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Environmental Impact Assessment Environmental Statement

A887 Allt Lagain Bhain Bridge Replacement

Produced for:

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1 Introduction

1.1 Introduction to the Proposed Project

BEAR Scotland Ltd has been commissioned by Transport Scotland to replace the existing A887 Allt Lagain Bhain road bridge. The Allt Lagain Bhain Bridge carries the A887 trunk road which is the main route between the A82 at Invermoriston and the Isle of Skye (via the A87). The site is located at National Grid Reference (NGR) NH 30958 13540 approximately 500 m west of the small settlement of Dundreggan.

The existing structure consists of a single 5 m span bridge which has been propped at its mid-span since 2001 and has a history of parapet damage due to its narrow deck width. The existing road bridge is currently in a very poor condition with the main reinforcement being severely corroded. Maintenance repairs are not feasible due to the extent of the work required and it is considered that the bridge has come to the end of its working life. In addition, there is a redundant historic masonry arch bridge which is immediately adjacent to the road bridge on its north side that will need to be demolished to accommodate the proposed scheme.

1.2 The Location of the Project

The Allt Lagain Bhain Bridge is located at NGR NH 30958 13540 on the A887 trunk road in Glen Moriston, west of the small settlement of Dundreggan (Figure 1.1). The River Moriston, including part of the Allt Lagain Bhain watercourse up to the downstream side of the trunk road bridge, is designated as a Special Area

of Conservation (SAC) due to its populations of Atlantic salmon (*Salmo salar*), and freshwater pearl mussels (*Margaritifera margaritifera*).

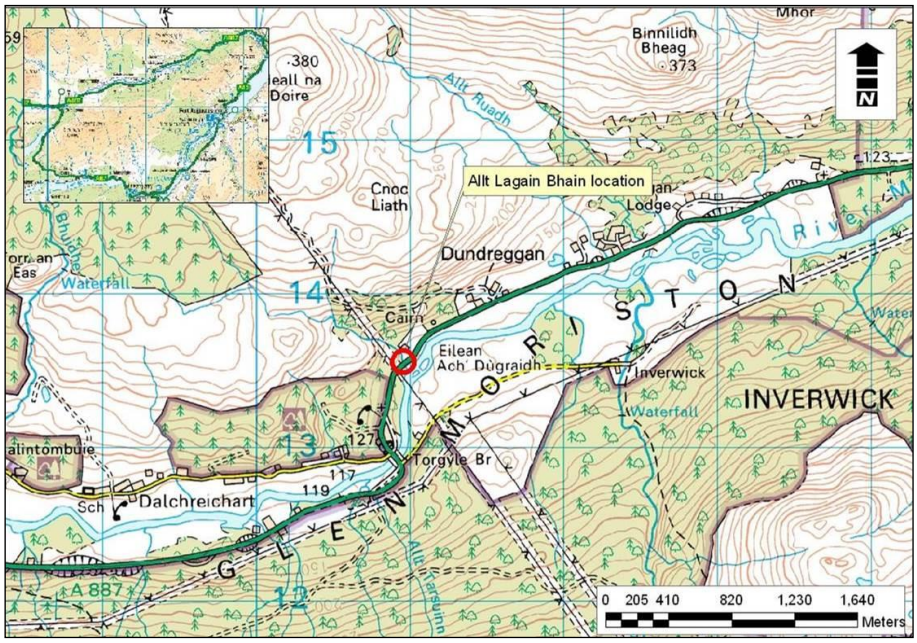


Figure 1.1 Location of Allt Lagain Bhain Bridge

1.3 Environmental Impact Assessment – Legal Basis

The requirement for Environmental Impact Assessment (EIA) is detailed in Sections 20A and 55A of the Roads (Scotland) Act 1984 as amended by Part III of the Environmental Impact Assessment (Scotland) Regulations 1999 and the Environmental Impact Assessment (Scotland) Amendment Regulations 2006. EIA is a requirement under The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011, hereafter referred to as the 'EIA Regulations'. The legislation details projects for which EIA is mandatory (Annex I) and projects for which EIA may be required where specified thresholds have been exceeded and significant effects are considered likely (Annex II). Annex II projects are screened for potentially significant effects with regard to Annex III criteria.

The A887 Allt Lagain Bhain Bridge Replacement is a "Relevant" Annex II project as it is located in part within the River Moriston Special Area of Conservation (SAC) – see Figure 6.2 for extents in relation to the project and Section 6.5 for baseline information. The project was screened initially by Scotland TranServ on behalf of Transport Scotland and, with regard to Annex III criteria, the potential for significant effects was identified and the requirement for EIA determined.

EIA has been undertaken as an integral part of the proposed scheme design and appraisal and environmental constraints have directly informed the design process. They will also inform the contract specification, incorporating measures to avoid, reduce, remedy or offset any significant predicted adverse environmental impacts.

1.4 The Environmental Statement - Purpose and Legislative Context

As stated in Section 1.3, the A887 Allt Lagain Bhain Bridge Replacement Project has been subject to EIA. The Environmental Statement (ES) reports on the findings of this assessment and aims to present the results in an objective, clear and comprehensive manner. Another objective of the ES is to inform all those with an interest in the project including the public, Scottish Ministers and organisations with statutory and non-statutory interests in the environment, of the likely effects of the proposals.

Schedule 4 of the EIA (Scotland) Regulations 1999 and the EIA Regulations provides detail of information to be included in Environmental Statements and accordingly, the ES provides:

- A description of the proposed scheme, including information on the site, design and scale of the project. This will include details of the land use requirements during construction and operation of the proposed scheme as well as the nature, type and materials used.
- An outline of the main alternatives and the main reasons for the choice of the preferred scheme, taking into account environmental effects.
- A description of the aspects of the environment likely to be significantly affected by the proposed scheme.
- A description of the likely significant effects on the environment arising from the proposed scheme. This will include direct, indirect, secondary, cumulative, short, medium and long-term, permanent, temporary, positive and negative effects and a description of the forecasting methods used to assess the impacts on the environment.
- A description of the measures envisaged to avoid, prevent, reduce and where possible offset any significant adverse effect on the environment.
- An indication of any difficulties (technical deficiencies or lack of know-how) encountered in compiling the required information.
- A Non-technical Summary of the information provided above.

1.5 Structure and Content of the Environmental Statement

The ES presents the main report detailing the results of the EIA including figures and appendices that offer supporting information.

The structure of this ES is as follows:

- Non-technical Summary (NTS) highlights the key impacts and proposed mitigation measures in non-technical language and is available as a separate document.

- Chapter 1 includes this introduction, which presents the purpose of the report, the assessment team and the report structure.
- Chapter 2 provides a description of the project and alternatives considered.
- Chapter 3 provides details of methods used in the EIA.
- Chapter 4 provides details of consultation and scoping carried out.
- Chapters 5 to 8 each address a specific environmental topic area (determined through scoping, see Chapter 4), with subsections on assessment methods, baseline conditions, predicted impacts, mitigation measures and residual impacts under the following chapter headings:
    - Chapter 5: Cultural Heritage
    - Chapter 6: Ecology and Nature Conservation
    - Chapter 7: Landscape Effects
    - Chapter 8: Road Drainage and the Water Environment
- Chapter 9 considers the cumulative impacts in terms of interactions between different environmental topics and with other existing or planned projects.
- Chapter 10 provides a summary of effects.
- Chapter 11 provides a schedule of environmental commitments.
- Chapter 12 provides a list of references.
- Chapter 13 provides a glossary of technical terms used in the ES.

1.6 The Assessment Team

The EIA was undertaken, managed and compiled by BEAR Scotland with additional specialist input provided by Highland Ecology and Development Ltd and CFA Archaeology Ltd.

1.7 Review and Comments

Copies of the ES are available for viewing by the public. These are on display at the following locations:

Transport Scotland
Roads Directorate - Bridges Branch
George House 2nd Floor
36 North Hanover Street
Glasgow
G1 2AD

Highland Council
Charles Kennedy Building
Achintore Road
Fort William
PH33 6RQ

Fort Augustus Post Office
Great Glen Trading Centre
Main Street
Fort Augustus
PH32 4DD

Copies of the Environmental Statement may be purchased (at a charge of £250 for a hard copy) and are also available in USB format (at a charge of £25), or downloaded free of charge on the Transport Scotland website at https://www.transport.gov.scot/projects/a887-lagain-bhain-bridge-replacement/. All hard copy requests should be made in writing to Transport Scotland by email to TRO-Objections@transport.gov.scot or at the postal address above.

Any person wishing to make representation on the ES should write to Transport Scotland at the postal address or email provided above. Representations must be received within 42 days of the advertised date of the publication of the ES.

2 The Project

2.1 Background to the Project

The existing trunk road bridge dates to the 1930s or 1940s and has been stabilised with temporary props since 2001 (Figure 2.1). It is now considered necessary to replace the structure. Existing land use in the vicinity of the bridge consists mainly of deciduous woodland and rough grazing.

Figure 2.1 Existing A887 Allt Lagain Bhain Bridge looking upstream

2.2 Policies and Plans

The proposed bridge upgrade supports the Highland Wide Local Development Plan (HwLDP) (Highland Council, 2012) to ensure better road connections for residents and tourists. In conjunction with this, the Inverness and the West Highland and Islands Local Plans have been considered. Similarly, the proposed scheme is in line with one of the outcomes supported by the Transport Strategy for the Highlands and Islands (HITRANS, 2008), i.e. to improve journey times and connections. The Local Transport Strategy 2010/11 – 2013/14 (Highland Council, 2010) supports improvements to the trunk road network, for example, in LTS Policy No. 2 "… the Council will continue to lobby for improvements to the strategic trunk road network …".

The River Basin Management Plan for the Scotland River Basin District (2015) has also been considered to seek to ensure the water environment is protected throughout the works.

2.3 The Project Objective

The project objective is to replace the A887 Allt Lagain Bhain Bridge with a structure that meets current Design Manual for Roads and Bridges (DMRB) standards. The work is required to meet the existing standards and provide a long-term solution to structural issues with the bridge; it is not required to address environmental issues *per se*.

2.4 Description of the Project

2.4.1 Works to the Trunk Road Bridge

The proposed scheme will entail replacing the existing bridge with a new structure (i.e. a box culvert) on the existing horizontal alignment of the road. Existing annual average daily traffic flow at the bridge is 965. In August daily flows increase to 1367. There will be no predicted increase in traffic flows as a result of the proposed scheme. The existing bridge is single track (Figure 2.2) while the proposed scheme will be upgraded to a standard carriageway width and allow for the eventual upgrading of the short section of single track road lying immediately to the west.

Figure 2.2 Existing single track A887 over Allt Lagain Bhain Bridge

A drawing of the proposed scheme layout can be found in Appendix B - Drawing 09/NW/1202/001/005. The design working life for the new structure is 120 years.

The proposed scheme will have no effect on the horizontal alignment of the A887. The road centre line will be retained and the road cross section widened out from this point. The vertical alignment of the road will be altered to allow additional clearance through the proposed new culvert. The horizontal alignment of Allt Lagain Bhain will be altered at the culvert so it returns to a more natural alignment. The vertical alignment of the road will be raised to allow the culvert to provide the design flood capacity with an allowance for freeboard.

The proposed scheme to replace the existing bridge entails installation of a buried invert segmental precast concrete box structure with internal dimensions 5.5 m width, 1.9 m height at 11.35^{o} skew. The overall skewed length is approximately 12.5 m and the approximate depth of cover is 0.6 m. A 0.5 m wide otter ledge will be cast on one side and the invert of the box structure will be buried to a depth of 0.3 m and the watercourse bed re-instated to reflect a natural state. This will provide a channel opening of 5 m and height of 1.6 m. *In situ* concrete upstand walls will be cast to the end of the structure and support the masonry bridge parapets.

The foundation options are either a piled foundation or ground improvement with the preferred option being to improve the bearing capacity by use of a geogrid basal platform. Construction of the foundations and installation of the precast structure will require a temporary cofferdam rather than open excavation.

A reinforced concrete U-shape channel will be installed to Allt Lagain Bhain, for approximately 4.6 m upstream of the inlet and 6.4 m downstream of the outlet of the box structure. This will be an *in situ* structure, varying in height to provide wingwalls and training walls. The otter ledge will be continued along the channel walls. The watercourse bed will be reinstated on the base of the concrete channel to reflect a natural state. There will be no step in the bed along the whole length of the proposed scheme.

2.4.2 Works to the Old Bridge

In order to accommodate the new structure and facilitate safe working, the historic masonry arch bridge lying directly upstream of the trunk road bridge will need to be demolished. The works will require formation of a temporary diversion route to the north of the bridge and realignment of the Allt Lagain Bhain watercourse to its original line, as its current alignment has been skewed to flow perpendicularly to the A887 trunk road.

Figure 2.3 View of invert showing brick laid stone arrangement

The realignment will improve flow and the buried invert will allow a natural stream bed to be formed in place of the current artificial brick laid stone arrangement (Figure 2.3). There will be no permanent lighting associated with the finished bridge. Boulders will be placed on the stream bed and set in concrete to form baffles providing both a low flow channel and cover for fish.

2.5 Land Use Setting and Land-take

The extent of land-take is shown in Figure 2.4.

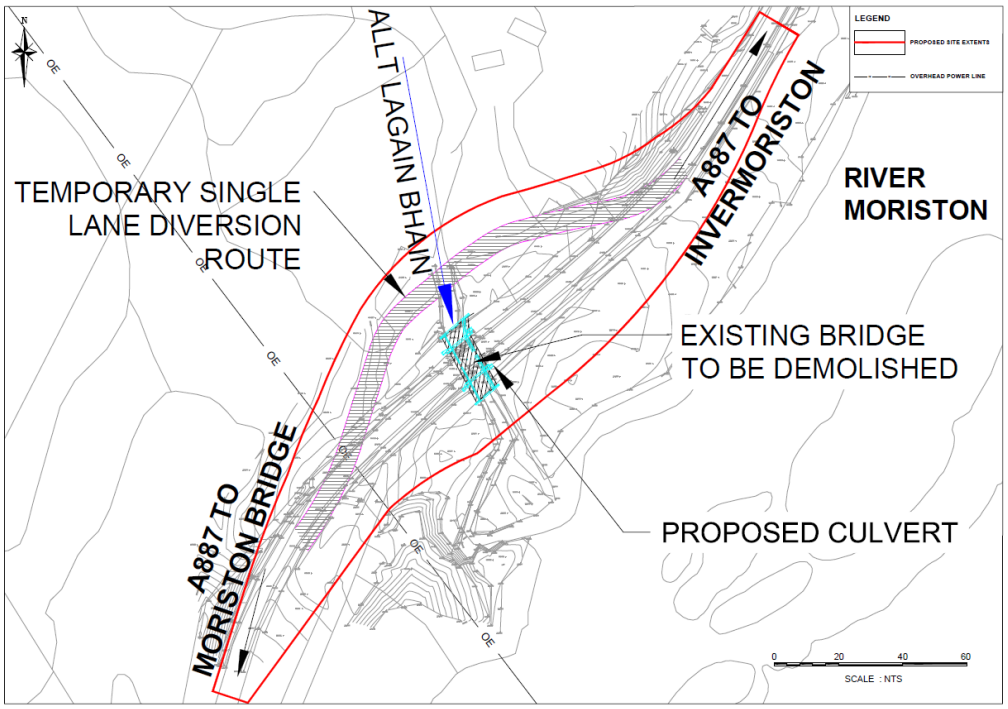


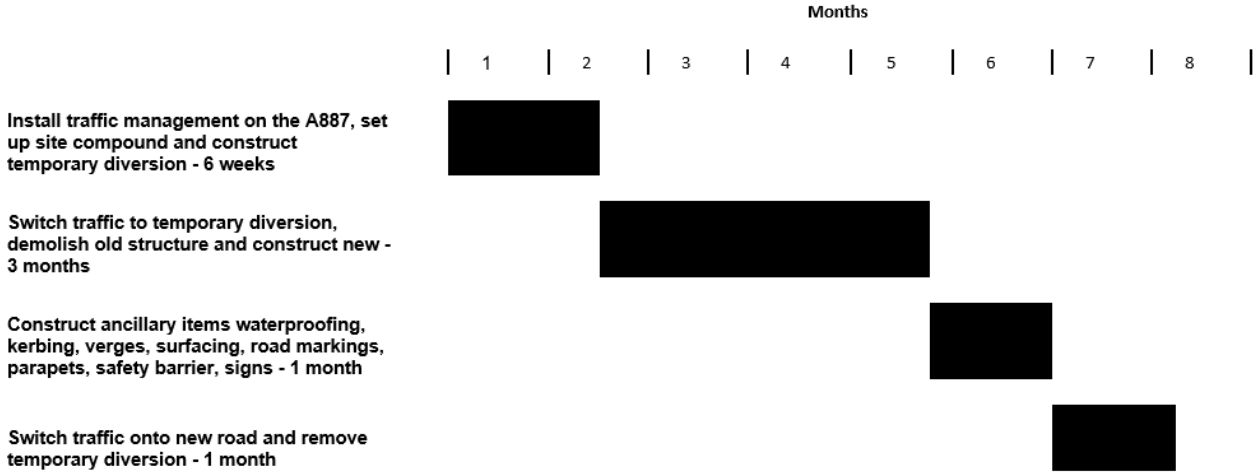
Figure 2.4 Extent of land-take (outlined in red) at A887 Allt Lagain Bhain

2.6 Construction, Operation and Long-term Management

The construction of the proposed scheme, subject to satisfactory progression of the statutory process, is currently programmed for 2019. The construction works will take approximately nine months to complete and will be programmed to ensure works within the watercourse are completed during the summer months (1st June to 14th October inclusive). The majority of the works will be undertaken during daytime hours with the possibility of some limited night-time works. Consequently, the need to light the site during construction is likely to be limited.

