HD204/08: Scoping of Environmental Impact Assessments.

1.5 The Purpose and Structure of the Scoping Report

This Environmental Scoping Report determines the scope of further environmental assessments associated with the A82 Improvements Scheme. The assessments detailed in this report have been completed in line with guidance set out in DMRB Volume 11, Section 3, Part 1 to Part 12.

The report has been produced following an extensive desk study, a number of site visits and communication with various consultees. Its structure is as follows:

- an introduction to the proposed scheme, its location, the designer / assessment team, the overseeing organisation and the purpose of the report (this section);
- a summary of the existing conditions along the A82;
- the scheme background;
- the objectives of the scheme;
- the alternatives that have been considered and those explored in this report;
- the consultation undertaken to date and the anticipated programme and publication events;
- for each environmental topic, the existing and baseline knowledge, the value of the environmental resource, potential effects; and
- for each topic, a recommendation as to the need for any further assessment including the proposed methodology for that assessment.

As part of good practice, the following consultees will be consulted on the scheme and the proposed scope of the environmental assessment as set out in this report:

- Scottish Environment Protection Agency (SEPA);
- Scottish Natural Heritage (SNH);
- Historic Scotland (HS);
- Argyll & Bute Council
- Stirling Council; and
- Loch Lomond and the Trossachs National Park (LLTNP) Authority.

This page is blank.

2 Existing conditions

2.1 The A82

The strategic route of the A82 between Glasgow and Inverness is, at 269 kilometres in length, the second longest trunk road in Scotland after the A9, comprising a mix of single and dual carriageway sections of differing standards and constructed at various times. The route provides an important connection between central Scotland and areas to the west and north west of Scotland. As such, the route is considered to be an economic lifeline not only to the communities directly served by the route, but also to the wider areas as noted above.

2.1.1 A82 Southern Section

The A82 begins in central Glasgow as Great Western Road at a junction with the M8 and the A804, continuing as a de-trunked road for 6 kilometres, then generally as dual carriageway sections in a northwesterly direction for 10 kilometres before joining the A898 from Erskine Bridge, providing critical links to the M8, the M77 and the M74.

From this point north, the A82 becomes a trunk road all the way to Inverness. It continues as a dual carriageway section in a generally northwest direction through Dumbarton for 14 kilometres to Balloch Roundabout near the western shore of Loch Lomond, bypassing Alexandria and Bonhill.

From this point, the route continues as a single carriageway road in a generally northerly direction parallel to the Old Military Road for approximately 27 kilometres, following the western shores of the loch. The section between Balloch and Tarbet is generally of good standard, having been widened to a standard cross-section of 7.3 metre carriageway with hardstrips during the 1980's.

2.1.2 A82 Tarbet to Inverarnan Upgrade Section

At Tarbet, the A83 branches west to Campbeltown, while the A82 continues northward for approximately 17 kilometres along the western shores of the loch to Inverarnan. This section of the A82 is sandwiched into a narrow corridor between the loch to the east and the West Highland Railway to the west. The road is generally less than 7.3 metres in width, frequently narrowing to below 6.0 metres with no hard strips and substandard verges. This section contains a pinch point at Pulpit Rock, where traffic signals control single-lane operation. Works are currently progressing at this location to widen the road to allow two-lane trafficking.

The 17 kilometre section of the A82 between Tarbet and Inverarnan was identified by Transport Scotland as being significantly below standard and in need of upgrading.

Traffic data recorded along the route indicates that the annual average daily traffic flow (AADT) on this section of the A82 is approximately 3,500.

The importance of this route is highlighted by the volume of tourist related traffic and the recent growth in traffic, specifically HGVs travelling between central Scotland and the north.

2.1.3 A82 Northern Section

North of Inverarnan, the road widens to 7.3 metres and continues in a generally northeast direction for 10 kilometres to Crianlarich, where the route joins with the A83 and continues for 8 kilometres to Tyndrum. From Tyndrum, the A82 continues in a generally northerly, then northwesterly direction for 50 kilometres to Glencoe. It then continues in a northeasterly direction for 27 kilometres to Fort William, where it meets with the A830, before continuing in a northwesterly direction for 16 kilometres to a junction with the A86 at the River Spean, then a northeasterly direction for 25 kilometres to a junction with the A87 at Invergarry.

The A82 then continues in a generally northeasterly direction along the southeastern shore of Loch Lochy to Fort Augustus for approximately 13 kilometres, then along the northwestern shore of Loch Ness, passing Drumnadrochit, for approximately 41 kilometres before running parallel to the River Ness for approximately 10 kilometres, then becoming dual carriageway at Telford Roundabout, crossing the River Ness and continuing in a generally northeasterly direction for 2 kilometres to end in a junction with the A9 at Longman Roundabout, immediately south of Kessock Bridge.

2.2 Description of Locality and Topography

The study area is located within LLTNP, on the western shore of Loch Lomond. The existing road generally follows the route of the Old Military Road, located just to the west of the A82. Further west, the West Highland Railway is present at the top of a steep embankment. The 17 kilometre road passes through two local authority areas; Argyll & Bute and Stirling.

The horizontal alignment of the road generally follows the shore of Loch Lomond, incorporating tight radius curves that fall up to 4 steps below DMRB standards. The cross section of the road is also substandard, with all sections below 7.3 metres width, and many below 6.0 metres. There are no hard strips present and inadequate verges.

There is presently a pinch point at Pulpit Rock, where traffic signals control single-lane operation. Works are currently progressing at this location to widen the road to allow two-lane trafficking.

The vertical geometry of the existing road typically follows the local topography. Road elevations on the existing A82 within the study corridor range from a minimum of approximately 11 metres AOD at the lowest point immediately north of Tarbet to a maximum of approximately 22m AOD just south of Ben View, located south of Ardlui. Elevations then fall to approximately 18 metres AOD at the end of the study corridor, north of Inverarnan.

Loch Lomond lies immediately to the east of the A82 at approximately 8 metres AOD winter water level. There are a number of retaining walls along the eastern boundary of the corridor supporting the A82.

A large number of watercourses are present in the area, generally flowing from west to east and outfalling into Loch Lomond. There are 152 No. existing culverts under the A82 along the study section, and 7no. bridges (plus 2 in Tarbet).

To the west of the A82 generally lies a steep embankment supporting the West Highland Railway. Retaining walls are present in several locations along the route.

3 The scheme

3.1 Background to the Scheme

The existing A82 carriageway between Tarbet and Inverarnan is below standard due to topographical constraints and offers limited cross-sectional width, with much of the carriageway less than 7.3 metres wide and many sections without hardstrips or verges. The existing carriageway also hosts a number of tight radius curves throughout the scheme extents which 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.

A review of accident records covering the period 1st January 2008 to the 31st December 2011 recorded 48 accidents of which 6% were fatal, 27% serious and 67% slight. The weather conditions during which the accidents occurred were noted as follows:

- fatal accidents: 33% occurred in wet conditions with 66% in fine weather;
- serious accidents: 24% occurred in wet conditions with 76% in fine weather;
- slights: approximately 50% split between fine and wet conditions.

The main contributing factors resulting in the high severity of accidents include factors such as unsafe overtaking manoeuvres and excessive speed through the bends (design speed has been calculated to be 85B kph along the route) along with vehicles colliding and striking off carriageway hazards.

3.2 Scheme Development History

A number of previous studies have been carried out on the A82 which have highlighted various issues and collated information on the route.

3.2.1 A82 Tarbet to Fort William Route Action Plan Study (2006) [2]

This strategic route study and broad summary highlighted issues associated with the A82 from Tarbet to Fort William. Although the report covers a longer length of road than the section from Tarbet to Inverarnan, it highlights issues specifically related to this smaller section:

- operational stress due to poor road alignment along the side of Loch Lomond and the narrow carriageway width;
- increased journey times 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;
- road traffic accidents (some involving pedestrians and cyclists); and

[2] Transport Scotland; Scott Wilson (2006). A82 Tarbet to Fort William Route Action Plan Study.

- parking areas of a poor standard.

3.2.2 Strategic Transport Projects Review (2009, 2010)[3]

Project 3 (Targeted programme of measures to improve road standards between Glasgow and Oban / Fort William (A82)) of the Strategic Transport Projects Review (STPR) supported the objective of providing a significant upgrade to the standard of the road along the A82 and to reduce the severity of accidents along the route. This project specifically identified that carriageway widening should take place at selected locations between Tarbet and Inverarnan.

The STPR envisaged that the introduction of physical works along the A82 would provide safer overtaking opportunities and improve road safety along the route when combined with the introduction of speed enforcement measures. It identified the A82 as a key tourist route which has a high proportion of infrequent users and that the provision of a high standard of carriageway would be of particular benefit to road safety.

The STPR identified and assessed several different route corridor options. These are shown on Figure 3.1.

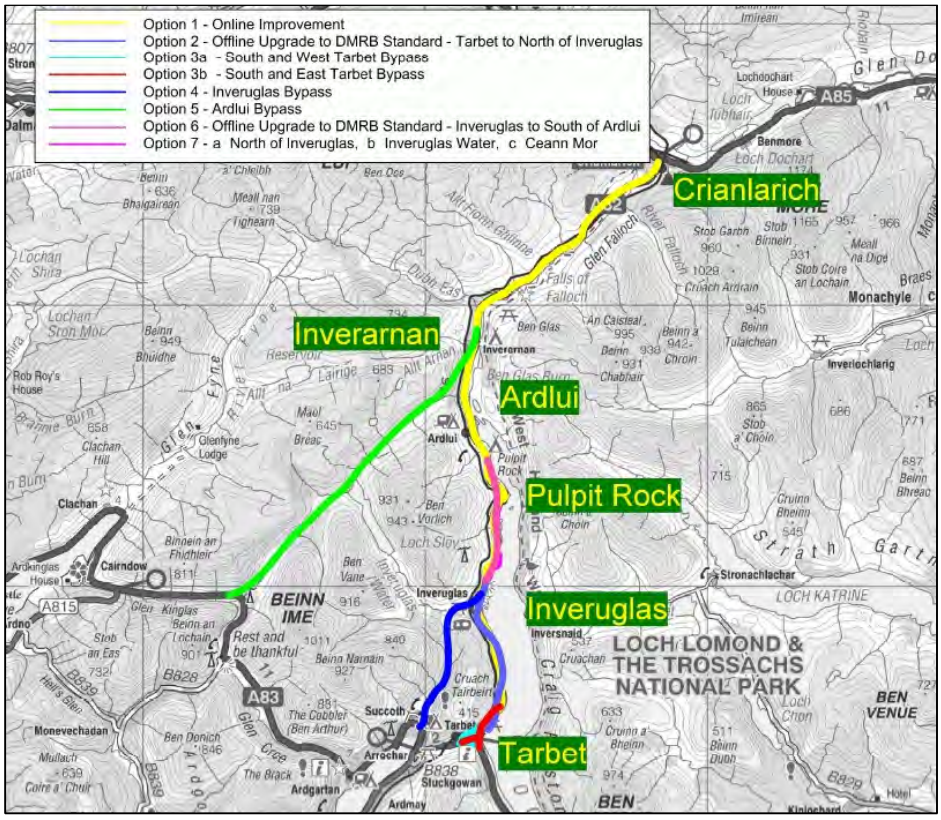


Figure 3.1: STPR route corridor options

[3] Transport Scotland (2009, 2010). Strategic Transport Projects Review.

3.2.3 Engineering and Environmental Surveys (2012)[4]

These surveys were commissioned with a view to gathering engineering and environmental data to support future DMRB design and assessment. The surveys were focused on an online upgrade option, so were restricted to a corridor some 30 metres either side of the existing carriageway. This was extended in areas where preliminary designs showed that there may be a requirement for additional width.

The survey results provide an initial study of the nature of the environment and set out key objectives which should be considered. It sets out challenges associated with the site and suggests what measures should be considered to deliver the key objectives.

Aspects identified during the surveys specific to the Tarbet to Inverarnan route were:

- high value tourist route through sensitive semi-wild landscape within the LLTNP;
- lies within a National Scenic Area;
- 21 listed buildings and three scheduled monuments within the scheme extents, mainly associated with the villages of Tarbet, Inveruglas and Inverarnan;
- the area is valued for its traditional rural character and special qualities creating a relatively unspoilt environment.

The study stated that consultation workshops should be undertaken with LLTNP, SNH, HS and SEPA. The views of these stakeholders would be important to the delivery of future design solutions.

3.2.4 Pulpit Rock

An improvement to a section of the route known as Pulpit Rock (OS Grid Reference 232664, 713682) (see Figure 1.1) has been progressed independently of this commission, with site works commenced in May 2013 and scheduled to take approximately 12 months to complete.

The improvements at Pulpit Rock will see the removal of traffic signals, and the section of road widened to provide a two-way carriageway by constructing a new viaduct running parallel with Loch Lomond. Benefits resulting from the scheme are expected to include a reduction in accidents, improvements to journey times and reduced driver frustration.

3.3 Scheme Objectives

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.

Early discussions with Transport Scotland have concluded that previous preliminary assessment work undertaken to support the STPR identification of potential

[4] Transport Scotland; Amey (2012). Engineering and Environmental Surveys.

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 review is undertaken, complying with STAG, to confirm previous problems, issues and constraints are still valid, in order to support a Strategic Business Case (SBC).

Following the preparation of the SBC, the following key transport planning objectives were identified for the scheme:

- to improve average journey times for A82 trunk road users between Tarbet and Inverarnan (based on observed post Pulpit Rock scheme);
- 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 (Killed or Seriously Injured) rates;
- 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.;
- Seek to provide opportunities for enhanced access by sustainable modes of travel along the A82 corridor between Tarbet and Inverarnan.; and
- to reduce disruption to road users resulting from the undertaking of maintenance activities on the A82 between Tarbet and Inverarnan.

4 Description of alternative schemes

4.1 Corridor Options

The STPR considered a number of route corridor options (see section 3.2.2). These were supplemented with additional options identified by the project team and through discussion with consultees. This "long list" of corridor options is illustrated in Figure 4.1 below.

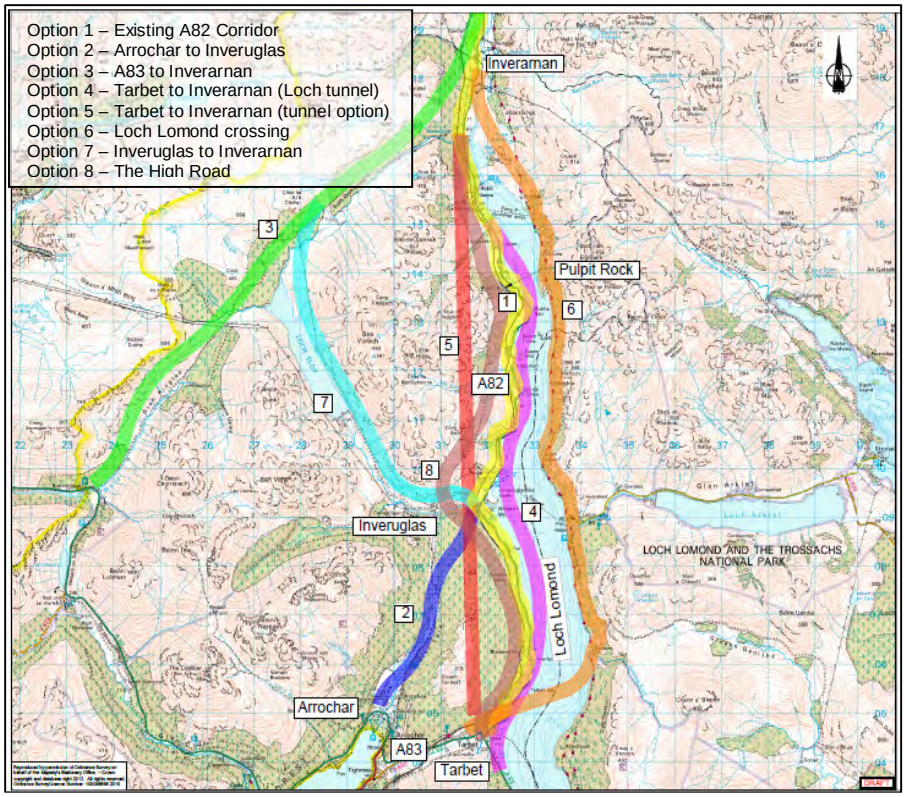


Figure 4.1: Long list of route corridor options

Sifting and appraisal of the identified corridors resulted in three options being recommended to be taken forward for DMRB Stage 1 assessment as follows:

- Option 1: Existing A82 Corridor;
- Option 2: Arrochar to Inveruglas to Inverarnan;
- Option 3: High Road (Tarbet to Geal Loch to Inverarnan).

4.2 Corridor Options to be Assessed

The three route corridors which are the subject of the Stage 1 assessment are described below. They are also shown on drawing 476416-0000-016 in Appendix A.

4.2.1 Corridor 1: Existing A82 Corridor

Corridor 1 follows the existing route of the A82 traversing from the south edge of Tarbet (start of the 30mph speed restriction) through Inveruglas before tie-ing into the southern end of the Pulpit Rock improvements. From the north end of the Pulpit

Rock improvements the route continues north to Ardlui at the north end of Loch Lomond and then onto the end of the study area, a point approximately 770 metres north of Inverarnan. The total length of Corridor 1 is in excess of 17 kilometres.

4.2.2 Corridor 2: Arrochar to Inveruglas to Inverarnan

Corridor 2 uses the existing A83 west of Tarbet to tie into a new section of road along Glen Loin, extending from Arrochar, at the north end of Loch Long, to Inveruglas. As the route drops to tie-in at Inveruglas it crosses over the West Highland Railway. From Inveruglas to Inverarnan the route traverses north via an improved A82 route (as used in Corridor 1). The total length of the route is in excess of 16.2 kilometres.

4.2.3 Corridor 3: High Road (Tarbet to Geal Loch to Inverarnan)

Corridor 3 traverses to the western side of Tarbet primarily following the existing A83 corridor where a junction is envisaged immediately to the west of the existing railway overbridge. Thereafter the alignment traverses to the north of Tarbet, passing through Kenmore Wood and running parallel with the West Highland Railway Line before crossing over the railway and rejoining the existing A82 at the north end of Geal Loch. From the tie-in point north to Inverarnan the route traverses an improved A82 north to Inverarnan. The total length of the route is in excess of 17.5 kilometres.

5 Consultation

5.1 Consultation Undertaken

Consultation has been undertaken with a number of consultees and has been completed through a variety of methods including meetings, workshops and email correspondence. This has allowed consultees to share any environmental information that they may have in relation to the proposed scheme and also to provide initial views on the proposals.

Table 5.1 provides a summary of the key consultation events undertaken to date.

Table 5.1: summary of key consultation events undertaken to date

Consultation event	Date	Description
Inception workshop attended by: • Transport Scotland • LLTNP	28th June 2013	Discussed aims, objectives & aspirations of an improved A82. Aspects covered included: • improved safety; • contribution to the local / regional economy; • a well managed project; • driving experience (scenic drive, views from the road etc); • sympathetically designed (taking into the account the sensitive environment / landscape); • increased tourism. Discussed constraints / issues and opportunities associated with the road improvement. Constraints / issues: • road width; • challenging topography; • sensitive ecology, landscape (National Park status); • community / local business issues; • visitor / road user management; • requirement for NMUs; • road drainage and flood risk; • railway. Opportunities: • scenic route and management of views; • contextual design (to suit the context / character of the location); • access for community / businesses & to the National Park; • improved facilities for NMUs; • improved journey times; • accident reduction; • SuDS & flood alleviation; • environmental mitigation.

Table 5.1: Summary of key consultation events undertaken to date (Cont.)

Consultation event	Date	Description
Correspondence with SNH (email)	16th September 2013	SNH provided background information on a number of aspects. This included: • data on highly environmentally sensitive sites (i.e. 'hot spots') along the route of the affected A82. This includes Loch Lomond NSA, Glen Etive and Glen Fyne SPA and a number of SSSI's; • specific guidance on the culverting of watercourses and mammal passes for otters. Indicated that otter surveys are likely to be required and a desk study for badgers should be completed to identify the need for a badger survey. Bat surveys of any potential roosting or hibernacula sites likely to be disturbed should be completed; • information on groundwater dependent ecosystems within Geal and Dubh Lochs SSSI; • a request that flooding and drought related issues are considered in relation to sensitive ecosystems; • guidance on the potential for construction works to affect floodplains.
Meeting with LLTNP	16th September 2013	Consultation meeting was held with the Director of Operations. LLTNP are keen to support the proposed consultation and ongoing design process. LLTNP are keen to explore the opportunity of positioning the A82 as a major tourist product as well as key infrastructure, through the promotion of the concept of "National Scenic Routes" which in themselves could be attractions.
Leaflet distribution	16th September 2013	An information leaflet was distributed to local residents and businesses along the A82 route. The leaflet introduces the scheme, sets out a programme for the design work and provides contact details for the A82 Consultation Manager and the scheme's website.
Correspondence with SEPA (email)	1st & 16th October 2013	Provided links to construction guidance documents. Set out future procedure for consulting SEPA as the scheme develops and provided additional point of contact.
A82 Stakeholder Forum workshop attended by: • Transport Scotland • Historic Scotland • LLTNP • SNH	2nd October 2013	The A82 is an economic lifeline to local communities, providing both strategic and local access. Currently the A82 has poor journey times with a lack of parking facilities and views obstructed. There is opportunity to improve cycling routes and provide improved access to the national park. This project should learn from the Pulpit Rock scheme. The

Table 5.1: Summary of key consultation events undertaken to date (Cont.)

Consultation event	Date	Description
• HITRANS • Police Scotland • Arrochar and Tarbet Community Council • Road Haulage Association • The A82 Partnership • The Highland Council • SEPA		A82 is a pilot for Transport Scotland's Scottish Scenic Routes. Other points raised are summarised below: • most offline options i.e. offline along Glen Kinglas, immersed tube tunnel, bridge and route up east of Loch Lomond all generally agreed as being not worthy of detailed assessment; • existing route corridor: all agreed should be considered; • tunnel option deemed worthy of consideration and various combinations of tunnel over southern section only or over northern section only; • new housing planned for Arrochar at bottom of Glen Loin; this could have negative implications for this offline option; • a further option called "High Road" was suggested, which would cross the railway around Tarbet, climb the hillside, then follow the contours to the west of the railway all the way, then re-joining the existing route around Ardlui/Inverarnan. However, if existing route corridor made wide enough, there would be scope to consider such an option within that corridor; and • the section from Inveruglas to Pulpit Rock seen as the most challenging section.
Meeting with LLTNP	11th November 2013	Update provided on the assessment & options development undertaken to date and the next stages of assessment to be undertaken in line with DMRB methodologies. Particular discussion of landscape and visual and all travellers issues.

5.2 Proposed Consultation

The results and conclusions of this Environmental Scoping Report will be communicated to the statutory consultees identified in Section 1.5 and their comments invited on the proposed scope of future environmental assessment work. As the preferred route corridor is selected and the scheme is developed through DMRB Stage 2, further consultation will be undertaken as required. It is recommended that any further consultation on the proposals target key stakeholders, local interest groups and local communities. In addition, a website has been established and will be periodically updated with scheme information in order to inform the wider public:

http://www.transportscotland.gov.uk/road/projects/A82-Improvements/A82-Tarbet-to-Inverarnan-Upgrade.

5.3 Proposed Publication Strategy and Timings

Once a decision is reached as to the preferred route corridor and route alignment, a Record of Determination for the scheme will be produced and a Notice of Determination published which will record the need (or otherwise) for statutory EIA and the production of an ES.

6 Scoping Assessments

6.1 Air Quality

6.1.1 Introduction

This section considers potential local air quality and regional air pollution issues associated with each of the three route corridors. Road transport schemes have the potential to give to rise to changes in the nature and location of vehicle emissions, with a consequent impact on air quality. A scoping level assessment has been carried out in accordance with the DMRB Volume 11, Section 3, Part 1: Air Quality - HA207/07. Scoping establishes whether or not the proposal has the potential to affect air quality and thus require further assessment. The level of assessment required is determined during scoping.

The key elements of the air quality scoping level assessment are as follows:

- identify roads that are likely to experience traffic flow changes significant to air quality as a result of the proposed scheme;
- identify sensitive receptors (properties, schools, hospitals and nature conservation sites) within 200 metres of affected roads;
- identify the locations of any Air Quality Management Areas (AQMAs); and
- make a qualitative assessment as to whether the proposals are likely to cause an improvement or deterioration in emissions of greenhouse gases.

In order to determine potential air quality impacts on nearby receptors, DMRB Volume 11, Section 3, Part 1, HA 207/07 states that all existing and planned properties where people might experience a change in local air quality, within 200 metres of affected roads should be identified. Furthermore, all nationally designated nature conservation sites within 200 metres of roads affected by the proposed scheme should also be identified.

Affected roads will be identified at the next stage of assessment, according to different criteria for the assessment of local and regional air quality impacts.

Affected roads for the assessment of local air quality are those that meet any of the following criteria:

- road alignment will change by 5 metres or more; or
- daily traffic flows will change by 1,000 AADT or more; or
- Heavy Duty Vehicle (HDV) flows will change by 200 AADT or more; or
- daily average speed will change by 10 kilometres /hour or more; or
- peak hour speed will change by 20 kilometres /hour or more.

Affected roads for the assessment of regional air quality are those that meet any of the following criteria:

- a change of more than 10% in AADT; or
- a change or more than 10% to the number of HDVs; or

- a change in the daily average speed of more than 20 kilometres/hour.

6.1.2 Policy and Legislation

6.1.2.1 European Legislation

EU Framework Directive 96/62/EC on ambient air quality assessment and management came into force in November 1996. The Directive aims to protect human health and the environment by avoiding, reducing or preventing harmful concentrations of air pollutants.

The European Commission worked together with Clean Air For Europe (CAFE) to produce and publish a new European Directive in 2008 (Directive 2008/50/EC). Key changes include a new air quality objective $PM_{2.5}$. The objective includes a limit value and exposure reduction target.

6.1.2.2 Local Air Quality Management

The Local Air Quality Management (LAQM) process as set out in Part IV of the Environment Act (1995) and the Air Quality Strategy for England, Scotland, Wales and Northern Ireland 2007 places an obligation on all local authorities to regularly review and assess air quality in their areas, and to determine whether or not the air quality objectives are exceeded.

The air quality objectives applicable to LAQM in Scotland are set out in the Air Quality (Scotland) Regulations 2000 (Scottish SI 2000 No 97)[5], the Air Quality (Scotland) (Amendment) Regulations 2002 (Scottish SI No 297)[6], and are shown in Table 6.1 below. This table shows the objectives, relevant to road transport schemes, in units of micrograms per cubic metre, $\mu g/m^3$ with the number of exceedances in each year that are permitted (where applicable).

[5] Air Quality (Scotland) Regulations 2000 (Scottish SI 2000 No. 97). The Stationery Office

[6] Air Quality (Scotland) Amendment Regulations 2002 (Scottish SI No. 297). The Stationery Office

Table 6.1: Air quality objectives applicable to LAQM in Scotland

Pollutant	Concentration	Measured as	Date to be achieved by
Nitrogen Dioxide (NO_2)	200 µg/m^3 not to be exceeded more than 18 times a year	1-hour mean	31.12.2005
	40 µg/m^3	Annual Mean	31.12.2005
Particles (PM_{10}) (gravimetric)	50 µg/m^3, not to be exceeded more than 35 times a year	24-hour mean	31.12.2004
	50 µg/m^3, not to be exceeded more than 7 times a year	24-hour mean	31.12.2010
	40 µg/m^3	Annual Mean	31.12.2004
	18 µg/m^3	Annual Mean	31.12.2010

Where a local authority's review and assessment of local air quality indicates that air quality objectives are not expected to be achieved, they are required to designate an AQMA.

6.1.3 Existing and Baseline Knowledge

Argyll & Bute Council has not declared any AQMAs along the length of any of the route corridors. A review of the 2013 Air Quality Progress Report for Argyll & Bute Council[7] identified that, "*In reviewing the annual mean concentration levels of PM_{10} monitoring at Tarbet, monitoring indicates compliance with national standards. However, more importantly from 2007, there is a downwards trend in concentrations and improving air quality*".

The route of the A82 between Tarbet and Inverarnan is sparsely populated. There are a number of small villages with residential dwellings including Tarbet and Ardlui which are located close to the A82. Traffic data from counts undertaken in 2012 indicate a daily flow of approximately 3,500 vehicles. On the basis of the background air quality being good, and the relatively low traffic flows, there is very little risk that any of the air quality objectives are exceeded even at the residential properties nearest to the route.

Within 200 metres of the proposed route corridors there are approximately 70 properties within Corridor 1, 280 within Corridor 2 and 100 within Corridor 3 (the majority of these properties are residential in nature). Arrochar Primary School is located just south of the A82 in Tarbet, closest to Corridor 2. There are also many recreational and tourist amenities, such as hotels, bed and breakfasts, campsites and visitor centres located within 200 metres of the route corridors.

The Internationally and Nationally designated nature conservation sites located within 200 metres of the route corridors are:

[7] 2013 Air Quality Progress Report for Argyll & Bute Council (April 2013)

- Glen Etive and Glen Fyne Special Protection Area (SPA);
- Loch Lomond Woods Special Area of Conservation (SAC) (nitrogen deposition critical load range of 10-15 kg/ha/yr exceeded – exceedance impacts: decrease in mycorrhiza, loss of epiphytic lichens and bryophytes, changes in ground vegetation);
- Glen Falloch Woods Site of Special Scientific Interest (SSSI) (nitrogen deposition critical load exceeded);
- Geal and Dubh Lochs SSSI (nitrogen deposition critical load exceeded);
- Garabal Hill SSSI (not sensitive to nitrogen deposition); and
- Glen Loin SSSI (nitrogen deposition critical load exceeded).

Further details on the habitats within these sites can be found in Section 6.4 (Nature Conservation), however many of them contain deciduous and coniferous woodland habitats which are sensitive to air pollution, particularly increased nitrogen levels. Nitrogen deposition in this area of Scotland is approximately 20 kg/N/ha/year, which exceeds the critical load range for many habitats in the sites designated for nature conservation, as set out by the United Nations Economic Commission for Europe (UNECE) in 2003. The background critical level for NOx is currently not exceeded in the Argyll and Bute area, with the maximum concentration in the council area being less than 10 ug/m^3 in 2013 (source: Defra background maps).

The local air quality along the length of the scheme is considered to be good, with the majority of the emissions being generated from road traffic.

6.1.4 Value of the environmental resources and receptors

Sensitive receptors within 200 metres of the three route corridors will be considered in more detail if further assessment is required.

Potentially sensitive receptors during the operational phase of the scheme have been defined according to Defra 2009, Local Air Quality Management Technical Guidance (LAQM.TG09)[8] as:

"*Locations where members of the public are likely to be regularly present and are likely to be exposed for a period of time appropriate to the averaging period of the air quality objective*".

The following sensitive receptors have been identified and considered as part of the scoping assessment:

- the route corridors for the A82 scheme cover a number of villages including Tarbet and Arrochar, with residential properties and local amenities. There are a small number of individual properties located adjacent to the A82 as well as many sites for tourism and recreation as the route corridors are located within a National Park. There are approximately 70 properties within 200m of

[8] Local Air Quality Management Technical Guidance (2009). Defra

Corridor 1, 280 within Corridor 2 and 100 within Corridor 3 (the majority of these properties are residential in nature); and

- there are a number of Internationally and Nationally designated nature conservation sites located within 200 metres of the route corridors, which could contain habitats sensitive to air pollution. Such designated sites can be affected by changes in NOx concentration (for which an annual mean 'critical level' is set out in Directive 2008/50/EC of 30 μg/m^3), and changes in nitrogen deposition. Rates of nitrogen deposition are set, which aim to conserve the ecology of the designated site. Empirical critical loads for nutrient nitrogen are set under the Convention on Long-Range Transboundary Air Pollution, and are found on the Air Pollution Information System[9].

6.1.5 Potential effects

All of the route corridors have the potential to give rise to temporary construction impacts through the emission of dust from construction activities. The potential effects should be considered at receptors up to 200 metres away from the construction location. Effects from construction will be temporary and could be mitigated and controlled by implementation of a Construction Environmental Management Plan.

During operation, route improvements are likely to increase the volume and speed of traffic and could change the road alignment, decreasing the distance between the road and receptors and increasing emissions and therefore roadside concentrations; this may give rise to significant adverse effects at any receptors (residential properties and designated sites) located close to the route chosen. In the same way, a reduction in traffic speed or flow and a change in alignment could increase the distance between the road and receptors and have the potential to give rise to beneficial effects. Given the relatively low traffic flow on the existing A82 route, the distance at which significant impacts will occur is likely to be substantially less than 200 metres.

Corridor 1 will continue the road on-line to the greatest extent of the three corridors and this may potentially result in adverse effects at the greatest number of human health receptors, for those in dwellings close to the existing roads.

Corridor 2 will divert traffic away from existing dwellings in part. This corridor therefore has the potential to improve air quality at some dwellings (eg. between Tarbet and Inveruglas), and worsen it at other locations (eg. in the centre of Tarbet and in Arrochar).

Corridor 3 will divert the road away from existing human health receptors to the greatest extent, by-passing Tarbet and improving air quality at existing dwellings close to the existing road.

Where the alignment of the new road is within 200 metres of a site designated for nature conservation, there is the potential for adverse impacts due to nitrogen deposition, depending on the nature of the habitat.

[9] Air Pollution Information System. www.apis.ac.uk.

6.1.6 Proposed Level and Scope of Future Assessment

All of the proposed route corridors will require assessment for impacts arising from construction.

All of the route corridors are considered likely to give rise to changes in traffic flow or alignment and at this stage are likely to require a simple DMRB assessment for impacts on receptors within 200 metres of the route, for impacts on Local Air Quality, and on Critical Levels and Critical Loads of nitrogen deposition on sites designated for nature conservation. Changes to the proposed level and scope of assessment may come about once a detailed review of traffic data has been undertaken and consultation has been completed with the relevant authority (SNH). It is proposed that an assessment of regional emissions is carried out to provide information on the change in greenhouse gas emissions.

6.1.7 Proposed Methodology (including Significance) of Future Assessment

The proposed methodology is to follow the DMRB guidance for air quality HA 207/07 and current Interim Advice Notes (IAN), as required. The IAN for determining the significance of Local Air Quality Impacts is IAN 174/13.

The DMRB HA207/07 (in the process of being revised) contains a screening assessment tool suitable for simple assessments. It is proposed that this tool is used to undertake an assessment of a base year and do minimum and do something options in the opening year.

Given that there is little risk of failing to comply with the nitrogen dioxide objective in the study area, it is not proposed to carry out any baseline air quality measurements.

6.2 Cultural Heritage

6.2.1 Introduction

This section provides a summary of the existing known archaeological and cultural heritage resource within 1 kilometre of the route corridors. This information has been used to highlight potential archaeological and built heritage constraints to the proposed scheme, as well as providing recommendations for future study where appropriate.

6.2.2 Policy and Legislation

The Historic Environment (Amendment) (Scotland) Act 2011 amends three pieces of primary legislation: The Historic Buildings and Ancient Monuments Act 1953; The Ancient Monuments and Archaeological Areas Act 1979; and, The Planning (Listed Buildings and Conversation Areas) (Scotland) Act 1997. It provides increased protection and improved management for Scheduled Monuments and Listed Buildings.

Scottish Historic Environment Policy (SHEP) 2011 is the overarching policy statement for the historic environment. It provides a framework for more detailed strategic policies and operational policies that inform the management of the historic environment.

Planning Advice Note (PAN) 2/2011: Planning and Archaeology, provides advice to Planning Authorities and developers on dealing with archaeological remains, with an emphasis on proportionality to the relative value of the remains and of the development itself.

6.2.3 Existing and Baseline Knowledge

A 1 kilometre buffer was set around each of the route corridors and a review of the cultural heritage resources within these buffers was undertaken. Drawing 476416-3001-0002 (Appendix A) sets out the location of the cultural heritage resources within 1 kilometre of each route corridor. Cultural heritage resources are detailed below.

6.2.3.1 Battlefield Sites

There are no designated Battlefield Sites within 1 kilometre of each route corridor.

6.2.3.2 Historic Gardens and Designed Landscapes

There are no Historic Gardens and Designed Landscapes within 1 kilometre of each route corridor.

6.2.3.3 Scheduled Monuments

There are three Scheduled Monuments located within 1 kilometre buffer of the route corridors:

- Inveruglas Castle, Inveruglas Isle, a small island on Loch Lomond;
- Pulpit Rock, Preaching Site, south of Ardlui; this is a large rock outcrop into which a vestry was excavated in 1825. There are possible remains of a wooden pulpit to the front of the rock; and
- Island I Vow, castle and settlement, a small island on Loch Lomond. The castle was built in 1577 by Andrew MacFarlane. The castle stands at the southern edge of the island with a small bay immediately to its south. The bay is now filled with fallen masonry but a retaining wall can be seen on its western edge. In 1581 the dowager of the MacFarlane chief had a liferent on the castle from her son. The castle was occupied by the MacFarlane's as their principal residence after their castle on Inveruglas Isle was destroyed by Cromwell's troops in the mid-17th century. The MacFarlane's moved to a new house at Arrochar in 1697 and the castle was thereafter used as a storehouse.

6.2.3.4 Listed Buildings

There are 46 Listed Buildings that lie within 1 kilometre of the route corridors; these are mainly concentrated around the villages along the A82.

6.2.3.5 Conservation Areas

There are no designated Conservation Areas within 1 kilometre of each route corridor.

6.2.3.6 Non-Designated Cultural Heritage Assets

A review of the West of Scotland Archaeology Service (WoSAS) interactive map shows that the Tarbet and Crianlarich military road, which was constructed in the mid-18th century, runs adjacent to the west of the A82.

A desk based assessment carried out in 2010 for the Glen Falloch Overhead line refurbishment by Scotia Archaeology sets out the archaeological sites and monuments for the proposed route of a new power line around the head of Loch Lomond. This provides a useful overview of the site context surrounding Pulpit Rock to Inverarnan.

A preliminary examination of the Sites and Monuments Register (SMR) information suggests the possibility of pre-improvement agricultural settlement (SMR ref NN31NW 44).

Several milestones have been recorded along the A82.

6.2.4 Value of the Environmental Resources and Receptors

As per DMRB guidance (HA 208/07 Vol. 11, Section 3, Part 2, chapter 5) for scoping reports, this Scoping Report has utilised readily available cultural heritage data to quantify the cultural heritage resource and those receptors potentially vulnerable to the proposed scheme.

The cultural heritage resource within 1 kilometre either side of all route corridors comprises archaeological remains, historic buildings and historic landscapes and their settings.

The value of the cultural heritage receptors are gauged utilising the criteria given in HA 208/07 DMRB Volume 11, Section 3, Part 2 (Tables 5.1 and 6.1 – Annexes 5 and 6), these have been reproduced in Table 6.2 below:

Table 6.2: Value of the cultural heritage receptors as defined by HA 208/07

Resource value	Criteria
Very High	World Heritage Sites
	Assets of acknowledged international importance
High	Scheduled Monuments (including proposed sites) and those with standing remains
	Archaeological assets that can contribute significantly to acknowledged national research objectives
	Category A Listed Buildings
	Other Listed Buildings that feature exceptional quality of their fabric or historical associations
	Conservation Areas containing very important buildings
Medium	Category B Listed Buildings

Table 6.2: Value of the cultural heritage receptors as defined by HA 208/07 (Cont.)

Resource value	Criteria
	Conservation Areas that contain buildings that contribute to its historic character
	Historic townscapes or built-up areas with built heritage integrity, or built settings (street furniture etc)
Low	Designated and undesignated assets of local importance
	Category C(s) Listed Buildings
	Historic townscape or built-up areas of limited historic integrity in their buildings or built settings
Negligible	Assets with very little or no surviving archaeological interest
	Buildings of no architectural or historic note or buildings of an intrusive character
Unknown	The importance of the resource has not been ascertained
	Buildings with some hidden potential for architectural merit or historic association

The value of receptors identified within the baseline section has been defined in Table 6.3 overleaf.

Table 6.3: Value of receptors identified in Section 6.2.3

Receptor	Value
Scheduled Monuments	High
Listed Buildings – Category A	High
Listed Buildings – Category B	Medium
Listed Buildings – Category C	Low
Non designated assets – Military Road and Milestones	Low

6.2.5 Potential Effects

In accordance with DMRB the following criteria have been used to determine what level of future assessment is required.

Archaeological remains:

- are any designated or other important archaeological remains in the footprint of the scheme or within 300 metres of it?
- is the setting of any designated or other important archaeological remains affected by the scheme?
- will there be new land-disturbance associated with the scheme? and
- could ground conditions conceal potential archaeological remains?

Historic buildings:

- are any designated or other important historic buildings in the footprint of the scheme or within 300 metres of it?
- is the setting of any designated or other important historic building affected by the scheme?
- is an area of historic built environment (even partially) inside the footprint? and
- will the scheme lie within the setting of an area of historic built environment?

There is potential for buried archaeological remains along all of the route corridors, including in relation to the pre-improvement agricultural settlement (SMR ref NN31NW 44). In addition in accordance with the above criteria the proposed route corridors do pass close to listed structures and could impact the setting of Scheduled Monuments. Given the proximity of all three corridors there is little difference in potential effects, however the following broad generalisations can be made:

Corridor 1: the majority of the potential impacts to the setting of Scheduled Monuments would be from this corridor, particularly around Pulpit Rock. Listed Buildings in Tarbet and Inveruglas would be least impacted by this corridor, as the route covers slightly less of the village area.

Corridor 2: this would be broadly similar to Corridor 1 north of Inveruglas. There is greater potential for the setting of Listed Buildings to be affected in Tarbet as the route encompasses more of the village.

Corridor 3: this corridor presents the least potential for impacts given its location further away from Loch Lomond than Corridor 1 and thus having a potentially lesser impact on the setting of the Scheduled Monuments. The potential impacts to Listed Buildings would also be reduced around the village of Tarbet as compared to Corridor 2.

6.2.6 Proposed Level and Scope of Future Assessment

In accordance with DMRB it is suggested that a Simple Assessment would be the most appropriate level of assessment:

*"If Scoping indicates that it is only necessary to carry out a **limited** assessment then a Simple Assessment is required. The purpose of a Simple Assessment is to address critical unknown aspects revealed by scoping in order to reach an appropriate understanding of the effects of the proposed scheme and complete its design and assessment, or to reach an understanding that identifies the need for a Detailed Assessment. For a Simple Assessment to be sufficient it should clearly establish the value of the affected assets, the impact of the scheme, and*

determine satisfactory mitigation measures or enable the need for mitigation to be discounted. A scheme will need to have been designed to a stage that indicates its objectives and general form but design flexibility may remain in many elements. Simple Assessment may involve new nonintrusive fieldwork, such as geophysical survey or field walking, to confirm the conclusions of desk-based studies." (DMRB HA 208/07)

Changes to the proposed level and scope of assessment may come about once the simple assessment has been completed and further consultation has been undertaken with the relevant authority.

6.2.7 Proposed Methodology (including Significance) of Future Assessment

A desk based assessment would be produced in accordance with the Simple Assessment approach. This work would comprise the following:

- request for SMR information from WOSAS and the production of a gazetteer of all sites, events and designations for 1 kilometre around all route corridors;
- desk based assessment would also utilise aerial photographs and historic mapping;
- historic mapping, including a complete Ordnance Survey (OS) set and pre-OS mapping (estate maps, tithe and apportionments, other non-OS maps) to establish land use in the later historic periods, including identification of potential archaeological sites and areas of truncation or disturbance;
- published sources (local histories, archaeological monographs e.g. Council for British Archaeology and journals/ periodicals); and
- unpublished sources (archaeological grey literature, or private client reports available through the local HER or local archaeological contracting companies).

Established DMRB assessment criteria will be used to assess impact magnitude and assign significance of effect to the resources identified.

6.3 Landscape

6.3.1 Introduction

This section forms part of a DMRB Stage 1 Assessment for three potential route corridors being considered as part of the A82 Tarbet to Inveranan upgrade scheme and assesses the potential landscape and visual baseline conditions and potential effects of the proposed road development.

The assessment has been undertaken in line with the guidelines provided in DMRB Volume 11. The section follows the methodology recommended by DMRB Volume 11, Section 3, Part 5 and Interim Advice Note 135/10, with reference to Guidelines for Landscape and Visual Effects Assessment, Third Edition (Landscape Institute and Institute of Environment and Assessment, 2013). Section 3 Part 5 of the DMRB recommends the assessment of:

- the extent to which the road will be visible in the landscape;
- the character of the landscape and its capacity to accept changes of the type and scale proposed;

- the extent to which effects can be mitigated and the road can be integrated into the landscape.

6.3.1.1 The Study Area

For the purposes of this DMRB Stage 1 Landscape and Visual Effects Assessment the study area is defined on drawings 476416-3000-001/2/3 (Appendix A) and is inclusive of all three route corridors:

- Corridor 1: an "online" corridor involving realignment and improvements to the existing A82 route, which follows the west shore of Loch Lomond;
- Corridor 2: a route that uses the existing A83 west from Tarbet towards Arrochar and then a new section of road from Loch Long to Inveruglas and then re-joins the existing A82;
- Corridor 3: a high road route alignment which looks to utilise historic tracks and forestry roads running parallel to the existing A82.

6.3.2 Policy and Legislation

6.3.2.1 National Policy

The study area lies within a National Park:

- National Parks (Scotland) Act 2000; and
- Scottish Outdoor Access Code which is part of The Land Reform (Scotland) Act 2003.

6.3.2.2 Local Policy

The study area lies within the boundary of the LLTNP Authority. The Local Plan 2010 – 2015 is the current document that guides development within the study area. The following policies within LLTNP Adopted Local Plan 2010 – 2015, are considered relevant to the study area and the proposed development:

- Policy L1 Conserving and Enhancing the Diversity and Quality of the Park's Landscapes;
- Policy D1 Design Quality;
- Policy ENV2 Sites of Special Scientific Interest, National Nature Reserves and RAMSAR Sites;
- Policy ENV1 European Sites (SACs and SPAs);
- Policy ENV3 Local Nature Conservation Sites;
- Policy ENV8 Ancient, Long-established and Semi-natural Woodlands;
- Policy ENV9 Development Impacts on Trees and Woodlands;
- Policy ENV10 Protecting the Water Environment; and
- Policy ENV25 Scheduled Ancient Monuments and Candidate Scheduled Ancient Monuments.

Within the extents of the study area there are several designations that are considered relevant to the study area, as can been seen on drawings 476416-3000-002/3 (Appendix A).

6.3.3 Existing and Baseline Knowledge

The following information has been gathered to fit the requirements for DMRB Volume 11, Section 3, Part 5, to sufficiently identify landscape constraints associated with the selected route corridors. Information has been collected on the landscape resource, including landscape designations, environmental designations and circulation routes. Representative viewpoints have been selected and reviewed from the study area based on the results of Zones of Visual Influence (ZVIs), multiple site visits and in consultation with LLTNP and other stakeholders. A more in depth description of the localised landscape characteristics and how these interact with the wider context, for each proposed route corridor follows.

Relevant environmental designations have been included within this section as often reasons for their designation relate to landscape features, such as vegetation and landform.

Scheduled Monuments (SMs) have been included within landscape designations, as their designations include setting.

6.3.3.1 Landscape Baseline

6.3.3.1.1 Designations

Environmental and landscape designations are a major consideration when studying the route corridors within the study area. The many designations across the study area confirm the high quality of this landscape and its value that is recognised by appropriate legislation. Below is a list of the relevant landscape and environmental designations and circulation routes that fall within the study area and are shown on drawings 476416-3000-002/3 (Appendix A).

Landscape designations:

- National Park;
- National Scenic Area:
  - Loch Lomond;
- Scotland Wild Land:
  - Ben Lui – Beinne Ime;
  - Ben More – Ben Ledi;
- Ancient Woodland & Semi Natural Ancient Woodland:
  - Several examples across study area;
- Scheduled Monuments:
  - Pulpit Rock;
  - Island I Vow;
  - Inveruglas Castle I Isle.

Environmental designations:

- Sites of Special Scientific Interest (SSSI);
- Natura 2000 Sites (Special Protection Areas and Special Areas of Conservation);
- Environmentally Sensitive Areas:
    - Breadalbane and Loch Lomond Environmentally Sensitive Areas.

Circulation routes:

- Core Paths (including The West Highland Way);
- Cycle Network;
- Walk Highlands (Tourist Walks).

6.3.3.1.2 Landscape Character

The study area lies within the LLTNP, which is one of two National Parks in Scotland. The park is divided in to four distinct areas and the study area is part of the Loch Lomond area, described by LLTNP:

"Ben Lomond stands guard over Loch Lomond, the largest expanse of freshwater in Great Britain and the romantic centrepiece of the National Park. In the north the loch is deep and narrow, bound by steep-sided mountains. Further south it spills into an island studded panorama."[10]

The total study area that is inclusive of the three route corridors is covered by the LLTNP Landscape Character Assessment[11].

Drawing 476416-300-001 (Appendix A), shows how the study area of land and water is made up of a wide selection of Landscape Character Types (LCT), with predominant character types being LCT 1 - Open Hills, LCT 11/LCT12 - Wooded or Forested Glen Sides and Loch Lomond itself (LCT 16 - Straith and Glen Floor Lochs) which includes a few small islands.

The topography of the landscape is often dramatic with steep hills allowing scenic views surrounding Loch Lomond from elevated points.

Settlement is mostly concentrated to flatter areas of land on the east of Loch Lomond, between the foot of the hills and the loch shore. The main settlement areas are Tarbet; a village with a school, visitor information centre and hotels, and Arrochar, which is situated close to Tarbet and together they form the largest settlement across the study area. In the north of the study area other smaller settlement areas include Inveruglas and Ardlui. There are individual houses along the route mainly to the west of the

[10] LLTNP (ND). *Looking After the National Park.*

[11] SNH (2009). Loch Lomond and The Trossachs National Park Landscape Character Assessment.

existing A82. This information is included on drawings 476416-3000-004/5 (Appendix A).

Land use is mostly for forestry, farming, recreation and some residential, along with associated development. Transport corridors are prominent features within the landscape, including the A82 and The West Highland Railway that lies to the west of Loch Lomond, with stations at Tarbet and Ardlui. Ferry routes are located along Loch Lomond connecting east to west.

Tourism is a key land use and consequently marinas, tourist information centres, holiday parks and hotels are present within the study area; these are detailed further in Section 6.9 (Community and private assets).

Two areas of Wild Land are designated close to the study area in the upland hills above the loch. SNH describe these areas as having characteristics of non-humanised land that are remote and "natural"[12]. These areas are nationally valuable for both ecological and cultural reasons.

6.3.3.1.3 Landscape Character of Each Route Corridor

Corridor 1

This corridor which follows the existing A82, between Tarbet to Inveruglas, lies within a National Scenic Area and benefits from scenic views of Loch Lomond and surrounding hills. The existing road is narrow and bending with soft verges and safety barriers in some places.

Woodland is a constant characteristic of the route and in many places creates an enclosed feel. In places this is designated Ancient and Semi Natural Ancient Woodland and is most predominant at Kenmore Woods. The main Landscape Character Types are Glen Sides (including LCT 10 - Open, LCT 11 - Forested, LCT 12 - Wooded and LCT 13 – farmed) and LCT 17 - Loch Shore Fringes.

Tourist activities are a key characteristic of the area, with the Inveruglas Loch Cruises and Visitor Information Centre being a main place for tourists to stop. Access to walking paths is also located close to the road corridor and subsequently there are several tourist car parks alongside the existing road.

From Inveruglas to Inverarnan, woodland is more sporadic and there are more opportunities for views of the loch and surrounding landscape. During this section of the road a key feature of the route corridor are two Islands, which are designated as Scheduled Ancient Monuments. These include Island I Vow and Inveruglas Castle I Isle, which were both previous castles and settlements. Informal lay-bys are common in this part of the route and are mostly unsignposted, with some hard standing for parking. These are generally located on the east side of the road, closest to the loch and are therefore more easily accessible for vehicles travelling south. However there are also some on the west for drivers travelling north.

[12] SNH. (2012). *Wild Land*. SNH.

Topography is a prominent feature of this corridor with steep sided cliffs bounding the western road edge. There are several areas of rock cut and other areas where the topography is gentler.

There are some informal paths by the side of the road and access to marked paths including Tarbet Isle Loop.

Corridor 2

This route corridor has the same landscape character as Corridor 1 between Inveruglas and Inveranan, as it follows the existing A82. However as this corridor travels north via Arrochar up to Inveruglas, inland Landscape Character Types are a key feature. The corridor includes a section of the A83 through Tarbet and Arrochar, with an area of Farmed Upland Glens (LCT 7), in between; as a result there is much more of a village and managed character to the landscape. The area to the north of Arrochar opens up to the flat extents of the loch shore (LCT 19: Sea Loch Shore Foreshores) of Loch Long, where a range of Landscape Character Types are in close proximity and in view. From Arrochar Loch Long is visible against a backdrop of dramatic hills. Further north of Arrochar the proposed corridor cuts through an area of Natural Semi Ancient Woodland around Glen Loin, which is protected as a Site of Specific Interest (SSSI) and Natura 2000 site.

Northward, the route corridor travels through either woodland or forest plantation along hills rising from the Succoth area to Inveruglas where the proposed corridor meets the existing A82. This woodland is in places designated Ancient and Semi Ancient Natural Woodland. Unlike corridors 1 and 3, Corridor 2 is partially outside of the National Scenic Area. Where the route corridor meets the Kenmore Woods the landscape character is enclosed by woodland. This corridor cuts through a more diverse range of landscape character types than Corridor 1 as it moves away from the loch shore to upland areas.

The landform of the corridor is low lying in the south and travels along a valley from Succoth towards Inveruglas. However close to Inveruglas the corridor passes over a steep rise in topography, over a steep glen and then travels over Inveruglas Water at the northern end of Kenmore Wood, before meeting Corridor 1 at Inveruglas.

Paths are located along the valley corridor and follow the rising topography to Inveruglas Water. Watercourses are another key landscape receptor with several streams located in the valley and Inveruglas Water, situated in the central section of the corridor.

Corridor 3

From Tarbet this route corridor steadily diverts away from the existing A82, into the hills above Loch Lomond. The first section of the corridor between Tarbet and Inveruglas goes through LCT11 - Forested Glen Sides and LCT 2 - Forested Hills and therefore has an enclosed woodland landscape character with restricted views. This section of corridor includes several areas of Ancient and Semi Natural Ancient Wood, including Kenmore Woods.

Landscape character changes north of Inveruglas, from enclosed to very open, as the route corridor travels through LCT 4 – Open Upland Glens, with elevated, unrestricted panoramic views of the loch and wider area. The corridor continues across areas of openness and increases in altitude as it enters a long stretch of LCT 1 –

Open Hills. These areas are distinctive for their "open unspoilt qualities, a sense of altitude and extensive space, panoramic views, significant landmark summits, open access for quiet recreation, remoteness and attributes of wildness and opportunities for encounters with wildlife." (p75)[13] and are a common feature of the Loch Lomond Area above the tree line. This corridor cuts through smaller areas of protected woodland towards the north of the route corridor. The entirety of this corridor is within an Environmentally Sensitive Area and most is within a National Scenic Area.

Most of this corridor is located on glen sides and therefore the topography is elevated and steep. Several watercourses run from west to east across the corridor.

Old forestry tracks exist in many locations along the corridor but are most concentrated in the southern section between Tarbet and Inveruglas. In the areas of Open Hills and Upland Glens (LCT 1 & 4) there are few marked paths.

Settlement along this corridor is sparse and therefore there are few residential receptors within the corridor.

6.3.3.2 Visual Baseline

Public access across the study area is subject to the Scottish Outdoor Access Code, a statutory right that allows free access to land and inland water for outdoor recreation, crossing land and some educational and commercial purposes, across Scotland[14]. So although there is a designated path network (see drawings 476416-3000-004/5 (Appendix A)) to the west of the loch, people are free to move across the landscape surrounding Loch Lomond.

The landscape surrounding Loch Lomond has a strong contrast between loch and landscape, with naturalistic wooded glen sides, designated walks, the right to free access and areas of Wild Land, that all combine to draw in tourists for Loch Lomond's scenic qualities.

The landscape of hills and mountains are recognised as a feature of special landscape character for their scenic value, as SNH and LLTNP Authority describe (p24):

"Loch Lomond and its immediate surrounds are enclosed by hills and mountains on three sides which provide an impressive backdrop to views across the loch and grand panoramas from their summits."[15]

[13] SNH (2009). Loch Lomond and The Trossachs National Park Landscape Character Assessment.

[14] *Access Rights*. SNH.

[15] SNH and The Loch Lomond and The Trossachs National Park Authority. (2010). The Special Landscape Qualities of The Loch Lomond and The Trossachs National Park.

6.3.3.2.1 Corridor 1

Where the existing A82 is located in land views of Loch Lomond and surrounding landscape tend to be screened by landform and vegetation. However closer to the loch edge partial views between single tree belts on the loch shore, can be gained.

Elsewhere in more open areas, long distance views can be gained.

Marked tourist walks include a short loop walk at Tarbet that follows the loch shore. The West Highland Way follows the eastern shore of Loch Lomond and provides good views across the loch and to the proposed route corridor.

6.3.3.2.2 Corridor 2

From Arrochar to Inveruglas views are of a wide open valley that is framed by the valley sides. A marked path follows this route and will be a visual receptor. Within the valley pylons are a prominent feature. Views of Loch Long and settlement around Arrochar, in the southerly direction are possible.

The Three Loch Ways is a core path that runs through the center of the corridor and will be a major visual receptor. Residential receptors are also present in Arrochar and Succoth.

As the corridor rises at Inveruglas, views are restricted by the vegetation around Kenmore Wood.

6.3.3.2.3 Corridor 3

The mountains and hills from Tarbet to Inverarnan are very significant to the visual baseline for Route Corridor 3. There are two distinct visual qualities of this corridor. From Tarbet to Inveruglas the corridor is densely wooded so views are restricted and in contrast the area from Inveruglas to Inverarnan has views from open hills of the National Scenic Area. The elevated topography means that it is possible to achieve panoramic views of the surrounding landscape and Loch Lomond.

As settlement is sparse there are few residential receptors within the corridor, although the corridor is visible from other residential receptors in the wider area.

This corridor can be seen from the West Highland Way to the east of Loch Lomond.

6.3.4 Value of the Environmental Resources and Receptors

Guidelines stated within 'Landscape Character Assessment: Guidance for England and Scotland'[16] recommend the development of thresholds of landscape value. The table below provides a definition of the criteria to be used to assess landscape value. The analysis of landscape value or importance aims to reflect the perceived value of the landscape at a specific scale, identify the group to which it is important and describe why it is important.

[16] The Countryside Agency and Scottish Natural Heritage (2002). Landscape Character Assessment: Guidance for England and Scotland

Table 6.4: Criteria for assessing landscape value

Value		Typical criteria	Typical scale	Typical examples
High	Exceptional	High importance and rarity. No or very limited potential for substitution.	Designated at International or National level.	World Heritage site, National Park, Area of Outstanding Natural Beauty (AONB), National Scenic Area (NSA), Environmentally Sensitive Area (ESA).
	High	High importance and rarity. Limited potential for substitution.	Designated at a National or Regional level.	National Park, AONB, National Scenic Area, Areas of Great Landscape Value (AGLV), Regional Scenic Area.
Moderate	Medium	Medium importance and rarity. Limited potential for substitution.	Designated at a Regional or Local level.	AGLV, Regional Scenic Areas, ESA.
	Medium - low	Medium importance and rarity. Some or good potential for substitution.	Undesignated but of Regional or, local scale value.	Undesignated but value expressed for instance in demonstrable use.
Low	Poor	Low importance and rarity.	Local.	Areas identified as having some redeeming feature or features and possibly identified for improvement.
	Very poor	Degraded condition.	Local.	Areas identified for restoration or improvement.

This table establishes general guidance on the perceived level of landscape value. A landscape may have international, national, regional and local level planning and environmental designations, which may reinforce the associated value by the general public. Quantification of landscape 'value' can be attributed to the use and perception of particular characteristics that contribute to a sense of place, the visitor, or user experiences of the landscape.

Due to the study area's designation as a National Park, the environmental resource as a whole is considered to be of high value.

Within the study area there are further national designations and a range of other landscape features and receptors of varying values as set out in Section 6.3.3 and shown on drawings 476416-3000-002/3 (Appendix A).

Landscapes that are not of a quality to warrant national or regional designation may be of great local amenity value. Further assessment at DMRB Stage 2 will look to ascertain value at a more detailed local level.