Although the detailed design is still in progress, Table 2.1 provides an anticipated high-level construction plan for the main works based on similar bridge replacements undertaken by BEAR Scotland.

Table 2.1 Anticipated construction plan



In addition, landscaping works entailing appropriate planting with native species will be undertaken once the main works are completed.

During the operational phase, it is expected that routine maintenance will be carried out as required over the new bridge's lifespan.

2.7 Alternatives Considered

2.7.1 Design Options that have been Considered

The location of the existing Allt Lagain Bhain Bridge and the relatively small scale of the likely works, led to the conclusion that an on-line solution to the deterioration of the existing bridge would be the most appropriate. Consideration was given to the following options:

- do nothing;
- strengthening the existing structure through maintenance repairs; and
- complete replacement with a new structure.

The "Do Nothing" scenario is not considered viable as this would eventually entail a weight restriction being placed on the bridge forcing HGVs to take a long detour. It would eventually entail the closure of the trunk road.

The maintenance repairs option would involve stripping the surfacing from the bridge, carrying out concrete repairs to the top of the deck, waterproofing the deck, resurfacing, installing new joints and installing new safety barriers. Concrete repairs would also be required at the bottom flanges of the precast beams that form the soffit of the bridge. The temporary propping would also be replaced. Although this option would improve the condition of the current

structure, it would not improve its assessed load-carrying capacity or improve the road cross section. This option was, therefore, discounted because the assessed capacity of the structure is only 17 tonnes and considered not sufficient for a trunk road of this nature.

The preferred option is to replace the bridge with a new structure, designed to current loading standards and this is required to allow the long term availability of this route to trunk road traffic.

2.7.2 Further Design Development

Should there be significant amendments and/or variations to the design, an assessment of environmental effects would be carried out as required. This would include consultation with relevant statutory consultees, and presentation of the assessment in an Addendum to this Environmental Statement.

3 Study Methods

3.1 Introduction

The aims of the EIA are:

- to gather information about the environment of the study area (Figure 3.1) and identify environmental constraints and opportunities associated with the area which may influence, or be affected by the proposed scheme;
- to identify and incorporate into proposed scheme design, construction and operation, features and measures to avoid or mitigate adverse impacts and enhance beneficial impacts; and
- to identify and assess predicted significant environmental impacts after mitigation has been applied.

This chapter discusses the approach and methods used to carry out the assessment and identifies aspects of the proposed development that have been subject to assessment.

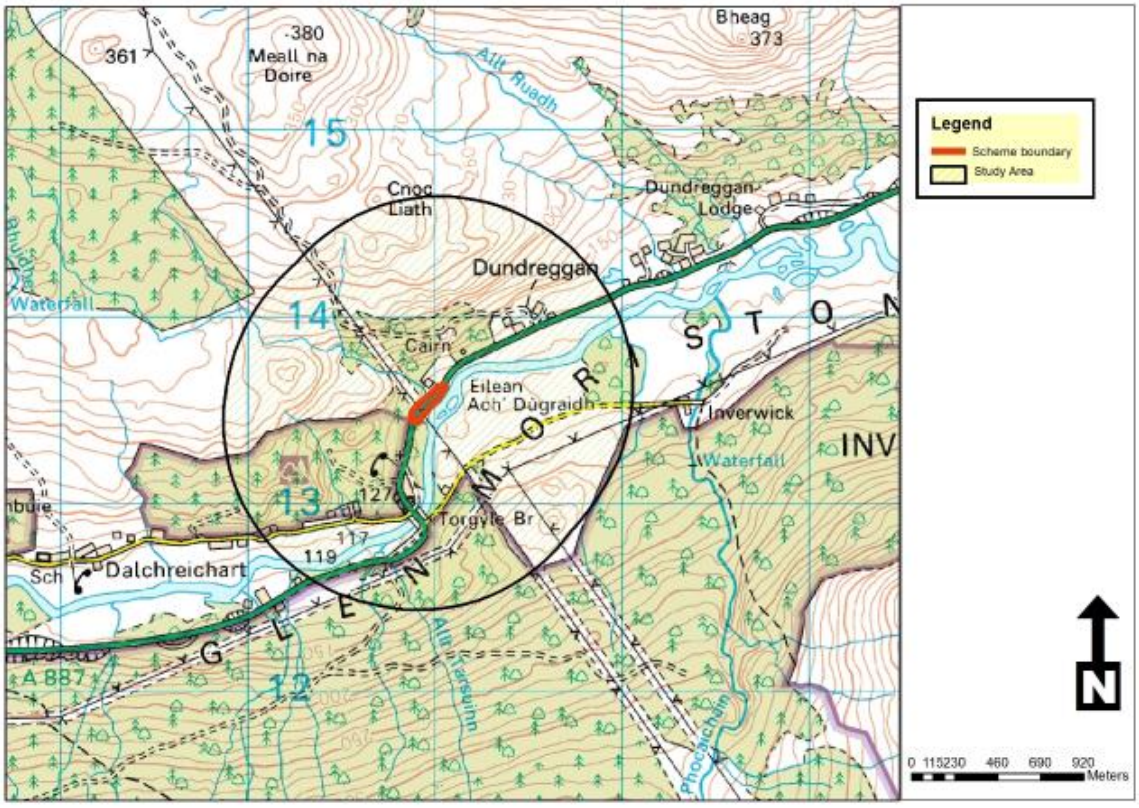


Figure 3.1 Study Area

3.2 Approach and Methods

3.2.1 Scope and Guidance

This EIA has been carried out in accordance with the Environmental Impact Assessment (Scotland) Regulations 1999 and Environmental Impact Assessment (Scotland) Amendment Regulations 2006. EIA is a requirement under the EIA Regulations. It also takes guidance from Volume 11 of the Design Manual for Roads and Bridges (DMRB) (Highways Agency, 1993); this was first published in 1993 and amended and updated by the Highways Agency, The Scottish Government, The Welsh Assembly Government and The Department for Regional Development Northern Ireland.

The DMRB provides guidance on the development of trunk road schemes including motorways and is applicable to this proposed scheme. Volume 11 of the DMRB specifically provides guidance on the environmental impact assessment of this type of scheme, including the level of assessment required at key stages of development and the requirements for reporting the environmental effects of such schemes.

Annex E of the Circular 8/2007 'The Environmental Impact Assessment (Scotland) Regulations 1999' (Scottish Government, 2007) provides guidance on EIAs of trunk road projects. Although The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011 consolidated, updated and replaced Part II of the Environmental Impact Assessment (Scotland) Regulations 1999, Parts III and IV of the 1999 Regulations concerning Roads, Bridges and Land Drainage, remain extant. Consequently, the guidance contained in Circular 8/2007 in Annex E continues to apply and is relevant to the proposed scheme.

New DMRB guidance has been published recently (Interim Advice Note 125/15: Environmental Assessment Update, IAN125/15), but since the assessment was scoped prior to this, it has not been applied to the ES.

3.2.1.1 Scoping

The scoping stage is generally a desk-based assessment that draws on readily-available sources of information to identify those features that can scoped out of an EIA because no significant effects are anticipated. It then assesses in detail those that are scoped in.

3.2.1.2 Detailed assessment

Detailed assessment is required where the potential for significant effects has been identified. This will usually involve site investigation to better understand the character and value of the resource, the magnitude of the impact and the mitigation required to minimise the impact.

The assessment covered in this report was undertaken between April 2013 and November 2016. The environmental topics covered by this assessment are those that were 'scoped in' in the Scoping Report (Scotland TranServ, 2013) as being considered to have significant impacts on environmental receptors. It identifies the likely impacts of the proposed scheme and assesses the residual impacts following implementation of mitigation measures.

The assessment approach has also taken into account further guidance as detailed below.

Best Practice Guidance used for Environmental Assessment

General

- Environmental Impact Assessment (Scotland) Regulations 1999.
- Environmental Impact Assessment (Scotland) Amendment Regulations 2006.
- Scottish Planning Series: Planning Circular 8 2007: The Environmental Impact Assessment (Scotland) Regulations 1999, November 2007.
- The Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011.
- Planning Advice Note (PAN) 1/2013: Environmental Impact Assessment, 2013.Circular 15/99 The Environmental Impact Assessment (Scotland) Regulations 1999, The Scottish Executive.
- A Handbook on Environmental Impact Assessment – Guidance for Competent Authorities, Consultees and others involved in the Environmental Impact Assessment Process in Scotland, SNH 2013.

Water Environment

- The SuDS Manual, CIRIA C753, 2015.
- PPG1: General Guide to the Prevention of Pollution, SEPA.
- PPG2: Above Ground Oil Storage Tanks, SEPA.
- PPG4: Treatment and Disposal of Sewage where no Foul Sewer is Available, SEPA.
- PPG5: Works and Maintenance in or near Water, SEPA.
- PPG6: Working at Construction and Demolition Sites, SEPA.
- PPG13: Vehicle Washing and Cleaning, SEPA.
- PPG20: Dewatering of Underground Ducts and Chambers, SEPA.
- PPG22: Incident Response – Dealing with Spills, SEPA.
- PPG26: Safe Storage: Drums and Intermediate Bulk Containers, SEPA.
- The Water Environment (Controlled Activities) (Scotland) Regulations 2011, as amended.
- The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended): A Practical Guide, Version 7.2, March 2015.
- Is your site right? (a 10-point checklist produced by SEPA).
- SPP7: Planning and Flooding, Scottish Executive, 2004.
- PAN 79: Water and Drainage, Scottish Executive, 2006.

- WAT-SG-23 Good Practice Guide – Bank Protection, SEPA, 2008.
- WAT-SG-25: Good Practice Guide – River Crossings, SEPA, 2010.
- WAT-SG-26: Good Practice Guide – Sediment Management, SEPA, 2010.
- WAT-SG-29: Good Practice guide – Construction Methods, SEPA, 2009.

Ecology and Nature Conservation

- Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal, Chartered Institute of Ecology and Environmental Management, 2016.
- Ecological Impact Assessment, Jo Treweek 1999.
- Biodiversity Impact, Helen Byron 2000.
- National Planning Policy Guideline (NPPG) 14: Natural Heritage, 1999 The Scottish Government

Landscape and Visual Issues

- Landscape and Visual Assessment Supplementary Guidance, Scottish Executive 2002.
- Cost Effective Landscape: Learning from Nature, Scottish Executive, 1998.
- Guidelines for Landscape and Visual Assessment, Landscape Institute and Institute of Environmental Management and Assessment, 2013.
- Richards, J., 1999: Inverness District Landscape Character Assessment, Scottish Natural Heritage Review No. 114, 1999.

Policies and Plans

- SPP1: The Planning System, The Scottish Government (November 2002).
- NPPG 10: Planning and Waste Management, The Scottish Government (June 1996).
- NPPG11: Sport, Physical Recreation and Open Space, The Scottish Government, 1996.
- Scottish Planning Policy 15 SPP 15: Planning for Rural Development (2010).
- NPPG 17: Transport and Planning, The Scottish Government, 1999.
- NPPG18: Planning and the Historic Environment, The Scottish Government, 1999.

In accordance with DMRB Volume 11, consideration has been given to the following environmental factors:

- Air Quality;
- Cultural Heritage;
- Disruption Due to Construction;
- Ecology and Nature Conservation;
- Landscape Effects;
- Land Use;
- Noise and Vibration;
- Pedestrians, Cyclists and Community Effects;
- Vehicle Travellers;
- Road Drainage and the Water Environment;
- Geology and Soils; and
- Impact of Road Schemes on Policies and Plans.

A number of these topics have been 'scoped out' (see Section 4.4.) and this ES specifically focusses on Cultural Heritage (Chapter 5), Ecology and Nature Conservation (Chapter 6), Landscape Effects (Chapter 7) and Road Drainage and the Water Environment (Chapter 8) as well as an assessment of cumulative effects (Chapter 9). In line with current DMRB guidance, the assessment of impacts due to construction and consideration of policies and plans, where relevant, are also included within each topic chapter.

3.2.2 Assessment Methods

Impacts which occur during construction works, whether temporary or permanent, and impacts on policies and plans are considered within each environmental topic where appropriate.

Each assessment reported in the ES is structured as follows:

- description of study area;
- evaluation of baseline features;
- impact assessment;
- identification of mitigation, enhancement and monitoring measures;

- significance of residual impacts following mitigation; and
- summary of the assessment.

There may be slight differences in layout within the individual sections, as appropriate to the individual topic assessment.

3.2.3 Baseline Conditions

The specific assessment for each environmental subject has been undertaken in relation to a 'baseline'. The 'baseline' normally reflects the existing situation and how this would change if the proposed scheme did not go ahead (i.e., the Do Nothing Scenario).

Baseline information has been collected through site visits and review of maps, data, records, information and reports obtained from statutory and non-statutory organisations (see Chapter 4: Consultation and Scoping) and a variety of field surveys.

Site visits were undertaken on several occasions during 2011 to 2016 by the Scotland TranServ / BEAR Scotland Environment Team to assess the baseline conditions and potential environmental risks from the proposed work.

The consultation process with statutory and non-statutory organisations is reported in Chapter 4.

3.2.4 Predicted Impacts and Determining the Significance of Environmental Effects

3.2.4.1 Predicted Impacts

The nature of predicted impacts arising from the proposed scheme has been described and in general an assessment of the level of significance of the impact (as described in Section 3.2.4.2) for each effect determined as far as practical.

Impacts may also be wide-ranging in nature; they could result in direct or indirect, secondary, cumulative, short, medium or long-term, permanent or temporary, positive or adverse effects. These factors have also been taken into account.

3.2.4.2 Determining the Significance of Environmental Effects

The general criteria for assessing the significance of environmental effects are set out in detail in Volume 11 Section 2 Part 5 (HA 205/08) of the DMRB. Tables 3.2-3.4 are reproduced directly from this guidance for the convenience of the reader. Tables specific for each topic are also provided within each chapter.

There is no universally accepted definition of what constitutes a significant impact. It varies according to the environmental factor under consideration, the

context in which the assessment is made and the background of the assessor. Much depends on the availability of data relating to existing environmental conditions and the value applied to these conditions.

The level of significance of impact has been defined in accordance with DMRB Volume 11, Section 2, Part 2. The approach combines the sensitivity of the environmental feature in question with the magnitude of impact, each having been assessed independently according to defined criteria. Sensitivity has generally been defined according to the relative importance of the feature or by the characteristics of the receptor. In the definition of magnitude of impact, consideration has been given to any legislative or policy standards or guidelines, and/or the following factors:

- the degree to which the environment is affected, e.g. whether the quality is enhanced or impaired;
- the scale of the development, e.g. the size of land area or number of receptors affected and degree of change from the existing situation;
- the scale of change resulting from impacts; and
- whether the effect is temporary or permanent.

3.2.4.3 *Magnitude of Impact and Typical Criteria Descriptors*

Major

- Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements (Adverse).
- Large scale or major improvement of resource quality; extensive restoration or enhancement; major improvement of attribute quality (Beneficial).

Moderate

- Loss of resource, but not adversely affecting the integrity; partial loss of/damage to key characteristics, features or elements (Adverse).
- Benefit to, or addition of, key characteristics, features or elements; improvement of attribute quality (Beneficial).

Minor

- Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements (Adverse).
- Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring (Beneficial).

Negligible

- Very minor loss or detrimental alteration to one or more characteristics, features or elements (Adverse).
- Very minor benefit to or positive addition of one or more characteristics, features or elements (Beneficial).

No change

- No loss or alteration of characteristics, features or elements; no observable impact in either direction.

3.2.4.4 Typical Descriptors of the Significance of Effect Categories

Very large

Only adverse effects are normally assigned this level of significance. They represent key factors in the decision-making process. These effects are generally but not exclusively, associated with sites or features of international, national or regional importance that are likely to suffer a most damaging impact and loss of resource integrity. However, a major change in a site or feature of local importance may also enter this category.

Large

These beneficial or adverse effects are considered to be very important considerations and are likely to be material in the decision-making process.

Moderate

These beneficial or adverse effects may be important but are not likely to be key decision-making factors. The cumulative effects of such factors may influence decision-making if they lead to an increase in the overall adverse effect on a particular resource or receptor.

Slight

These beneficial or adverse effects may be raised as local factors. They are unlikely to be critical in the decision-making process but are important in enhancing the subsequent design of the project.

Neutral

No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

Significance Criteria for Cumulative Effects (DMRB Volume 11, Section 2, part 5)

Severe

Effects that the decision-maker must take into account as the receptor/resource is irretrievably compromised.

Major

Effects that may become key decision-making issue.

Moderate

Effects that are unlikely to become issues on whether the project design should be selected, but where future work may be needed to improve on current performance.

Minor

Effects that are locally significant.

Not significant

Effects that are beyond the current forecasting ability or are within the ability of the resource to absorb such change.

3.2.5 Mitigation Measures

The approach to mitigation measures adopted for this EIA is consistent with the guidance provided in Planning Advice Note (PAN) 1/2013 on EIA. Mitigation should be considered as a hierarchy ranging from prevention or avoidance of environmental effects, down to compensation for effects that cannot be remedied. The hierarchy is summarised below.

3.2.5.1 Mitigation Hierarchy

Prevent/Avoid

To prevent adverse environmental effects at source, for example, through choice of site or specification of construction equipment.

Reduce

If adverse effects cannot be prevented, steps taken to reduce them through such methods as minimisation of cause of impact at source, abatement on site and abatement at receptor.

Remedy/Offset

When effects remain that cannot be prevented or reduced, they are offset by remedial or compensatory actions. This can be provision of environmental improvements, opportunities for access and informal recreation, creation of alternative habitats and prior excavation of archaeological features.

The approach to the mitigation of adverse environmental impacts has been to avoid them wherever practicable. From the design outset, this has been achieved by considering how to prevent adverse effects at source, rather than relying on measures to mitigate the effects. Where it has not been possible to avoid impacts, measures have designed to minimise those impacts, such as landscaping and pollution prevention measures on site.

3.2.6 The Definition of Residual Effects

Residual impact sections within each chapter report the anticipated significance of impacts remaining following the application of the proposed mitigation identified in the chapter.

4 Consultation and Scoping

4.1 Introduction

This chapter describes the consultation process that was undertaken throughout the various stages of the EIA process and provides a summary of the key issues raised by consultees. It also includes relevant responses from consultations that were undertaken as part of the Scoping Report (Scotland TranServ, 2013). Consultation is a key and fundamental part of the EIA process; in the case of this project, it has been informed by the key environmental issues identified during the scoping stage. Scoping was undertaken in 2012 including the scoping consultations. The scoping responses were received during the same year. It was agreed to initially consult by e-mail and letter. Further consultations during the EIA process were undertaken from 2013 to 2016. Re-consultation with statutory consultees will be carried out as the design progresses, as will consultation with non-statutory consultees and other stakeholders.

4.2 The Consultation Process

The consultation process serves to:

- seek to ensure that statutory consultees and other bodies with a particular interest in the environment within the area of the proposed scheme are informed of the proposal and provided with an opportunity to comment;
- obtain baseline information regarding existing environmental site conditions;
- establish key environmental issues and identify potential impacts to be considered during the EIA;
- identify those issues which are likely to require more detailed study and those which can be justifiably excluded from further assessment; and
- provide a means of identifying the most appropriate methods of impact assessment.

Although consultation is an important part of the EIA process, it may continue in an iterative manner throughout the detailed planning and design stages of the project.

4.3 Consultation

Consultation has been informed by the key environmental issues identified and as a result, the following statutory and non-statutory consultees have been consulted:

- Scottish Environment Protection Agency (SEPA);

- Scottish Natural Heritage (SNH);
- Highland Council Historic Environment Team;
- Ness District Salmon Fishery Board; and
- Ness and Beauly Fisheries Trust.

A summary of responses and details of how concerns have been addressed are provided in Table 4.1. Further consultation will be undertaken with all parties to address their concerns and to obtain the necessary licences.

Table 4.1 Summary of consultee responses and actions taken

Consultee	Summary of Response	Action taken
SNH	An appropriate assessment will be required which examines the impact on freshwater pearl mussels. Advice was provided in relation to the bat roosts and the need for a licence to destroy the roosts.	1. A report known as Report to Inform Appropriate Assessment (RIAA) has been produced, examining the impact on the qualifying features of the River Moriston SAC. The RIAA concluded no impact on the integrity of the qualifying interests of the SAC. 2. A number of bat surveys have been undertaken to inform the nature of the roost. These will be repeated prior to the works being undertaken. The contractor will work with SNH to develop mitigation and a licence to destroy the bat roosts will be obtained prior to work commencing.
SEPA	CAR licence will be required due to both bridge construction and Allt Lagain Bhain realignment. Flood risk issues were highlighted and SEPA wish to be provided with the flood risk assessment.	1. CAR licence will be obtained in advance of the works for construction of bridge and river realignment. 2. Flood risk assessment has been provided to SEPA who have now agreed that capacity is sufficient.
Highland Council Archaeology Unit	Masonry bridge is of historic interest and other options should be considered in	1. Other options were considered that would remove the need to demolish the historic bridge, however for reasons of logistics and safety, a viable alternative could not be found.

Consultee	Summary of Response	Action taken
	preference to demolition.	2. A level 3 standing building survey has been undertaken to record the historic bridge. This fully meets the specification provided by the Highland Council and a watching brief will be undertaken during demolition.
Ness District Salmon Fishery Board	Ensure that works do not prevent the upstream migration of fish or result in any contamination of the water. Avoid perched culvert in finished design.	1. Extensive measures have been incorporated to prevent pollution during the works (see Sections 6.7.3, 8.6.2 and 8.7.2). 2. The design is such that there will not be steps in the river bed, with the invert being buried and a natural bed reinstated.
Ness and Beauly District Fisheries Trust	Timing of the works is critical – avoid 15th October to 31st May. Consider removal of fish during realignment.	1. The project will be timed to avoid in-river works during the salmonid spawning season. This is also anticipated to be a requirement of the CAR licence. 2. Mitigation to avoid impacts on fish include their removal and relocation during realignment by means of electrofishing.

4.4 Scope of the Environmental Impact Assessment

Throughout the development of options and the development of the preferred option, the issues requiring environmental assessment have been identified through review of the Scoping Report (Scotland TranServ, 2013) and re-assessment as new information (such as further survey information) has been made available. The scope of the EIA has been defined in accordance with the DMRB guidance and has also been informed through consultation with stakeholders. This has resulted in certain issues being 'scoped out' on the basis of no significant effects predicted and, therefore, not considered further. This section lists the issues which have been scoped 'in' or 'out' of the EIA and discusses, where appropriate, the justification for not considering them further. Table 4.2 summarises issues scoped 'in' and 'out' for further assessment.

Table 4.2 Summary of Scoping Assessment as given in the Scoping Report Scotland TranServ, 2013)

Topic	Scoping assessment (in or out)	Reason for assessment as given in the Scoping Report
Air Quality	Out	Although a slight adverse impact is predicted on air quality during construction, this is temporary and not considered significant, especially with no receptors within 200 m. With a neutral long term significance of effect it is considered that provided standard best practice mitigation during construction is adopted, then further assessment is not required. Air quality is, therefore, **scoped out** of assessment and not considered further in the Environmental Statement (ES).
Cultural Heritage	In	During consultation with the Highland Council Historic Environment Team, concerns were raised in relation to the historic masonry arch bridge despite not being recorded at the time in the Highland Historic Environment Record. Due to the Large or Very Large predicted significance of effect, as a result of demolition and loss of bridge of significant historic value, cultural heritage is **scoped in** for assessment within the ES.
Ecology and Nature Conservation	In	A Large or Very Large significance of effect has been predicted for bat species, based on survey and design work carried out to date. Further survey and design work will be carried out to better understand the nature of this impact and to investigate opportunities for mitigation and impact reduction. The Scoping Report identified that further assessment of the impact on all

Topic	Scoping assessment (in or out)	Reason for assessment as given in the Scoping Report
		protected species, habitats and designated areas is also required. All the issues highlighted in the Ecology and Nature Conservation Section are therefore **scoped in** to the ES.
Landscape Effects	In	A slight adverse effect was predicted and not considered to be significant. However, due to the current status of designs, the exact nature of this impact is considered to be sufficiently unclear and landscape effects are **scoped in** for further assessment within the ES.
Land Use	Out	Land take as part of the project is unavoidable and the predicted slight adverse effect is not considered to be significant. Further assessment within the ES therefore is not required and land use is **scoped out**.
Noise and Vibration	Out	Although works are anticipated to take nine months to complete, there are no sensitive residential receptors within 200 m of the proposed scheme. As there is no significant impact predicted due to noise and vibration, this discipline is **scoped out** and not considered further in the ES.
Pedestrians, Cyclists and Equestrians	Out	As there are no existing or known planned footways, cycleways, cycle tracks or paths on this route, it is not necessary to consider their provision further within this project. As there is no adverse long-term impact predicted, further assessment is not necessary and this section is **scoped out** of the environmental statement. Due to the slight adverse construction related impact it is proposed to include measures designed to minimise disruption to pedestrians, cyclists and equestrians in the schedule of environmental commitments within the ES.
Vehicle Travellers	Out	Due to the slight or moderate beneficial effect of the finished proposed scheme, further assessment of the effect on vehicle travellers is **scoped out** of the ES. There will be some disruption to vehicle travellers during construction. Measures will however be included within the schedule of environmental commitments aimed at reducing the impact on vehicle travellers during construction. A

Topic	Scoping assessment (in or out)	Reason for assessment as given in the Scoping Report
		temporary road and bridge diversion will be provided alongside the existing road.
Road Drainage and the Water Environment	In	A moderate or large significant adverse impact is predicted during the construction phase. Further assessment of the Road Drainage and the Water Environment is required and has, therefore, been **scoped in** to the ES.
Geology and Soils	Out	The predicted level of impact (neutral or slight) is not considered to be significant, therefore, geology and soil is **scoped out** of further assessment within the ES. In accordance with best practice, measures will be included within the schedule of environmental commitments to further minimise the impact on geology and soils.
Cumulative Effects	In	The Scoping Report concluded that the significance of cumulative impacts could be slight to moderate for Ecology and Nature Conservation; Landscape Effects; and Road Drainage and the Water Environment only. Therefore cumulative effects have been **scoped in** for further assessment in the ES.

The environmental statement includes an assessment of the following topics, as these were identified in the Scoping Report as requiring further assessment:

- Cultural Heritage;
- Ecology and Nature Conservation;
- Landscape Effects; and
- Road Drainage and the Water Environment.

Where relevant, best practice measures have been included in the Schedule of Environmental Commitments (see Chapter 11). This will serve to minimise any temporary, minor, construction related impacts associated with these topics.

5 Cultural Heritage

5.1 Introduction

This chapter considers the predicted impact on cultural heritage in relation to the proposed scheme. The assessment has been informed by surveys carried out by CFA Archaeology Ltd which have been used to determine the baseline as well as record existing cultural heritage assets. The CFA assessment focussed on the existing road bridge and the old stone arch bridge, both of which will be demolished as a result of the works. A list of policy documents and published guidelines taken into account in the preparation of this chapter is included in Section 5.3.

The Council of Europe, in the *Framework Convention on the Value of Cultural Heritage for Society (*Faro 2005), has defined cultural heritage as:

'…a group of resources inherited from the past which people identify, independently of ownership, as a reflection and expression of their constantly evolving values, beliefs, knowledge and traditions. It includes all aspects of the environment resulting from the interaction between people and places through time.'

Cultural heritage resources consist of archaeological remains, historic buildings and historic landscapes. They include world heritage sites, scheduled monuments or other archaeological features, listed buildings or other buildings of historic/architectural importance, conservation areas and other significant townscapes or historic gardens and designated landscapes or other significant historic landscapes. The fact that a site is not designated does not mean it is not valuable. Indeed such sites can have a value comparable with some designated sites. Impacts which could be significant can occur on undesignated cultural heritage assets as well as assets that are designated. It is therefore important to include identification of undesignated cultural heritage assets (of which the old bridge is one) within an assessment of impacts of a project or scheme.

Cultural heritage assets can be important features within the landscape of a local area. Refer to Chapter 7: Landscape Effects for further information on the existing landscape and the potential impacts of the scheme on landscape aspects.

A simple assessment of the cultural heritage interests relevant to the proposed scheme was undertaken in accordance with HA208/07. This chapter discusses the results of the simple assessment. The study area in this instance covers the area within the proposed area of land-take and within a 300 m radius around it (Figure 5.1). A larger scale plan showing the cultural heritage receptors, protection zones, areas of archaeological potential and where a watching brief is required is included in Figure B1, Appendix B.

The predicted impact of the construction and operation of the proposed scheme upon cultural heritage resources was considered and measures identified to reduce and/or mitigate the impact. The assessment is based on guidance provided in relation to cultural heritage in DMRB Volume 11, Section 3, Part 2 – HA208/07.