6.3.5 Potential Effects

This section will assess the potential effects of development within the three route corridors, on the landscape and visual resource of the study area. The route corridors are shown on drawing 476416-0000-016 (Appendix A).

6.3.5.1 Corridor 1

This corridor largely follows the route of the existing A82 and therefore most potential effects will be associated with the existing road corridor and areas in close proximity. In some places more extensive engineering changes to the existing A82 may be needed and would be a key consideration.

Landscape character is likely to change moderately to highly in localised areas as changes to the road boundaries may be needed as the existing corridor is constrained by the loch to the east and by steep topography to the west. It is likely that where it is not possible to widen the road to the west, due to environmental constraints eg. landform and geology, engineering work will extend the road over the existing loch shore. Therefore a change in character to areas of Landscape Character Type 17 – Loch Shore Fringes is a key possible effect. The change in character will be highly influenced by the removal of existing vegetation.

However in comparison to corridors 2 and 3, existing landscape character is likely to change the least, as a road corridor is already present in this location and there are existing views of this road corridor running along the loch shore.

Existing vegetation in proximity to the route corridor includes Semi Natural Ancient Woodland, some smaller areas of Ancient Woodland and individual trees. Most of the protected woodland lies to the west of the road which is in most places growing along steep glen sides. Therefore any road improvements in the location of protected woodland may result in the removal of protected woodland, which may also lead to a change in landscape character.

Views will also potentially be affected by the removal of vegetation along the loch shore. The effects will be the opening up of views from the road, of Loch Lomond and the surround scenery, which is within part of a National Scenic Area. This has the potential to have a positive impact upon the landscape and visual amenity, of the area. However there is also potential for the removal of vegetation to have negative effects as views of the road from the wider area may be more noticeable.

Several watercourses are a key landscape element of the corridor, particularly to the northern section, where several burns travel across from the hills towards Loch Lomond, crossing the path of the corridor and existing A82. Changes to topography and ground water may affect these water features and will be a key constraint.

Cultural and historic elements are also a key feature of the landscape, as three Scheduled Ancient Monuments lie within or in close proximity to the corridors. The effects of development may alter the setting of these cultural and historic features and at Pulpit Rock, which lies adjacent to the existing road corridor existing access from the road may be altered.

The pattern of settlement includes a few isolated houses, farms and businesses in close proximity to the road corridor. Potential effects to these would include changes to views as well as physical changes to property boundaries and access.

6.3.5.2 Corridor 2

This corridor travels across land west of the existing A82 between Arrochar and Inveruglas, and will therefore have fewer effects on Loch Lomond shore and instead will have effects on the inland landscape and visual resource and area around Succoth and Loch Long. From Inveruglas to Inverarnan the route follows the same path as Corridor 1 and will therefore have the same effects as previously discussed, consequentially the comments below relate specifically to effects between Tarbet and Inveruglas.

Changes to landscape character will be affected mostly by the changes and loss of woodland, which is likely to disrupt the existing landscape character of the area.

This corridor is likely to require the sighting of a road across steep topography, in the central section at Inveruglas. Therefore it is likely that engineering works will be required, which will likely affect the landscape resource. Another consideration related to the topography is the valley area around Glen Loin, which due to the landform is an area where several burns drain into. The location of these water courses is a likely constraint to the location of road along this corridor.

The route corridor travels through areas of protected Ancient and Semi Natural Ancient Woodland close to Glen Loin and to the north of Kenmore Woods. This loss of woodland would have negative effects to the woodland landscape resource, which has been designated for its value to habitat, culture and landscape character.

Views of this corridor from the wider surrounding area, including Loch Lomond will mostly be screened by woodland and the existing landform in most places, except as the corridor crosses steep topography at Inveruglas. However proposed development within this corridor may have a negative effect on views from Arrochar and Succoth.

Several footpaths follow or cross parts of this corridor around the Glen Loin area and this corridor may cause disruption and re-locations of these routes and therefore the views, which people experience from using these footpaths, are likely to change.

Residential receptors in the village settlements around Tarbet and Arrochar may experience negative visual and landscape effects due to an increase in traffic along the A83.

6.3.5.3 Corridor 3

This corridor travels along glen sides adjacent to the existing A82. Much of the route is designated as Semi Natural Ancient Woodland or smaller areas of Ancient Woodland and the loss of some of this environmental resource would also result in a likely negative effect by causing change to Landscape Character Types 3 - Woodland Hills and 12 - Wooded Glen Sides.

Currently only rural roads and no main road corridors are located along most of this corridor. Footpaths are also often located in these areas of woodland and the location of a road within this corridor is likely to result in change to the location of and access to footpaths.

As this corridor is located along glen and hill sides, the topography of the landscape will be a major consideration and permanent negative effects are likely. The landform slopes down towards the loch and therefore many watercourses run across the route corridor and would be a key constraint to this corridor.

In the northern section, from Inveruglas to Inverarnan the corridor is located through open land and will not be screened by landform or vegetation and will therefore be more visible from surrounding locations, such as the West Highland Way.

Removal of woodland along the corridor would change views from woodland footpaths from enclosed to more open. In the northern section views will be elevated and panoramic, and it is therefore possible that formal viewing places could be located here.

Settlement is sparsely located along this corridor so there will be fewer direct effects than corridors 1 and 2 upon residential receptors, although the corridor is still in close proximity to residential areas and may cause effects to residential receptors living in Tarbet and Ardlui.

6.3.5.4 Possible Mitigation Measures

The suggested mitigation measures set out general principles for the proposed development to reduce the negative impacts of the proposed development and are applicable to all of the route corridors:

- make use of existing topographical features, landform and woodland to help restrict the visual envelope;
- avoid rock cutting where possible and if it is necessary the rock cut slope should be graded out, to help soften the appearance of engineering works and fit them better within the landscape;
- identify and protect key landscape features from development where possible;
- follow the existing topography for the route alignment to reduce the amount of earthworks;
- additional planting should be included, when further screening of the proposed development is required, or if specific sections of proposed development detract from the existing landscape character; and
- culverting of watercourses.

6.3.6 Proposed Level and Scope of Future Assessment

Interim Advice Note 135/10 (Highways Agency, 2010, p. 17), states that 'a Detailed Assessment should be used when significant landscape and/or visual effects are anticipated.'

For landscape effects this situation may occur:

- when the landscape resource is of distinct quality with a range of landscape elements in good condition; and
- when impacts are significant in terms of duration and scale (e.g. major new road improvements, road widening projects; major lighting schemes).

For visual effects this situation may occur:

- where there are sensitive receptors in the immediate vicinity (e.g. a recreational path or residential properties); and

- where there are large numbers of sensitive receptors (e.g. a residential suburb which overlooks the project).

As highlighted in this section the study area is within the LLTNP and is of distinctive quality with a number of sensitive receptors in the immediate vicinity of the three route corridors.

It is therefore likely that significant impacts may occur for the three route corridors and as a result a DMRB Stage 2 assessment, in line with DMRB Volume 11, Section 3, Part 5 Landscape Effects and IAN 135/10 will be required.

6.3.7 Proposed Methodology (including Significance) of Future Assessment

Future assessment will follow the relevant methodology outlined in chapter 3 of DMRB Volume 11, Section 3, and Part 5: Landscape Effects and IAN 135/10. The assessment will involve:

- further detailed desk study of baseline landscape and visual resources, in line with the final route corridor selected;
- site visits based on selected route corridor;
- consultation with interest groups, landowners, local community, LLTNP and other stakeholders;
- views assessed utilising landscape assessment also (key views, TZVI, visual character and sensitive views);
- check with the relevant statutory body and local planning authority that no new landscape areas have been designated;
- make an estimate to the number of properties which are likely to experience visual change and the categorization of these possible changes to substantial, moderate and slight deterioration or improvement;
- assessment of the quality of specific Landscape Character Types along the selected route; and
- description of the significance of each route corridor on the landscape and visual resource.

6.4 Nature Conservation

6.4.1 Introduction

A desk study was undertaken to confirm the locations of statutory and non-statutory nature conservation designations within 5 kilometres of the route corridors for internationally designated sites, 2 kilometres for nationally designated sites, and 1 kilometre for locally designated sites.

The assessment has been completed in accordance with the DMRB Volume 11, Section 3, Part 4: Ecology and Nature Conservation, and as such an ecological walk-over survey has not been conducted at this time for the current route corridors. A phase 1 habitat survey and a number of species surveys have been completed between January and February 2012 as part of the Engineering and Environmental Surveys commission (see Section 3.2.3). In that commission, the survey corridor was

approximately 17 kilometres in length and extended 300 metres east and west of the A82 road between Tarbet and Inverarnan. These are used to provide baseline information and are summarised in section 6.4.3.

6.4.2 Policy and Legislation

The main European Conventions and Directives affecting nature conservation / ecological resources are the Bern Convention and EC Birds (2009/147/EC) and Habitats Directive 92/43/EEC). The Bern Convention and Birds Directive are implemented in UK law by the Wildlife and Countryside Act (1981, as amended). The EC Habitats Directive is transposed into UK law through the Conservation of Habitats and Species Regulations 2010 (as amended). UK and Scottish legislation relating to Nature Conservation includes:

- The Conservation (Natural Habitats, &c.) Regulations 1994 (as amended);
- Nature Conservation (Scotland) Act 2004;
- Wildlife and Countryside Act 1981 (as amended);
- The Natural Environment and Rural Communities (NERC) Act 2006;
- Salmon and Freshwater Fish Act, 1975;
- Deer (Scotland) Act 1996;
- Conservation (Natural Habitats, &c.) Amended (Scotland) Regulations 2007; and
- The Surface Waters (Fishlife) (Classification) (Scotland) Amendment Regulations 2007.

There are additional pieces of legislation dealing with specific species that are not based on nature conservation but are none the less important as part of the impact assessment process, e.g. Protection of Badgers Act 1992.

6.4.3 Existing and Baseline Knowledge

The following section sets out the ecological and nature conservation baseline for the study area, which includes the three route corridors. Where appropriate the information has been mapped and is set out on drawing 476416-3000-008 (Appendix A).

6.4.3.1 Special Areas of Conservation (SAC)

Within 5 kilometres of the route corridors there is one SAC the Loch Lomond Woods (this designation comprises 18 individual sites). Corridor 2 is located within one area of the SAC between Inveruglas and Arrochar, and all route corridors are within 300 metres of an SAC in the north near Inverarnan. The site is one of the best areas in the UK for old sessile oak woodlands, with holly *Ilex* and fern *Blechnum*. The site supports a significant presence of otter *Lutra lutra*. This site is regarded as being of International / European value.

6.4.3.2 Special Protection Area (SPA)

Within 5 kilometres of the route corridors there is one SPA the Glen Etive and Glen Fyne, which is within 120 metres from the existing A82 carriageway in the north of

the scheme area (it should be noted that although there is only one designation, the designation does cover 3 individual sites within the 5 kilometres buffer area). The site encompasses a diverse range of habitats including heather moorland, rough grassland, blanket bog, native woodland, montane heaths and exposed rock and scree. There are also numerous freshwater lochs and river systems. The SPA qualifying features are that the site regularly supports a population of European importance of the Annex 1 species golden eagle *Aquila chrysaetos*, equalling more than 4.2% of the British population.

6.4.3.3 Ramsar Sites

There are no Ramsar sites within 5 kilometres of the route corridors.

6.4.3.4 Sites of Special Scientific Interest (SSSI)

Within 2 kilometres of the route corridors there are nine biological SSSIs that have been designated, these are shown on drawing 476416-3000-008 (Appendix A). The sites identified are as follows:

- Ben Lomond – Distinct from other hills in the Southern Highlands, as it retains remnants of the full range of upland plant communities, from high to low altitudes. The upland assemblages of plant communities are nationally important for its alpine flushes.
- Ben Vorlich – One of a series of high altitude sites with outstanding base-rich outcrops and associated plant communities and species developed on Dalradian Schist in the Breadalbanes and southwest Highlands.
- Craig Royston Woods – Comprises ancient natural woodland, with extensive areas of oak woodland. The diversity of the understorey vegetation and age of woodlands support a wide a variety of moths.
- Geal and Dubh Lochs – A site of botanical importance for the emergent and submerged plant species in the two oligotrophic lochs, and for the diversity of mire and fen communities that make up hydromorphic mire range.
- Glen Falloch Woods – The Glen Falloch Woods are part of the very extensive mixed deciduous woodlands which lie within the Loch Lomond area. This complex is one of the largest in Scotland and has a very diverse structure and species composition reflecting the variety of soils, aspects and previous management.
- Glen Loin – The natural features of the site are upland oak woodland on higher ground and upland mixed ashwood on the lower ground. Of interest is the extensive scree on the upper slopes, where large boulders create a diversity of habitat that supports extensive bryophyte communities.
- Pollochro Woods – The SSSI supports an extensive area of semi-natural woodland, most of which is of ancient origin. The wet woodland is characteristic of the western highlands and has a canopy dominated by alder, with oak, birch, hazel and ash. Shrub species present include hawthorn and holly. Within the wet woodland, at the southern end of the site, there is also a small area of even-aged oak coppice woodland.

- Rowardennan Woodlands - The notified feature of upland oak woodland is part of the extensive oak woodlands found throughout Loch Lomondside. The upland oak woodland is made up of ancient and long-established semi-natural woodland.
- West Loch Lomondside Woodlands – The SSSI includes extensive areas of upland oakwood, typical of much of those found throughout Loch Lomondside. However, within West Loch Lomondside Woodlands SSSI there is a greater diversity of woodland types due to the variety of soils, aspect, land use history and management on the western shores of Loch Lomond.

6.4.3.5 Ancient Woodland

Ancient Woodland is located throughout the study corridor, in many cases adjacent to the existing A82. Within 2 kilometres of the route corridors there are a total of 111 areas of Ancient Woodland listed on the Inventory of Ancient Woodland.

6.4.3.6 National Nature Reserves (NNR)

There are no NNRs within 2 kilometres of the route corridors.

6.4.3.7 RSPB Reserves

The Inversnaid RSPB Reserve is located on the eastern side of Loch Lomond and it extends to within 800 metres of Route Corridor 1. The RSPB website[17] describes the Inversnaid Reserve as follows:

"*Inversnaid is on the east shore of Loch Lomond, where oak woodland rises steeply from the loch and gives way to open moorland with spectacular views. In the summer months you might see pied flycatchers here, as well as buzzards, while in the colder months look out for bullfinches and woodpeckers*".

6.4.3.8 Local Nature Reserves (LNR)

There are no LNRs within 1 kilometre of the route corridors.

6.4.3.9 Phase I Habitat and Protected Species Surveys

A phase 1 habitat survey was completed for the scheme between January and February 2012. The survey corridor was approximately 17 kilometres in length and extended 300 metres east and west of the A82 carriageway. Subsequent phase 2 protected species surveys were completed. The results of these surveys are summarised below. The exact extents of the current route corridors were not covered and Corridor 2 between Inveruglas and Arrochar and much of Corridor 3 were not included in these surveys.

6.4.3.9.1 Habitats

The habitats recorded during the survey included:

- amenity grassland;

[17] http://www.rspb.org.uk/reserves/guide/i/inversnaid/index.aspx

- artificial spoil;
- broadleaved semi-natural woodland;
- buildings;
- bare ground;
- coniferous semi-natural woodland;
- coniferous plantation woodland;
- semi-natural mixed woodland;
- continuous bracken;
- dense/continuous scrub;
- improved grassland;
- marsh/marshy grassland;
- natural basic inland cliff;
- running water;
- scattered bracken;
- scattered scrub;
- scattered broadleaved trees;
- standing water;
- tall ruderal;
- walls;
- tall fern and herb;
- basic scree;
- natural inland cliff acid neutral;
- ephemeral/short perennial.

6.4.3.9.2 Protected and Notable Species

Deer

Red deer *Cervus elaphus* is named on the Argyll and Bute Local Biodiversity Action Plan (BAP) as a priority species for upland flushes, fens and swamps. Deer *Cervidae* signs were evident throughout the survey area, including footprints, mammal track, faeces, carcasses and sightings. Deer crossing points were observed through many of the watercourses that run under the A82 to Loch Lomond. Scottish Natural Heritage (SNH) records of Deer Vehicle Collisions were reviewed and this identified that the area around Ardlui has a high proportion of deer casualties, suggesting there could be higher numbers in this area.

Badger

Desk studies identified records of badger *Meles meles* in all of the study areas. The habitats surveyed adjacent to the A82 were considered to be suitable for badger, with woodland and shelter available. There is suitable foraging habitat in the wider area.

A badger survey was completed in January and February 2012 within areas of the A82 survey corridor which were considered to be suitable habitats for badger. The foraging habitats to the east of the A82 were found to be limited to a few areas; in the woodland between Inverarnan and Ardlui, south of Ardlui in broadleaved woodland and at grassland to the east of Ardvorlich Cottages. Badger pathways were found to the southwest of Inveruglas. These pathways lead to further badger signs including a dung pit. A faint badger print was recorded to the south of Inveruglas. No badger setts were recorded.

Bats

A number of bat species, including brown long-eared *Plecotus auritus* and soprano pipistrelle *Pipistrellus pipistrellus*, are named as a priority species on the UK BAP, the Argyll and Bute Local BAP and the National Park BAP. A bat roost survey was completed between January and February 2012, on trees within a 30 metre boundary of the A82 road corridor. This identified numerous trees, woodlands, bridges and buildings along the current alignment of the A82 that were found to be suitable for bats for roosting, foraging and commuting.

Pine marten

Pine marten *Martes martes* is listed as a UK BAP and National Park BAP priority species. The habitats to the west of the A82 between Tarbet and Inveruglas and around Inverarnan were considered suitable for pine marten, however the West Highland Railway line and the A82 are barriers to the species distribution. Spruce and birch plantations provide possible den locations and foraging areas.

A pine marten survey was completed between January and February 2012. No field signs of pine marten were recorded in the survey area, however it was acknowledged that the species may be in the wider area.

Otter

Otters are listed within the National Park BAP. An otter survey was completed by Amey between January and February 2012. Otters were found to be active on all watercourses along the survey area, including the watercourses that flow under the A82 from the hillside to Loch Lomond and they are known to be within the habitats of the Loch Lomond Woods SAC. The rock outcrops and exposed tree roots along the watercourses provide ideal otter resting sites and Loch Lomond and the River Falloch are suitable for foraging activities. The Inveruglas Water and an unnamed watercourse directly north of Ardvorlich are also excellent otter habitats. An otter holt was identified in the north of the survey area on the east bank of the River Falloch. 13 resting sites were recorded and eight of these were within the vicinity of the A82.

Otter road kill data obtained from BEAR Scotland shows that there were 22 otter roads kills recorded on the A82 between 1981 and 2007. The data was gathered by Dominic McCafferty. A study into otter road mortality by Hutchison and McCafferty in 2009 was obtained. This study found that the frequency of otter mortalities decreased with increasing distances from the nearest waterbody. In addition a dated

record (February 1986), was obtained from LLTNP which listed an otter road kill at Inverarnan.

Water vole

Water voles *Arvicola amphibius* are listed within the Argyll and Bute Local BAP and the National Park BAP. The desk study identified recording of water voles within the study area. Suitable habitats for water vole was identified during a water vole survey completed between January and February 2012. This included water filled ditches with penetrable banks, overgrown vegetation and surrounding grasses and rushes which offer a feeding resource. However, the steep hillsides within the survey areas and the high volume of deer within the woodland would discourage water vole from the area.

Wildcat

Wildcats *Felis silvestris silvestris* are listed within UK BAP, the Argyll and Bute Local BAP and the National Park BAP and they are one of Britain's rarest animals and are now only found in Scotland. The habitats to the west of the A82 were found to be suitable for wildcats, with woodlands bordering open hills and uplands. A wildcat survey was completed between January and February 2012. Field evidence of wildcats was identified in two areas, between Tarbet to Inveruglas and Inveruglas to Pulpit Rock. Both areas were located between 230 and 300 metres from the A82.

Red squirrel

The red squirrel *Sciurus vulgaris* is the only native squirrel species in the UK. It is listed as a priority species in the UK BAP, the Argyll and Bute Local BAP and the National Park BAP. A red squirrel survey was completed between January and February 2012, which identified that the most suitable areas for red squirrel were within areas of conifer plantation. Squirrel feeding stations were observed between Tarbet to Inveruglas. These had been installed by the Forestry Commission. Field signs noted were over 30 metres from the existing A82, however red squirrels are likely to be active along the A82 between Tarbet and Inverarnan.

Reptiles

There are various rocky outcrops, an abundance of bracken scrub and stone walls which provide refuge and basking areas for reptiles along the A82 survey area.

Great crested newt

Great crested newt *Triturus cristatus* Habitat Suitability Index (HSI) suggests that the survey area is located in an unsuitable geographic location. The standing water located on the section between Pulpit Rock and Inverarnan is considered to be of poor quality.

Birds

The habitats present support a good diversity of woodland and Loch Lomond provides habitat for waterfowl. Numerous birds were identified during the phase 1 habitat survey including coal tit *Periparus ater*, blue tit *Cyanistes caeruleus*, buzzard *Buteo buteo*, red grouse *Lagopus lagopus scotica* and cormorant *Phalacrocoracidae*. Sand martin *Riparia riparia* nest holes were identified on the east bank of the River Falloch, to the east of the A82 north of Inverarnan. Barn owls *Tyto alba*, a Wildlife and Countryside Act 1981 Schedule 1 species, are present in the survey area north of Inveruglas.

Freshwater fisheries

A fisheries assessment was completed in March 2012 along the A82 between Tarbet and Glen Falloch. The habitats along Loch Lomond are suitable for powan *Coregonus clupeoides*, particularly the shallow bays around Ardvorlich which are suitable for spawning. Powan are scarce in Scotland and the UK.

The burns over which the A82 passes over are small and unlikely to support fish populations, the Loch has steep sides which decreases the suitability for fish within the smaller watercourses. The larger watercourses provide potential habitats for salmonids *Salmonidae*, lamprey *Petromyzontiformes* and European eel *Anguilla anguilla*, with features that provide migratory passages and potential breeding and foraging habitat.

Japanese knotweed

The 2012 survey identified this invasive plant species at a number of locations adjacent to the A82 carriageway.

6.4.4 Value of the Environmental Resources and Receptors

The purpose of the Scoping Report assessment is to identify and value nature conservation resources, and clarify further study on those resources that have the potential to be associated with significant effects. The value of nature conservation receptors is defined in DMRB (HA, Interim Advice Note 130/10) and is reproduced in Table 6.5.

Table 6.5: Value of nature conservation receptors as defined in IAN 130/10

Resource value	Criteria
International or European Value	Natura 2000 sites including: Sites of Community Importance (SCIs); Special Protection Areas (SPAs); potential SPAs (pSPAs); Special Areas of Conservation (SACs); candidate or possible SACs (cSACs or pSACs1); and Wetlands of International Importance (Ramsar sites). Biogenetic Reserves, World Heritage Sites and Biosphere Reserves. Areas which meet the published selection criteria for those sites listed above but which are not themselves designated as such. Resident, or regularly occurring, populations of species which may be considered at an International or European level where: • the loss of these populations would adversely affect the conservation status or distribution of the species at this geographic scale; or • the population forms a critical part of a wider population at this scale; or • the species is at a critical phase of its life cycle at this scale.

Table 6.5: Value of nature conservation receptors as defined in IAN 130/10 (Cont.)

Resource value	Criteria
UK or National Value	Designated sites including: Sites of Special Scientific Interest (SSSIs); Marine Protected Areas (MPAs) including Marine Conservation Zones (MCZs); National Nature Reserves (NNRs) and National Parks. Areas which meet the published selection criteria e.g. JNCC (1998) for those sites listed above but which are not themselves designated as such. Areas of key/priority habitats identified in the UK Biodiversity Action Plan (BAP), including those published in accordance with Section 41 of the Natural Environment and Rural Communities Act (2006) and those considered to be of principal importance for the conservation of biodiversity. Areas of Ancient Woodland e.g. woodland listed within the Ancient Woodland Inventory. Resident, or regularly occurring, populations of species which may be considered at an International, European, UK or National level where: • the loss of these populations would adversely affect the conservation status or distribution of the species at this scale; or • the population forms a critical part of a wider population at this scale; or • the species is at a critical phase of its life cycle at this scale.
Regional Value	Areas of key/priority habitats identified in the Regional BAP (where available); areas of key/priority habitat identified as being of Regional value in the appropriate Natural Area Profile (or equivalent); areas that have been identified by regional plans or strategies as areas for restoration or re-creation of priority habitats (for example, South West Nature Map); and areas of key/priority habitat listed within the Highways Agency's BAP. Resident, or regularly occurring, populations of species which may be considered at an International, European, UK or National level and key/priority species listed within the HABAP where: • the loss of these populations would adversely affect the conservation status or distribution of the species at this scale; or • the population forms a critical part of a wider population; or • the species is at a critical phase of its life cycle.
County or Unitary Authority Area Value	Designated sites including: Sites of Nature Conservation Importance (SNCIs); County Wildlife Sites (CWSs); and Local Nature Reserves (LNRs) designated in the county or unitary authority area context.

Table 6.5: Value of nature conservation receptors as defined in IAN 130/10 (Cont.)

Resource value	Criteria
	Areas which meet the published selection criteria for those sites listed above but which are not themselves designated as such. Areas of key/priority habitats identified in the Local BAP; and areas of habitat identified in the appropriate Natural Area Profile (or equivalent). Resident, or regularly occurring, populations of species which may be considered at an International, European, UK or National level where: • the loss of these populations would adversely affect the conservation status or distribution of the species across the County or Unitary Authority Area; or • the population forms a critical part of a wider population; or • the species is at a critical phase of its life cycle.
Local Value	Designated sites including: Local Nature Reserves (LNRs) designated in the local context. Trees that are protected by Tree Preservation Orders (TPOs). Areas of habitat; or populations/communities of species considered to appreciably enrich the habitat resource within the local context (such as veteran trees), including features of value for migration, dispersal or genetic exchange.

Receptors have been valued in line with the table above and this information is included in the potential effects section below within Table 6.6.

6.4.5 Potential effects

The assessment covers potential significant effects arising from the permanent and temporary direct, indirect, secondary, cumulative, short, medium and long term positive and negative impacts of each route corridor.

Negative impacts are considered to relate to direct loss of habitat, severance, road mortality, disruption to local hydrology, polluted run-off, new road structures, new lighting, air pollutants, spray from traffic and disturbance as a consequence of the construction works; some of these impacts will require further assessment to be determined at the next stage. These will be revisited at the next stage of assessment once further detailed surveys on the preferred route corridor(s) are complete.

Table 6.6: Nature conservation potential effects

Ecological receptor	Value	Predicted impact		
		Corridor 1	Corridor 2	Corridor 3
European / International Sites (SAC, SPA)	International / European	*Loch Lomond Woods SAC* – construction works within 200m, leading to disturbance, including removal of key habitats (woodland and watercourses) used by otters and construction noise and air quality deterioration. *Glen Etive and Glen Fyne SPA* – habitat loss (woodland) and disturbance habitat (watercourses) of qualifying species (otters – refer to protected species section). Works are within 200m resulting in potential direct disturbance (noise and air) to qualifying species.	*Loch Lomond Woods SAC* – as Corridor 1 & direct impact (loss of woodland habitat) *Glen Etive and Glen Fyne SPA* – as Corridor 1.	*Loch Lomond Woods SAC* – as Corridor 1. *Glen Etive and Glen Fyne SPA* – as Corridor 1.

Table 6.6: Nature conservation potential effects (Cont.)

Ecological receptor	Value	Predicted impact		
		Corridor 1	Corridor 2	Corridor 3
National Site (SSSI)	National	*Ben Lomond SSSI* – no impacts predicted. *Ben Vorlich SSSI* – no impacts predicted. *Craig Royston Woods SSSI* - indirect negative impacts on woodland, including pollution incidents, noise disturbance and air quality impacts. *Geal and Dubh Lochs SSSI* – direct negative impacts to the oligotrophic lochs, through pollution incidents and changes to air quality. *Glen Falloch Woods SSSI* – direct negative impacts on woodland, including pollution incidents, noise disturbance and air quality impacts. *Glen Loin SSSI* – no impacts predicted. *Pollochro Woods SSSI* – as Craig Royston Woods SSSI. *Rowardennan Woodlands SSSI* - as Craig Royston Woods SSSI. *West Loch Lomondside Woodlands SSSI* - as Craig Royston Woods SSSI.	*Ben Lomond SSSI* – no impacts predicted. *Ben Vorlich SSSI* – no impacts predicted. *Craig Royston Woods SSSI* – as Corridor 1. *Geal and Dubh Lochs SSSI* – as Corridor 1. *Glen Falloch Woods SSSI* – as Corridor 1. *Glen Loin SSSI* – direct impacts due to construction disturbance to woodland habitats and bryophyte communities, including habitat loss, construction noise, pollution incidents and changes in air quality. *Pollochro Woods SSSI* – as Corridor 1. *Rowardennan Woodlands SSSI* – as Corridor 1. *West Loch Lomondside Woodlands SSSI* – as Corridor 1.	*Ben Lomond SSSI* – no impacts predicted. *Ben Vorlich SSSI* – no impacts predicted. *Craig Royston Woods SSSI* - as Corridor 1. *Geal and Dubh Lochs SSSI* – as Corridor 1. *Glen Falloch Woods SSSI* – as Corridor 1. *Glen Loin SSSI* – no impacts predicted. *Pollochro Woods SSSI* – as Corridor 1. *Rowardennan Woodlands SSSI* – as Corridor 1. *West Loch Lomondside Woodlands SSSI* – as Corridor 1.

Table 6.6: Nature conservation potential effects (Cont.)

Ecological receptor	Value	Predicted impact		
		Corridor 1	Corridor 2	Corridor 3
Key Habitats	Local - National	*Woodland (including broadleaved semi-natural, coniferous and semi-natural mixed)* – habitat loss through road widening. Adverse impacts on air quality and noise disturbance during construction. *Ancient Woodland* - much of this woodland area lies to the east of Loch Lomond and is unlikely to be affected. *Running Water* – direct impacts through increased risk of pollution incidents and sedimentation during construction. *Standing water* – as running water. *Continuous Bracken* - habitat loss through road widening. Adverse impacts on air quality and noise disturbance during construction.	*Woodland (including broadleaved semi-natural, coniferous and semi-natural mixed)* – as Corridor 1. *Ancient Woodland* – as Corridor 1. *Running Water* – as Corridor 1. *Standing water* – as Corridor 1. *Continuous Bracken* - as Corridor 1.	*Woodland (including broadleaved semi-natural, coniferous and semi-natural mixed)* – as Corridor 1. *Ancient Woodland* – as Corridor 1. *Running Water* – as Corridor 1. *Standing water* – as Corridor 1. *Continuous Bracken* - as Corridor 1.