5.2 Criteria for Evaluation of Cultural Heritage Resources

Cultural heritage assets are an irreplaceable resource that can be affected by a development at a number of levels ranging from total loss of the asset at the most extreme to gradual degradation throughout the operation of a scheme. Table 5.1 summarises the process of evaluation of cultural heritage assets.

Following evaluation of the value or sensitivity of cultural heritage assets, it is then necessary to consider the magnitude of impact, both beneficial and adverse. Impacts on the cultural heritage resource, are as defined by the DMRB, namely as changes to the cultural heritage resource caused by the mitigated proposed scheme.

The process of assessing the significance of the effects of the proposed scheme both pre- and post-mitigation, brings together the **value** of the resource and the **magnitude of the impact** for each cultural heritage asset. The adverse or beneficial **significance of effect** is then derived using the matrix in **Error! Reference source not found.**2.

Table 5.1 Evaluation of the value of cultural heritage resources

Level of Importance	Value of resource	Examples with category
International	Very High value and rarity, international scale	World Heritage Sites Assets of acknowledged international importance Buildings of recognised international importance
National	High value and rarity, national scale, or regional scale	Scheduled monuments with standing remains Site suitable for scheduling Category A listed buildings (Scotland) Conservation Areas containing very important buildings Undesignated structures of clear national importance Historic battlefields
Regional	Medium value and rarity, local or regional	Designated or undesignated assets that contribute to regional research objectives Historic (unlisted buildings that can be shown to have exceptional qualities in their fabric Category B listed buildings Conservation Areas containing buildings that contribute significantly to its historic Character Historic Townscape or built-up areas with important historic integrity in their buildings, or built settings (e.g. including street furniture and other structures)
Local	Low value and rarity, local scale	Archaeological sites of local importance

		Assets compromised by poor preservation and/or poor survival of contextual associations Locally Listed (Category C) buildings Unlisted buildings and townscapes of some historic or architectural interest
Lesser	Negligible value and rarity, local scale	Other archaeological sites Assets with very little or no surviving archaeological interest Find spots where artefacts have been already removed Buildings of no architectural or historical note; buildings of an intrusive character
Unknown	Scale of risk needs to be estimated and strategy for management proposed.	Archaeological sites whose morphology, character and date are currently not established Buildings with some hidden (i.e. inaccessible) potential for historic significance

5.2.1 Assessing the Magnitude of Impact on Cultural Heritage Resources

Major

- Loss of resource and/or quality and integrity of resource; severe damage to key characteristics, features or elements (Adverse).
- Large scale or major improvement of resource quality; extensive restoration or enhancement; major improvement of attribute quality (Beneficial).

Moderate

- Loss of resource; partial loss of/damage to key characteristics, features or elements (Adverse).
- Benefit to, or addition of, key characteristics, features of elements; improvement of attribute quality (Beneficial).

Minor

- Some measurable change in attributes, quality or vulnerability; minor loss of, or alteration to, one (maybe more) key characteristics, features or elements (Adverse).
- Minor benefit to, or addition of, one (maybe more) key characteristics, features or elements; some beneficial impact on attribute or a reduced risk of negative impact occurring (Beneficial).

Negligible

- Very minor loss or detrimental alteration to one or more characteristics, features or elements (Adverse).
- Very minor benefit to or positive addition of one or more characteristics, features or elements (Beneficial).

No change

- No loss or alteration of characteristics, features or elements; no observable impact in either direction.

Table 2.2 Arriving at the Significance of Effects Categories

Cultural Heritage Value (Sensitivity)	No Change	Negligible	Minor	Moderate	Major
Very High	Neutral	Slight	Moderate or Large	Large or Very Large	Very Large
High	Neutral	Slight	Slight or Moderate	Moderate or Large	Large or Very Large
Medium	Neutral	Neutral or Slight	Slight	Moderate	Moderate or Large
Low	Neutral	Neutral or Slight	Neutral or Slight	Slight	Slight or Moderate
Negligible	Neutral	Neutral	Neutral or Slight	Neutral or Slight	Slight

5.2.2 Descriptors of the cultural heritage Significance of Effect Categories

Very large

Only adverse effects are normally assigned this level of significance. They represent key factors in the decision-making process. These effects are generally but not exclusively, associated with sites or features of very high, high or medium value that are likely to suffer a most damaging impact and loss of resource integrity. However, a major change in a site or feature of local importance may also enter this category.

Large

These beneficial or adverse effects are considered to be very important considerations and are likely to be material in the decision-making process.

Moderate

These beneficial or adverse effects may be important, but are not likely to be key decision-making factors. The cumulative effects of such factors may influence decision-making if they lead to an increase in the overall adverse effect on a particular resource or receptor.

Slight

These beneficial or adverse effects may be raised as local factors. They are unlikely to be critical in the decision-making process, but are important in enhancing the subsequent design of the project.

Neutral

No effects or those that are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

5.3 Policy and Regulatory Framework

5.3.1 Legislation

- *Planning (Listed Buildings and Conservation Areas) (Scotland) Act (1997):* this legislation aims to protect all listed buildings and conservation areas. Once a building is listed and a conservation area is designated, any alterations that would affect the historic and architectural character of a building or its setting would require listed building or conservation area consent. The Listed Buildings and Conservation Areas Act was amended with the Historic Environment (Amendment) (Scotland) Act 2011.

5.3.2 Policies and Plans

- Highland-wide Local Development Plan (HwLDP) is the Highland Council's vision for the whole area (Highland Council, 2012). It sets out how land can be used by developers for the next 20 years, but excludes the area covered by the Cairngorms National Park, which has its own plan.

- Highland Historic Environment Strategy Guidance (adopted Jan. 2013). This strategy has been prepared as Supplementary Guidance to the HwLDP, relating specifically to Policy 57: Natural, Built and Cultural Heritage. It ensures that future developments take account of the historic environment and that they are of a design and quality to enhance the historic environment bringing both economic and social benefits. It also sets out a proactive, consistent approach to the protection of the historic environment. The purpose of this strategy is to define Highland Council's approach to the protection of the historic environment through the planning process.

- Managing Change in the Historic Environment – Historic Environment Scotland's guidance note series.

- Planning Advice Note 2-2011 Planning and Archaeology (2011): This Planning Advice Note (PAN) works alongside SPP and SHEP and advises heritage professionals in the assessment of impact on sites of archaeological / cultural heritage interest.

- Policy 57: Natural, Built and Cultural Heritage sets out the tests against which all development that affects natural, built and cultural heritage features must be assessed.

- Scottish Planning Policy (Updated 2014): SPP (Scottish Government, 2014) is a document which sets out Government policy on development in Scotland. Policies 135 to 151 provide guidance on heritage assets and planning issues to local authorities and others on the operation of the planning system. These policies provide guidance with particular reference to the identification, protection, conservation and enhancement of archaeological remains, upstanding remains, sites and landscapes as well as designated sites such as listed buildings, conservation areas, scheduled monuments, wrecks, gardens and designed landscapes and world heritage sites.

- Scottish Historic Environment Policy (Revised 2016): The Scottish Historic Environment Policy (SHEP) sets out the Ministers' policies for the historic environment in Scotland. It complements and has the same authority as Scottish Planning Policy and sets out the Scottish Ministers' Policies for planning matters relating to the historic environment as well

as providing direction to Historic Environment Scotland and other bodies on heritage issues.

- Sustainable Design Guide – Supplementary Guidance (adopted January 2013) has been developed to accompany and support the approach to Sustainability and Design contained within the HwLDP. The guidance relates specifically to HwLDP Policy 28 Sustainable Design.

5.4 Study Area

For existing cultural heritage assets, the initial study area formed a 300 m buffer around the footprint of the works as shown in Figure 5.1. An initial desk study and walkover survey was undertaken by the Scotland TranServ/BEAR Scotland environment team and following consultation with the Highland Council archaeologist, a Level 3 Standing Building Survey was undertaken by CFA Archaeology Ltd (Appendix C1.1).

5.5 Character of the Existing Baseline

A search of the Historic Environment Scotland (HES) database, PastMap, found 3 recorded sites of cultural heritage interest within 300 m of the proposed area of land-take. Torgyle Chapel, located 360 m south of the bridge, Torgyle House or Inn, 430 m south of the bridge and the Glenmoriston Footprints, located 300 m to the north (Figure 5.1). There are no scheduled monuments recorded or inventory battlefields within or near the bridge location.

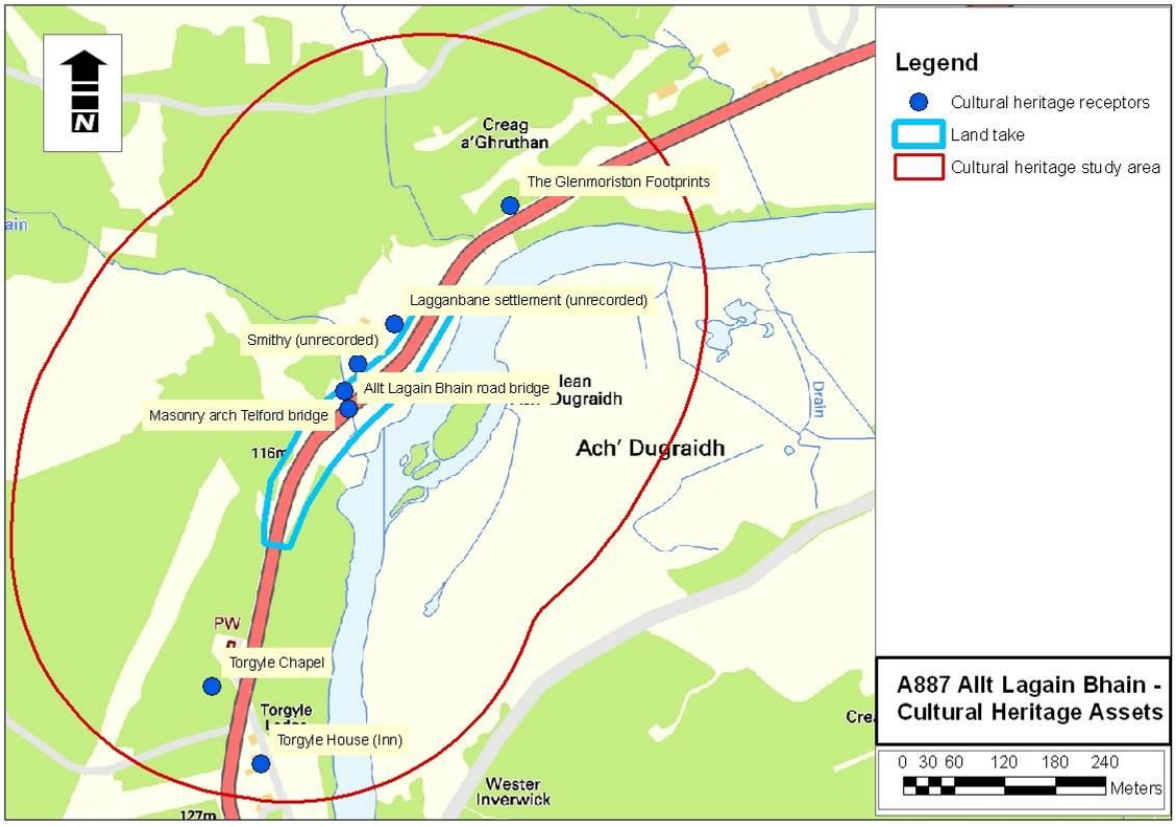


Figure 5.1 Cultural heritage assets within 300 m of the proposed scheme. Note: land-take is indicative only.

During the scoping process and consultation with the Highland Council Historic Environment Team, concerns were raised in relation to the historic masonry arch bridge. Despite being unrecorded on the HES database (PastMap) or in the Highland Historic Environment Record (HER), subsequent survey and research by specialist archaeological contractors, CFA archaeology, determined that the masonry arch bridge was of significant cultural heritage interest, being originally built by Thomas Telford.

The cultural heritage of the existing trunk road bridge, also unrecorded, was also considered. The existing A887 trunk road bridge and the adjacent historic bridge are both now recorded on the HER. A search of the HES PastMap website in November 2016 indicated that Torgyle Chapel, Torgyle House or Inn, the Glenmoriston Footprints, the old masonry bridge and the A887 trunk road bridge were recorded within 300 m of the proposed area of land-take.

There are no listed buildings, scheduled monuments, inventory battlefields, gardens and designed landscape inventory sites or conservation areas within the study area. A description of the recorded and un-recorded cultural heritage assets follows.

5.5.1 Torgyle Chapel

An old chapel is set back from the road and is currently derelict with windows boarded (Figure 5.2). It is described on the Canmore website as “a small unroofed building is depicted on the 1st edition of the OS 6-inch map (Inverness-shire 1874, sheet LXVII), but it is not shown on the current edition of the OS 1:10000 map (1971)”. Further analysis of the 1871 Ordnance Survey (OS) six-inch to the mile, Inverness-shire (Mainland), Sheet LXVII map (Figure 5.3), shows a building recorded as a Roman Catholic Chapel.

Figure 5.2 An old chapel at Torgyle, 2013

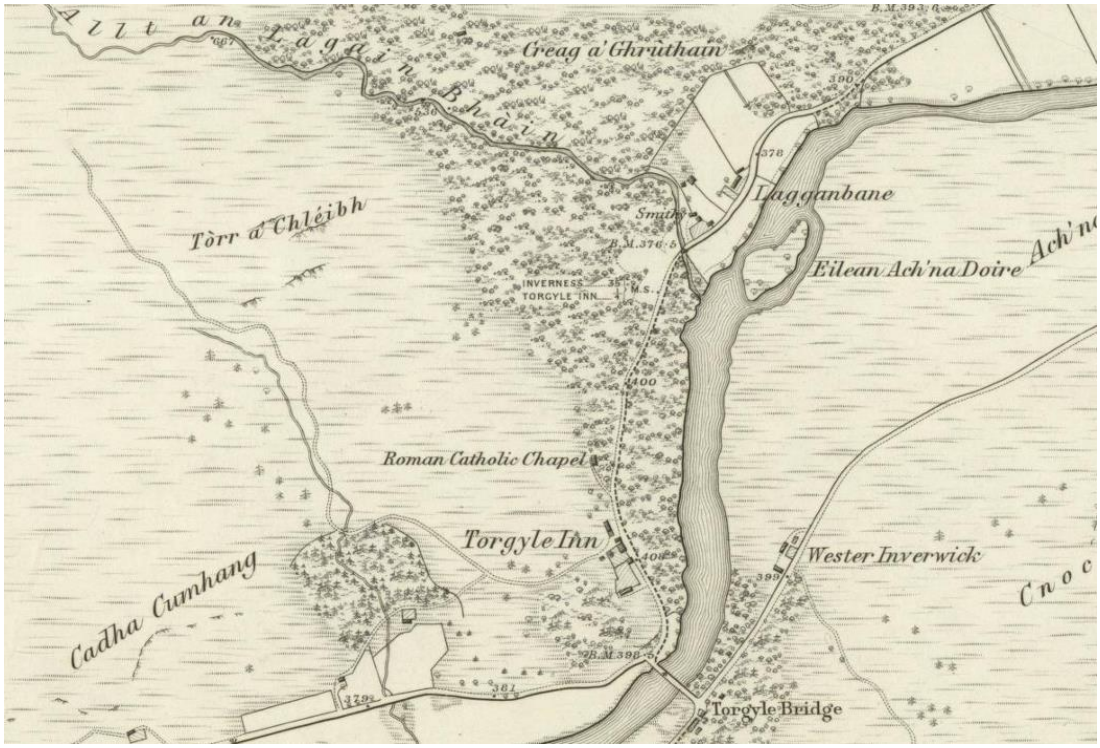


Figure 5.3 1871 Ordnance Survey map; six-inch to the mile, Inverness-shire (Mainland), Sheet LXVII

Torgyle Chapel is recorded on the National Monuments Record of Scotland (NMRS). It seems likely that more than one place of worship was located in the vicinity. Groome mentions: “near Torgyle Bridge and Inn, 9 miles higher up, are

an Established mission church, a Free church, and a Roman Catholic church (1841; 100 sittings), all three designated of Glenmoriston" (Groome, 1882-1885). Therefore, the Torgyle Chapel site could refer to one of the other churches present in the vicinity in the early 18th century.

5.5.2 Torgyle House

Torgyle House is believed to be the site of the former Torgyle Inn (Figure 5.4). It is recorded on the NMRS. The road has been realigned at some point, so the site now lies on the east side of the road rather than the west as shown on the 1871 map (Figure 5.4). There is no further information on the inn on either HES PastMap or Highland HER. There is mention of a marriage of Isabella McDonell at the inn during May 1852 (Inverness Advertiser, 1852a). Her family are believed to have kept the inn between 1841 and 1861. There is further record of the tenantry of Glenmoriston being entertained by Sir Henry Meux in February 1852 (Inverness Advertiser, 1852b) showing its importance as a social hub. The 1893-96 County Directory of Scotland shows Thomas Dott living at Torgyle Inn. The Inverness Courier of 25th April 1890 makes reference to the architect firm of Ross and MacBeth having carried out work there.

A drove road ran between Tomich and Torgyle and on to Fort Augustus (Heritage Paths website) which undoubtedly explains the existence of the Inn at this otherwise seemingly remote location. The Heritage Paths website states: "This is part of the long distance drove route between Wester Ross and on to the Corrieyairack and further south. The section between Glenmoriston and Strathglass was used for driving stock during the First World War and can be seen on a mid-nineteenth century estate map. There was an Inn at Torgyle until the mid-1880s. The section between Glenmoriston and Fort Augustus was commonly used in the late nineteenth century by cattle from Skye and the west coast going to Dalwhinnie Station. It is believed that Bonnie Prince Charlie travelled southwards on this route between Strathglass and Glen Moriston in August 1746 following his defeat at Culloden."

Figure 5.4 Torgyle House, 2013, now a private residence

5.5.3 Glenmoriston Footprints

The Glenmoriston "footprints" are two bare patches of earth about the size and shape of footprints. Detail is available on the Highland HER.

According to the Wikipedia entry, it is commonly held that the footprints are those of Tain evangelist Finlay Munro. Following his ministry on Lewis, he toured the southern Highlands, preaching in Glenmoriston in 1827. Although supposedly well received, some Catholics from Glengarry heckled him and legend has it that Munro closed his bible declaring that the ground on which he stood would bear witness to the truth of what he said until the Day of Judgment comes.

The Highland HER entry is based on a 1999 letter from former MSP John Farquhar Munro which states:

“The folklore of the glen records the event. When a visiting preacher of the Gospel - on being questioned as to the credibility of his sermon - stated as proof of his truthfulness and divine support that the spot on which he stood would forever show the imprint of his feet. The 'Footprints' have remained and are often visited but the site is not easily found although they are within 50 metres of the main road.”

5.5.4 A887 Trunk Road Bridge and Trunk Road

The existing trunk road bridge (Figure 5.5) is previously unrecorded and is not of great antiquity. It was recorded by CFA archaeology in the Standing Building Recording Survey (Report no 2140 – see Appendix C1.1). The report did not date the bridge specifically although it did refer to the presence of an OS benchmark dating to 1956-68 and it suggests the bridge is late 19th or early 20th century. Transport Scotland SERIS database suggests a completion date of 1949 for the bridge, however, this has not been verified.

Figure 5.5 Existing A887 Allt Lagain Bhain trunk road bridge

The CFA reports states: "Cartographic sources suggest a construction date for the A887 between the late 18th century and the beginning of the 19th century. It seems likely that while a built route was in place from 1784 it was developed into a more vital conduit towards the end of the first decade of the 1800s." The report suggests that it started as a minor local track, developing into a main road in the early 1800's.

The Fifth Report of the Commissioners for Roads and Bridges in the Highlands of Scotland indicated that the building of the main road commenced in March 1809 and was complete by the time of the report in April 1811, being overseen by Thomas Telford.

5.5.5 Old Masonry Arch Bridge

The old masonry bridge (Figure 5.6) is currently in a poor state of repair and is located in very close proximity (<1 m) to the existing trunk road bridge. It is of single arch construction comprising two spandrels on either side of the segmented arch. The CFA Archaeology survey (Appendix C1.1) provides a date of c.1810 for the old Allt Lagain Bhain Bridge. The survey of the bridge also

indicates that the old bridge spandrels are in poor condition but the structure of the segmental arch is good. It is considered that the bridge was built as part of the construction of the road under the auspices of Thomas Telford. It is also considered that there are relatively few bridges surviving from this era along this route. Refer to Chapter 7: Landscape Effects, Section 7.6 for information on existing views of the bridge from the road.

Figure 5.6 View of historic masonry arch bridge

5.5.6 Un-recorded Ruins

The 1871 OS map (Figure 5.3) clearly shows a smithy and settlement called Lagganbane directly to the north of the bridge. These are unrecorded on the HES PastMap website and Highland HER, however, the ruins of both are clearly present on site (Figure 5.7, Figure 5.8 and Figure 5.9). There is mention of the MacDonald family moving to the Invermoriston Smithy in the first decade of the 20th century (Moriston Matters, 1980). This would coincide with the final decline in the use of the drove roads which would have made such a rural blacksmiths unviable. The 1871 census shows the family of Duncan MacDonald, blacksmith as well as Ewen MacDonald, tailor and family living at Lagganbane indicating there were at least 2 houses on the site. The family are listed at Lagganbane in both the 1881 and 1891 census, but not in 1901 indicating that habitation ended between 1891 and 1901. In the 1861 census, Ann Cameron, a grocer and crofter, is living at "Lagganban" and in 1881 she is described as a pauper and is also living in the household of Ewen MacDonald, Ann being described as his aunt. Duncan Macdonald is listed in 1841 census as a "smith" living at "Torgoil" (Torgoyle). It is clear, therefore, that there is a history of settlement in the area for a period of at least 40 years.

Figure 5.7 Possible remains of smiddy (smithy)

Figure 5.8 Remains of Lagganbane settlement

Figure 5.9 Further remains of Lagganbane settlement

5.6 Impact Assessment

The impact of the proposed works, without and with mitigation in place is summarised in Table 5.3 and Table 5.4 respectively and described in the following sections. Impacts are adverse unless stated otherwise.

5.6.1 Torgyle Chapel, Torgyle House, Glenmoriston Footprints

These assets are considered to be of local importance, none having been scheduled or listed. Their environmental value is considered to be at highest, **Medium.**

5.6.1.1 Potential impacts during construction

During construction, there is potential for permanent damage or loss to these assets through inappropriate storage of materials or site compound or damage from construction vehicles. This could potentially result in a **Moderate** magnitude of impact and a **Moderate** significance of effect. The mitigation measures that will be implemented will avoid loss or alteration to any of these assets and the magnitude of impact is predicted to be **No Change** resulting in a **Neutral** significance of effect.

5.6.1.2 Potential impacts during operation

There will be no impact on the setting of these assets during the operation phase as they are sufficiently distant from the proposed scheme and hidden by trees and local topography.

5.6.2 Unrecorded Remains at Lagganbane

Through being previously unrecorded, the value of these resources is currently unknown. Given the duration of settlement and the importance of the settlement in relation to the drove road, they could fairly be described as of regional importance with a **Medium** value.

5.6.2.1 Potential impacts during construction

During construction, in the absence of mitigation, there is significant potential for permanent damage or loss to this asset. This could potentially result in a **Moderate** magnitude of impact and a **Moderate** significance of effect. By establishing an exclusion zone where practicable and if necessary, undertaking appropriate recording and a watching brief, this will help to mitigate the impact, resulting in a **Minor** to **Moderate** magnitude of impact and **Slight** to **Moderate** significance of effect.

There will be a **Moderate** impact magnitude on the setting of these remains as they are in close proximity to the proposed scheme resulting in a **Moderate** significance of effect during and immediately following the construction period.

5.6.2.2 Potential impacts during operation

In time with the proposed re-vegetation and tree planting following construction works, the impact on setting during the operation phase would be reduced to **Minor** magnitude and **Slight** significance.

5.6.3 Trunk Road Bridge

The existing trunk road bridge is of **Low** value.

5.6.3.1 Potential impacts during construction

During construction, the bridge will completely demolished resulting in a **Major** magnitude of impact but the significance of effect is only considered to be **Slight**. No mitigation is proposed in relation to this asset and there is no change to the residual impact.

5.6.3.2 Potential impacts during operation

During the operational phase, there will be no significant impact caused by demolition of the trunk road bridge.

5.6.4 Old Masonry Arch Bridge (Telford Bridge)

Although this bridge has not been formally recorded or listed, it is considered to be of considerable historic importance on a regional basis, giving it a **Medium** value**.**

5.6.4.1 Potential impacts during construction

The bridge is to be completely demolished during the construction phase, resulting in total loss of the resource and the integrity of the site. The magnitude of impact is predicted to be **Major** with the resulting significance of effect being **Moderate or Large**. However, with the proposed mitigation to record the bridge, the significance of effect would be reduced to **Moderate**.

5.6.4.2 Potential impacts during operation

During the operation phase without mitigation measures, there would be no opportunity for future generations to study the bridge and the significance of effect would be Large. With mitigation in place that would result in the structure being fully recorded, it would be reduced to **Moderate** significance.

Table 5.3 Summary of cultural heritage impacts pre-mitigation (impacts are adverse unless stated otherwise)

Potential Impact	Value/sensitivity of receptor	Duration of impact	Magnitude	Significance
Demolition of trunk road bridge	Low	Permanent	Major	Slight
Demolition of historic bridge	Medium	Permanent	Major	Large
Disturbance or damage to Chapel, Torgyle house and Glenmoriston footprints during works	Medium	Temporary	Moderate	Moderate
Disturbance or damage to unrecorded remains at Lagganbane	Medium	Permanent	Moderate	Moderate

Table 5.4 Summary of cultural heritage residual impacts post-mitigation (impacts are adverse unless stated otherwise)

Potential Impact	Value/sensitivity of receptor	Duration of impact	Magnitude	Significance
Demolition of trunk road bridge	Low	Permanent	Major	Slight
Demolition of historic bridge	Medium	Permanent	Major	Moderate
Disturbance or damage to Chapel, Torgyle house and Glenmoriston footprints during works	Medium	Temporary	No change	Neutral
Disturbance or damage to unrecorded remains at Lagganbane	Medium	Permanent	Minor to Moderate	Slight to **Moderate**

The above table indicates that there will be significant residual impact on the historic masonry bridge.

5.7 Design, Mitigation and Enhancement Measures

The design of the proposed scheme is such that Torgyle Chapel, Torgyle House (Inn) and Glenmoriston Footprints all lie outside the works area. The location for the site compound is yet to be chosen and there is the possibility of inadvertently damaging these assets from a poorly-chosen site. Protection zones around these assets have been identified in order to prevent this scenario. These are a 50 m radius for the chapel and the footprint sites and 100 m for Torgyle House. The protection zone for the latter will also help to protect the residential property from noise disturbance from an inappropriately located compound. Figure 5.10 shows the extents (see Figure B1 in Appendix B for a larger scale plan). These protection zones will not be delineated on site. They are for consideration only when establishing the location for the site compound, material storage, lay down area, parking for plant and machinery or any such other area that could cause an impact.

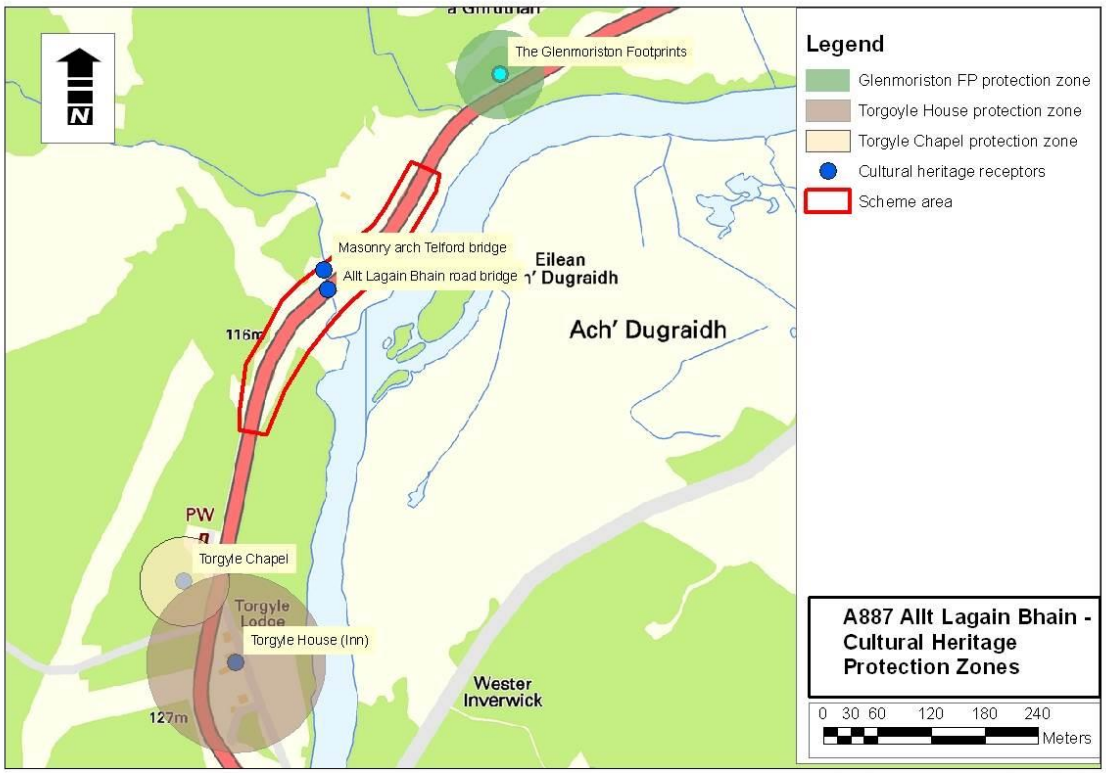


Figure 5.10 Proposed cultural heritage protection zones (note that the scheme area is indicative only)

The new bridge is of little cultural heritage interest and it is considered that the Standard Building Recording Survey carried out already by CFA Archaeology provides a sufficient level of recording for the structure.

The old masonry arch Telford bridge was described by CFA as being of "significant historic importance". In light of this, the design was reconsidered to see if it would be possible to come up with a viable alternative or to be able to work around the bridge. It was considered that since the Telford bridge was in such a poor state and almost in contact with the trunk road bridge, from a health and safety perspective it would not be possible to leave the bridge *in situ.* It was further considered that there were no viable alternative routes for the proposed scheme. The mitigation suggested in the CFA report will be followed, specifically:

- metric survey, analytical recording and further photographic survey commensurate with a Level 3 (English Heritage) Standing Building survey with a view to creating an accurate and comprehensive record of the bridge; and

- a watching brief to be undertaken during demolition of the Telford bridge in order to record additional relevant information.

Highland Council has asked if the stone may be given to them for repair of their own historic bridges. The majority of stone will be reused on site in the building/facing of the new bridge, but any surplus can be passed to the Highland Council with the appropriate waste exemption in place.