Table 6.6: Nature conservation potential effects (Cont.)

Ecological receptor	Value	Predicted impact		
		Corridor 1	Corridor 2	Corridor 3
Protected and notable species	Regional County Regional Regional County County UK/National	*Badgers* – habitat loss through road widening. Road improvements, leading to increased speeds, may result in increased road kill. *Bats* - widening may lead to loss of roost sites and impact foraging and commuting lines. Any new lighting may result in disturbance to foraging and commuting lines. *Pine marten* – not likely to be impacted. *Otter* – habitat loss and direct disturbance to habitats, through noise and pollution incidents to watercourses. Road improvements, leading to increased speeds, may result in increased road kill. *Water vole* – habitat loss and direct disturbance of habitats, through noise and pollution incidents to habitats. Road improvements, leading to increased speeds, may result in increased road kill. *Wildcat* - habitat loss and direct disturbance through noise. *Red squirrel* - habitat loss, through clearance of conifer plantation and direct disturbance through noise.	*Deer* – as Corridor 1. New sections of road could result in severance of habitats. *Badgers* – new sections of road may lead to loss of habitat. Road improvements, leading to increased speeds, may result in increased road kill. *Bats* – new sections of road may lead to loss of roost sites and impact foraging and commuting lines. Any new lighting may result in disturbance to foraging and commuting lines. *Pine marten* – not likely to be within the areas adjacent to existing A82. New sections of road may lead to loss of habitat and disturbance due to construction noise, as well as habitat fragmentation. *Otter* – as Corridor 1. *Water vole* – as Corridor 1. *Wildcat* – as Corridor 1. New section of road may lead to habitat fragmentation. *Red squirrel* - as Corridor 1. New section of road may lead to habitat fragmentation. *Reptiles* – as Corridor 1. *GCN* – as Corridor 1. *Breeding birds* – as Corridor 1. *Freshwater fisheries* – as Corridor 1.	*Deer* – as Corridor 2. *Badgers* – as Corridor 2. *Bats* – as Corridor 2. *Pine marten* – as Corridor 1. *Otter* – as Corridor 1. *Water vole* – as Corridor 1. *Wildcat* – as Corridor 2. *Red squirrel* - as Corridor 2. *Reptiles* – as Corridor 1. *GCN* – as Corridor 1. *Breeding birds* – as Corridor 1. *Freshwater fisheries* – located further away from the Loch so direct impacts are less likely.

Table 6.6: Nature conservation potential effects (Cont.)

Ecological receptor	Value	Predicted impact		
		Corridor 1	Corridor 2	Corridor 3
	UK/National County County Regional Regional	*Deer* – road improvements, leading to increased speeds, may result in increased road kill. *Reptiles* – construction activities may result in habitat loss. *GCN* – no impacts anticipated. *Breeding birds* – vegetation removal will result in habitat loss and direct disturbance to breeding birds. *Freshwater fisheries* –direct impacts including pollution incidents and disturbance due to noise and vibration.		

This page is blank.

6.4.5.1 Possible Mitigation Measures

In general, ecological mitigation can be completed in a number of ways, including:

- avoidance through re-location, re-design or changes in construction programme;
- reduction involving lessening the severity of an impact which cannot be avoided; and
- compensation through habitat creation or enhancement.

The route corridor selected should aim to minimise fragmentation of habitats. To minimise the potential effects of the proposed scheme the works footprint should be minimised, particularly in terms of its waste management, heavy plant tracking and material storage during construction. This will reduce the area of habitat loss. Direct impacts to designated sites and habitats known to support protected species should be avoided through scheme design. The works programme should be considered to avoid sensitive seasons for wildlife where possible. New road lighting, if required should be selected so that it minimises impacts to bats, such as use of LED lighting.

A more detailed mitigation strategy will be prepared as part of the next phase of assessment following the completion of the required ecological surveys.

6.4.6 Proposed Level and Scope of Future Assessment

The route corridors are situated within an ecologically sensitive area, with a number of European and Nationally designated nature conservation sites within 200 metres. In addition there is potential for protected and important species to be present within the corridors, therefore the assessment of ecology will progress to simple and detailed assessment in Stage 2 and Stage 3, as detailed in DMRB Volume 11, Section 3, Part 4. Consultation with SNH will take place throughout the development of the scheme and will ensure that surveys and subsequent mitigation measures are suitable. In addition impacts to European designated sites will be assessed fully as detailed within DMRB Volume 11, Section 4, Part 1: Assessment of Implications of European Sites (HD 44/09), which may include the requirement to complete Habitats Regulations Assessments, once further details on the selected route corridor and construction methods are identified.

An Extended Phase 1 Habitat Survey of the route corridor(s) selected for further assessment will be carried out. This is anticipated to be completed in 2014 preferably during optimal survey periods (May to June).

The Extended Phase 1 Habitat Survey will determine the need for further, detailed protected species and habitat surveys which will establish the potential effects that the upgrade scheme would have on the ecological receptors, and propose mitigation measures. From the existing baseline information Phase 2 surveys are likely to be required for the following species:

- Badgers: badgers are likely to be active in the areas surrounding the route corridors, as confirmed by SNH. A survey should be completed during optimal survey season, spring to early autumn;

- Bats: it is highly likely that bats are present in the route corridors. A survey should be completed to determine the presence of roost sites within trees to be removed throughout the final route corridor;
- Otters: existing baseline information and correspondence with SNH has indicated that otter surveys are likely to be required to identify potential impacts and mitigation required;
- Red squirrel: further surveys will be required particularly where the upgrade works take place inland; and
- Birds: detailed surveys on bird abundance within the route corridor, particularly barn owls.

Other species specific surveys may be required following on from the findings of the Extended Phase 1 Habitat Survey in 2014. Depending on the outcome of the surveys European Protected Species Licences may be required to be obtained from SNH.

In addition to protected species surveys, consideration will also be given to any impacts to important habitats and designated sites.

6.4.7 Proposed Methodology (including Significance) of Future Assessment

The Extended Phase 1 Habitat Survey will be completed in accordance with JNCC Methodology (2010) ideally during the optimum survey period of May to June. This survey will establish whether further species specific surveys are required, together with any seasonal survey constraints. It will also highlight any opportunities to enhance the ecological value of the upgrade project.

Following the completion of the ecological surveys, the ecological resource present within the study area would be evaluated and the value of the resources assessed. The potential effects of the upgrade scheme on the resources would be evaluated and mitigation measures developed to reduce or remove potential adverse effects.

The ecological assessment would be undertaken in accordance with guidance provided within DMRB Volume 11, Section 3, Part 4: Ecology and Nature Conservation and IAN 130/10: Ecology and Nature Conservation Criteria for Impact Assessment. The significance of the potential effects upon receptors will be based upon criteria proposed in DMRB Volume 11, Section 2, Part 5: Assessment and Management of Environmental Effects – HA 205/08. The assessment would also follow the principals detailed in IEEM (2006) Guidelines.

6.5 Geology & Soils

6.5.1 Introduction

Road schemes are capable of impacting upon the geology and soils of an area directly and indirectly on sites of importance or scientific interest, loss or sterilisation of mineral deposits or soil resources or disturbance of contaminated land.

This chapter describes the assessment undertaken to determine the potential impacts on geology and soils of each route corridor. A preliminary review of ground conditions and potential sources of contamination is presented. This will set out baseline conditions to enable an assessment of how each corridor route will impact on the geology and soils.

The impact of each route corridor on the geology and soils of the area has been considered in accordance with the Design Manual for Roads and Bridges (DMRB), (1998); Volume 11; Environmental Assessment, Section 3; Part 11; Geology and Soils.

Assessment has considered any sensitive sites or potential sources of contamination that may exist within a relatively cautious distance of 500 metres of from each route corridor.

6.5.2 Policy and Legislation

The following key legislation and guidance documents have been used to inform the assessment:

- Planning Advice Note 33: Development of Contaminated Land, published by the Scottish Government October 2000: provides guidance relating to the development of contaminated land and implications for planning applications;
- Environmental Protection Act 1990: Part 2A, Contaminated Land, published by Department for Environment Food and Rural Affairs (Defra), 1990: provides guidance on the definition of contaminated land; and
- The Contaminated Land (Scotland) Regulations 2005, published by the Scottish Government, 2005: contains amendments made to the Environmental Protection Act 1990: Part 2A with specific reference to Scotland.

6.5.3 Existing and Baseline Knowledge

A number of sources of baseline information have been used to assess the sensitivity of the geology and soils within the study area. The following information was reviewed to obtain baseline data:

- British Geological Survey, Scotland Sheet 038W, Solid Edition, Scale 1:50,000;
- British Geological Survey online map database;
- British Geological Survey, Hydrogeological Map of Scotland (1988), Scale 1:625,000;
- British Geological Survey online borehole database;
- Landmark Envirocheck Report Reference 49966754-1-1. This includes environmental data such as sensitive sites, discharge consents and waste management permits.
- Historical Ordnance Survey mapping;
- Macaulay Land Use Research Institute soils map, Sheet 56, Loch Lomond, Scale 1:50,000;
- Geological Conservation Review Sites (GCRS) including SSSIs as listed by the Registers of Scotland website (www.ros.gov.uk) or Joint Nature Conservation Committee website (jncc.defra.gov.ukJNCC); and
- Local Geo-diversity Sites as identified by regional Geo-conservation groups.

The geology along the routes, designated sites and areas of contaminated land are summarised below. Simplified maps showing the drift and solid geology along the route corridors can be seen on drawings 476416-3001-0003/4 (Appendix A).

6.5.3.1 Geology

6.5.3.1.1 Solid Geology

The solid geology underlying the route corridors principally comprises metamorphic rocks of Dalradian Age that belongs to the Southern Highland Group. These rocks principally comprise psammites and pelites. These metamorphic rocks contain younger igneous intrusions

The metamorphic rocks contain a number of younger igneous intrusions of Permo-Carboniferous and Lower Devonian and Upper Silurian Age. The Permo-Carboniferous intrusions are approximately west-east orientated Quartz-Tholeiite dykes which are often several kilometres long. The Lower Devonian intrusions are generally north south orientated porphyritic dykes of Felsite and more rarely Lamprophyre and are generally less than 1 kilometre long.

There are also localised intrusions of Lower Devonian –Upper Silurian rocks comprising Breccias, Diorites, Granodiorites and Gabbros for example at the northern end of Glen Loin and south of Ardlui,

A much more extensive igneous intrusion termed the Glen Fyne Pluton occupies Garabal Hill to the north west of Ardlui. These rocks include Granodiorite, Diorite, Gabbro and Pyroxenite.

A number of faults of various orientations dissect the route corridors.

6.5.3.1.2 Drift Geology

The Quaternary drift geology predominantly comprises Glacial Till, with some areas not having any superficial deposits recorded. Alluvial deposits are present within the River Falloch and Loin Water floodplains. Localised alluvial deposits may also be present within stream valleys and at mouths of rivers and larger burns discharging into Loch Lomond.

6.5.3.2 Soil

Information on topsoil has been taken from the Macaulay Land Use Research Institute soils map, Sheet 56, Loch Lomond, Scale 1:50,000. The map indicates that much of the site is underlain by soils derived from arenaceous schists and strongly metamorphous argillaceous schists of the Dalradian series. There are local areas of recent riverine and lacustrine alluvial deposits or fluvioglacial sands and gravels derived from acid rocks.

The soil types are predominantly humus iron podzols and brown forest soils with some local areas of humic gleys, peaty soils, peat, alluvial soils and rankers. An assessment of agricultural land quality is contained in Section 6.9.

6.5.3.3 Sensitive Land Uses / Designated Sites

Research has identified one Geological Conservation Review site as being within or within influencing distance of the route corridors. This is the Garabal Hill SSSI (Site Code 668); the site has been notified owing to the variety of igneous rocks outcropping in a fairly small area, which includes all the principal variants of the

intrusive complex and is of international importance for research purposes. The location of this SSSI is shown on drawings 476416-3001-0003/4 (Appendix A).

The research undertaken does not suggest that there any other Geological Conservation Review sites within influencing distance of the route corridors, nor have any Local Geo diversity sites been identified from the sources consulted.

It is noted that both the Ben Vorlich and Glen Loin SSSI's also lie within, or within the suggested influencing distance of the route corridors. Although these sites are not notified for geological reasons, impacts on the soils and geology may result from engineering works. Assessment of the potential impacts this may have on the ecology of these sites will need to be considered.

6.5.3.4 Potential Contaminated Land

This assessment has been made by desk based review only, with the potential for contaminated land being assessed using historic Ordnance Survey mapping and environmental data sets produced as part of an "Envirocheck Report".

6.5.3.4.1 Historic Contamination

The history of the area from circa 1864 to the present day as evidenced by ordnance survey mapping has been researched.

The earliest maps (1860's) show the existing road networks and many of the current dwellings but pre-date the railway and show much less extensive forestry.

Subsequent mapping from the 1890-1920's show the railway has been built and the continued expansion of the principal small settlements along the route.

Subsequent mapping from the 1920's to the present day charts the expansion of commercial forestry, tourist development and the Loch Sloy Power Station, north of Inveruglas.

Principal potential sources of historic contamination may include the railway, demolished or derelict properties, former tanks and former sand and gravel pits of which there are a few examples along the route notably near Inveruglas, and south of Garabal in the north of the study area.

6.5.3.4.2 Current Contamination

Principal potential sources of current contamination are indicted by Envirocheck reporting to comprise relatively isolated discharge consents associated with dwelling houses and other occupied buildings along the existing A82 route, and fuel stations at Arrochar, Tarbet and Ardlui.

It is also possible that there may be contamination associated with the Railway Line.

6.5.4 Value of the environmental resources and receptors

The value of the resources identified above has been determined as detailed in Table 6.7.

Table 6.7: Value of geology and soils

Resource value	Criteria
High	An international and nationally designated site (e.g. Site of Special Scientific Interest). Presence of non-substitutable geology or soils.
Medium	Any local or regionally designated sites (Regionally Important Geological Sites). Presence of soils or geology with limited potential for substitutability.
Low	Small areas of geology or soils not designated or classified. Easily substitutable soils / geology.

It is considered that the Garabal Hill SSSI will by definition have a high resource value.

It is considered that the other areas of geology and soils summaries in Section 6.5.3 likely to be impacted will have a low resource value.

6.5.5 Potential Effects

The three route corridors all currently have equal potential to impact on the Garabal Hill Geological SSSI as they have the similar footprints in this locality (north of Ardlui).

Corridor 1 is likely to have a lower impact on areas of low resource geology than Corridors 2 and 3 as a result of the likely requirement for generally lesser earthworks.

Corridor 3 is likely to have a greater impact on the low resource geology than Corridor 2 as more significant earthworks are anticipated.

A preliminary assessment has been carried out to assess whether the potential construction or operational phases of the scheme will be significantly different from the baseline conditions.

At this stage only a very general assessment is possible as only relatively broad route corridors are currently being considered and there is little or no detail on specific construction proposals.

6.5.5.1 Construction

The construction phase impacts are summarised below:

- direct disturbance of Geological Conservation Review Site (Garabal Hill SSSI);
- consolidation of underlying soils which may impact upon groundwater flows;
- altering local groundwater flows by drainage/ earthworks;
- the potential to mobilise contaminants by excavating contaminated material. There would be a subsequent risk that the contaminants could impact upon sensitive receptors such as humans, the water environment or property;

- spillage of potentially polluting substances during construction e.g. fuels which could impact upon potentially sensitive receptors such as humans, the water environment or property;
- potential to create new preferential pathways for contaminant flow e.g. along drainage routes or by construction of boreholes / piles;
- generation of potential hazardous waste materials e.g. excavation of peat.

It is considered that mitigation of the above impacts will depend on the specific construction proposals which are yet to be developed.

6.5.5.2 Operation

The operational phase impacts are summarised below:

- potential fuel spills from road users which may impact upon sensitive receptors such as humans, the water environment or property.

The potential for fuel spills would be mitigated by way of a properly designed road drainage scheme.

6.5.6 Proposed Level and Scope of Future Assessment

Further assessment will be required during Stage 2 once a preferred route corridor(s) has been chosen.

The historical review undertaken as part of the desk study exercise has identified that potentially contaminated sites may exist within the study area.

Further desk based study will be required in order to identify any potentially significant pollutant linkages (source-pathway-receptor relationships) between identified sources of contamination and potentially sensitive receptors. This information should then be used to design the intrusive ground investigation to identify the extent and nature of potentially contaminated areas. Any potentially contaminated sites that may be affected by the route corridors will require individual assessment, commencing with initial characterisation of soil, ground gas and groundwater conditions at the site by means of intrusive investigation.

Intrusive ground investigation works will also be required to confirm the geology and hydrogeology along the route to help establish how possible earthworks may impact upon underlying soil, rock and groundwater.

6.5.7 Proposed Methodology (including Significance) of Future Assessment

Future assessment will be primarily based around desk based studies and intrusive ground investigation being carried out along the route. Any assessment will be carried out in accordance with the Design Manual for Roads and Bridges (DMRB), (1998); Volume 11; Environmental Assessment, Section 3; Part 11; Geology and Soils, and will include the following:

- the geology and hydrogeology underlying the route;
- the nature of any contaminated land along the route(s) and the potential impacts on nearby sensitive receptors such as the water environment, humans or property;

- the extent to which contaminants would be mobilised or remediated as a result of the construction and operational phases of the route(s); and
- any designated geological sites (SSSIs or Local Geo-diversity Sites(RIGS)).

6.6 Materials and Waste

6.6.1 Introduction

This section considers the potential environmental impacts and effects associated with the use and consumption of materials and the production and management of waste during the construction and maintenance of the proposed scheme in accordance with the methodology outlined in the draft DMRB Volume 11, Section 3, Part 6, Materials guidance (HD212/11).

This assessment considers the environmental impacts and effects associated with two principal areas associated with the construction, improvement and maintenance of the trunk road network:

- the use and consumption of 'Material Resources' from primary and recycled / secondary sources, and manufactured construction products; many material resources will originate off site, purchased as construction products, and some will arise on-site such as excavated soils or recycled road planings; and
- the production and management of 'Waste' (defined in Article 1(a) of the European Waste Framework Directive 2008/98/EC as "any substance or object in the categories set out in Annex I which the holder discards or intends to discard or is required to discard"; the term 'holder' is defined as the producer of the waste or the person who is in possession of it; the term 'producer' is defined as anyone whose activities produce waste; waste can be further classified as hazardous, non-hazardous or inert).

During the operation of the proposed scheme the use of material resources and the generation of waste is likely to be negligible (by type, duration and volume). Operational materials use and waste have therefore been scoped out of this assessment.

6.6.2 Policy and Legislation

The use and consumption of material resources and the production and management of waste are subject to a complex framework of legislative and policy instruments at both the European and national level.

In addition to material and waste specific policies and legislation, there is also the legislative framework for sustainable development which must be considered in assessing the effects of material resource use and waste.

6.6.2.1 The Overarching Policy Objectives for Sustainable Development

- The EU Sustainable Development Strategy (Renewed Strategy 2006) provides the policy framework from delivering sustainable development at the European level. The key objectives of the strategy, relevant to this assessment, are to tackle climate change, natural resource protection, public health and the global dimension of sustainable development;

- The Sustainable Development Strategy (Choosing our Future) 2005 sets out the action which Scotland will take to address the key objectives of the EU Sustainable Development Strategy and turn the shared priorities set out in the UK Framework (One future - different paths) for Sustainable Development into action;
- The Climate Change (Scotland) Act 2009 aims to reduce greenhouse gas emissions and transition to a low carbon economy. Part 1 of the Act, creates the statutory framework for greenhouse gas emissions reductions in Scotland by setting an interim 42 per cent reduction target for 2020 and an 80 per cent reduction target for 2050. Part 4 of the Act requires that a public body must, in exercising its functions, act in the way best calculated to contribute to delivery of the Act's emissions reduction targets, in the way best calculated to deliver any statutory adaptation programme and in a way that it considers most sustainable;
- The Transport Scotland Corporate Plan (2012-2015) sets out the role Transport Scotland will play, over the period 2012-2015, in helping to deliver increased sustainable economic growth, set in the context of the Government Economic Strategy's six strategic priorities which are critical to economic growth.

  The following commitments are considered of particular relevance to this assessment:

  - fully integrate the Carbon Management System (CMS) to influence and support low-carbon decision-making across the design and delivery of transport infrastructure projects and network maintenance;
  - utilise the CMS in tandem with the Carbon Management Plan to facilitate annual sustainability reporting;
  - embed resource efficiency into practices and adopt the next generation of WRAP Construction Commitments; and
  - support sustainable design, construction, maintenance and operations through the adoption of infrastructure assessment schemes.

6.6.2.2 Legislative and Policy Framework for Waste Management:

- The EU Waste Framework Directive (WFD) 2008/98/EC provides the overarching legislative framework for the collection, transport, recovery and disposal of waste, and includes a common definition of waste. The overall purpose of the WFD is to lay down measures to protect the environment and human health by preventing or reducing the adverse effects of the production and management of waste and by improving the efficiency and reducing the overall impacts of resource use. The WFD requires EU Member States to prepare a national waste management plan. In response the Scottish Government has implemented 'The Zero Waste Plan';
- Scotland's Zero Waste Plan 2010 sets out the Scottish Government's vision for a zero waste society. This vision describes a Scotland where all waste is seen as a resource; waste is minimised; valuable resources are not disposed of in landfills, and most waste is sorted, leaving only limited amounts to be treated. To achieve this vision the Plan sets out a number of measures; those relevant to this assessment include:

- landfill bans for specific waste types therefore reducing our greenhouse gas emissions and capturing the value from these resources;
- two new targets that will apply to all waste: 70 per cent target recycled, and maximum 5 per cent sent to landfill, both by 2025;
- restrictions on the input to all energy from waste facilities therefore encouraging greater waste prevention, reuse and recycling; and
- measure the carbon impacts of waste to prioritise the recycling of resources which offer the greatest environmental and climate change outcomes.

- The Environmental Protection Act 1990 establishes in England, Scotland and Wales the structure and authority for waste management and control of emissions into the environment; and defines the legal framework for duty of care for waste, contaminated land and statutory nuisance;
- The Landfill (Scotland) Regulations 2003 (as amended) transposes the requirements of the Landfill directive (Council Directive 1999/31/EC), which aims to prevent, or to reduce as far as possible, the negative environmental effects of landfill;
- The Waste Management Licensing (Scotland) Regulations 2011 (along with the associated Waste (Scotland) Regulations 2011)) implement the revised WFD 2008;
- The Waste (Scotland) Regulations 2012 introduced a number of important requirements including the segregation of materials such as glass, metal, plastics, paper and card for recycling. It also introduced a ban on sending segregated materials for incineration or to landfill;
- The Environmental Protection (Duty of Care) (Scotland) Regulations 2014 requires a transfer note to be signed by the transferor and transferee of waste, specifies information to be included and requires copies to be kept for two years;
- The Special Waste Regulations 1996 (as amended) provides a definition of 'special waste' in Scotland to cover all hazardous waste andregulates waste carriers by requiring them to complete and keep consignment notes.

6.6.3 Existing and Baseline Knowledge

There is currently no data available on the types and quantities of materials required or sufficient information to forecast waste arisings. Nevertheless, based on similar highway improvement schemes, the likely materials used, and wastes generated by the project are likely to be akin to those detailed in the Table 6.8 below.

Table 6.8: Estimated material use and waste generation

Materials required for the project	Wastes arising from the project
• Bituminous materials for road construction; • Road markings (thermoplastic materials); • Granular stone sub base; • Drainage products – pipes, chambers and gully pots (including metal covers or grates), plastic, clayware or precast concrete; • Drainage products – storm cells and interceptors (likely to be plastic); • Granular stone bedding and backfill to drainage pipes; • Traffic signage; • Steel safety barriers; • Steel for use in structures (e.g. bridges); • Precast concrete – kerbs and paving flags; • Concrete for various purposes including drainage chamber/gully pot base and surround, sign foundations, in situ drainage channels and structures; • Traffic signal posts and heads, electrical cables, ducts, inspection chambers; and • Street lighting columns, lanterns, cables, ducts, feeder pillars.	• Vegetation and scrub removal (non-hazardous); • Bituminous road planings (hazardous (if containing road tar) or non-hazardous)); • Embankment fill and excavated soils (hazardous, non-hazardous, inert); • Steel safety barrier (non-hazardous); • Concrete waste (inert); • Traffic signs (non-hazardous); • Street lighting columns, lanterns (non-hazardous); • Power / communication cables (non-hazardous); • Mixed inert waste; • Mixed construction and demolition waste (non-hazardous); • Canteen / office / adhoc waste (non-hazardous); • Mixed packaging (non-hazardous); • Timber (non-hazardous); • Plastics (non-hazardous); • Metals (non-hazardous); • Miscellaneous aqueous liquids wastes (non-hazardous); • Miscellaneous hazardous waste; • Hydraulic oils (hazardous); and • Waste electrical and electronic equipment (hazardous or non-hazardous);

During the operation of the proposed scheme the use of material resources and the generation of waste is likely to be negligible (by type, duration and volume). Operational materials use and waste have therefore been scoped out of this assessment.

6.6.4 Value of the Environmental Resources and Receptors

The draft DMRB Volume 11, Section 3, Part 6 Materials guidance (HD212/11) defines the methodology for determining the value and / or sensitivity of the identified receptors. This will be reported during the simple assessment stage (see Section 6.6.7).

6.6.5 Potential Effects

The construction of the proposed scheme is likely to require the use of material resources including primary raw materials, such as aggregates and manufactured construction products including concrete, cement and steel. For material resource use, the potential environmental impacts are associated with the extraction, processing and transport of material resources, the manufacture of construction products and their subsequent transport to, and use on, the project site. The consumption of significant quantities of materials is likely to result in permanent and direct effects on the environment. Effects will occur, for example, as a result of the depletion of natural resources (e.g. primary aggregates), the embodied carbon emissions (or embodied energy) associated with the manufacture of materials and through transport related carbon emissions.

The generation of waste from the proposed scheme will give rise to a number of impacts, most notably on the waste management infrastructure available to accept, treat and dispose of the various types of waste which will be generated. For surplus materials and waste, the potential environmental effects are associated with the production, movement, transport, processing, and disposal of arisings from the construction site(s) and during operation. For example, the generation of large quantities of surplus materials and waste will lead to effects on the available waste management infrastructure (the receptor with regards to waste).

Significant environmental impacts and effects are likely to arise from those materials which are used in the largest quantities or are high in embodied carbon, wastes which arise in the largest quantities, which have hazardous properties or comprise a large proportion of the value of the project.

There is insufficient information available at this stage regarding the precise material requirements and waste quantities associated with the three route corridor options and hence a judgement cannot be made as to whether the potential effects are likely to be significant. Nevertheless, the information available indicates that the construction activities where the use of materials and the generation of waste is likely to be highest include:

- new sections of highway, particularly Corridors 2 and 3;
- new highway structures, particularly Corridors 2 and 3;
- widening of the existing A82 carriageway;
- areas where emergency refuge areas are required;
- areas of additional car parking such as the inclusion of lay-bys'; and
- areas where any new signage or lighting are proposed which would require excavation for the creation of foundations.

6.6.6 Proposed Level and Scope of Future Assessment

This scoping assessment has identified that the potential exists for environmental impacts and effects to occur from the use and consumption of materials and the production and management of waste. Based on the findings at the scoping level, it is recommended that the proposed scheme be assessed in the first instance at the simple level of assessment.

The assessment will primarily focus on the environmental impacts and effects arising from construction in the form of:

- embodied carbon emissions associated with the production of materials;
- carbon emissions from the transport of materials;
- the depletion of natural resources;
- the generation and management of waste on site;
- the potential impact on the available waste management infrastructure; and
- the alignment of the project proposals with the legislative and policy framework for sustainable development, resources and waste.

6.6.7 Proposed Methodology (including Significance) of Future Assessment

The purpose of the simple assessment is to assemble data and information that is readily available to come to a better understanding of the likely environmental effects of the proposed scheme. The outcomes will inform the final design or contribute to reaching an understanding of the likely environmental effects which identify the need for any further 'detailed assessment'.

The simple assessment is largely a desk-based exercise and for the purposes of the materials and waste topic it is mainly qualitative. It will aim to identify the following:

- baseline data for the project;
- information about construction methods and techniques;
- the materials required for the project and where information is available, the quantities;
- the anticipated waste arisings from the project, and where information is available, the quantities and type (e.g. inert, non-hazardous, hazardous);
- the alignment of the project proposals with the legislative and policy context;
- the results of any consultation (i.e. with the Scottish Environmental Protection Agency and Minerals Planning Authorities);
- the impacts / effects that will arise from the issues identified and whether these are likely to be significant; and
- a conclusion about whether this level of assessment is sufficient to understand the impacts / effects of the project or whether detailed assessment is necessary and the identification of any mitigation measures.

The method of assessment will ultimately depend on the stage the project / design has progressed to at the time of assessment. Where detailed information about the types and quantities of materials and waste is available, it is recommended that the simple assessment will be carried forward to the 'detailed level' of assessment. This is deemed appropriate given the availability of the Transport Scotland Carbon Management System (CMS) tools.

The assessment will be undertaken following the methodology outlined in the draft DMRB Volume 11, Section 3, Part 6 Materials guidance (HD212/11) for determining

the value and / or sensitivity of the identified receptors, the magnitude of impact and the significance of effect associated with the use and consumption of materials and the production and management of waste.

6.7 Noise and Vibration

6.7.1 Introduction

The study area for a noise assessment at scoping level is defined in the DMRB, Volume 11, Section 3, Part 7 "Noise and Vibration (HD213/11)". This considers a 1 kilometre buffer around the area of the physical works, and affected routes within this area to be identified. An affected route is where there is a possibility of a change of 1 dB(A) or more in the opening year, and 3 dB(A) or more in the future assessment year. An area of 600 metres is then defined around the area of the physical works and any affected route within this 1 kilometre buffer. Affected routes outside of the 1 kilometre buffer are also included in the study area, but the area considered is narrowed to a 50 metres corridor.

The study considers potential increased noise levels associated with the scheme. The key elements to consider for the noise scoping assessment are as follows:

- does the project alter the line or level of carriageway;
- will the project cause a change in traffic flow;
- will the project cause a change in traffic speed; and
- are there other changes to infrastructure that may cause a change in noise level.