The unrecorded structures (i.e. the smithy and remains at Lagganbane) are very close to the works and an exclusion area will be erected as far away as practicable from the structures in order to prevent inadvertent damage. Where this cannot be avoided the watching brief will also extend to the works in proximity of these structures.

By incorporating mitigation measures, the project seeks to comply with policies laid out in Section 5.3.2.

Measures aimed at the protection and recording of cultural assets are listed in **Error! Reference source not found.** in the Schedule of Environmental Commitments (Chapter 11). They are cross-referenced with the Summary of Effects (Chapter 10). The contractor will also be required to produce a Construction Environmental Management Plan (CEMP) which will need to be approved by the operating company before work starts on site. The CEMP will fully incorporate all mitigation measures, indicating timing for implementation. It will also include specific details of measures to be employed, clear method statements for the works, an environmental risk assessment, a site waste management plan and contingency plans for environmental incidents.

Taking consideration of the design requirements and with the implementation of the proposed mitigation measures, it is anticipated that the proposed scheme will comply with relevant policies and plans including Scottish Planning Policy, 2014. Although the proposed scheme will result in the loss of the old masonry

bridge, there was considered to be no practicable alternative. Consequently, the proposed scheme is considered to comply with Policy 57 of the HwLDP.

5.8 Summary

There will be a residual effect of **Moderate** significance as a result of the permanent and irreversible loss of the old masonry arch Telford bridge. This residual impact is considered significant under the EIA Regulations. However, the impact is unavoidable and has been reduced from a large impact through mitigation which includes a metric survey, analytical recording and further photographic survey to ensure proper recording of the structure. Furthermore, a watching brief will be undertaken by an appropriately-qualified and competent archaeologist during demolition works. The watching brief will be arranged by the relevant Trunk Roads Operating Company at the time of construction.

The works could result in disturbance and/or damage to the unrecorded remains at Lagganbane. Consequently, the residual effect on these remains will be of potentially **Moderate** significance and would be mitigated by appropriate recording and watching brief if they are disturbed.

It is considered that, following mitigation, significance of effect on the other cultural heritage receptors will be neutral to slight and not considered to be significant. These measures include establishment of protection zones around assets when establishing locations for site compounds etc. and the establishment of an exclusion zone around remains close to the works.

6 Ecology and Nature Conservation

6.1 Introduction

This Chapter focuses on habitats and species present in the study area and as such mentions the watercourses present. Further information on the water environment is given in Chapter 8: Road Drainage and the Water Environment.

Ecology and Nature Conservation has been assessed in accordance with the Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3, Part 4; Interim Advice Note 130/10; and Chartered Institute for Ecology and Environmental Management Guidelines for Ecological Impact Assessment 2016 (CIEEM, 2016). These documents give guidance on the assessment of the impact that road projects may have on the surrounding ecology. This section presents the results of a desk study and ecological surveys that were undertaken to establish the baseline conditions at the site and the nature conservation value of the land surrounding the works. The aims of the studies are to:

- establish the baseline ecology and any nature conservation designations within the vicinity of the proposed scheme footprint;
- assess how the construction and operation of the proposed scheme might impact upon local ecology and nature conservation;
- detail any mitigation measures designed to counter potential negative effects on the ecology and nature conservation interests within the vicinity of the proposed scheme; and
- assess the significance of residual effects.

6.2 Criteria for Evaluation of Ecology and Nature Conservation

The ‘value’ of an ecological resource (for example a habitat or a species) requires definition and this is summarised in Table 6.1. Based on IAN 130/10, the value of habitats and species is measured against a range of published selection criteria. The value of habitats and species is given in Appendix D.

Table 6.1 Evaluation of the nature conservation/biodiversity value of ecological receptors

Value	Criteria	Examples
International	High importance and rarity, International scale and limited potential for substitution	Internationally designated sites including Sites of Community Importance (SCI's), Special Areas of Conservation (SACs), Special Protection Areas (SPAs), candidate SACs (cSACs), possible SPAs (pSPAs), Wetlands of International Importance (Ramsar sites), World Heritage Sites and Biogenetic Reserves. A discrete area which meets the published selection criteria for international designation. 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 populations form 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
National	High importance and rarity, National scale with limited potential for substitution	Designated sites including: Sites of Special Scientific Interest (SSSIs), Marine Protected Areas (MPAs) including Marine Conservation Zones (MCZs) and National Nature Reserves. Areas which meet the published selection criteria for those sites listed above which are not themselves designated.

Value	Criteria	Examples
		Areas of ancient woodland listed i.e. where listed on the Ancient Woodland Inventory Resident or regularly occurring, populations of species which may be considered at a UK or National level where: • The loss of these populations would adversely affect the conservation status or distribution of the species at this geographic scale; or • The populations form 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	High or medium importance and rarity, Regional scale and limited potential for substitution	Areas that have been identified by regional plans or strategies as areas for restoration or recreation of priority habitats. Resident or regularly occurring populations of species which may be considered at a Regional level and key/priority species listed within the Highland Biodiversity Action Plan (HBAP) where: • The loss of these populations would adversely affect the conservation status or distribution of the species at this geographic scale; or • The populations form 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.

Value	Criteria	Examples
County	Medium importance and rarity on a County scale.	Designated sites, including Local Nature Reserves (LNRs) designated in the county or unitary authority area context. Areas which meet published selection criteria for those sites listed above but not themselves designated as such. Resident or regularly occurring populations of species which may be considered at a County level where: • The loss of these populations would adversely affect the conservation status or distribution of the species at this geographic scale; or • The populations form 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.
Local	Low or medium importance and rarity, Local scale	Designated sites, including 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.

Potential impacts on specific receptors is described and assessed in detail in Appendix D. The approach to characterisation of ecological impacts is identified in the *pro forma* shown in Table 6.2 in line with IAN 130/10. In determining the significance of effect, cognisance has been taken of CIEEM Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial Freshwater and Coastal, Second Edition, 2016 (CIEEM, 2016). The CIEEM guidelines propose an assessment of significance based on the geographical scale of the impact. For example, an impact may be described as having a significant negative effect at a local scale. It is this approach that has been taken in this ES.

Table 6.2 Characterisation of ecological impacts during the construction phase, operational phase, and decommissioning phase

Resource	Proposed activity, biophysical change, related to receptor structure and function	Characterisation of Impact	Mitigation proposals	Summary of Characterisation
Resource ref: Description: Nature conservation value: Policy/Legal context: Integrity/conservation status: Factors/Criteria:	Biophysical change:	SI PO: CO: EC: SZ: RE: DU: TF:	Mitigation: Quantification/Measure: Mechanism for delivery:	Residual impacts: Significant / Not significant Confidence of predictions

Key:

SI (sign): positive (beneficial (+ve)) or negative (adverse (-ve))

PO (probability of occurring): Certain, Probable, Unlikely

CO (complexity): Direct, Indirect, Cumulative

EC (extent): Area measures and percentage of total (e.g. area of habitat /territory lost)

SZ (size): Description of level of severity of influence (e.g. complete loss, number of animals affected)

RE (reversibility): Reversible or not reversible (can the effect be reversed, whether or not this is planned)

DU (duration): Permanent (P) or Temporary (T) in ecological terms. Where differing timescales are determined in relation to the life cycle of the receptor, these should be defined.

TF (Timing and Frequency): Important seasonal and/or life-cycle constraints and any relationship with frequency considered.

6.3 Policy and Regulatory Framework

- Guidelines for Ecological Impact Assessment in the UK and Ireland: Terrestrial, Freshwater and Coastal, Chartered Institute of Ecology and Environmental Management, 2016 (CIEEM, 2016).
- Ecological Impact Assessment, Jo Treweek, 1999.
- Biodiversity Impact, Helen Byron, 2000.
- National Planning Policy Guideline (NPPG) 14: Natural Heritage, 1999 The Scottish Government.
- HwLDP (Highland Council, 2012), in particular Policy 58: Protected Species; and Policy 60: Other Important Habitats and Article 10 Features.

6.4 Study Area

The size of the study area for ecology and nature conservation varied according to the species or habitat being considered. On the broadest scale, baseline data was obtained for species identified within the same 10 km square with species-specific surveys being undertaken within (but not limited to) 50 m around the development area. This extended to 250 m for otters and up to 1 km for badgers (Figure 6.1). Sites designated for nature conservation of national importance (e.g. SSSIs) were identified within a 5 km radius and within a 10 km radius for sites of international importance (e.g. SACs and SPAs). Where possible connectivity with these areas was identified, the survey area extended further afield.

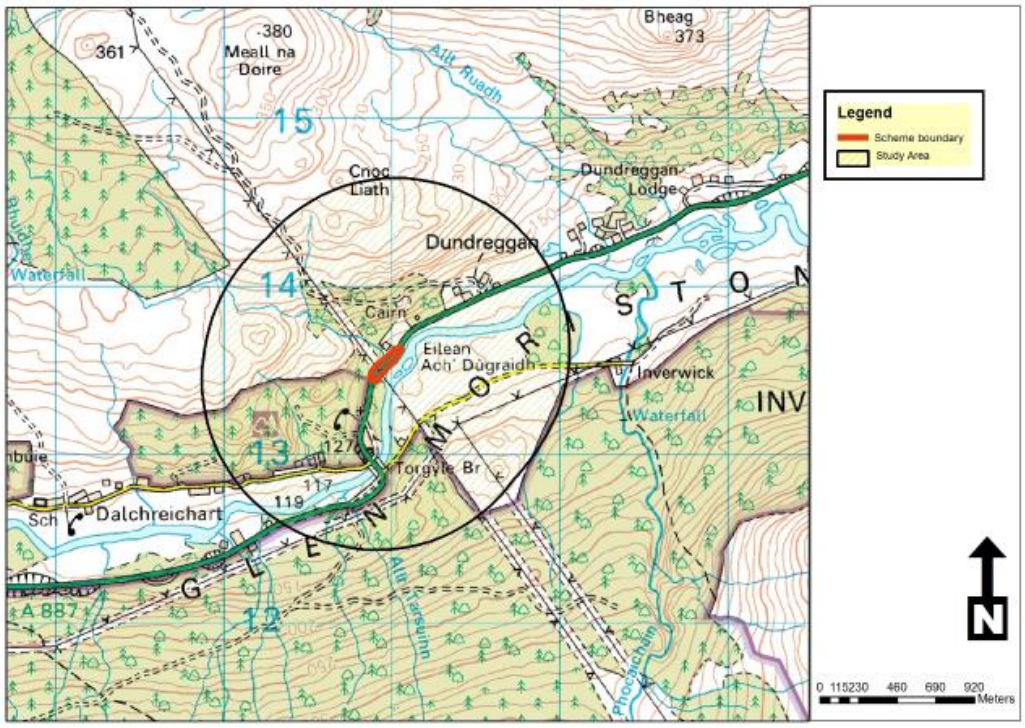


Figure 6.1 Ecology study area

The preliminary desk study consulted publicly available data sources held on the National Biodiversity Network (NBN) gateway. This was complemented by interrogating the operating company roadkill database which provided details of recorded road mortalities within the area. The SNH Sitelink website provided details of the areas designated for nature conservation.

Otter and badger surveys were carried out by experienced ecologists according to methodology in Volume 10, Section 4 of the DMRB. Otter surveys consisted of looking for signs of otter including the presence of holts (underground resting places), lying-up sites or couches (resting places above ground), natal dens (used for breeding), paths, feeding areas, play areas, spraints and footprints.

The badger survey consisted of looking for setts, paths, dung pits and latrines, scrapes and hairs.

Remote infra-red camera traps were used to better understand usage of the area by mammals.

A freshwater pearl mussel survey was undertaken in the Allt Lagain Bhain and River Moriston in September 2012 in accordance with Scottish Natural Heritage (SNH) protocol. The site was also surveyed for signs of pine marten (March 2012 and March 2013) and other species of conservation interest.

Surveys included searching for signs of water vole along streams and ditches and included recording:

- actual sightings;
- burrows on stream side edges;
- latrines;
- footprints;
- runs in the vegetation;
- grazed lawns; and
- feeding remains.

Visual surveys were carried out to detect the presence of red squirrel as per Gurnell *et al* 2001 (Forestry Commission Practice Note - *Practical Techniques for Surveying and Monitoring Squirrels)*. Signs searched for included feeding stations and red squirrels themselves. Suitable trees were searched using binoculars for the presence of dreys or squirrels.

Signs of pine marten were searched for including scat, footprints and potential dens including a search of all windblown trees within 250 m of the bridge.

All potential areas for wildcat were searched including rock crevices, rock piles, under tree roots, under windblown root plates and in dykes or old walls. Signs searched for included footprints, scat and potential kill by wildcats.

Further surveys of bat roosts were undertaken by Highland Ecology and Development Ltd during summer 2012 and winter 2012/2013 and their methodology is provided in their reports (Confidential Appendices C1.2 and 1.3).

6.5 Character of the Existing Baseline

Consultation was undertaken with SNH, Ness District Salmon Fishery Board and the Ness and Beauly District Fisheries Trust to help inform the character of the existing baseline. A summary of their responses is shown in Table 4.1 in Chapter 4: Consultation and Scoping.

6.5.1 Designated Sites

The Allt Lagain Bhain watercourse forms part of the River Moriston Special Area of Conservation (SAC) from the point immediately downstream of the bridge to the River Moriston itself and beyond (Figure 6.2). The qualifying interests of the River Moriston SAC are Atlantic salmon (*Salmo salar*) and freshwater pearl mussels (*Margaritifera margaritifera*) and the impact on these species are discussed further within the protected species section. The last SNH site condition assessment available was in 2011 for Atlantic salmon and 2003 for freshwater pearl mussels. Atlantic salmon were assessed as being 'unfavourable no change' and freshwater pearl mussels were assessed as being 'unfavourable no change'. No other international and no national designated nature conservation sites have been identified within the study area.

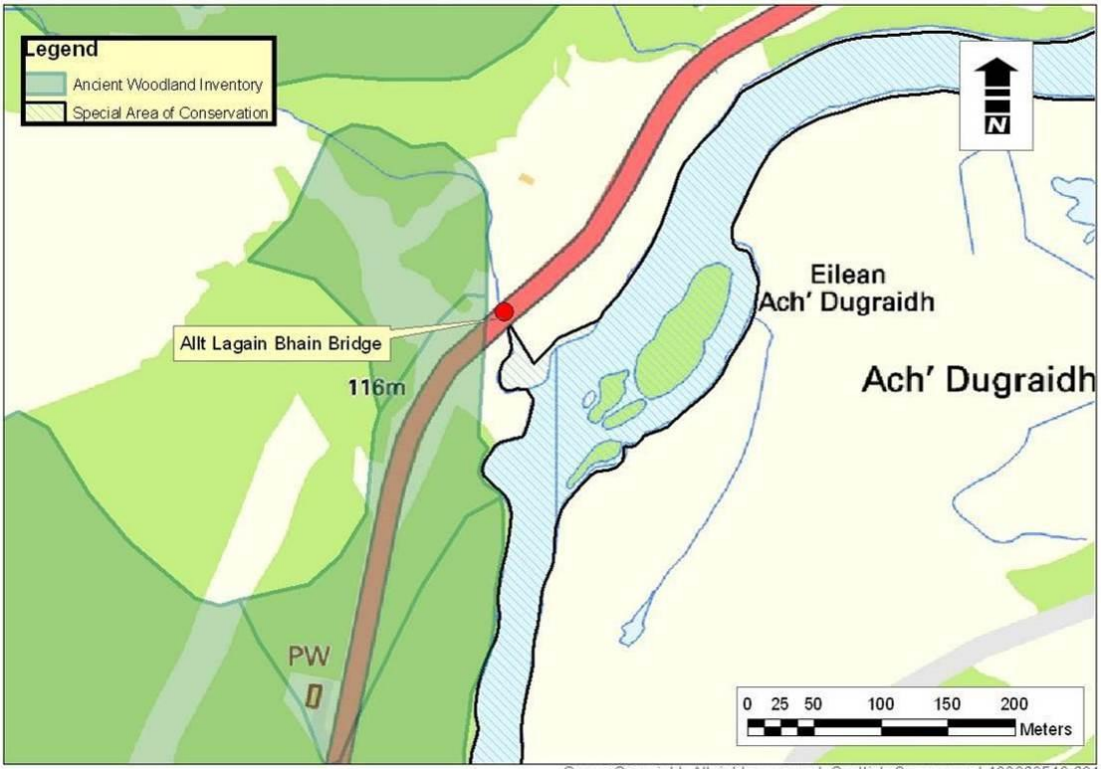


Figure 6.2 Location of sites designated for nature conservation and other environmentally sensitive areas in proximity to the bridge

Habitats

6.5.1.1 Terrestrial

The predominant habitat within the vicinity of the bridge is semi-natural broadleaf woodland (see Appendix C 1.8 for Phase 1 Habitat Survey). The block immediately to the west of the bridge is listed on the Ancient Woodland Inventory (AWI) as "1a - of semi-natural origin" (see Figure 6.3). This block of AWI woodland extends to 2.45 ha and it is anticipated that approximately 0.3 ha lies within the area of the development. The total area of tree clearance, which includes trees not within the AWI, is estimated to be in the region of 0.55 ha. Indicative locations of woodland are shown in Figure 6.3.

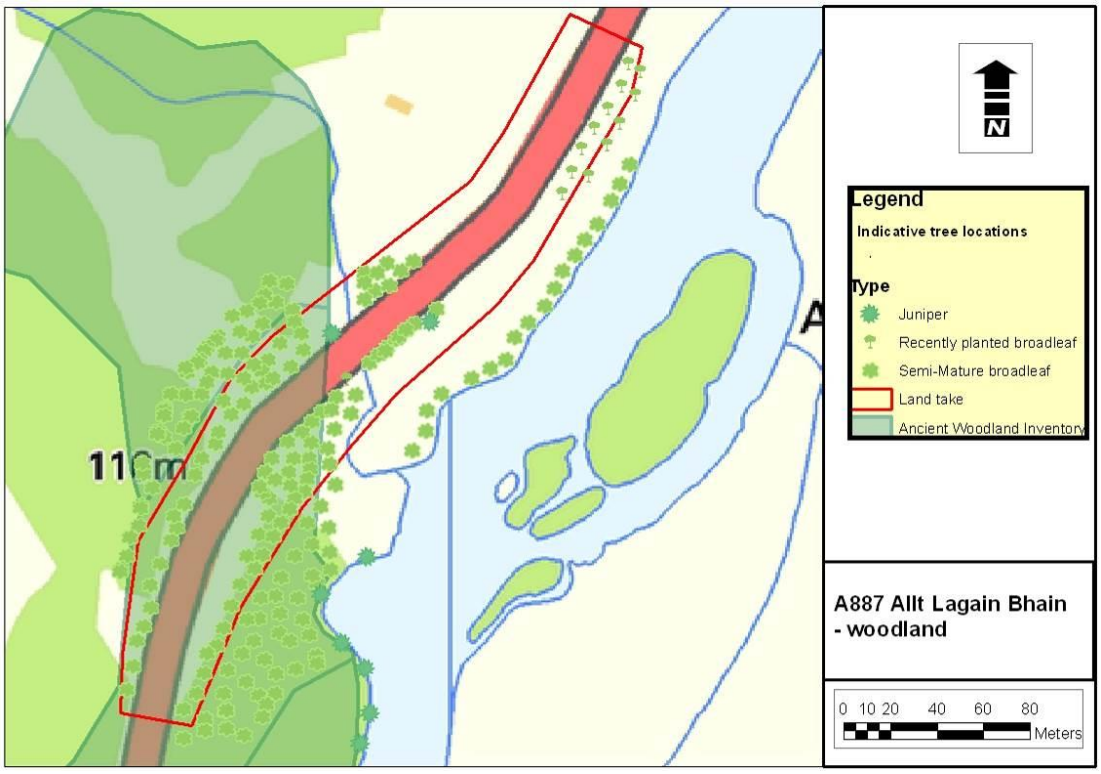


Figure 6.3 Location of woodland relative to proposed scheme (note: land take is indicative only)

There are approximately 200-300 recently-planted small birch trees on the eastern (Invermoriston) side of the bridge to the south of the road; some of these will require felling. There are also around 10 mature birch that will require felling. The riverbank is wooded with mature trees, although this is out with the proposed scheme area. The surrounding habitat in the wider area is dominated by rough pasture and bracken.

There are approximately 100 semi-mature birch on the north side of the road that may be affected; the remainder of the habitat here comprises rough pasture with some broom. A photograph of the habitat adjacent to the east (Invermoriston) side of the bridge is provided in Figure 6.4.

On the western (Skye) side of the bridge to the north of the road, the woodland predominately comprises birch. Stands next to the road are semi-mature, with more mature trees present further back from the road. The understorey consists predominantly of bracken and a section devoid of trees that is used as a wayleave for the power lines. This wayleave has been cleared recently as part of the works on the nearby Beauly to Denny power line. It is estimated that around 300-450 trees, mostly mature and semi-mature birch, will need to be felled in this area.

On the same side of the bridge but to the south of the road, the habitat is dominated by un-thinned, semi-mature birch (Figure 6.5). It is estimated that some 300 trees will need to be felled at this location.

There are two areas on either side of the bridge where small stands of juniper (*Juniperis communis*) are growing on the verge; these will be removed as part of the works (Figure 6.6).

Figure 6.4 Habitat adjacent to east side of Lagain Bhain Bridge

Figure 6.5 Woodland on west side of the bridge, to the south of the road

Figure 6.6 Stand of juniper on east side of bridge

6.5.1.2 Watercourses

The main watercourse in the vicinity of the works is the Allt Lagain Bhain (Figure 6.7). It is a tributary of the River Moriston (Figure 6.8), located approximately 30 m downstream of the bridge. There is also a small, un-named watercourse that flows beneath the road, west of the bridge (Figure 6.9).The watercourses are covered more fully in the “Road Drainage and Water Environment” section. They provide valuable habitat and foraging resources for several species listed in Section 6.5.2.

Figure 6.7 Allt Lagain Bhain watercourse

Figure 6.8 View of the River Moriston

Figure 6.9 View of small, un-named watercourse

6.5.2 Species

6.5.2.1 Otter (Lutra lutra)

The surrounding area contains a diverse range of freshwater habitats suitable for otter and their prey and they are known to be present in the area. The National Biodiversity Network (NBN) Gateway shows a number of otter records in the 10 km grid square NH31.

Otter surveys conducted between 2010 and updated in 2013 and 2016 found numerous signs of otter activity in the vicinity of the bridge and by the River Moriston (Figure 6.10). A full account of the 2010 otter survey is provided in the report in confidential Appendix C1.7.

A clear path, considered to be used by otters, was also found under the fence adjacent to the road. This provided an indication that otters are currently choosing to cross the road, most likely during high flow conditions. A distinct sprainting point was noted on the other side of the road near the River Moriston with another clear path. The marking suggests it indicates the preferred route across fields towards the road.

Otter resting places were found in the vicinity. Details of these are included in the confidential otter survey report to be submitted to SNH.

It is clear that the habitats near the bridge are important for otters. It is considered that the otter population in the area is of **County** importance.

Figure 6.10 Otter footprints in soft sand on river's edge

6.5.2.2 Bats

During the initial site survey for the extended phase 1 habitat survey in 2011, it was considered that there was low to medium potential for roosting bats in the

road bridge and medium to high potential in the historic masonry arch bridge. Most of the trees within the proposed working area are semi-mature birch and unlikely to support bat roosts.

Subsequent surveys in summer 2012 and winter 2012/2013 by ecological consultants (full reports by HED Ltd in Confidential Appendices C1.2 and C1.3) led to the discovery of a summer roost of Daubenton's bat (*Myotis daubentonii*) in the upstream historic, masonry arch bridge. This particular roost was found to be used by 25-30 individuals. The Daubenton's roost is considered to be of **County** importance.

A small roost of soprano pipistrelle bat (*Pipistrellus pygmaeus*) was found in the road bridge. Although bats were not observed using the road bridge, the presence of an occasional roost was inferred due to the presence of droppings on the ledges and within triangular crevices under the bridge. This suggested that a low number of individuals was present. The soprano pipistrelle roost is considered to be of **Local** importance.

Both bridges were considered to have potential as winter hibernacula. Further surveys were carried out over the winter of 2012/13. No evidence of winter use was found within the road bridge. However, Daubenton's and Soprano pipistrelle bats were found to be active near or under the old masonry arch bridge during December 2012. It was, therefore, concluded that the masonry arch bridge is likely to be used as a winter hibernacula for both bat species (see HED Ltd report in confidential Appendix C1.2 and 1.3).

6.5.2.3 Freshwater Pearl Mussel (Margaritifera margaritifera)

A survey of the Allt Lagain Bhain was carried out in September 2012 from 100 m upstream of the road bridge to 200 m downstream of the confluence with the River Moriston. No living freshwater pearl mussels (FWPM) were found. The recommended survey extent is usually 500 m downstream of the works (SNH survey protocol), however, it was limited on this occasion due to the height of the water. A further survey was undertaken on 5th March 2013 which again found no evidence of FWPM presence. Even though the water level was low, the survey extents were again restricted to approximately 200 m downstream of bridge. Beyond this the river becomes a large, slow-flowing and very deep (>2 m) glide that could only be surveyed by diving or by boat. The Allt Lagain Bhain itself was considered to provide poor FWPM habitat due to the lack of finer sediments for burrowing into. Even though no FWPM were found, the River Moriston was considered to provide good habitat. The full FWPM survey report is provided in confidential Appendix C1.4 as is the map showing the extent of the survey.

Freshwater pearl mussels in the immediate vicinity (i.e. Allt Lagain Bhain and the River Moriston 150 m downstream of the confluence have been assessed as being of **Local** value as no live mussels were found during the survey. The River Moriston population beyond this area, however, is considered to be of

International value based on the precautionary principle and the SAC designation.

6.5.2.4 Pine Marten (Martes martes)

There are several records of pine marten within the 10 km square NH31 (NBN Gateway). A field survey was undertaken during winter 2012/13. During a survey of 5th March 2013, a pine marten was observed near the trees on the island (Figure 6.11) opposite the confluence of the Allt Lagain Bhain and the main river (confidential Appendix C1.9). Pine martens in the vicinity are considered to be of **County** importance.

Figure 6.11 Pine marten on island

6.5.2.5 Atlantic Salmon (Salmo salar) and other Fish Species

Atlantic salmon, brown/sea trout (*Salmo trutta*) and European eel (*Anguilla anguilla*) are migratory fish species which are all recorded within the NH31 10 km square (NBN Gateway). Numerous juvenile (0+) salmonid fry were observed while undertaking the FWPM survey, both within the Allt Lagain Bhain and River Moriston suggesting spawning within the area. There were areas of good fry habitat identified both upstream and downstream of the bridge including near the entry into the River Moriston on the Allt Lagain Bhain (Figure 6.12). A short 5 m section was also identified with some spawning potential although it was considered that the River Moriston itself provides more suitable spawning habitat. A fish habitat survey was undertaken and the report is provided in Confidential Appendix C1.5, as is a map of the survey extents.

The population of Atlantic salmon in the vicinity is considered to be of **Regional** importance, whilst the population of sea trout / brown trout is considered to be of **County** importance.

Figure 6.12 Good fry habitat (with spawning potential) on Allt Lagain Bhain downstream of bridge

6.5.2.6 Badger (Meles meles)

Badgers are recorded within the wider 10 km square (NH31) in which the proposed scheme is located and a survey report is provided in confidential Appendix C1.10. There is good potential habitat within, and surrounding, the proposed scheme footprint and evidence of badger activity was found in the vicinity during surveys in 2013 and 2016.

The population of badgers in the immediate vicinity is considered to be of **Local** importance.

6.5.2.7 Birds

During the survey of 5th March 2013, great tit (*Parus major*), blue tit (*Cyanistes caeruleus)* and chaffinch (*Fringilla coelebs*) were all incidentally observed or heard calling and establishing territories. During the survey of 21st January 2016, incidental sightings of treecreeper (*Certhia familiaris*), blue tit, robin (*Erithacus rubecula*), buzzard (*Buteo buteo*) and carrion crow (*Corvus corone*) were made. No schedule 1 birds or birds of conservation concern were identified. It is, however, considered that the woodland surrounding the proposed scheme will provide useful nesting and foraging habitat. In the breeding season the year prior to the works, at least three breeding bird surveys will be undertaken to

provide further information on birds in the area. Birds in the vicinity are considered to be of **Local** importance.

6.5.2.8 Wood Ants

Wood ants are well known within the area and the Highland Biological Recording Group Data records no less than five species of *Formica* within the same 10 km grid square, NH31. No wood ants were found within the actual proposed work footprint, however, several nests were found in the birch woodland approximately 150 m north of the proposed scheme (Figure 6.13 and Figure 6.14). The habitat surrounding the proposed scheme is excellent for wood ants and with the opening up of the wayleave for the nearby pylon line, this may encourage wood ants to expand their range into the works area by the time the works commence. Wood ants in the vicinity are considered to be of **Local** importance.

Figure 6.13 Wood ants on nest surface

Figure 6.14 Wood ant nests within birch woodland offering excellent habitat

6.6 Impact Assessment

The impact on ecology and nature conservation is provided in Appendix D and summarised in the following section. Each section deals with impacts at the construction and operation phases and identifies the significance of residual

effects. The significance of residual effect on each receptor is described at the end of each sub-section and also presented in Table 6.3. Impacts are adverse, unless stated otherwise. The effectiveness of mitigation measures is noted in this section and measures are described fully in Section 6.7 with an outline of the importance and delivery of mitigation given in Section 6.7.1.

6.6.1 Designated Sites

The characterisation of the impact on designated sites is provided in Table 6.3. The River Moriston SAC is of **International** Value. Unmitigated, there will be a likely significant effect on the qualifying interests due to the potential for pollution. With robust mitigation in place, no adverse effect on the integrity of the SAC is predicted. This is explored more fully in the Report to Inform an Appropriate Assessment, as required by SNH. The residual effect is predicted to be **Not Significant**.

6.6.2 Habitats

6.6.2.1 Terrestrial

According to SNH, ancient and semi-natural woodland is "an important and irreplaceable national resource that should be protected and enhanced". In Scotland there is no statutory protection for ancient woodland although planning policy recognises that it should be considered in planning decisions. Just over 12% of the ancient woodland block will be permanently lost; this is marginal woodland that is considered to be of **County** value rather than National value. Replanting will be undertaken, but, once destroyed, ancient woodlands cannot be recreated. Although there will be permanent loss, it is considered that the integrity of the resource will be maintained and, therefore, a **Significant** residual effect at a **County Scale** is predicted.

Juniper is a Priority Species in the UK Biodiversity Action Plan but the stands consist of single plants and are poorly developed. It is considered to be of **Local** importance. Translocation, if considered appropriate by SNH and Forestry Commission Scotland, should allow the integrity of the resource to be maintained and the residual effect will be **Not Significant**. If translocation is not considered to be appropriate by SNH / Forestry Commission Scotland, the residual effect is still considered to be **Not Significant**.