At this stage of the project, details are often not sufficiently known to precisely follow the scoping methodology. Therefore assumptions and professional judgement are often required.

6.7.2 Policy and Legislation

The general policies and legislation relating to the proposed improvements have already been described in this scoping report.

For changes to a highway, the Noise Insulation (Scotland) Regulations (1975) (No.460 (S60)) may apply. Specific circumstances need to be present for the Regulations to apply, and where there is an 'additional carriageway' then the authority has a duty to carry out insulation work or to make grants. For an 'altered highway', the authority has the power to carry out insulation work or to make grants. The proposed route corridors would contain both 'additional carriageway' and also 'altered highway', so the Noise Insulation Regulations would be applicable.

Directive 2002/49/EC of the European Parliament and of the Council relating to the assessment and management of environmental noise, more commonly referred to as the EU Environmental Noise Directive (END), was published in June 2002. This Directive deals with noise from road, rail, and air traffic, and from industrial noise in agglomerations, and places certain obligations on member states. The three main objectives of the Directive are:

- to determine the noise exposure of the population through noise mapping;
- to make information available on environmental noise to the public; and

- to establish Action Plans, based on the mapping results, to reduce noise levels.

The Environmental Noise (Scotland) Regulations 2006 (No.465) implement the obligations of the Scottish Government.

The Transportation Noise Action Plan was first published in 2010 and then revised in December 2010. The purpose of the Transportation Noise Action Plan is to describe how the Scottish Government proposes to deliver their obligations under the Environmental Noise Directive in Scotland. The full text of the Action Plan can be found at http://www.scottishnoisemapping.org/. This site also provides a copy of the END and The Environmental Noise (Scotland) Regulations 2006.

In addition to the Transportation Noise Action Plan, a document 'Guidance for possible measures to manage noise from road and rail' has also been published. This guidance is predominantly for those organisations involved in implementing the Noise Action Plan, and provides possible mitigation measures in managing noise from road and rail.

6.7.3 Existing and Baseline Knowledge

The route of the A82 between Tarbet and Inverarnan is sparsely populated. There are a number of small villages with residential dwellings including Tarbet and Ardlui which are located close to the A82. In addition there are isolated dwellings along the route, together with properties associated with tourism and recreation including hotels, bed and breakfasts, campsites, restaurants and visitor centres. A large Holiday Park is found close to Inveruglas. There are approximately 100 properties within 600 metres of Corridor 1, 330 for Corridor 2 and 100 for Corridor 3. The majority of these properties are residential in nature.

Corridor 1 follows the general line of the existing A82. Corridor 2, which initially follows the route of the A83, passes close to the village of Arrochar which has residential dwellings as well as various hotels and local amenities. The route would then pass through an area containing very few sensitive receptors where the existing noise climate is likely to be low. Corridor 2 would then link back to the existing A82 around Inveruglas. Corridor 3 moves further away from Loch Lomond than the existing route for much of its length, and would move the road to locations where there are few sensitive receptors and the baseline noise level is likely to be low.

The West Highland Way long distance footpath runs along the eastern side of Loch Lomond opposite the A82. In addition, the National Park has identified adopted core paths through the park and there are a number of these located within 200 metres of the route corridors, particularly along the Route Corridor 2 between Inveruglas and Arrochar and around Arrochar and Tarbet.

There are a number of International and Nationally designated sites for nature conservation within 2 kilometres of the route corridors, the locations of these are shown on drawing 476416-3000-008 (Appendix A) and are detailed within Section 6.4 (Nature conservation) of this report. There are three Scheduled Monuments within 1 kilometre of the A82; these are shown on drawing 476416-3001-002 (Appendix A) and are detailed in Section 6.2 (Cultural heritage) of this report.

The dominant noise source in the area is the existing A82, together with the Glasgow to Fort William and Mallaig railway line that runs adjacent to the A82 for most of the route. There are few other noise sources in the area, although it is possible that local

noise sources may arise from small industrial facilities and also from the Sloy hydroelectric power station located close to Inveruglas.

Traffic data from counts undertaken in 2012 indicate a daily flow of approximately 3,500 vehicles. This level of traffic would produce a noise level of approximately 65 dB L_{A10} at 10 metres from the road.

A site visit by an acoustician has not been undertaken, and all information is based on applicable available mapping. At this stage of assessment a noise survey has not been undertaken.

The noise maps produced by Transport Scotland in response to the END do not cover this area due to the A82 having a yearly traffic level below that required for noise maps.

6.7.4 Value of the Environmental Resources and Receptors

HD213/11 provides a scale indicating various magnitudes of impact from changes in noise at sensitive receptors. These are provided for the short and long term, and are also used as 'threshold values' to determine an affected route. These 'threshold values' are a permanent change of 1 dB(A) or more in the short term, and 3 dB(A) or more for the long term. Values for changes in vibration that may cause an adverse impact are also provided within HD213/11.

No guidance is provided on the value of noise sensitive resources and therefore no overall significance of impact can be evaluated.

Sensitive receptors for a noise and vibration assessment are considered to include dwellings, hospitals, schools, community facilities, designated areas (including National Scenic Areas, SAC, SPA, SSSI, SM) and core paths.

6.7.5 Potential Effects

Construction activities have the potential to change the noise climate at sensitive receptors. Impacts from construction activities will be temporary in nature. Changes to the road layout and any resulting changes in traffic flow also have the potential to change the noise climate at sensitive receptors in all route corridors.

6.7.5.1 Corridor 1

Widening of the road will potentially move the edge of the road and the stream of traffic closer to nearby noise sensitive receptors.

6.7.5.2 Corridor 2

The construction impacts will be greater where new sections of road are constructed. Once operational the new section of road between Inveruglas and Arrochar will result in increased noise levels for the receptors, including residential properties, adjacent to the new road. The existing section of the A82 between Tarbet and Inveruglas will have much reduced traffic levels, creating a reduction in road noise levels to the receptors along this section.

6.7.5.3 Corridor 3

By moving the alignment of the road the potential impacts are higher, especially if the noise source is moved closer to the facade of sensitive receptors that are currently not directly exposed to the noise source. Corridor 3 will move the traffic further inland,

potentially moving road noise from the front of houses to the back. However it will mean that the noise levels around the Loch are reduced as the road is set further back from the water's edge, providing benefits to recreational visitors to the Loch.

6.7.6 Proposed Level and Scope of Future Assessment

To determine whether the assessment continues to the next stage, the scoping assessment should identify whether the threshold values within HD213/11 are likely to be met or exceeded for the study area. This can be determined by examining if any of the following conditions are likely to be met:

- the road project alters the alignment of any existing carriageways;
- changes in traffic volume on existing roads or new routes may cause either of the threshold values for noise to be exceeded;
- changes in traffic speed or proportion of heavy vehicles on the existing roads or new routes may cause a change in noise level of 1 dB(A) or more, either during construction, including temporary diversion routes, or when the road project is completed;
- changes in traffic volume and composition on existing roads or new routes during the night which may cause either of the threshold values to be exceeded; and
- any physical changes to the infrastructure surrounding the road or any change in the way in which the existing road is used that could cause a change in noise level of 1 dB(A) or more.

Traffic data showing the predictions for each corridor was not available at the time of writing and so some of the conditions could not be determined. However, with at least two of the corridors indicating that the alignment of the road will change, that is sufficient to require the assessment to proceed to the next stage of assessment.

6.7.7 Proposed Methodology (including Significance) of Future Assessment

To determine whether the assessment should proceed to Simple or Detailed, it is necessary to consider whether it is evident that the project will result in noise or vibration changes greater than the threshold levels. If it is clearly evident, then the assessment should continue directly to Detailed, otherwise a Simple Assessment should be undertaken.

In this situation, with two of the corridors likely to move the road to a different side of sensitive receptors, the noise level is likely to increase by more than 1dB. Therefore the project should proceed to a Detailed Assessment as described in HD213/11. The magnitude of impacts will be described using the guidance within HD213/11.

These conclusions will be re-confirmed once a detailed review of the traffic data has been undertaken early in Stage 2.

6.8 Effects on All Travellers

6.8.1 Introduction

This section presents an assessment of the Effects on All Travellers and forms part of the Stage 1 DMRB Assessment for the three potential route corridors being considered as part of the A82 Tarbet to Inverarnan upgrade scheme.

The methodology for the assessment of Effects on All Travellers is based on guidance within DMRB Volume 11 Section 3 Part 8 'Pedestrians, Cyclists, Equestrians and Community Effects' and Part 9 'Vehicle Travellers'. In accordance with the Interim Arrangements for the Reporting of Environmental Impact Assessments Interim Advice Note 125/09, these 2 sections now combine to form DMRB Volume 11, Section 3, Part 8 'Effects on All Travellers'.

This section describes the assessment undertaken to determine the potential effects of each route corridor on all travellers. For the purpose of this section all travellers refers to vehicle travellers and non-motorised users (NMUs). NMUs include pedestrians, equestrians and cyclists.

6.8.2 Policy and Legislation

6.8.2.1 National Policy and Legislation

The National Planning Framework 2 (NPF2) sets out the long term spatial strategy for Scotland's Development. It was published in June 2009.

The Scottish Outdoor Access Code is part of The Land Reform (Scotland) Act 2003, under which Local Authorities are also required to produce a Core Paths Plan which includes 'a system of paths sufficient for the purpose of giving the public reasonable access throughout their area'.

The Roads (Scotland) Act 1984 is a piece of primary legislation affecting roads in Scotland with regard to new road construction and extension to existing roads.

The National Parks (Scotland) Act 2000 aims to 'promote understanding and enjoyment (including enjoyment in the form of recreation) of the special qualities of the area by the public' and 'promote sustainable economic and social development of the area's communities'.

The National Transport Strategy 2006 maps out the long-term future for transport in Scotland with regard to key issues including improved journey times, connections, quality and accessibility.

The Transport Scotland Act 2005 requires Partnerships to prepare transport strategies for their regions. The Transport Strategy for the Highlands and Islands 2008-2021 outlines objectives to reduce journey times and improve journey reliability on the 'Western Strategic Corridor': the A82 corridor from Loch Lomond to Fort William.

6.8.2.2 Local Policy

The Argyll and Bute Structure Plan (Approved 2002) includes the following relevant policies: Strat SI 1 (Sustainable Development); Rec SI 2 (A82 Trunk Road Improvement); Prop Trans 1 (Development Control, Transport and Access); and Tour 1 (Tourism).

The Argyll and Bute Local Plan (Approved 2009) outlines the strategy to address public transport and community transport issues, walking and cycling provision, and prepare and implement a core path plan for Argyll and Bute. It also outlines strategic issues including 'encouraging the continued improvement of the A82 Trunk Road'.

Loch Lomond and the Trossachs Local Plan 2010-2015 provides a spatial framework for the development and use of land in the National Park. Chapter 3 of the Local Plan outlines the A82 as a key strategic transport route which runs through the National Park.

6.8.3 Existing and Baseline Knowledge

Baseline information relating to all travellers has been obtained from information gathered through site visits undertaken, review of Transport Scotland's video of the existing A82 road travelling both north and south, desk top survey work and consultation. For details of consultation undertaken to date, refer to Chapter 5.

The baseline data has been set out below, in relation to each of the three route corridors, firstly for NMU's and then for Vehicle Travellers.

6.8.3.1 Non Motorised Users

6.8.3.1.1 Corridor 1

The corridor follows the existing A82 from Tarbet to Inverarnan, following tightly the west edge of Loch Lomond through the LLTNP. The route is heavily wooded to the west between Tarbet and Inveruglas. Between Inveruglas and Inverarnan the route is wooded in places.

There are limited pedestrian facilities along the existing A82 route and associated side roads. The only lengths of footway along this route corridor are around Tarbet, Inveruglas and to the north towards Inverarnan at the north end of the corridor (see drawing 476416-3000-002 (Appendix A)).

The following Core Paths are identified as being partially located within Route Corridor 1:

- Beinn Chabhair from Inveranan;
- Ben Vane from Inveruglas;
- Ben Vorlich from Inveruglas;
- Tarbet Isle Loop; and
- Cruach Tairbeirt.

Pedestrian movements within this route corridor appear to be concerned mainly with the ad hoc movement of visitors and tourists staying at locations along the route, crossing over the A82 to access the loch side, or travelling between accommodation and tourist attractions such as ferry terminals. There is no cyclepath provision or route for equestrian usage - the road is considered unsafe for cycle and equestrian use.

Public transport provision in the route corridor is as follows:

- Tarbet to Inverarnan route currently has 9 bus services a day, Monday to Saturday (08:04 first, 19:07 last at Tarbet Hotel, up to 2-hour frequency); and
- existing bus stops have poor facilities – not properly marked, no hard standing, no footway connections.

Parking provision in the route corridor is as follows:

- formal parking: lay-by provision, areas of bypassed road, private visitor areas;
- informal parking: verges – currently poor standard, unsafe access, use of private access entrances, NPA concern at associated antisocial behaviour; and
- parking is associated with existing tourism and recreation along the route corridor. The majority of stops are an average of 15 minutes in duration.

Although the route travels through the National Park, and adjacent to Loch Lomond, amenity of the existing A82 is limited due to the nature of the surrounding topography, vegetation and alignment of the route itself. Steep wooded hills to the west of the route, and vegetation along the Loch side to the east of the route maintain contained views from Tarbet to Inveruglas, with little opportunity for appreciation of the designate landscape through which the route travels. Views are similarly limited from Inveruglas north towards Inverarnan, again due to topography and loch side vegetation, with only a few limited and very short sections where views across the loch can be appreciated.

6.8.3.1.2 Corridor 2

The corridor travels west from Tarbet towards Arrochar on the A83, then follows Glen Loin from Arrochar northeast towards Inveruglas, where it joins the route of Corridor 1.

There are limited pedestrian facilities within Corridor 2.

There is limited pedestrian count information for Corridor 2.

The following Core Paths are identified as being partially located within Corridor 2:

- Beinn Chabhair from Inveranan;
- Ben Vane from Inveruglas;
- Ben Vorlich from Inveruglas;
- Cruach Tairbeirt; and
- Threelock Ways Arrochar Tarbet to Inveruglas.

There are potential opportunities to gain intermittent panoramic views within Corridor 2 through gaps in existing vegetation.

6.8.3.1.3 Corridor 3

The corridor generally travels parallel and to the west of the existing A82 route and the West Highland Railway line.

There are limited pedestrian facilities within Corridor 3.

There is limited pedestrian count information for Corridor 3.

The following Core Paths are identified as being partially located within Corridor 3:

- Beinn Chabhair from Inveranan;
- Ben Vane from Inveruglas;
- Ben Vorlich from Inveruglas;
- Tarbet Isle Loop; and
- Cruach Tairbeirt.

There are potential opportunities to gain intermittent panoramic views from higher ground within Corridor 3 through gaps in existing vegetation.

6.8.3.2 Vehicle Travellers

6.8.3.2.1 Corridor 1

The road characteristics of the A82 are as follows:

- single carriageway road (generally less than 6 metres wide);
- general lack of hardstrips and formal 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 a mix of formal and informal areas;
- poor drainage (road surface is often wet);
- narrow road affects maintenance activities (need for closures);
- bounded to the east by Loch Lomond; and
- bounded to the west by mountains, rock outcrops and a railway line.

Traffic flow characteristics on the A82 are as follows:

- A82 has the lowest flow compared to alternative routes (A9 and A83);
- A82 vehicle flows have remained relatively stagnant, with only a 2.5% rise in 2012 over 2008 flows;
- 2-way 24hr AADT figure of approximately 3,500 vehicles (average) (higher in summer);
- northbound carriageway carries higher volumes of traffic than the southbound carriageway; and
- A82 has a similar flow profile to the A83.

The daily flow profiles of the A82 are as follows:

- broadly similar profile for both weekdays and weekends;
- weekday peak periods are typically 11:00 – 12:00 and 16:00 – 17:00;

- higher flows (an increase of over 50%) occur at weekends, especially Saturdays.

The seasonal flow profiles of the A82 are as follows:

- both sets of flows (weekdays & weekends) peak in August;
- northbound flows are slightly higher than the southbound flows; and
- both sets of winter flows are less than half of the summer month flows.

Existing journey time information[18] for the A82 between Tarbet and Inverarnan is as follows:

- average journey time is 19.5 minutes;
- average speed is 27mph;
- average speed for large vehicles is variable; and
- journey time on Saturdays is the longest.

Vehicle composition information (collected August 2013) for the A82 is as follows:

- lower levels of articulated HGVs on the A82 than the A83 but higher levels of LGVs and rigid HGVs;
- cars account for 83% of the vehicle composition.

Road safety information for the A82 is as follows:

- number of injury accidents during the past 5 year (2008 – 2012) has been fairly consistent;
- total of 53 injury accidents (3 fatal, 16 serious and 34 minor);
- killed or serious injury (KSI) accident rates are over 4 times the national average;
- accidents are generally spread along the route, with a few clusters of accidents (eg. sharp bends in the vicinity of the Inveruglas Holiday Centre, Pulpit Rock); and
- number of injury accidents for the period 2004 – 2009 was 57.

6.8.3.2.2 Corridor 2

This corridor initially follows the A83 from Tarbet to Arrochar, but the alignment is then off-line between Glen Loin from Arrochar heading northeast towards Inveruglas. This off line section does not accommodate any existing formal vehicular routes or tracks therefore the baseline assessment for vehicle travellers is only applicable to the small section of the existing A83 and then the A82 from Inveruglas

[18] Obtained from ANPR analysis at this stage.

to Inveranan as described previously in Corridor 1. Typically vehicle traveller considerations along the A83 include the following:

- road safety and change in vehicle speeds;
- drivers frustration due to lack of overtaking, platooning and congestion during busy periods; and
- potential uncertainty at new junctions between A83 and A82 proposed route of Corridor 2.

6.8.3.2.3 Corridor 3

This corridor does not accommodate any existing formal vehicular routes or tracks therefore the baseline assessment for vehicle travellers is only applicable to the small section of the existing A82 at Tarbet and then north of Arlui as described previously in Corridor 1.

6.8.3.3 Driver Stress

6.8.3.3.1 Corridor 1

Drivers experience significant levels of driver stress along parts of the current route of the A82, primarily due to the narrow carriageway and poor visibility due to bends in the road, particularly around Pulpit Rock. Drivers also experience a temporary signal controlled junction around current works associated with Pulpit Rock improvements. This can lead to traffic build-up at this section of the road corridor. Parts of the corridor have no road markings, and oncoming vehicles may also increase driver stress. Slow moving vehicles are common on the current A82 and few safe overtaking opportunities exist, which can result in the build-up of traffic behind Heavy Goods Vehicles (HGVs) and farm vehicles. Driver stress is reduced in straighter sections of road where visibility is improved, and the road corridor widens (particularly around Stuckendroin).

6.8.3.3.2 Corridor 2

Driver stress along the A83 from Tarbet to Arrochar is associated with overtaking, platooning and congestion during peak times. Driver stress along the offline section of the route cannot be monitored as there is no existing road corridor present. Driver stress along the online section of the A82 is as described in Corridor 1.

6.8.3.3.3 Corridor 3

This corridor does not accommodate any existing formal vehicular routes or tracks therefore the baseline assessment for driver stress is only applicable to the small section of the existing A82 at Tarbet and then north of Arlui as described previously in Corridor 1.

6.8.4 Value of the Environmental Resources and Receptors

The proposed route corridors are all located within the National Park and National Scenic Area (Corridor 2 is only partially located within the National Scenic Area). Corridor 2 is also located within a Special Area of Conservation. The following resources and receptors are to be considered in any further assessment as defined within DMRB Vol 11.

Vehicle travellers:

- protected views / viewing points along existing route;
- driver stress along existing route;
- potential viewing points along suggested route corridors;
- locations of relevant honey pot sites (popular locations for visitors), access to these from the A82 and control of recreational use along the existing route;
- potential locations of relevant honey pot sites, access to these from any proposed routes and control of recreational use along proposed routes if appropriate; and
- existing bus routes and tourist routes taking into account visitors around the study area travelling by vehicle.

Non-motorised users:

- locations of all relevant recreational routes (relevant to further assessment);
- National Trails, Long Distance Routes, Core Paths and other rights of way as agreed with the National Park Authority during consultation;
- relevant groups such as ramblers, equestrians, road cyclists and mountain bike groups;
- relevant community facilities (including schools, churches, marina);
- users groups and counts for the use of the recreational route network within the study corridors (as received from the National Park Authority). Including Loch Ferries / Railway;
- any specific vulnerable groups which are currently users of the National Park and associated recreational routes within the study corridors;
- any data or knowledge of local travel patterns for NMUs;
- any desire lines or additional routes for NMUs which are not currently formally provided for; and
- Community Action Plans is to be considered.

6.8.5 Potential Effects

6.8.5.1 Corridor 1

6.8.5.1.1 Vehicular Travellers

The construction phase of the scheme has the potential to have a temporary effect on vehicular travellers, with potential impact on views, journey times and driver stress associated with construction works. During the operation phase potential effects are likely to be offset where possible by proposed mitigation measures. There is an opportunity to improve the A82 route for vehicular travellers through sensitive road alignment and environmental design. There is potential to provide positive effects and enhance the existing road, with potential enhancement of views of the landscape along the route. There is also potential for improvement to existing lay-bys to create more scenic places for tourists to stop. There is also the potential for driver stress to be reduced through proposed design and environmental mitigation.

At this stage there is limited information available to provide a quantitative assessment of driver stress.

6.8.5.1.2 NMUs

The construction phase of the scheme has the potential to have a temporary effect on NMUs due to interruption and severance of routes with associated effects on journey times, recreational routes and routes to community facilities. There is an opportunity to improve experience for NMUs through sensitive road alignment and environmental design. There is potential to provide positive effects, allow for improved views of the landscape, improve routes and creating scenic routes.

6.8.5.2 Corridor 2

6.8.5.2.1 Vehicular Travellers

There is the potential opportunity to improve the vehicle travellers experience as any new road will be designed to current guidance. Opportunities exist for improved views and reduced driver stress through sensitive design and mitigation.

6.8.5.2.2 NMUs

The construction phase of the scheme has the potential to have a temporary effect on NMUs due to interruption and severance of routes with associated effects on journey times, recreational routes and routes to community facilities. There is an opportunity to improve experience for NMUs through sensitive road alignment and environmental design. There is potential to provide positive effects, allow for improved views of the landscape, improve routes and creating scenic routes.

6.8.5.3 Corridor 3

6.8.5.3.1 Vehicular Travellers

There is the potential opportunity to improve the vehicle travellers experience as any new road will be designed to current guidance. Opportunities exist for panoramic views due to the elevated route. Opportunities to reduce driver stress through sensitive design and mitigation.

6.8.5.3.2 NMUs

The construction phase of the scheme has the potential to have a temporary effect on NMUs due to interruption and severance of routes with associated effects on journey times, recreational routes and routes to community facilities. There is an opportunity to improve experience for NMUs through sensitive road alignment and environmental design. There is potential to provide positive effects, allow for improved views of the landscape, improve routes and creating scenic routes.

6.8.5.4 Potential Mitigation Measures

6.8.5.4.1 Vehicular Travellers

Drivers stress can be managed through advanced signage and appropriate traffic management and diversion routes through the construction phase of the project. Phasing of construction works and considering the requirement for limited road closures can also be helpful in minimising any disruption to vehicle travellers and should be established early on in the route design and assessment process. Mitigation regarding the view from the road has been identified and summarised within the Landscape section.

6.8.5.4.2 NMUs

Potential mitigation measures would be subject to further stakeholder consultation, more detailed survey analysis data and would need to take into account recommendations set out in the Landscape, Noise, Air quality and Community and private assets sections.

6.8.6 Proposed Level and Scope of Future Assessment

A Stage 2 (simple) DMRB assessment will be required and will be undertaken based on the following:

- determination of the route within the preferred route corridor – further detailed assessment required;
- site visit based on the selected route;
- determination of factors and effects relevant to the study area concerning vehicle travellers which are to be considered when refining the preferred route;
- views from the road assessed utilising landscape assessment techniques (key views, theoretical ZVI, visual character and sensitive views);
- driver stress for preferred route;
- community facilities and recreational routes.

Pedestrian counts information will be required, including information on any local travel patterns or any local movements to and from community facilities. Further information on cyclist and equestrian movements will also be required.

6.8.7 Proposed Methodology (including Significance) of Future Assessment

Future assessment will be undertaken using the relevant sections of guidelines set out within Volume 11, Section 3, Part 8 Pedestrians, Cyclists and Equestrians and Community Effects (for Non Motorised Users) and Part 9 Vehicle Travellers (for motorised users) of the DMRB (1993 and Revisions May 2003) and Interim Arrangements for the Reporting of Environmental Impact Assessments Interim Advice Note 125/09.

6.9 Community and Private Assets

6.9.1 Introduction

This chapter considers the potential environmental effects of the proposed scheme on Land Uses such as community and private assets and has been prepared in accordance with DMRB Volume 11, Section 3, Part 6: Land Use and Part 8: Community Effects.

Section 3, Part 6 of the DMRB states that there are five main areas which need to be considered in any assessment of effects on land-use, namely:

- demolition of private property and the associated land-take;
- loss of land used by the community;
- effects on development land; and

- effects on agricultural land.

The study area for community and private assets includes the areas of land directly required for the proposed scheme including additional land required for construction works.

Volume 11, Section 3, Part 8 of DMRB defines how to assess community severance as a result of the scheme which will be considered as part of the impact assessment.

6.9.2 Policy and legislation

6.9.2.1 National policy and legislation

Town and Country Planning Scotland Act 1997 sets the planning context for new development and redevelopment of existing properties/ facilities. It includes the safeguarding of National Scenic Areas and the designation of Tree Preservation Orders.

The National Planning Framework 2 (NPF2) 2009 provides guidance on Scotland's spatial development to 2030, setting out strategic development priorities to support sustainable economic growth. NPF2 takes forward the spatial aspects of the Scottish Government's policy commitments on sustainable economic growth and climate change, which will see Scotland move towards a low carbon economy. It focuses strongly on priorities for the improvement of infrastructure to support Scotland's long-term development. For transport infrastructure, it supports the strategic outcomes set out in the National Transport Strategy and draws on the work being undertaken on the Strategic Transport Projects Review. It identifies strategic priorities for investment in energy infrastructure, water and drainage capacity and waste management facilities.

National Transport Strategy 2006 sets out the overall aims in Scotland, including improving journey times and connections, reducing emissions, and improving the quality, accessibility and affordability of public transport. It also states a commitment to introducing a carbon balance sheet.

National Parks (Scotland) Act 2000 requires the conservation and enhancement of the natural and cultural heritage of National Parks, the promotion of sustainable use of the natural resources, the understanding and enjoyment of the area, and the sustainable economic and social development of the area's communities.

The Transport Strategy for the Highlands and Islands 2008-2021 overarching policy is to develop a fit for purpose, multi-modal transport system. It comprises a package of policies and measures under a number of horizontal themes which apply across the region, and a package of priorities for investment to improve the transport network, across all modes.

6.9.2.2 Local policy

Argyll and Bute Structure Plan (Approved 2002) provides a long term vision for the strategic development of the Council Area to meet the economic social and environmental requirements of the area. The need to improve the A82 trunk road is identified as a key strategic issue (strategic issue 6) which requires priority consideration.

Argyll and Bute Local Plan (Approved 2009) follows the Structure plan and sets the strategy and land use framework for the development of land and protection of the

environment in the Council Area excluding the Loch Lomond and Trossachs National Park area. The Local Plan 'encourages the continued improvement of the A82 Trunk Road'.

Loch Lomond and the Trossachs Local Plan 2010-2015 provides a spatial framework for the development and use of land in the National Park. It is set in the context of achieving the National Park's four statutory aims and delivering the outcomes identified in the National Park Plan 2007-2012 that have a land-use planning component. The Local Plan recognises the A82 as a crucial link between central Scotland and the highlands and islands. The Plan stipulates that the National Park Authority will work closely with Transport Scotland to ensure that the route can be upgraded sensitively and appropriately in a manner benefitting the surrounding landscape/habitat.

6.9.3 Existing and baseline knowledge

The land use within the route corridors is dominated by areas of woodland, pasture and rocky outcrops, with Loch Lomond to the east of the A82, which a number of watercourses feed into from the surrounding hills. The area is sparsely populated, with a few small villages and hamlets scattered throughout.

6.9.3.1 Residential, commercial and community property

The route corridors cover a number of villages and hamlets, particularly those situated adjacent to the existing A82 carriageway. This includes Tarbet, Arrochar, Succoth, Inveruglas and Ardlui. There are also individual and groups of properties located throughout the route corridors.

Commercial properties are also scattered throughout the route corridors and are mainly associated with recreation and tourism, including hotels, shops, cafes, holiday parks and ferry crossings. Arrochar has four hotels, self-catering and bed and breakfasts for tourists and local amenities include post office, newsagent, grocers, a pottery and art gallery as well as places to eat such as a café, The Village Inn and Ben Arthurs Bothey. Tarbet also has a number of hotels and Bed and Breakfasts, as well as a tea room and seasonal Tourist Information centre. Tarbet and Ardlui also have stations for the West Highland Railway. Loch Lomond Holiday Park is located just south of Inveruglas off the A82 in addition Inveruglas Visitor Centre is nearby, situated between the A82 and Loch Lomond. Ardvorlich has a Bed and Breakfast and Ardlui has a hotel. The Drovers Inn is located in the north of the scheme near Inverarnan and attracts many visitors including ghost hunters. Sloy Hydroelectric Power Station is located adjacent to the A82 near to Inveruglas.

The community properties are focused within the villages of Arrochar, Tarbet and Succoth in the south of the route corridors. Arrochar Primary School is located in Tarbet and a Church is situated in Arrochar. The Three Villages Hall is located in Arrochar on the A814 Helensburgh/Garelochhead road, just west of the A83. This facility is used by residents of Arrochar, Tarbet and Succoth and the wider community. It is used by many local clubs and offers numerous social meetings, including weddings, and it has a gym and cinema facilities.

6.9.3.2 Land used by the community

Areas of land used by the community and open spaces are mainly located within the villages within the route corridors, particularly Tarbet, Arrochar and Succoth in the

south of the scheme. This area has recreational fields located in Succoth and a number of other areas of open space, including playing fields situated in Tarbet off the A82. The route corridors are located within the LLTNP and a National Scenic Area which is well used for recreational purposes by the local community and tourists. The recreational activities nearby include climbing, walking, biking, diving in underwater caves at Loch Long and other water based pursuits. A ferry is available from Tarbet to other destinations on Loch Lomond including Inversnaid.

6.9.3.3 Development Land

The Loch Lomond and Trossachs Local Plan (2010 – 2015) designates a number of small scale proposals for Arrochar and Tarbet, these include a small housing development at Cobbler's Rest in Arrochar as well as proposed improvements in marine access to the Loch and developments for commercial and light industrial use, tourism and community use. This includes the redevelopment of the former torpedo range site in Arrochar to support a variety of water based recreational activities and associated facilities.

A review of submitted planning applications on the Loch Lomond and Trossachs planning portal has identified a number of small scale residential extensions in Succoth, Arrochar, Tarbet and Ardlui. An application for a mobile concrete batching plant has been submitted located on land north of Succoth.

6.9.3.4 Agricultural Land

A review of Macaulay Land Use Research Institute (MLURI) definitions of agricultural land in Scotland indicates that the land within and surrounding the route corridors is marginally suitable for agriculture, capable of supporting rough grazing[19].

Areas of agricultural land occur within the route corridors where the terrain is flatter and is currently pasture. Stuckendroin Farm is located within 200 metres of the A82 just south of Ardlui. Areas adjacent to the A82 that are likely to be used for agricultural grazing include the land surrounding Ardvorlich, Inveruglas and Stuckendroin. Route corridors 2 and 3 cover areas of agricultural land adjacent to the A83 road between Arrochar and Tarbet and to the north of Succoth.

6.9.3.5 Loch and Loch Foreshore

The A82 is bounded in the east by Loch Lomond and River Falloch in the north between Ardlui and Inverarnan. The foreshore is dominated by individual trees and woodland, with some open areas of scrub and rough pasture.

---

[19] http://www.macaulay.ac.uk/policyrelevance/landusestrategy/LandCapabilityAgriculture_300dpi.pdf accessed 25.10.2013

6.9.3.6 Woodland and Forests

A large dense area of mixed woodland is located to the west of the A82 from Inveruglas south to Tarbet and Arrochar. There are areas of woodland and trees located throughout the route corridors.

6.9.4 Value of the Environmental Resources and Receptors

The assessment of impacts to existing land uses has been undertaken in accordance with the DMRB Guidance. The land uses of the study area have been assessed and a resource value afforded to them based upon the criteria set out in Table 6.9 below. As per the DMRB Guidance (Volume 11, Section 3, Part 6) the assessment has considered the quality of agricultural land, the presence of forestry, private properties, community land and proposed development land.

Table 6.9 - Land use receptor valuation

Resource value	Criteria
High	Residential properties, Community Facilities of importance, forestry of national or recreational importance, development land of national importance, Prime Quality Agricultural Land (Classes 1, 2 and 3:1).
Medium	Regionally and locally important community, forestry or development land. Agricultural land classified by the Macaulay Institute as being of Grades 3:2 to 5:3.
Low	Forestry, Community or development land of little to no importance. Unclassified agricultural land, or classified by the Macaulay Institute as being of Grades 6:1 to 7.

The value of the receptors identified in the baseline section (6.9.3) has been defined in Table 6.10 below.

Table 6.10: Value of the receptors identified in Section 6.9.3

Receptor	Value
Residential and commercial properties	High
Community properties	High
Land used by community	Medium
Development land	Low
Agricultural land	Low
Loch and Loch foreshore	Medium
Woodlands and Forests	High

6.9.5 Potential effects

6.9.5.1 Construction phase

The construction phase of the scheme has the potential to impact on residential, commercial and community property within and adjacent to all route corridors. Indirect impacts during the construction phase could include disruption to local businesses and changes in access to community land.

6.9.5.1.1 Corridor 1

Loch Lomond and the River Falloch could be indirectly impacted during construction due to the risk of pollution incidents and disruption in access to the water for commercial and recreational purposes.

Small areas of woodland could be impacted and agricultural land may be lost where localised widening is required. Access to agricultural land maybe disrupted during the construction period and construction activities have the risk of pollution incidents and potential to cause changes in land drainage.

6.9.5.1.2 Corridor 2

Construction could have an indirect impact on areas of land identified for development, such as the mobile concrete batching plant at Arrochar, mainly focused within existing settlements, and is likely to have the highest impact where it passes through Succoth, Arrochar and Tarbet. As with Corridor 1, impacts to the Loch are likely in the northern section of this Corridor.

Areas of woodland could be directly impacted by the need for vegetation clearance within working areas to enable upgrade activities, particularly between Inveruglas and Arrochar.

6.9.5.1.3 Corridor 3

This Corridor is likely to have the highest impact on Sloy Hydroelectric Power Plant as it is located directly within the land used for the plant. It is located further inland from the existing A82, therefore it will have a higher impact on areas of woodland and any agricultural land.

6.9.5.2 Operational Phase

Road widening and construction of new sections of carriageway is likely to include permanent land take from agricultural land to different extents within all route corridors. Consultation with affected land owners will be completed during the next phase of assessment, which will provide a detailed understanding of the current and future use and value of the agricultural land and identify appropriate mitigation measures.

Loch Lomond and the River Falloch are not likely to be impacted during the operational phase.

6.9.5.2.1 Corridor 1

There could be localised loss of community, commercial, woodland and agricultural land where widening is required.

6.9.5.2.2 Corridor 2

Community severance could occur, particularly adjacent to the new section of road between Inveruglas and Arrochar. This would include the residential areas within Succoth, Glen Loinn Crescent, The Chalets and the properties adjacent to the A83 where they may be a change in road traffic as a result. The new section of road may also alter the access to Succoth Playing Fields.

This Corridor will also result in the permanent loss of woodland between Inveruglas and Arrochar.

6.9.5.2.3 Corridor 3

Corridor 3 will result in permanent loss of woodland areas and agricultural land as it is situated to the west of the existing A82. The location of this corridor may alter access to the LLTNP area to the west of Loch Lomond.

6.9.6 Proposed Level and Scope of Future Assessment

The level and scope of assessment required for community and private assets will depend on the final route corridor selected, as each have varying degrees of potential impact on the surrounding land. However all aspects covered within this chapter will require assessment to Stage 3 detailed within DMRB Volume 11, Section 3, Part 6: Land Use and Part 8: Community Effects. The assessment into the impacts to agricultural land will be completed to at least Stage 2, and any further assessment will depend on the final route selected.

The impacts during construction and operation on residential, commercial and community property will be considered. This may include long term beneficial impacts as the upgrade scheme would increase road capacity benefiting the local community and businesses. Any severance that will result from the upgrade scheme, particularly where new sections of road are proposed will be identified. Impacts on land used by the community and development land will also be assessed, however impacts to access routes, including Loch Lomond and the River Falloch, will be considered within the 'Effects on All Travellers' assessment.

Where agricultural land is affected the assessment will identify both temporary and permanent impacts of the proposed scheme on a number of factors including; soils, current and future practices and access, field drainage and water supplies. Consultation with farmers will take place and the findings used to identify opportunities for mitigation within scheme design.

Impacts on the areas of woodland within the route corridor will be assessed through consultation with Forestry Commission Scotland to ensure the commercial and community value of any woodland is understood and that appropriate mitigation is developed.

6.9.7 Proposed Methodology (including Significance) of Future Assessment

The assessment will follow the relevant methodology outlined in DMRB Volume 11, Section 3, Part 6: Land Use and Part 8: Community Effects. The assessment will involve detailed desk studies and field visits. Consultation will be a key part of the assessment and will include liaison with landowners, the community and local interest groups, as well as key stakeholders such as the LLTNP Authority.

6.10 Road Drainage and the Water Environment

6.10.1 Introduction

Uncontrolled runoff from roads can cause serious degradation of the ecological and hydrological status of the receiving water environment, i.e. water quality deterioration and loss of wildlife habitat. Equally, engineering activities, such as watercourse diversions and crossings can have an adverse impact on the water environment, from a water quality and flooding perspective if appropriate mitigation measures are not employed.

This section presents background information on existing hydrological conditions in the study area, considers potential impacts of the alternative road corridors on the water environment and identifies requirements for mitigation measures. For the purpose of this report the study area is the immediate environs of the corridor extents.

Consideration has been given to the following aspects:

- importance and sensitivity of the surface water and groundwater environment;
- scheme construction and operation related pollution;
- flood risk; and
- changes to fluvial morphology, water quality and quantity.

The route corridor locations are shown on drawing 476416-0000-016 (Appendix A).

Potential impacts of the alternative corridors on the water environment have been considered in accordance with the DMRB, Volume 11: Environmental Assessment, Section 3: Environmental Assessment Techniques, HD45/09: Road Drainage and the Water Environment.

6.10.2 Policy and Legislation

6.10.2.1 Legislation

Legislation is already in place to protect and improve Scotland's water environment.

The Water Environment and Water Services (Scotland) Act 2003 (WEWS) implements the EU Water Framework and Groundwater Directives and aims to improve the general status of surface water and groundwater bodies.

Responding to Water Framework Directive recommendations, the Scottish Ministers published 'The River Basin Management Plan (RBMP) for the Scotland River Basin District 2009-2015'. RBMP records surface water and groundwater quality and sets out an action plan to improve polluted water bodies and to protect those presently in a good condition.

The Flood Risk Management (Scotland) Act 2009 (FRMA) implements the EU Floods Directive. FRMA encourages SEPA and local authorities to adopt a coordinated approach to the assessment and management of flood risk at a national and local level. The Act promotes a sustainable approach to flood risk management and aims to reduce the adverse consequences of flooding on communities, the environment, cultural heritage and economic activity.

6.10.2.2 Regulation

SEPA has primary responsibility for protecting the water environment in Scotland where the 'water environment' comprises all natural waters, either above or below ground. Control of potentially harmful activities is achieved by SEPA through the Water Environment (Controlled Activities) (Scotland) Regulations (CAR). SEPA's 'risk-based' approach to CAR is reflected in the varying levels of authorisation, from General Binding Rules for low risk activities to a Complex Licence for high risk activities.

FRMA requires SEPA and local authorities to manage flood risk proactively at national and local level giving due consideration of social, environmental and economic impacts.

Local authorities are also required to consider potential flooding impacts and minimise flood risk by implementing appropriate planning and development control measures.

6.10.2.3 Planning Context

LLTNP has a statutory duty as Planning Authority to prepare local development plans and control development and use of land including policies for the protection and enhancement of the natural and built environment in the National Park.

Sustainable flood management objectives are set out in Policies ENV 16 and ENV 17 of the 'Loch Lomond and Trossachs National Park Adopted Local Plan 2010-2015'.

The LLTNP Authority may consult with the relevant flooding authority (in this case the Argyll and Bute Council) in relation to flooding issues pertinent to any proposed development.

A joint SEPA and the Scottish Government publication entitled 'Flood Risk Management Planning in Scotland: Arrangements for 2012 -2016' explains the planned integrated approach to flood risk management in Scotland including the involvement of local partnerships and advisory groups.

6.10.3 Existing and Baseline Knowledge

6.10.3.1 Existing Site Description

The section of the A82 under consideration is bounded by extensive woodland, steep rock outcrop and rough pasture to the west and Loch Lomond, River Falloch floodplain and rough pasture to the east.

The A82 lies within the catchment of Loch Lomond. The northern part of the catchment is of 'highland' nature with high energy watercourses draining surrounding hills.

The average annual rainfall varies between 2500 and 3600 millimetres. The higher rainfall in the north together with thinner layer of soils and steeper slopes generates substantial runoff into Loch Lomond.

6.10.3.2 Data Collection

The existing water environment conditions have been derived through desk study of previous environmental studies in the area and Envirocheck Reports dated October

2013 as well as site visits. Additionally, OS mapping and published environmental information have been reviewed. Relevant data have also been requested from third parties, including SEPA, LLTNP, Scottish Natural Heritage (SNH), Argyll & Bute Council, Stirling Council, and West Dunbartonshire Council, and Scottish Water.

6.10.3.3 Hydrology

6.10.3.3.1 Corridor 1

Corridor 1 follows a line of the existing A82 between Tarbet and north of Inverarnan and extends for approximately 17 kilometres from south to north. Designated as a National Scenic Area, the area falls within the catchment of Loch Lomond and is drained by an extensive network of minor watercourses. The watercourses drain the western hillsides in defined channels with culverts under the existing A82 trunk road. The SEPA indicative flood map shows that Corridor 1 overlies the floodplain of Loch Lomond and its tributaries.

The notable water features within the study area are described below.

Loch Lomond

Loch Lomond covers an area of approximately 71 cubic kilometres. It is the largest UK inland freshwater body by surface area and is classified as a large raised reservoir under the Reservoirs Act 1975. Loch Lomond lies within the catchment of the River Leven. The northern section of the loch is narrower and deeper whereas the southern section is wider and shallower. The loch is fed by the River Falloch to the north, the Endrick Water to the east and numerous small watercourses along its course.

Loch Lomond discharges to the River Leven to the south. The normal operating water level is maintained between 7.8 metresAOD and 9.0 metres AOD by a barrage positioned across the River Leven. The barrage ensures that the water level in the loch remains high enough to facilitate Scottish Water abstractions for drinking water. The highest water level recorded at the southern end of the loch at the Ross Priory gauge station since 1947 is 10.413 metres AOD.

The predicted 1 in 200yr and 1 in 200yr plus climate change flood water levels in Loch Lomond are 10.720 metres AOD and 11.340 metres AOD respectively. The flood water levels have been derived from the Scottish Water Asset Flood Resilience Report (ref. 401191-0000-20-GEN-0128) prepared independently for the Auchendennan Pumping Station.

The RBMP classified Loch Lomond (North) as overall 'poor' status in 2008 with a target to achieve 'good' status in 2027.

River Falloch

River Falloch is one of the main tributaries of the Loch Lomond. The River Falloch is a mid-altitude siliceous watercourse with a catchment area of approximately 108 cubic kilometres. The catchment is essentially rural and mountainous with numerous small scale lochans present as headwaters.

At Glen Falloch gauge station, some 1 kilometre north of the Inverarnan, the highest water level recorded since 1978 is 12.388 metres AOD. According to the SEPA indicative flood map, the northern end of Corridor 1 overlies the River Falloch functional floodplain.

The RBMP classified the River Falloch (downstream of Dubh Eas) as having an overall status of 'good ecological potential' by 2008 (heavy modified).

Inveruglas Water

Inveruglas Water is one of the largest tributaries of Loch Lomond. The Inveruglas Water has a catchment area of approximately 33 cubic kilometres. The catchment is essentially rural and includes Loch Sloy and a number of small lochans. The watercourse is heavily modified by the Loch Sloy dam and the associated hydro power generating scheme. The RBMP classification for the Inveruglas Water was 'bad ecological potential' in 2008 (heavy modified) with a target to achieve 'good' status by 2027.

Allt Ardvorlich

Allt Ardvorlich is a minor tributary of the Loch Lomond with approximate catchment area of 3.4 cubic kilometres. The watercourse drains the western rock outcrop and agricultural land via culvert under the A82.

Strath Dubh-uisge

Strath Dubh-uisge is a tributary of the River Falloch with approximate catchment area of 6.5 cubic kilometres. A small lochan is located in the upper extent of the catchment. The watercourse drains the western rock outcrop and woodland area via culvert under the A82

Allt Arnan

Allt Arnan is a tributary of the River Falloch with an approximate catchment area of 8 cubic kilometres. A number of minor lochans are present in the upper extents of the catchment. The watercourse originates in the hills and drains woodland area via a culvert under the A82.

Ben Glas Burn

Ben Glas Burn is a tributary of the River Falloch at Inverarnan with an approximate catchment area of 7 cubic kilometres. It is a high energy watercourse draining mainly hillsides to the east of the River Falloch.

Geal Loch and Dubh Lochan

According to SNH, Geal Loch and Dubh Lochan are 'oligotrophic' and groundwater dependant loch features. They are located to the north of Loch Lomond in an extensive area of saturated marshland or 'mire'.

Other surface water features

There are numerous smaller unnamed watercourses present in the study area. The watercourses are steep and fast flowing and drain the western rock face and wooded areas towards Loch Lomond. Marshland areas exist within the River Falloch floodplain.

Groundwater

Groundwater in the area surrounding Loch Lomond is classified as 'good' status.

The rock within the study area is mostly of low permeability and contains only small volumes of water, mainly within fractures. It is considered as an aquifer of poor productivity.

6.10.3.3.2 Corridor 2

Corridor 2 starts in Tarbet and follows the existing A83 to Arrochar. At the northern shore of Long Long it turns in a north easterly direction and follows the Loin Water valley before crossing the Inveruglas Water and joining Corridor 1 along the existing A82 to the north of Inveruglas. It follows the line of the existing A82 between Inveruglas and Inverarnan as per Corridor 1.

The southern part of Corridor 2 to the west of Cruach Tairbeirt is located within a Special Conservation Area (SAC) / Site of Special Scientific Interest (SSSI) and falls within the catchment of Loch Long. The most northern part of the route is located within a National Scenic Area.

The southern section of Corridor 2 overlies the Loin Water floodplain and could be at risk of flooding from Loch Long. The northern section of the route is located near the floodplain of Loch Lomond and its tributaries.

The main water features in the study area are described below.

Loch Long

Loch Long is a sea loch extending from the Firth of Clyde and forming the entire coastline of the Rosneath Peninsula. Loch Long is located outside the boundary of the LLTNP but is commonly used for diving and military training. It was RBMP classified as overall 'good' status in 2008.

The SEPA / Environment Agency Coastal Flood Boundary Conditions dataset gives predicted extreme sea levels for various locations along the coastline of Scotland and advises on estuary boundaries beyond which the data is considered unreliable. However the dataset does not extend into sea lochs. The nearest point for which data is available is Cloch Point in Inverclyde. The predicted 1 in 200yr still water level at that location is 3.69 metresAOD. The extreme water level in Loch Long is likely to be higher due to common increase in tide level with distance up the estuary and wave action.

Allt Sugach

Allt Sugach is a tributary of the Loin Water at Arrochar with an approximate catchment area of 3 cubic kilometres. It is a high energy watercourse draining mainly hillsides and wooded areas to the west of the Loin Water.

Loin Water

Loin Water is a tributary of Loch Long with approximate catchment area of 10 cubic kilometres. The Loin Water is a mid-altitude siliceous watercourse draining local hills to the west and Kenmore Wood to the east. The RBMP classified the Loin Water as overall 'good' status in 2008.

Groundwater

Groundwater in the area around Loch Long is classified in the RBMP as having 'good' status. The Loin Water valley is underlain by minor and moderately permeable aquifers characterised in fractured rock having low permeability.

The remaining part of Corridor 2 falls within the Loch Lomond catchment and the water features present in that area are as described for Corridor 1 above.

6.10.3.3.3 Corridor 3

Corridor 3 starts at A83 between Tarbet and Arrochar. It runs north in parallel with the existing A82 on the western side of the railway track before crossing the railway south of Inverarnan and joining the line of the existing A82 north of Inverarnan.

Corridor 3 lies within the catchment of Loch Lomond. The most northern part of the route is located within a Special Protection Area (SPA) / SSSI and nearly the whole extent within the National Scenic Area.

The water features located in the area of Corridor 3 are substantially as described for Corridor 1.

6.10.3.4 Existing Road Drainage and Watercourse Crossings

Existing road drainage along the existing A82 between Tarbet and Inverarnan is limited in extent and variable in condition and performance. A survey of the existing A82 drainage and the numerous watercourse crossings was undertaken in 2012 and the findings are included in the 'Engineering and Environmental Surveys' report.

All watercourses originating to the west of the existing A82 are either culverted under the road or pass under bridges prior to discharge to Loch Lomond or the River Falloch. The survey identified 142 culverts and 8 bridges of various sizes and conditions between Tarbet and Inverarnan.

Many of the culverts were found to be either blocked or partly submerged. At several locations the culverts were significantly obstructed by vegetation affecting the hydraulic regime in the watercourse. In general, the culverts do not provide for wildlife passage in line with current practice.

Anecdotal information suggests that natural catchments of some watercourses have been altered by the installation of railway drainage to the west of the existing A82. The extent of the alterations and implications for the A82 upgrade will be investigated as the scheme progresses.

There are no roads except forest tracks within the southern extent of Corridor 2 between Arrochar and Inveruglas. Limited extents of existing road drainage are evident along the existing A82 between Inveruglas and Inverarnan. No information on existing drainage along the existing A83 between Tarbet and Arrochar is presently available.

There are no roads and thus no existing road drainage or watercourse crossings within Corridor 3 except a short section of the existing A82 immediately south of Inverarnan.

6.10.3.5 Existing Water Abstractions and Sewerage Discharges

Information on private water abstractions and wastewater discharges has been obtained from Argyll and Bute Council and Envirocheck Reports.

Due to the rural character of the area, a number of private water abstractions and sewage discharges are present along corridors 1 and 2. No obvious abstractions or wastewater discharges have been identified within the Corridor 3 study area.

6.10.4 Value of the Environmental Resources and Receptors

The importance of the significant water features within each corridor has been estimated based on environmental attributes associated with each water body.

The criteria used to assess the importance of a water body attribute are shown in Table 6.11 (based on Table A4.3 included in HD 45/09, Annex I).

Table 6.11 - Estimation of importance of water environment attribute

Importance	Assessment criteria
Very High	Attribute has a high quality and rarity on regional or national scale
High	Attribute has a high quality and rarity on local scale
Medium	Attribute has a medium quality and rarity on local scale
Low	Attribute has a low quality and rarity on local scale

The results of the assessment in relation to the water features described in Section 6.10.3 are shown in Table 6.12.

Table 6.12 - Estimation of importance of water feature described in Section 6.10.3

Corridor	Water Feature	Attribute	Importance
1	Loch Lomond	Designated as Drinking Water Protection Zone under WFD Supports fisheries and used for recreational purposes, i.e. boating. Four wooded islands on the loch are designated as Ramsar sites Endrick Water and Loch Lomond Woods designated as SAC The Luss Bay, in the southern part of the loch designated as EC bathing water	Very high
	Geal Loch and Dubh Lochan	Designated as SSSI	Very high
	River Falloch	Tributary of Loch Lomond Supports fisheries	Medium
	Groundwater	Low productivity aquifer however supports SSSI sites like Geal Loch and Dubh Lochan	High
2	Loch Long	Shellfish water Water quality 'good' status Used for recreational diving	High
	Loin Water	Tributary of Loch Long Water quality 'good' status	High
	Groundwater	Low productivity aquifer however supports SSSI sites like Geal Loch and Dubh Lochan	High
	Loch Lomond/ River Falloch/ Geal Loch and Dubh Lochan	As per Corridor 1	As per Corridor 1
3	As per Corridor 1	As per Corridor 1	As per Corridor 1

Based on the broad appraisal of the environmental receptors the importance of the water environment (as a whole and not individual water features) within each corridor has been assessed as 'High' or 'Very High'.

6.10.5 Potential Effects

New roads have the potential to disturb the natural water environment due to the increased runoff rates and pollution associated with the transport routes.

Also, any engineering works to the water bodies, i.e. culverting, watercourse diversions and construction in floodplain may alter the natural hydrological and hydraulic regime resulting in increased flood risk and disruption to the fluvial morphology and associated ecosystems. This may have a detrimental effect on existing water quality and ecology contrary to the WFM objectives.

The following negative impacts may occur during scheme construction and operation unless appropriate mitigation measures are incorporated:

- pollution to surface water and groundwater due to road runoff;
- pollution to surface water and groundwater due to accidental spillages;
- disruption to fluvial morphology and ecology; and
- increased flood risk.

6.10.5.1 Predicted Impacts

The impact of Corridor 1 on the water environment would be less significant due to the existing road and watercourse crossings being currently present in the area. It is considered that runoff quality and quantity will improve and a risk of accidental spillages will automatically decrease due to the improved road surface quality and incorporation of positive drainage. Also, application of latest guidance in design of watercourse diversions and crossings will ensure that disruption to fluvial morphology is minimised and flood risk reduced.

The potential impacts on local water bodies associated with the southern section of Corridor 2 would be adverse as no road currently affects them. Thus, any drainage discharges, watercourse culverting or diversions could lead to deterioration of the current status of the receiving water bodies. Additionally, higher traffic volumes would pass through the existing A83 between Tarbet and Arrochar leading to higher pollution load on the existing receiving water bodies along that section of the road. The impacts associated with the remaining part of Corridor 2 would be largely as per Corridor 1.

Considering the lack of roads present within Corridor 3 and potential for engineering works within upper sections of the watercourses currently unaffected, potential impacts are considered to be 'adverse'.

6.10.5.2 Mitigation Measures

Road drainage discharges and engineering activities carried out in or in the vicinity of a water body pose a risk of pollution, flooding and disruption to the local flora and fauna.

Sustainable Drainage Systems (SuDS) should be incorporated into the design, where practicable to mitigate the potentially adverse effects of uncontrolled road surface runoff in terms of water quality and flood risk. The aim of SuDS is to mimic natural catchment processes by adopting a surface water management or 'treatment train' approach. This utilises a hierarchy of sustainable drainage techniques from good housekeeping (prevention at source) to the regional runoff control and management in balancing ponds and wetlands. Accidental spillage containments should also be incorporated as appropriate.

Siting the new road above the predicted flood water level in the adjacent water bodies will protect the road infrastructure and users against flooding. Any resultant loss of floodplain storage should be compensated for to minimise the risk of flooding elsewhere. A flood risk assessment will need to be undertaken at a later stage of the scheme to assess the probability of flooding from various sources.

Watercourse diversions and crossings should be sized such that no significant changes on existing hydraulic regime are imposed and that flood risk upstream and downstream is not increased. The scheme should also ensure minimal disruption to fluvial morphology and migration of fish. Where mammal presence is evident, mammal pass facilities should also be incorporated into the design.

The adoption of best working practices and strict compliance with relevant SEPA Pollution Prevention Guidelines (PPG) and Regulatory Methods (RM) will minimise the risk of adverse effects on the water environment during the construction and operational stages of the scheme.

All engineering works affecting the water environment will require authorisation under the Water Environment (Controlled Activities) (Scotland) Regulations 2011.

6.10.5.3 Summary of impacts and mitigation measures

A summary of the main water environment related impacts and potential mitigation measures associated with the three corridors are presented in Table 6.13. The impacts for corridors 2 and 3 are largely as per Corridor 1. The exceptions are noted in the table overleaf.

Table 6.13 - Summary of water related impacts and mitigation measures

Corridor	Impact	Mitigation Measures
1	New surface water road drainage will continue discharging to Loch Lomond and its tributaries as per the existing situation posing a risk of pollution and flooding.	Incorporation of sustainable drainage systems (SuDS) during construction and operation stages of the project will lead to water quality improvement in the Loch Lomond and its tributaries. Also the discharges will be controlled to ensure no adverse impact on flood risk elsewhere.
	Corridor 1 is spatially constraint and accommodation of full SuDS treatment train for road runoff may prove difficult.	Site specific solutions will require to be developed to suit the challenging terrain. Any form of SuDS will present an improvement to the current situation.
	The northern section of Corridor 1 is located within the River Falloch's floodplain which poses a risk of inundation to road users but also increases a risk of flooding elsewhere due to reduction of flood storage area.	Positioning of new road above the predicted flood levels and provision of flood compensatory storage to manage flood risk.
	Numerous new watercourse crossings will be required along the corridor with potential for increased flood risk and disruption to fluvial morphology.	New watercourse crossings will be designed in accordance with the latest DMRB guidance ensuring that disruption to existing hydrological and hydraulic regime is minimised. Mammal passes will be incorporated as required.
	Watercourse diversions may be required within the corridor route which could have an adverse impact on the existing hydrological regime and fluvial morphology.	Watercourse diversions will be designed in accordance with the latest guidance ensuring that disruption to existing hydrological and hydraulic regime is minimised.
	SSSI site immediately to the north of the Loch Lomond (Geal Loch and Dubh Lochan)	Adverse impact on this designated site should be minimised by careful positioning of the new road and timed construction works to avoid disruption to the local ecology and groundwater regime
	Loch Lomond support fisheries and is used for recreational water sports.	SuDS will be required to protect the water quality in the loch. Construction works (watercourse diversions and crossings, drainage outfalls) will have to be timed to avoid fish spawning season and avoid interference with tourist season.
	Numerous private water supplies and sewerage discharges are present along Corridor 1.	Alternative proposals to deal with the affected private systems will have to be developed.

Table 6.13 - Summary of water related impacts and mitigation measures (Cont.)

Corridor	Impact	Mitigation Measures
2	New surface water road drainage from the section of corridor between Arrochar and Inveruglas will discharge to Loin Water and its tributaries posing a risk of pollution and flooding especially given that no roads are currently present in that area.	A full SuDS treatment train would be required to treat and control the road runoff. Discharge of the road runoff from that section of the corridor to the Loin Water catchment would contribute to water quality and quantity improvement in the minor tributaries of the Loch Lomond.
	A number of watercourses within the Loin Water catchment would be affected by the new road crossing.	New watercourse crossings and diversions will be designed in accordance with the latest guidance ensuring that disruption to existing hydrological and hydraulic regime is minimised. Mammal passes will be incorporated as required.
	The southern section of corridor is located within the floodplain of Loin Water and is also at risk of flooding from the sea (via Long Long).	Positioning of new road above the predicted flood levels and provision of flood compensatory storage to manage flood risk.
	A part of the southern section of corridor 2 is located within a SAC.	Adverse impact on the environmentally sensitive areas should be minimised by careful positioning of the new road and timed construction works to avoid disruption to the local water ecology
3	Upstream sections of the watercourses would be affected by road drainage discharges, watercourse diversions and new crossings.	See opportunities identified for Corridor 1. Positioning the corridor away from the Loch Lomond shore and to the west of the railway presents more scope for incorporation of full SuDS treatment in terms of space requirement.

6.10.6 Proposed Level and Scope of Future Assessment

Further more detailed assessment of the route corridors will be carried out during DMRB Stage 2 to quantify the impacts of the road scheme on the surrounding water environment.

The main objective of the assessment will be to ensure that:

- the need for the avoidance and reduction of impacts on the water environment is accounted for in the route selection and environmental evaluation of the scheme; and
- the selection of appropriate mitigation measures against any significant predicted impacts of the considered routes is made with the aim to design out potential adverse environmental impacts.

6.10.7 Proposed Methodology (including Significance) of Future Assessment

The assessment will be carried out in accordance with DMRB HD 45/09 using the following methods:

- Assessment of Pollution Impacts from the Routine Runoff to Surface Waters: Method A (Simple Assessment) and Method B (Detailed Assessment), if required;
- Assessment of Pollution Impacts from Routine Runoff on Groundwaters: Method C (if applicable);
- Assessment of Pollution Impacts from Spillages: Method D; and
- Hydrological and Hydraulic Assessment of Design Floods: Methods E and F.

Consultations with statutory stakeholders like SEPA and the LLTNP will be required to establish the design criteria in terms of water quality, fluvial morphology and flood risk protection for the scheme.

Relevant data will also be collected through consultations with other disciplines and site visits to aid the assessment process.

The collected data together with the results of the assessment will be used to estimate the importance of the water environment, magnitude of impacts and significance of potential effects on the water environment attribute. The preventive measures will be selected proportionately to the predicted environmental impacts.

This page is blank.

7 Consideration of Cumulative Effects

7.1 Study Area

This chapter of the Scoping Report sets out the potential cumulative impacts arising as a result of the construction and operation of the A82 upgrade scheme, and other committed projects within the area. In line with guidance set out in DMRB, the cumulative impact assessment has considered both the positive and negative cumulative impacts which could potentially occur.

7.2 Value of Environmental Resources and Receptors

DMRB Volume 11, Section 2, Part 5 (HA205/08) defines cumulative impacts as:

"Impacts that result from incremental changes caused by other past, present or reasonable foreseeable actions together with the project. For the purposes of the DMRB Volume 11 guidance, a cumulative impact may arise as the result of:

- *The combined impact of a number of different environmental topic-specific impacts from a single environmental impact assessment project on a single receptor or resources; and*
- *The combined impact of a number of different projects within the vicinity (in combination with the environmental impact assessment project) on a single receptor or resource."*

The cumulative impact assessment has been determined by assigning a value to the receptors (see Table 6.14) and determining whether a likely significant effect will occur upon them during the construction and operational phases of the proposed scheme.

Table 6.14: Value of receptors (cumulative assessment)

Value	Criteria
High	High importance and rarity (National or International scale) and a low substitutability.
Medium	Medium importance and rarity (Regional scale) and a moderate substitutability.
Low	Low importance and rarity (Local scale) and high substitutability.

7.3 Potential Effects

7.3.1 Proposed Scheme Cumulative Impacts

Due to the linear nature of the scheme, cumulative impacts on environmental receptors may result within the scheme itself where construction works are taking place in a number of locations. Within the scheme cumulative impacts are likely to be temporary, occurring during the construction phase only. The cumulative impacts for the construction phase may result across a range of environmental receptors.

The receptors likely to be most susceptible to cumulative impacts during the construction are residential, commercial and community property, designated sites, protected species, vehicle travellers, watercourses, soils and groundwater. Impacts will relate to increased noise, the deposition of dust, changes in access, and potential pollution incidences. The presence of construction plant along the route may also result in further cumulative impacts for vehicle travellers, the National Scenic Area and properties along this section of the route corridors during the construction period.

The cumulative assessment for the operational phase indicates that there is potential for adverse cumulative impacts to occur to receptors such as protected species, footpaths, private property including community and agricultural land. However, the final route corridor has not been identified and not enough detail on the scheme is available at this stage (for example traffic modelling data, or locations where vegetation / tree removal may be required) in order to be able to fully determine impacts on the identified receptors. Further assessment work has been recommended to the Simple Assessment level which will inform a further, more detailed cumulative assessment of the scheme, as well as identifying mitigation measures for reducing impacts to the sensitive receptors identified.

7.3.2 Cross Development Cumulative Impacts

7.3.2.1 Development Plan Proposals Included for Assessment

In order to identify and assess the cumulative impacts that the proposed route corridors will have in-combination with other proposed developments within the area, a review of the Loch Lomond and The Trossachs Local Plan (2010 – 2015) and submitted planning applications on the Loch Lomond and the Trossachs planning portal was undertaken and proposed development sites identified.

Proposed Local Plan developments are set out in Table 6.15. A full list will be obtained from the Local Planning Authority during the next stage of assessment.

Table 6.15: Local Plan developments

Development	Description
Cobbler's Rest	Small housing development in Arrochar.
Sand and gravel quarry at Stronatyne Farm, Arrochar	Formation of a sand and gravel quarry, recycling of inert construction materials and the siting of a mobile batching plant.

7.3.2.2 Transport Proposals Included for Assessment

A review of planned works on the Transport Scotland website has identified that the construction works on current A82 improvement works at Pulpit Rock and Crianlarich Bypass will be completed by summer 2014. There are some improvement works planned on the A83 which runs through Arrochar and Tarbet joining the A82 on the eastern edge of Tarbet and which include landslide risk reduction, minor improvements and speed control measures. The various elements of works on the A83 are programmed to continue into 2015.

Consultation will be undertaken with Transport Scotland to determine the construction programmes and confirm which of their schemes may result in cumulative impacts when considered in-combination with the proposed scheme (such as through the statutory processes).

7.4 Proposed Level and Scope of Assessment

Based upon the findings of the cumulative impacts identified above it is not considered necessary to undertake any further assessment of the cumulative impacts of the proposed scheme route corridors with other identified development, or transport projects. However, as potential cumulative effects are identified as potentially occurring during the construction and operation of the scheme, this will be given further consideration as part of a Simple Assessment.

7.5 Proposed Methodology

The methodology set out in DMRB Volume 11, Section 2, Part 5 (HA 205/08), and the subsequent Volume 11, Section 3 environmental topics will be followed to determine the potential cumulative effects as the scheme design develops and the final route is identified.

This page is blank.

8 Summary

This report has identified key environmental issues associated with the three route corridors to enable the scope of future environmental assessment to be determined. It is recognised that adverse impacts are likely to occur during the construction and operation of the proposed scheme. Some impacts will be short term (eg. during construction), others may be permanent (eg. direct loss of habitat / visual screening) or some may occur as a result of the operation of the scheme (eg. introduction of traffic into an area where previously there was none). As a result mitigation measures will be designed into the scheme to reduce adverse environmental impacts. The potential environmental effects identified during the scoping process are summarised in Table 8.1 below. The process of identifying, characterising and mitigating impacts should be continued beyond scoping to complement the development of the engineering design.

Table 8.1: Potential environment effects identified during the scoping process

Environmental topic	Corridor 1	Corridor 2	Corridor 3	Level of assessment / notes
Air quality	×	✓ & ×	✓	Simple assessment likely to be required for local and regional air quality impacts and impacts on designated sites. Scope to be reconfirmed once detailed traffic data has been reviewed.
Cultural heritage	× & O	×	O	Simple assessment required.
Landscape character	× / O	×	×	Simple and detailed assessments required (to include site visits, consultation and establishment of key views / TZVI).
Visual effects	×	×	×	Simple and detailed assessments required (to include site visits, consultation and establishment of key views / TZVI).
Nature conservation	×	×	×	Simple and detailed assessments required (to include extended phase 1 habitat surveys and protected species surveys).
Geology & soils	× / O	×	×	Simple assessment required (including ground investigation works).
Materials	× / O	×	×	Simple assessment required.
Noise and vibration	×	✓ & ×	✓ & ×	Detailed assessment required. Scope to be reconfirmed once detailed traffic data has been reviewed.

Table 8.1: Potential environment effects identified during the scoping process (Cont.)

Environmental topic	Corridor 1	Corridor 2	Corridor 3	Level of assessment / notes
Effects on all travellers	✓	✓	✓	Simple assessment required.
Community and private assets	× / O	×	×	Simple and detailed assessments required (to include site visits and consultation with land owners, community / local interest groups).
Road drainage and the water environment	✓	× / O	×	Simple (and detailed if required) assessment required.
Cumulative effects	× & O	× & O	× & O	Scheme cumulative impacts: simple assessment required. Cross development cumulative impacts: scoped out.

Key: ✓ - positive effect possible; O - no significant effect likely; × - adverse effect possible

(NB. where two symbols are assigned in the table, this reflects the fact that either, broadly, identified effects are both positive / negative / no effect, or effects are adverse but not necessarily to a significant degree).

9 References

Air Pollution Information System (APIS). www.apis.ac.uk.

Argyll & Bute Council (2013). Air Quality Progress Report for Argyll & Bute Council.

Defra (2009). Local Air Quality Management Technical Guidance.

LLTNP (ND). Looking After the National Park. http://www.lochlomond-trossachs.org/looking-after/.

Royal Society for the Protection of Birds (RSPB). http://www.rspb.org.uk/reserves/guide/i/inversnaid/index.aspx.

Scottish Natural Heritage (2009). Loch Lomond and The Trossachs National Park Landscape Character Assessment. http://www.snh.org.uk/pdfs/publications/review/140.pdf.

Scottish Natural Heritage. (2012). Wild Land. http://www.snh.gov.uk/protecting-scotlands-nature/looking-after-landscapes/landscape-policy-and-guidance/wild-land/.

Scottish Natural Heritage. Access Rights. http://www.snh.gov.uk/land-and-sea/managing-recreation-and-access/access-rights/.

Scottish Natural Heritage and The Loch Lomond and The Trossachs National Park Authority (2010). The Special Landscape Qualities of The Loch Lomond and The Trossachs National Park. http://www.snh.org.uk/pdfs/publications/commissioned_reports/376.pdf.

The Countryside Agency and Scottish Natural Heritage (2002). Landscape Character Assessment: Guidance for England and Scotland.

The Macaulay Land Use Research Institute (2010). Land Capability for Agriculture. http://www.macaulay.ac.uk/policyrelevance/landusestrategy/LandCapabilityAgriculture_300dpi.pdf.

The Stationery Office (2000). Air Quality (Scotland) Regulations 2000 (Scottish SI 2000 No. 97).

The Stationery Office (2002). Air Quality (Scotland) Amendment Regulations 2002 (Scottish SI 2002 No. 297).

Transport Scotland (2009, 2010). Strategic Transport Projects Review.

Transport Scotland; Amey (2012). Engineering and Environmental Surveys.

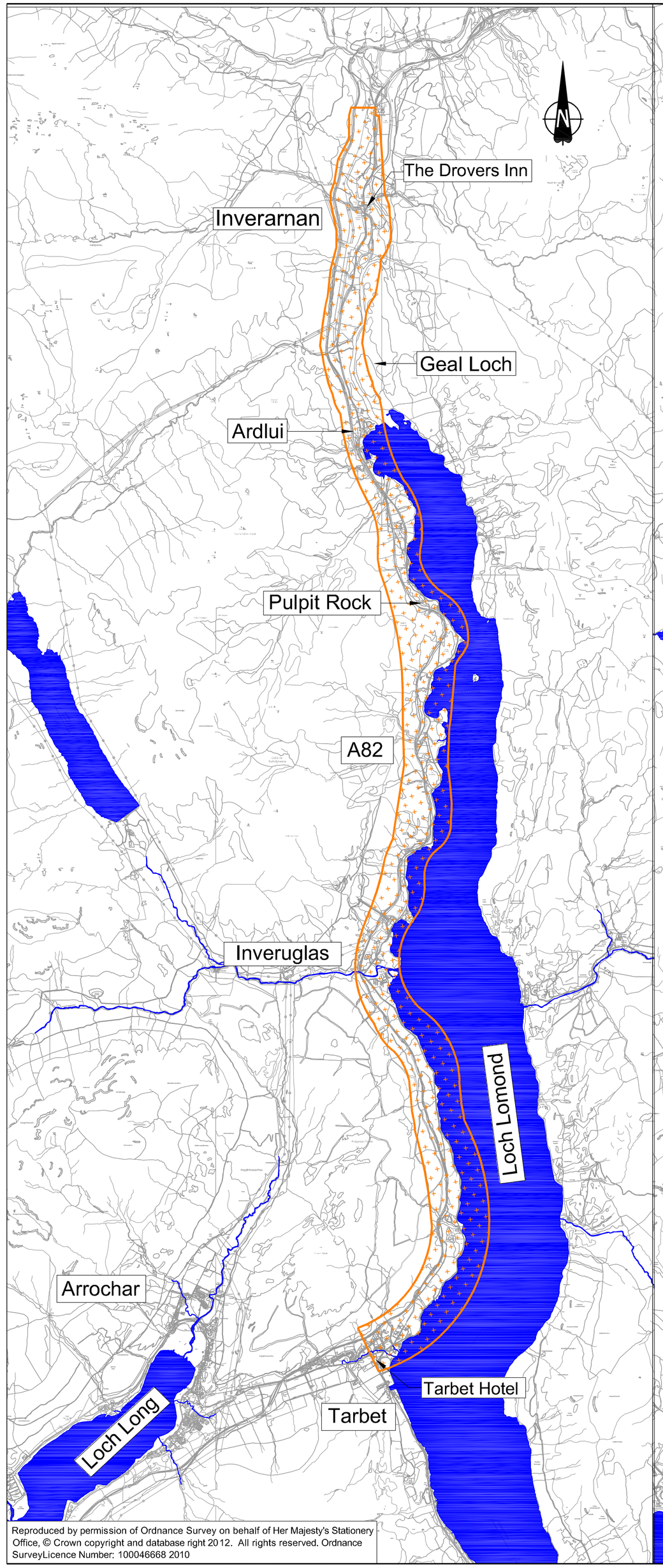
Transport Scotland; Scott Wilson (2006). A82 Tarbet to Fort William Route Action Plan Study.

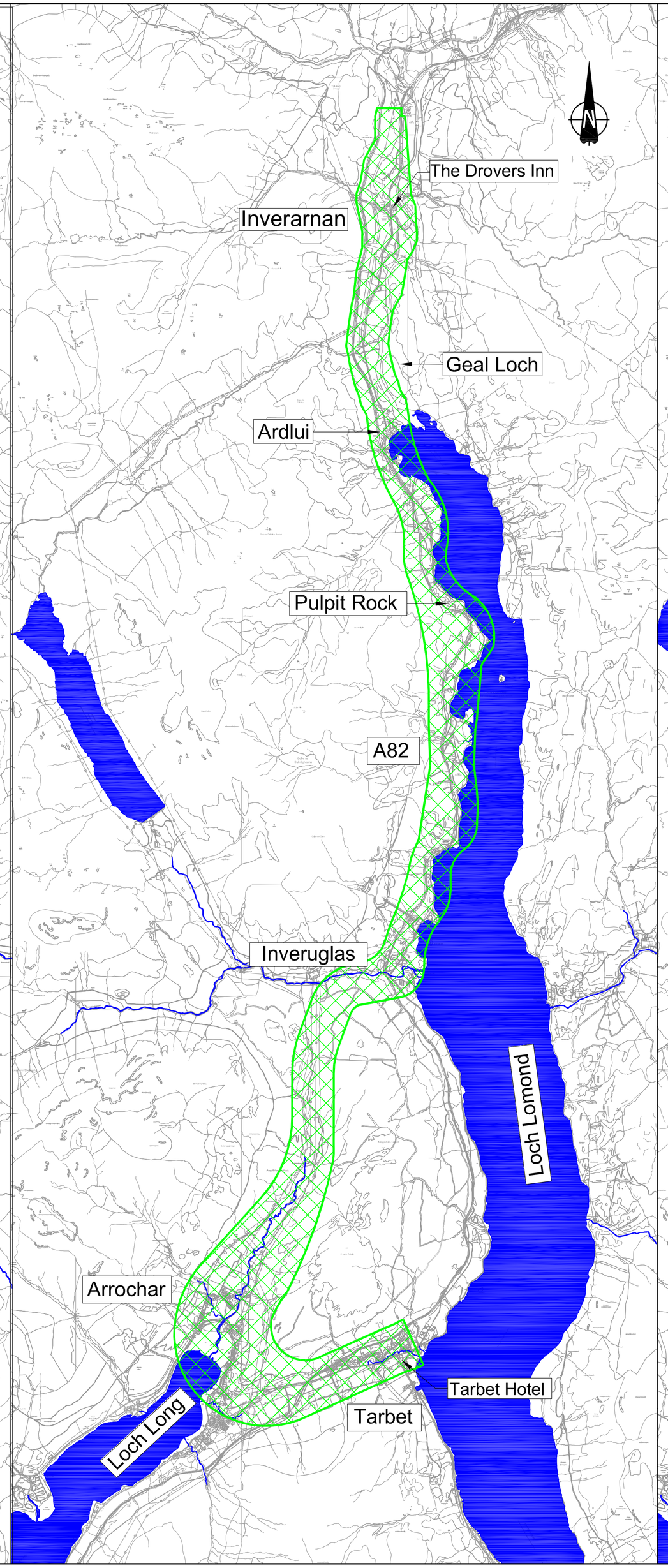
This page is blank.

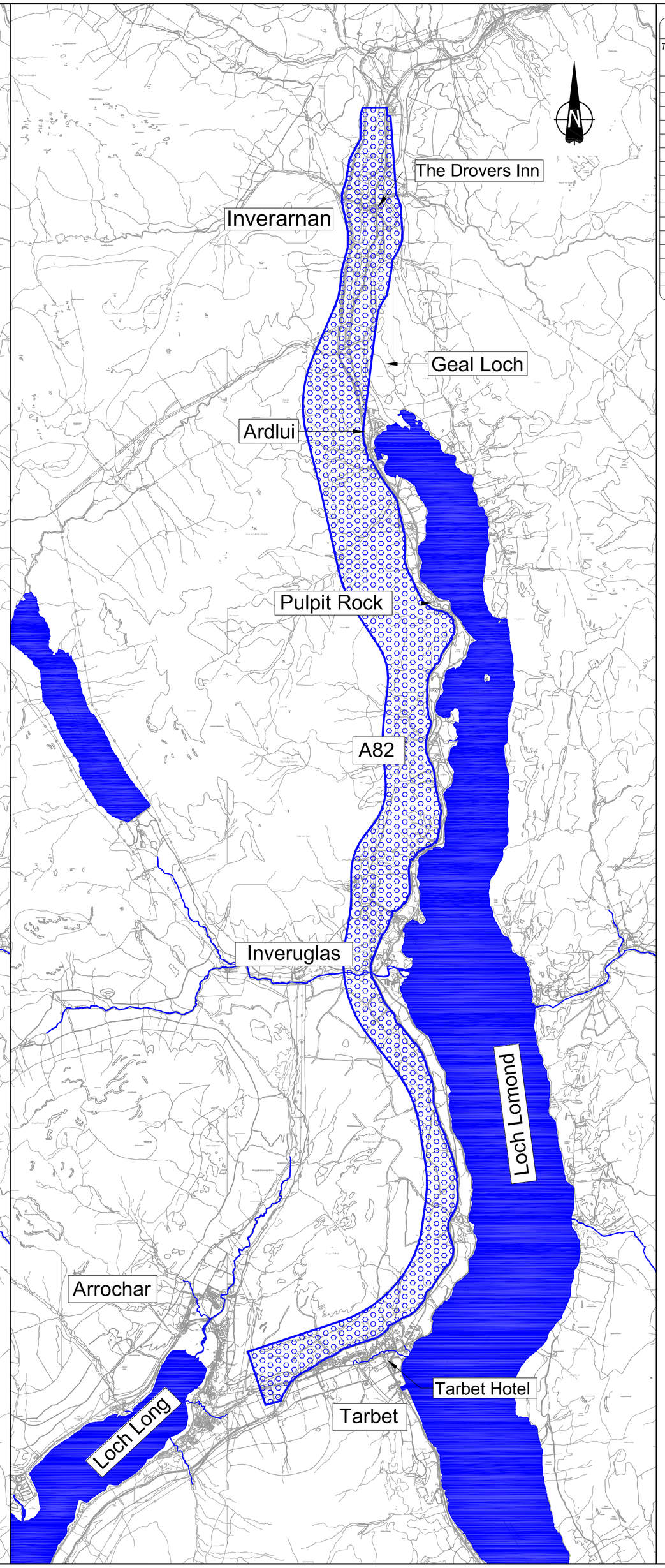
Appendix A

Drawings

This page is blank.







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

CH2M Hill Fairhurst JV
C/O: City Park 368 Alexandra Parade Glasgow G31 3AU
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. **476416-0000-016**	Revision **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 Drawings\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

Drawing file path & name :
Xreference file path :
User and Plot Date :

Key:

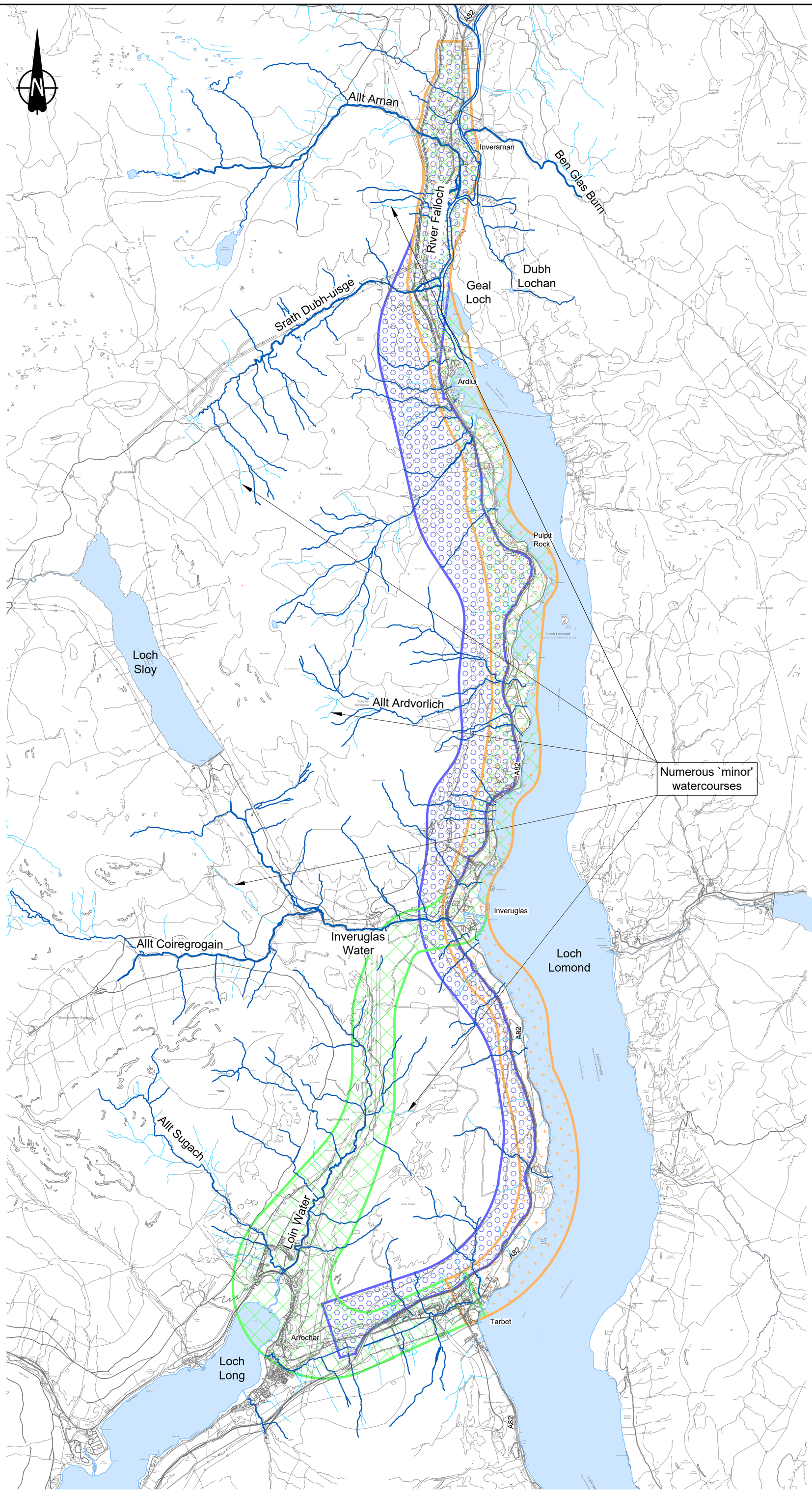
- Route Corridor 1
- Route Corridor 2
- Route Corridor 3

Water Designations:

- Water Body (loch/lochan/pond)
- `Major' Watercourse (shown on 1:50,000 OS Map)
- `Minor' Watercourse

Notes:

1. Only water bodies of significance to the scheme have been shown.
2. Full extents of water bodies not shown.
3. Other water bodies not shown on this drawing may also be present in the area of interest.



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

Revision	By	Checked	Approved	Date	Description
1.0	KAB	MLJ	ELC	15.11.13	Draft issue.
2.0	KAB	MLJ	ELC	12.12.13	Minor presentational amendments. Significant residual risks box revised.
3.0	CK	MLJ	ELC	28.02.14	Consultant's logo revised

Client: TRANSPORT SCOTLAND — The Scottish Government

CH2M Hill Fairhurst JV
C/O: City Park 368 Alexandra Parade Glasgow G31 3AU
Tel +44 (0)141 552 2000 Fax +44 (0)141 552 2525

Project: A82 TARBET TO INVERARNAN UPGRADE

Drawing Title: WATER FEATURES LOCATION PLAN

Drawn by	KAB	Date: 28/10/13
Checked by	MLJ	Date: 12/11/13
Approved by	ELC	Date: 12/11/13

Drawing No. **476416-0500-001**

Revision **3.0**

Drawing Scale: 1:25,000 at A1 (1:50,000 at A3)

CAD Filename:

Drawing file path & name :
Xreference file path :
User and Plot Date :

Key:

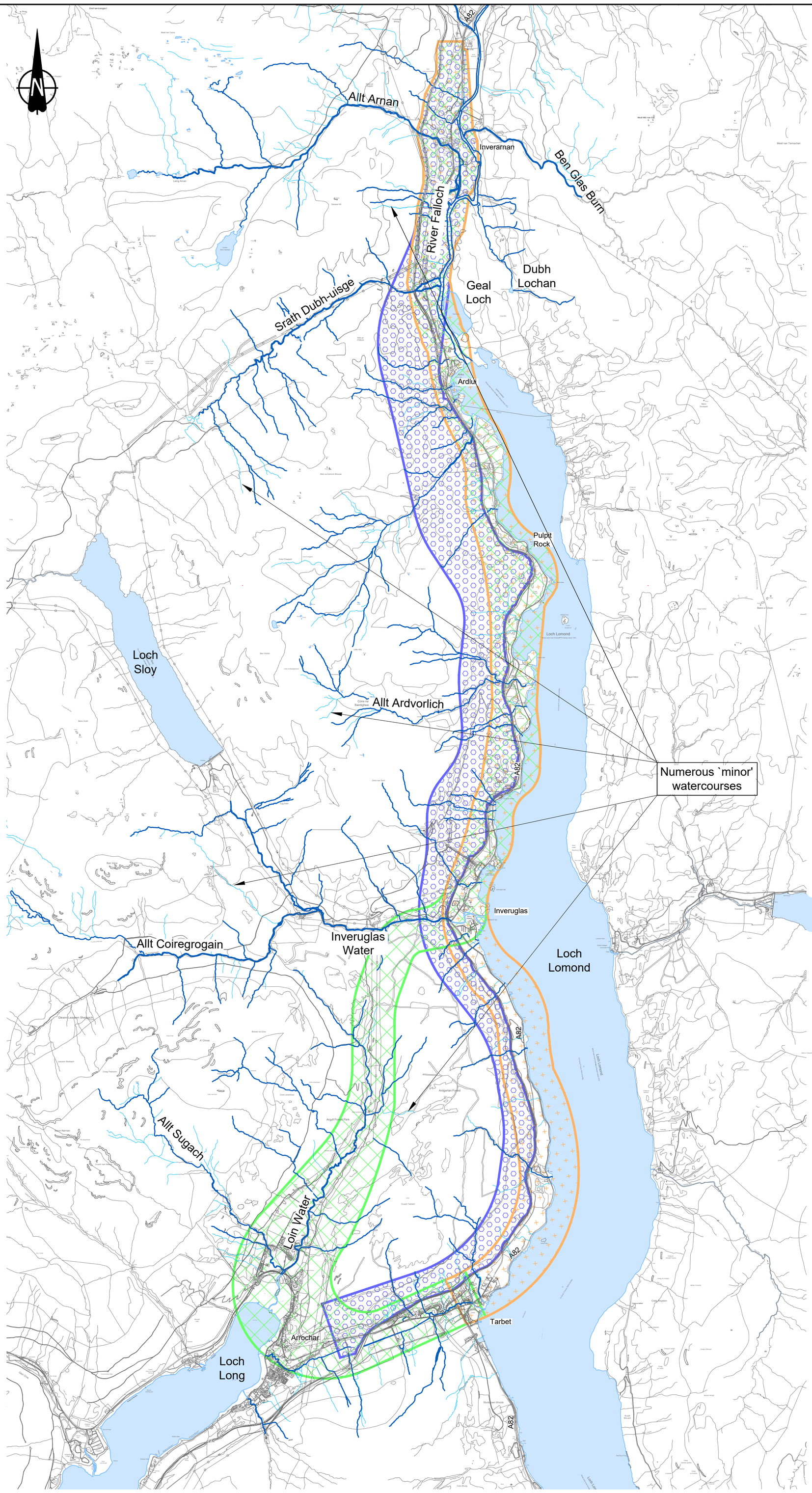
- Route Corridor 1
- Route Corridor 2
- Route Corridor 3

Water Designations:

- Water Body (loch/lochan/pond)
- `Major' Watercourse (shown on 1:50,000 OS Map)
- `Minor' Watercourse

Notes:

1. Only water bodies of significance to the scheme have been shown.
2. Full extents of water bodies not shown.
3. Other water bodies not shown on this drawing may also be present in the area of interest.



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

Revision	By	Checked	Approved	Date	Description
1.0	KAB	MLJ	ELC	15.11.13	Draft issue.
2.0	KAB	MLJ	ELC	12.12.13	Minor presentational amendments. Significant residual risks box revised.
3.0	CK	MLJ	ELC	28.02.14	Consultant's logo revised

Client: TRANSPORT SCOTLAND — The Scottish Government

CH2M Hill Fairhurst JV
C/O: City Park 368 Alexandra Parade Glasgow G31 3AU
Tel +44 (0)141 552 2000 Fax +44 (0)141 552 2525

Project: A82 TARBET TO INVERARNAN UPGRADE

Drawing Title: WATER FEATURES LOCATION PLAN

Drawn by	KAB	Date: 28/10/13
Checked by	MLJ	Date: 12/11/13
Approved by	ELC	Date: 12/11/13

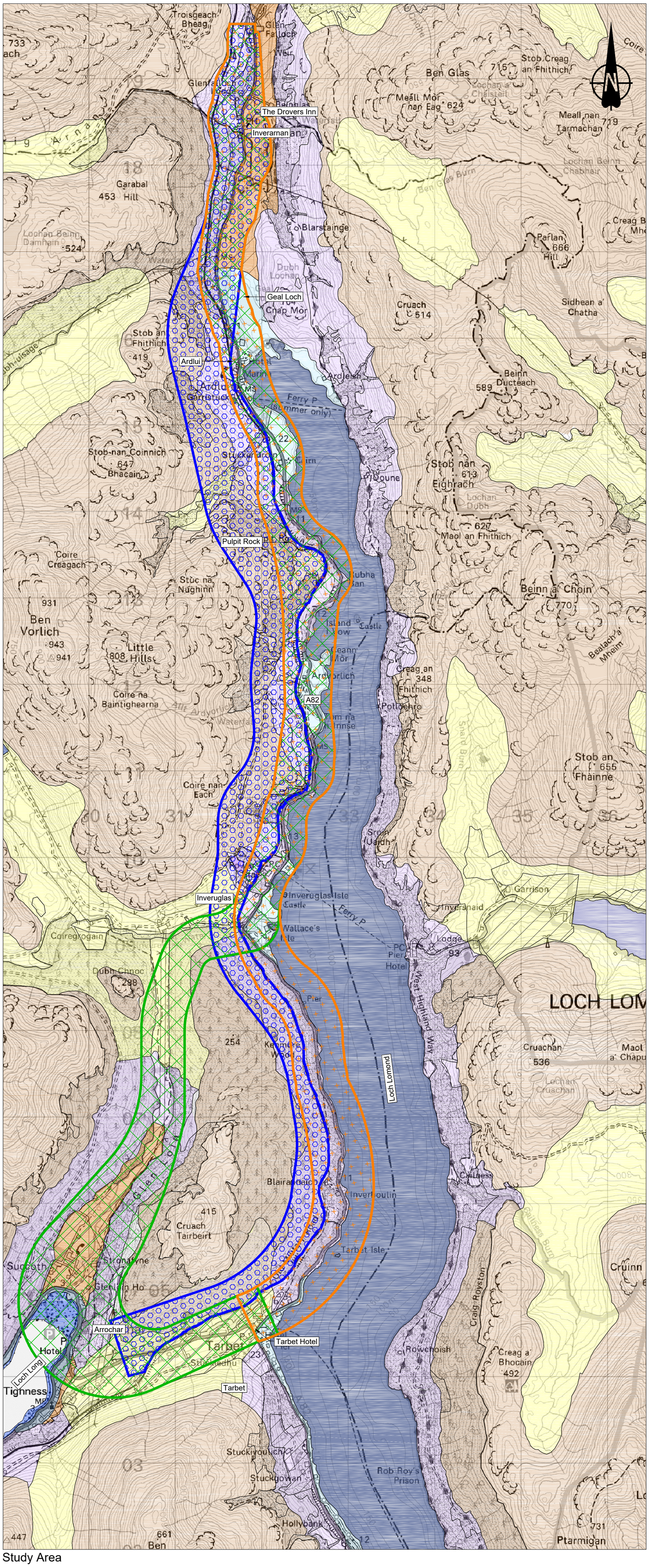
Drawing No. **476416-0500-001**

Revision **3.0**

Drawing Scale: 1:25,000 at A1 (1:50,000 at A3)

CAD Filename:

Drawing file path & name :
Xreference file path :
User and Plot Date :



Study Area

Key

- Route Corridor 1
- Route Corridor 2
- Route Corridor 3

Landscape Character Types

Hills
- LCT1: Open Hills
- LCT 2: Forested Hills
- LCT 3: Wooded Hills

Upland Glens and Lochs
- LCT 4: Open Upland Glens
- LCT 5: Forested Upland Glens
- LCT 6: Wooded Upland Glens
- LCT 7: Farmland Upland Glens

Glens Sides
- LCT 10: Open Glen Sides
- LCT 11: Forested Glen Sides
- LCT 12: Wooded Glen Sides
- LCT 13: Farmed Glen Sides

Strath and Glen Floors Loch Basins
- LCT 14 Farmed Strath and Glen Floors
- LCT 15 Forested Strath and Glen Floors
- LCT 16: Strath and Glen Floor Lochs
- LCT 17: Loch Shore Fringes
- LCT 18: Loch Islands
- LCT 19: Sea Loch Foreshores
- LCT 20: Sea Loch Shore Fringes

LCT 14 - Farmed Strath and Glen Floors (SNH, 2009)

Farmed Strath and Glen Floors are a defining scenic quality of the highlands, contrasting dramatically with wilder surroundings. Humanised and managed, they are significant cultural landscapes; the patterned quality of enclosure, enriched colours of land improvements, villages and rivers, make a particular contribution to scenic qualities. Much of this character type is viable farm land with enclosed fields.

LCT 7 - Farmed Upland Glens (SNH, 2009)

Farmed Upland Glens are important in the sequence and transition to wilder upland areas, representing marginal, small-scale agriculture and features associated with traditional farming more typical of the past, and contributing to scenic quality.

LCT 12 - Wooded Glen Sides (SNH, 2009)

Wooded Glen Sides are important natural landscapes, sequentially and as buffers to the wild land areas of the open hills. They are significant for natural heritage benefits and natural qualities, as well as features of traditional woodland management. Wooded Glen Sides are representative of how glen sides would have looked before historical woodland clearance and gradual loss of woodland through lack of regeneration.

LCT 17 - Loch Shore Fringes (SNH, 2009)

Loch Shore Fringes are important transitional landscape character types, significant for their natural and cultural heritage value, and which, in association with lochs, make a particular scenic contribution to the landscape. Loch Shore Fringes are a variable feature of glen and lowland freshwater lochs and generally less well-expressed or absent in upland lochs.

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

Notes:

References

Scottish National Heritage [SNH]. (2009) *Loch Lomond and The Trossachs National Park Landscape Character Assessment*. Scottish National Heritage and Loch Lomond and The Trossachs National Park Authority.

Revision	By	Checked	Approved	Date	Description
1.0	SH	CS	AS	27.01.14	DRAFT STAMP REMOVED.
1.1	SH	SWG	SWG	03.03.14	DRAWING BORDER AMENDED.

Client: Transport Scotland — The Scottish Government

CH2M HILL FAIRHURST
CH2M Hill Fairhurst JV
C/O: City Park 368 Alexandra Parade Glasgow G31 3AU
Tel +44 (0)141 552 2000 Fax +44 (0)141 552 2525

Project: A82 TARBET TO INVERARNAN

Drawing Title: LANDSCAPE CHARACTER PLAN

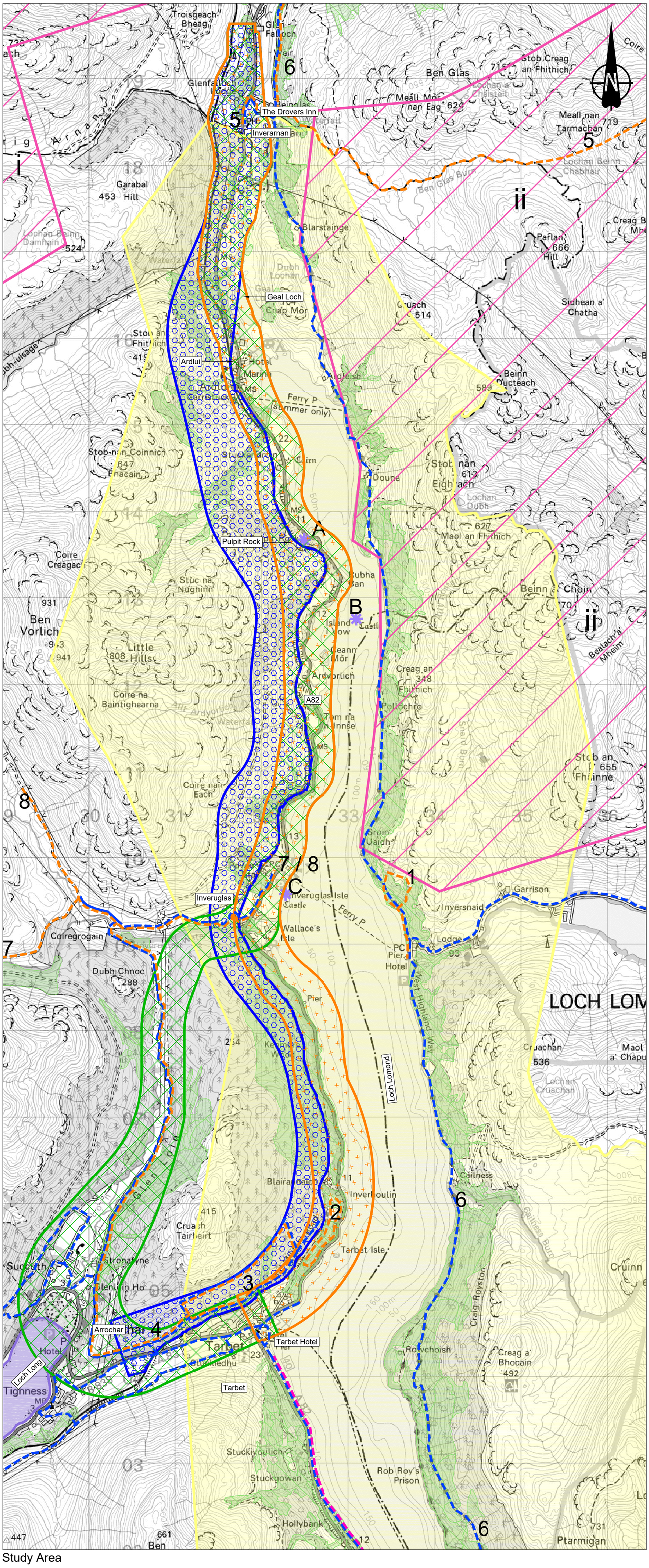
Drawn by	SH	Date: 08.10.13
Checked by	CS	Date: 21.10.13
Authorised by	AS	Date: 21.10.13

Drawing No. **476416-3000-001** Revision **1.1**

Drawing Scale: 25 000 at A1

CAD Filename: -

Drawing file path & name :
Xreference file path :
User and Plot Date :



Study Area

Key

- Route Corridor 1
- Route Corridor 2
- Route Corridor 3

Landscape Designations

- Area outside National Park Boundary (study area within National park)
- Ancient Woodland
- Semi Natural Ancient Woodland
- National Scenic Area
- Scotland Wild Land
  i. Ben Lui - Beinne Ime
  ii. Ben More - Ben Ledi
- Schedule Ancient Monuments
  A. Pulpit Rock, Preaching site
  B. Island I Vow, Castle and Settlement
  C. Inveruglas Castle I Isle Castle and Settlement

Circulation Network

- Core Paths
- National Cycle Network - Sustrans
- Walk Highlands - Tourist Walk
  1 - Inversnaid RSPB Nature Trail
  2 - Tarbet Isle Loop
  3 - Cruach Tainbeirt
  4 - Three Lochs Way
  5 - Beinn Chabhair from Inverarnan
  6 - West Highland Way
  7 - Ben Vane from Inveruglas
  8 - Ben Vorlich from Inveruglas

National Scenic Area and Special Landscape Qualities

Loch Lomond is recognised as one of 40 National Scenic Areas in Scotland, that are defined by Scottish National Heritage as areas “of outstanding scenic value in a national context” (SNH, 2012a). The special qualities of the Loch Lomond Area, which the study area covers much of, are described by SNH and The Loch Lomond and the Trossachs National Park Authority (2010), as:

- Immensity of Loch and Landscapes
- Two lochs in one
- Multitude of beautiful islands
- Ben Lomond, widely known, popularly frequented
- Banks of broadleaved woodland
- Peaceful side glens

Ancient and Semi Natural Ancient Woodlands

Ancient and Semi Natural Ancient Woodlands have a high landscape value for their natural and cultural heritage. Ancient woodland includes areas where there has been woodland cover for 250 years or more and is the richest woodland habitat type. Around the glens and hills surrounding Loch Lomond, there are native Sessile Oak woodlands that are Special Areas for Conservation for there rich habitats containing many animal and plant species and cultural value (Loch Lomond and Trossachs National Park, n.d.).

Wild Land

The study area is in close proximity to two nationally recognised core areas of Wild Land, including Ben Lui - Beinn Ime and Ben More - Ben Ledi.

Wild Land is explained by SNH as semi-natural areas that show minimal signs of human influence. These areas are nationally important as part of Scotland's Identity as they have a distinctive character that is highly valued and increasingly rare (SNH, 2012b).

Scheduled Ancient Monuments (SAMs)

There are three SAMs that are visible from the Corridor 1. These include two islands that were previous castle settlements (B&C) and a rocky outcrop formerly used for open-air preaching (A) (Historic Scotland, 2010).

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

Notes:

References

Historic Scotland. (2010). *A List of Scheduled Monuments 13-04-10, and a List of Properties in Care.* [online]. Available from: http://hsewsf.sedsh.gov.uk/pls/htmldb/dmzlive.pdfsched?pid=130410132559

SNH. (2012a). *Natural Scenic Routes.* [online]. Available from: http://www.snh.gov.uk/protecting-scotlands-nature/protected-areas/national-designations/nsa/

SNH. (2012b). *Wild Land*. [online]. Available from: http://www.snh.gov.uk/protecting-scotlands-nature/looking-after-landscapes/landscape-policy-and-guidance/wild-land/

SNH and The Loch Lomond and The Trossachs National Park Authority. (2010). *The Special Landscape Qualities of The Loch Lomond and The Trossachs National Park.* [online]. Available at: http://www.snh.org.uk/pdfs/publications/commissioned_reports/376.pdf

The Loch Lomond and The Trossachs National Park. (n.d.) *Forests and Woodland*. [online]. Available from: http://www.lochlomond-trossachs.org/learning/forests-and-woodlands/menu-id-304.html

Revision	By	Checked	Approved	Date	Description
1.0	SH	CS	AS	27.01.14	DRAFT STAMP REMOVED.
1.1	SH	SWG	SWG	03.03.14	DRAWING BORDER AMENDED.

Client: Transport Scotland — The Scottish Government

CH2M Hill Fairhurst JV
C/O: City Park 368 Alexandra Parade Glasgow G31 3AU
Tel +44 (0)141 552 2000 Fax +44 (0)141 552 2525

Project: A82 TARBET TO INVERARNAN

Drawing Title: LANDSCAPE DESIGNATIONS PLAN

Drawn by	SH	Date:	08.10.13
Checked by	CS	Date:	21.10.13
Authorised by	AS	Date:	21.10.13

Drawing No. **476416-3000-002**

Revision **1.1**

Drawing Scale: 25 000 at A1

CAD Filename: -

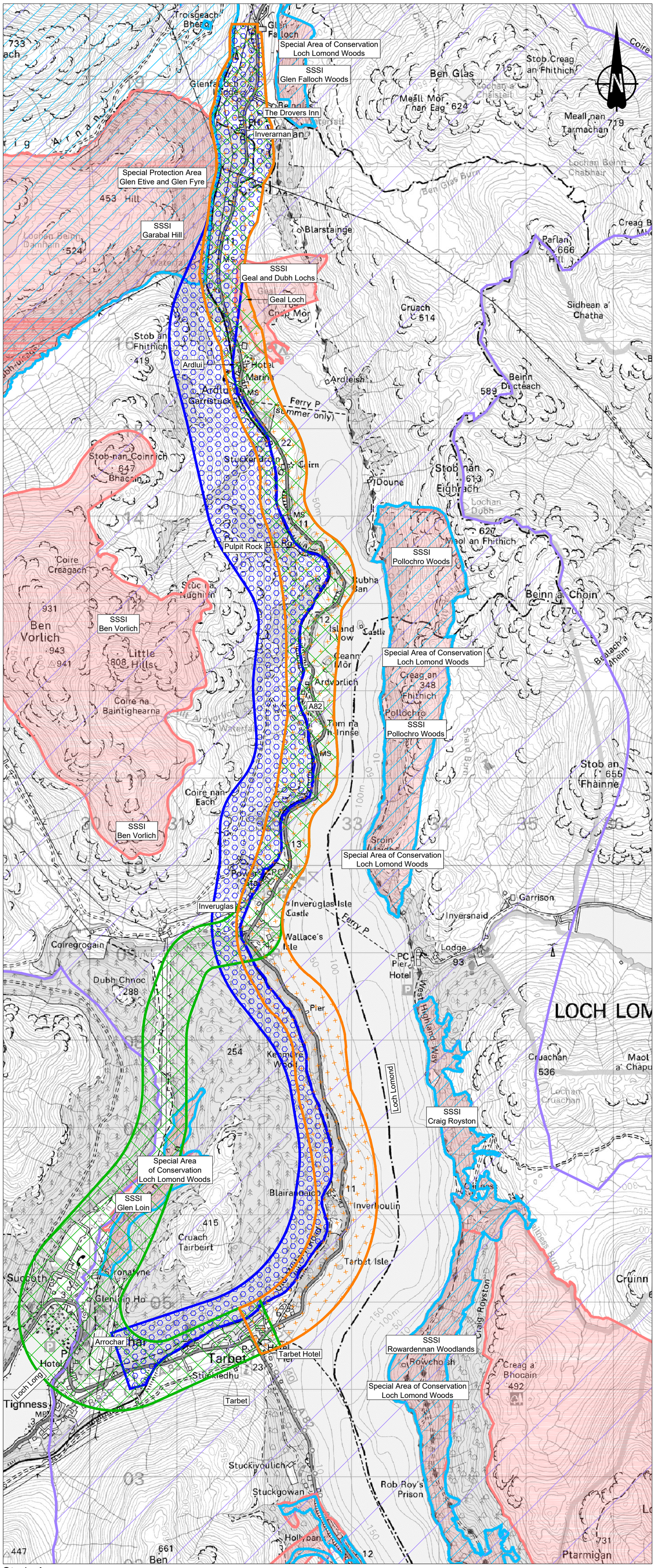
Drawing file path & name :
Xreference file path :
User and Plot Date :

Key

- Route Corridor Option 1
- Route Corridor Option 2
- Route Corridor Option 3

Environmental Designations

- SSSI
- Natura sites (Special Protection Areas and Special Area of Conservation)
- Environmentally Sensitive Area



Study Area

Image of Upland Oakwood

SSSI

Sites of Specific Scientific Interest are areas that are valuable for their plants, animals, habitats, rocks and landform, individually or in combination (SNH, 2012). The designated SSSI areas often occur in areas including hills, glens and the lochshore. There is one SSSI in close proximity to the route to the north of the study area that is of interest for its Ancient Sessile Oak woodland and associated rich habitat.

Natura Sites and Special Protection Areas and Special Areas of Conservation

Natura Sites are internationally important for threatened habitats and species and work as a European network of protected areas (SNH, 2013). Areas protected within the study area are mostly to the east side of the loch and are not close to the existing A82, except to the north near Garabel Hills.

Environmentally Sensitive Areas

Environmentally Sensitive Areas are part of a previous scheme designed to conserve areas of countryside that may be affected by farming and that has been designated for its landscape, wildlife or historic interest (The Scottish Government, 2009). The entire study area is located within one of Scotlands 10 ESAs, which binds farmers and land owners to manage land in a way that maintains habitat and valued features.

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

Notes:

References:

SNH. (2013). *Special Areas of Conservation*. [online]. Available from: http://www.snh.gov.uk/protecting-scotlands-nature/protected-areas/international-designations/sac/

SNH. (2012). *Sites of Special Scientific Interest*. [online]. Available from: http://www.snh.gov.uk/protecting-scotlands-nature/protected-areas/national-designations/sssis/

The Scottish Government. (2009). *Environmentally Sensitive Areas*. [online]. Available From: http://www.scotland.gov.uk/Topics/farmingrural/Agriculture/Environment/Agrienvironment/ESA/Introduction

Revision	By	Checked	Approved	Date	Description
1.0	SH	CS	AS	27.01.14	TEXT ADDED.
1.1	SH	SWG	SWG	03.03.14	DRAWING BORDER AMENDED.

Client: The Scottish Government

CH2M Hill Fairhurst JV
C/O: City Park 368 Alexandra Parade Glasgow G31 3AU
Tel +44 (0)141 552 2000 Fax +44 (0)141 552 2525

Project: A82 TARBET TO INVERARNAN

Drawing Title: LANDSCAPE DESIGNATIONS PLAN (ENVIRONMENTAL)

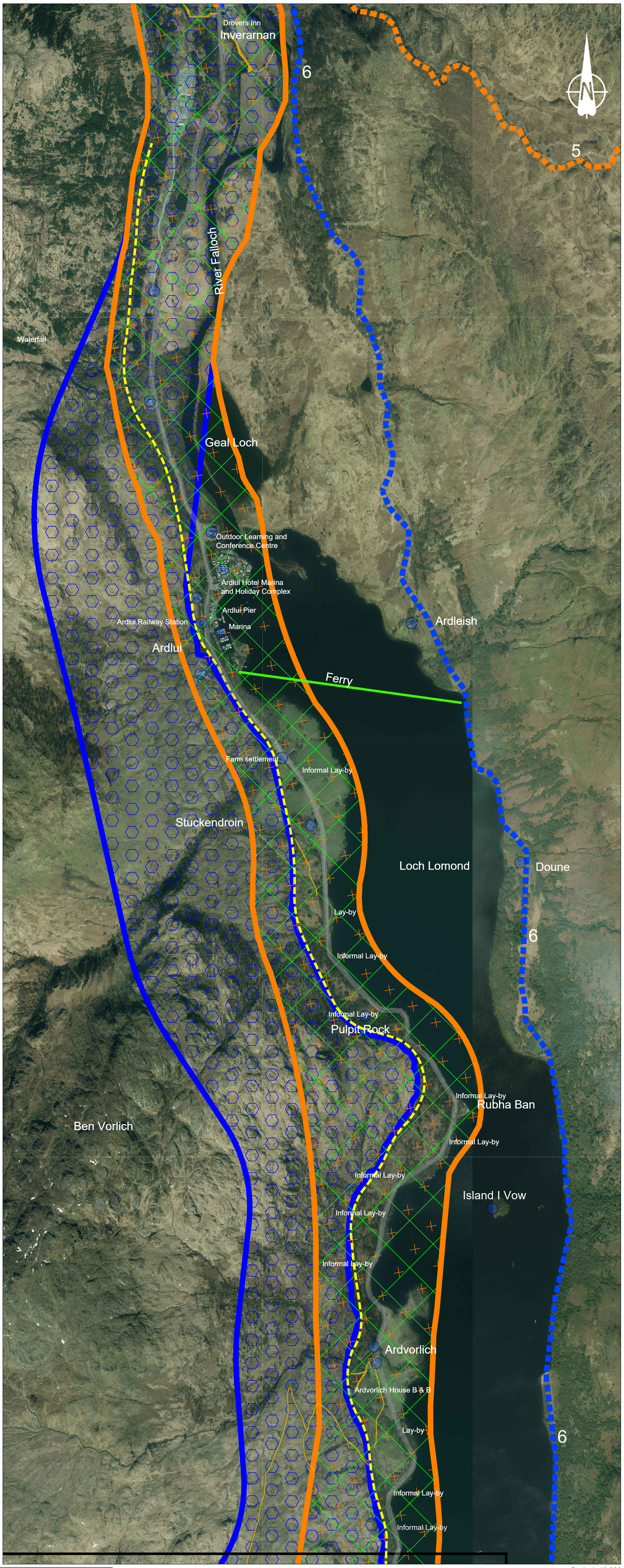
Drawn by SH Date: 08.10.13
Checked by CS Date: 21.10.13
Authorised by AS Date: 21.10.13

Drawing No. **476416-3000-003**
Revision **1.1**

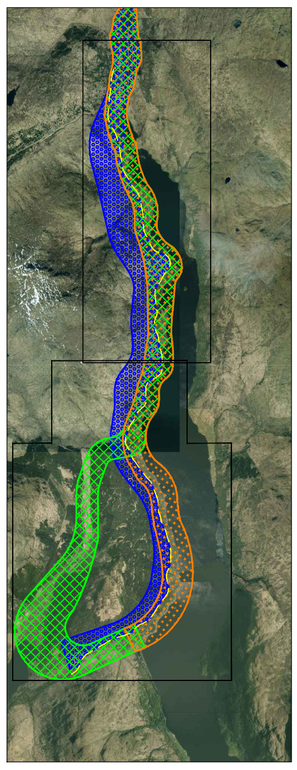
Drawing Scale: 25 000 at A1

CAD Filename: -

Drawing file path & name :
Xreference file path :
User and Plot Date :



Scale 1: 10 000



Atlas scale 1: 100 000

Key

- Route Corridor 1
- Route Corridor 2
- Route Corridor 3
- West Highland Railway
- Ferry
- Walking Access Tracks
- Receptors
- Settlements
- Core Paths
- Cycle Network
- Walk Highlands - Tourist walk

Core Paths and Walk Highlands - Tourist walk
1 - Inversnaid RSPB Nature Trail
2 - Tarbet Isle Loop
3 - Cruach Tainbeirt
4 - Three Lochs Way
5 - Beinn Chabhair from Inverarnan
6 - West Highland Way
7 - Ben Vane from Inveruglas
8 - Ben Vorlich from Inveruglas

Further Information

Core Paths

Core paths are a legal requirement and represent a basic framework of access routes to provide reasonable levels of public access throughout the park. The paths can be used by all users including; walkers, horse-riders and cyclists for everyday and recreational use.

In our study area there are 3 Core Paths that cut through varied landscapes. To the east of the loch there is a route that follows the shore of Loch Lomond. Whilst on the west, paths follow the loch for part of the route and then turn off to the eastern glens.

Cycle Paths

One cycle path is identified by Sustrans that forms part of the National Cycle Network. It is located to the south of corridor 1 and runs from just below Tarbet to Helensburgh and Balloch, following the loch side on a traffic-free woodland trail (see sheet 2 of 2).

Walk Highlands

Walk Highlands provides information to recreational walkers and tourist on trails, some of which fall within the study area. There is a range of walks that all vary in distance and difficulty. The Tarbet Isle Loop is an easy walk of 2km (45mins.) which climbs gently through pine then oak woodland providing good views over Loch Lomond and Tarbet Isle below (Sheet 2 of 2).

Informal Routes

Due to the 'Right to Roam' the public legally have free access to most of Scotland's land and water. There are many informal routes across the National Park, including pathways and tracks that are unmarked and not mapped.

View of Loch Lomond from the A82

View of Loch Lomond from the West Highland Way

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

Notes:

Revision	By	Checked	Approved	Date	Description
1.0	SH	CS	AS	27,01,14	DRAFT STAMP REMOVED.
1.1	SH	SWG	SWG	03.03.14	DRAWING BORDER AMENDED.

Client: TRANSPORT SCOTLAND — The Scottish Government

CH2M HILL FAIRHURST
CH2M Hill Fairhurst JV
C/O: City Park 368 Alexandra Parade Glasgow G31 3AU
Tel +44 (0)141 552 2000 Fax +44 (0)141 552 2525

Project: A82 TARBET TO INVERARNAN

Drawing Title: VISUAL PLAN
SHEET 1 OF 2

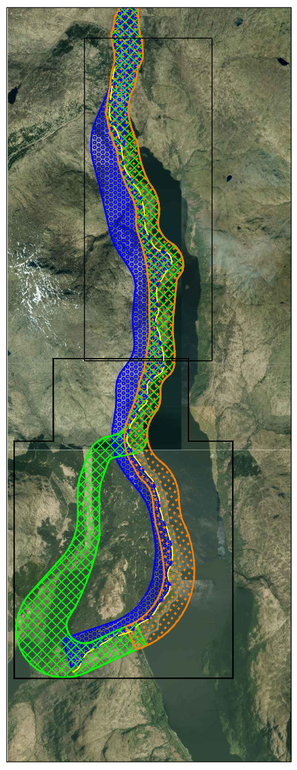
Drawn by SH Date: 08.10.13
Checked by AS Date: 18.11.13
Authorised by AS Date: 18.11.13

Drawing No. **476416-3000-004**
Revision **1.1**

Drawing Scale: AS SHOWN at A1

CAD Filename: -

Drawing file path & name :
Xreference file path :
User and Plot Date :



Atlas scale 1: 100 000

Key

- Route Corridor 1
- Route Corridor 2
- Route Corridor 3
- West Highland Railway
- Ferry
- Walking Access Tracks
- Receptors
- Settlements
- Core Paths
- Cycle Network
- Walk Highlands - Tourist walk

Core Paths and Walk Highlands - Tourist walk
1 - Inversnaid RSPB Nature Trail
2 - Tarbet Isle Loop
3 - Cruach Tainbeirt
4 - Three Lochs Way
5 - Beinn Chabhair from Inverarnan
6 - West Highland Way
7 - Ben Vane from Inveruglas
8 - Ben Vorlich from Inveruglas

Informal Lay-by
Scottish Hydro Electric - Sloy Power Station
Parking
Inveruglas loch cruises
Inveruglas coffee shop
7 / 8
Depot
Inveruglas
Inveruglas Castle
Ferry
Informal Lay-by
Informal Lay-by
Informal Lay-by
7 / 8
7
Loch Lomond Holiday Park
1
Hotel
Informal Lay-by
Kenmore Wood
Pier
Informal Lay-by
West Highland Way
Informal Lay-by
Informal Lay-by
Informal Lay-by
4
6
Informal Lay-by
Jetty
Bonnie Braes Restaurant
Restaurant
2
Cruach Tairbeirt
Tarbet Isle
Old Military Road
Informal Lay-by
Arrochar
3
6
Tarbet House B & B
Arrochar Primary School
4
Tourist Information Centre
Parking
Tarbet Hotel
Pier
Loch Long
Tarbet
Pier

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

Scale 1: 10 000

Notes:

Revision	By	Checked	Approved	Date	Description
1.0	SH	CS	AS	27.01.14	DRAFT STAMP REMOVED.
1.1	SH	SWG	SWG	03.03.14	DRAWING BORDER AMENDED.

Client: Transport Scotland — The Scottish Government

CH2M HILL FAIRHURST
CH2M Hill Fairhurst JV
C/O: City Park 368 Alexandra Parade Glasgow G31 3AU
Tel +44 (0)141 552 2000 Fax +44 (0)141 552 2525

Project: A82 TARBET TO INVERARNAN

Drawing Title: VISUAL PLAN
SHEET 2 OF 2

Drawn by	SH	Date: 08.10.13
Checked by	AS	Date: 18.11.13
Authorised by	AS	Date: 18.11.13

Drawing No. **476416-3000-005**
Revision **1.1**
Drawing Scale: AS SHOWN at A1
CAD Filename: -