6.6.2.2 Watercourses

For impacts on watercourses, refer to Chapter 8: Road Drainage and the Water Environment.

6.6.3 Species

6.6.3.1 Otter

The Eurasian otter is a European Protected Species (EPS) identified on the Red Data list as "near threatened", however they are relatively common within the Scottish Highlands. It is considered that the otter population in the area is of **County** importance. It is anticipated that no resting places will be lost and the risk of otters being killed as a result of the works is considered to be low. It is possible that a couch will need to be temporarily closed during the works. If this is necessary, it will be done by a suitably-qualified ecologist under an EPS licence to protect otters from injury and disturbance. The significance of residual effect is considered to be **Not Significant**. Note that this assessment refers specifically to the ecological or biodiversity value of otters. Although an EPS, this protection applies to their legal value and it is considered this will be fully mitigated through obtaining a licence and discharge of the conditions therein.

6.6.3.2 Bats

Two bat roosts will be lost permanently. While this can be partially mitigated through the provision of bat boxes, the loss of the historic masonry arch bridge may lead to the displacement of the Daubenton's bat colony in the long-term. It will definitely result in disturbance in the short-term. Daubenton's bats and soprano pipistrelle bats are identified on the Red Data list as being of "least concern". In biodiversity terms, Daubenton's bats are less common than pipistrelle but not within the rarest category i.e. they have a UK population of between 10,000-100,000. Since the Daubenton's roost is likely to be a hibernation roost supporting a medium sized population, and there are no similar structures in the vicinity, they are considered to be of **County** importance. The EPS status of bats refers to their value in a legislative context, as opposed to their biodiversity value. Legislative compliance can be fully mitigated through obtaining a species licence and does not need further consideration. Although the loss of the roosts can be partially mitigated by provision of bat boxes, there is no guarantee they will be used. The effectiveness of the mitigation will be monitored for five years following construction. The existing roost provides ideal habitat for Daubenton's bats and is the only structure of its type in the vicinity. In addition to being a summer roost for a moderate sized colony, it is likely to be used for winter hibernation. The residual effect caused by the loss of this roost is considered to be **Significant** at a **County Scale**.

The soprano pipistrelle roost is considered to be of **Local** importance. The residual effect caused by the loss of roost is considered to be **Significant at a Local Scale**.

6.6.3.3 Freshwater Pearl Mussels

The freshwater pearl mussel is identified on the Red Data list as being "endangered". No freshwater pearl mussels were found during the survey. No freshwater pearl mussels were found in Allt Lagain Bhain. Consequently, their value in the immediate vicinity (i.e. Allt Lagain Bhain and the River Moriston to 150 m downstream of the confluence) is assessed as being of **Local** value. The River Moriston population beyond this area is considered to be of **International**

value based on the precautionary principle and the SAC designation. With robust mitigation in place aimed at protecting freshwater pearl mussels and the wider water environment, the residual effect is predicted to be **Not Significant**.

6.6.3.4 Pine Marten

Although pine marten appear on the Red Data list, they are identified as being of "least concern" and in addition receive no European protection. They have been evaluated as being of **County** importance in the locality. They may undergo some minor, temporary disturbance during the works but this residual effect is considered to be **Not Significant**.

6.6.3.5 Atlantic Salmon

Atlantic salmon appear on the Red Data list as "lower risk/least concern" and do not receive any level of European protection. The species is, however, a qualifying feature of the River Moriston SAC. They have been evaluated as being of **Regional** value in the vicinity of the proposed scheme. There will be temporary disturbance to the species as a result of the work, especially during the channel realignment when passage will be prevented within the Allt Lagain Bhain. Without mitigation there would be potential for a Significant impact at a Regional scale. Careful timing of the in-stream works to avoid the spawning season (15th October to 31st May), removal of fish prior to dewatering of the channel and stringent pollution controls is predicted to result in a residual effect that is **Not Significant**.

6.6.3.6 Badgers

Eurasian badgers are identified on the Red Data list as being of "least concern" and receive no European level of protection. The value of the resource is, therefore, considered to be **Local**. There is likely to be some temporary effect in the mid-term through loss of some woodland habitat during construction, but this, and consequently the residual effect, is considered to be **Not Significant**.

6.6.3.7 Wood Ants

Various wood ant species appear on the Red Data list as "lower risk / near threatened". In the context of the local area, Scottish wood ant (*Formica aquilonia*) and hairy wood ant (*Formica lugubris*) are not particularly rare although the species are scarce on a UK level. The population is considered to be of **Local** importance. The residual effect from the proposed scheme is predicted to be **Not Significant.**

Table 6.3 Summary of residual effects on ecology and nature conservation (Impacts are adverse unless stated otherwise)

Potential Impact	Value/sensitivity of receptor	Duration of impact	Significance of effect
Designated site (River Moriston SAC)	International	Temporary	Not significant
Habitats – terrestrial (trees): ancient woodland	County	Permanent	Significant at a County scale
Habitats – terrestrial (trees): rest of woodland	Local	Permanent	Not significant
Habitats – terrestrial (juniper)	Local	Permanent	Not significant
Otter	County	Temporary	Not significant
Daubenton's bat	County	Permanent	Significant at County scale
Soprano pipistrelle	Local	Permanent	Significant at Local scale
Freshwater pearl mussels: within River Moriston beyond 150 m downstream of confluence	International	Temporary	Not significant
Freshwater pearl mussels: within Allt Lagain Bhain and in River Moriston to 150 m downstream of confluence	Local	Temporary	Not significant
Pine marten	County	Temporary	Not significant
Atlantic salmon	Regional	Temporary	Not significant
Brown / sea trout	County	Temporary	Not significant

Badger	Local	Temporary	Not significant
Birds	Local	Permanent	Not significant
Wood ants	Local	Temporary	Not significant

6.7 Design, Mitigation and Enhancement Measures

6.7.1 General

The design and construction of the bridge will be carried out in such a way as to reduce the impact upon the ecological interests and nature conservation designations. Residual impacts are listed in Table 6.3 and in Appendix D, Ecological Impacts Tables.

Due to the high environmental sensitivity of this site and the risk associated with the works, the contractor will provide an experienced ecologist / ecological clerk of works (ECoW).

All personnel and sub-contractors on site will be briefed as to the environmentally-sensitive nature of the habitats and species around the works. This will be achieved through inclusion in the mandatory site induction and regular toolbox talks. Note that measures in relation to designated sites are addressed in the following sections with regards the species that are potentially impacted.

Taking consideration of the design requirements and with the implementation of the proposed mitigation measures, it is anticipated that the proposed scheme will comply with relevant policies and plans including Scottish Planning Policy, 2014.

Although the proposed scheme will have impacts on protected species with a significant effect at a County scale on Daubenton's bats and at a Local scale on soprano pipistrelle bats, it is considered that it will comply with Policy 58 (Protected Species) of the HwLDP (Highland Council, 2012). This is because there is no satisfactory alternative, the development is required for overriding public interest and it is anticipated that with appropriate mitigation, the population of Daubenton's and soprano pipistrelle bats should be maintained. Monitoring of bats will continue following completion of the proposed scheme in order to determine if the latter condition is met. If it is not met, further discussions will be held with SNH to develop a strategy with the aim of meeting the objectives of the mitigation (i.e. to maintain populations of both bat species at the site).

It is considered that the proposed scheme complies with Policy 60 (Other Important Habitats and Article 10 Features) through the proposed mitigation

measures, in particular the requirement for compensation planting with native broadleaved tree species.

6.7.2 Habitats

6.7.2.1 Terrestrial

Impact on root zones will be kept to a minimum by careful use of machinery on site and formation of a root protection zone for trees close to the working area boundary. This will consist of robust silt fencing which will also ensure exclusion of machinery from sensitive woodland habitat around the entire site.

Juniper in some areas of Scotland is affected by a disease caused by a fungus-like organism *Phytophthera austrocedri* and care needs to be exercised with any planting or translocation of juniper that could inadvertently spread the disease. Consultation will be carried out with SNH to determine whether it is advisable to translocate the two stands of juniper to an area out with the works.

Compensation planting will be carried out following the works with local provenance broadleaf trees.

6.7.2.2 Watercourses

A range of measures aimed at prevention of pollution of the water environment will be undertaken during the construction phase of the work. These are fully described within Chapter 8: Road Drainage and the Water Environment.

6.7.3 Species

6.7.3.1 Otters

Further otter surveys will be required prior to the works going ahead to inform the need to secure a licence to disturb otters. This will be obtained from SNH prior to the works commencing. Conditions of the licence will require the development of a range of measures designed to protect otters and minimise their disturbance. Measures will include the following:

- Further surveys will be carried out by an experienced ecologist at least a month before the works commence to determine the level of otter activity in the area at that time. It is likely that a licence to disturb otters will need to be secured from SNH, depending on the results of the survey. It is possible that an otter couch will need to be temporarily closed during the works. If this is necessary, SNH will be informed and this will be done by an appropriately-qualified ecologist under the EPS licence.

- Before any work starts on site, a clearly-signed protection zone will be established to protect otter resting places. The protection zone will extend to distance of 30 m (where possible). This will be fenced off with orange, semi-rigid barrier fencing (or similar) to keep the workforce out but not

impede access for otters. Positioning of the fencing will be supervised by a suitably-experienced ecologist.

- All persons on site to be made aware of the mitigation measures in place and their obligations under legislation. This will be communicated by the site supervisor during the induction process. Toolbox talks and otter information sheets will be given to all members of the work force.
- Staff will remain vigilant for presence of otter through the works.
- If otters are encountered, work must stop temporarily in the vicinity and the site supervisor informed who should take further advice from a competent ecologist.
- Any temporary lighting required during the works will be directed away from the watercourse and the protection zone.
- Relevant SEPA Pollution Prevention Guidelines (PPGs) will be followed throughout the course of the works to avoid pollution of the watercourses, particularly PPG 5, "Works and maintenance in or near water".
- Materials will be stored at least 10 m away from watercourses in accordance with current best practice guidelines.
- A designated refuelling site will be established on an impermeable surface, at least 10 m distant from watercourses and will be fully bunded.
- Machinery will be checked at the start of each shift for the presence of resting otter and these checks will be recorded by the Contractor.
- Excavations will be covered over or ramped at end of shift to avoid otters (and other animals) falling into them and becoming trapped or injured.

A permanent ledge will be installed to allow otter passage through the structure during high river flows. Associated fencing will also be installed, to encourage otters to use the structure. Within the constraints of the design, the ledge will be set at a level as high as practicable whilst allowing at least 600 mm of headroom. Owing to the constraints of the design, this level will be approximately 150 mm below the 1 in 200-year flood level. The ledge will be at least 500 mm wide and will have a ramp at each end to allow ease of access for otter. The design will allow otters to access the ledge from the water (via the bank and then up the ramps to the ledge). Within 12 months of completion of construction, monitoring will be carried out to determine whether otters are using the ledge.

6.7.3.2 Bats

Due to the time elapsed since the initial survey bat surveys will need to be repeated. Surveys will cover hibernation (November to March) and maternity

periods (June/July). A survey will also be carried out of trees within the proposed working area to determine their potential for supporting bat roosts. A licence to disturb bats and destroy the two roosts will be secured from SNH prior to the works commencing. Durable bat boxes including hibernation boxes will be incorporated into the new structure and the surrounding habitat as permanent compensation for the loss of the roosts.

Measures that will be undertaken to minimise disturbance to bats are detailed as follows. These will be overseen or undertaken by a licensed bat worker and overseen by the ECoW. Measures include:

- Limiting the time when the works can be undertaken, whereby destruction of the bridges will be undertaken during either early summer (April-May) or late summer (August-September) and before the winter hibernation period unless otherwise agreed with SNH. Since the road bridge was not considered to be suitable as a hibernacula, demolition of this structure could also be undertaken during the winter (subject to other environmental constraints).

- Fitting a one way excluder to the roost entrances to allow the bats to leave the roost but not allow them back into the roost.

- Checking for the presence of bats after the one way excluder has been *in situ* for at least seven days of good foraging weather, by carrying out a dusk and dawn activity survey.

- Conducting an endoscopic survey of the bridges as an added precaution.

- Waiting until it has been confirmed by a licensed bat worker that the bats are no longer present in the roost before demolition work can commence.

- Providing all site staff with a bat toolbox talk prior to construction.

- Should bats be observed during demolition, work will stop and advice will be obtained from a licensed bat worker before works are allowed to continue.

Following construction, monitoring will be carried out over a period of five years, to determine whether Daubenton's and soprano pipistrelle bats are using the artificial roosts provided.

6.7.3.3 Freshwater Pearl Mussels

No freshwater pearl mussels were found in the Allt Lagain Bhain and no live individuals were found in the stretch of the River Moriston that could be surveyed. The River Moriston is also one of the 21 rivers included in the Pearls in Peril EU LIFE Project. The Ness and Beauly Fisheries Trust is currently (2016) encysting the gills of salmonid fish with fresh water mussel spat (glochidia) and monitoring the success of this. It is likely the species will be

present in greater numbers in future as a result of this. Mitigation has been designed with this in mind. This includes:

- A full crash deck will be erected during the demolition of the existing bridges to prevent debris entering the watercourses.
- The realignment of the short length of Allt Lagain Bhain will be carried out "in the dry" using a methodology agreed by SEPA and will be undertaken outwith the fish spawning season (15th October to 31st May).
- Silt fencing will be installed along the banks of the Allt Lagain Bhain within the works area and regularly checked and maintained for the duration of the works.
- SEPA's Pollution Prevention Guidelines (PPGs) and conditons of the CAR licence when issued will be strictly adhered to as will measures aimed at protecting the water environment which are fully detailed in Chapter 8: Road Drainage and the Water Enviroment.
- A pre-construction freshwater pearl mussel survey will be undertaken.

6.7.3.4 Pine Marten

A preconstruction survey will be undertaken for pine marten den sites. Should any new dens be found, an exclusion zone of at least 30 m (where possible) will be established to minimise the risk of disturbance. Where necessary, advice will be taken from SNH and further mitigation developed.

6.7.3.5 Atlantic salmon and other fish

Measures aimed at protecting FWPMs and the water environment will also help protect the fish population. In addition, further measures that will be put in place will include:

- No in channel works during the fish spawning season (15th October to 31st May).
- Electro-fishing to be carried out to safely remove fish prior to channel realignment and in channel works.
- The bed of the channel will not have a hydraulic drop either upstream or downstream of the new bridge and no obstacle to in-channel fish migration to be created.

6.7.3.6 Badger

A preconstruction survey will be undertaken for badgers. If any setts are identified within 30 m of the works then a badger protection plan will be establised in consultation with SNH and a licence to disturb badger obtained

prior to work commencing. No works will be undertaken within 30 m of a sett during the badger breeding season (December to June). The fencing erected to protect the woodland surrounding the proposed scheme (see Terrestrial Habitats) will also serve to protect badgers. In addtion, a badger toolbox talk with be provided to all staff in order to raise awareness.

6.7.3.7 Birds

Site clearance work will be undertaken out with the bird breeding season (March to September) inclusive. Where this is unavoidable, a survey will first be undertaken for breeding birds by a suitably-qualified ecologist. If any signs of bird breeding are encountered on site, then work will stop in the immediate area and an exclusion zone of a minimum of 10 m erected until the young have fledged. The size of the exclusion area may need to be increased depending on the conservation status of the bird. A breeding bird toolbox talk will be provided to all site staff.

6.7.3.8 Wood Ants

A preconstruction survey will be carried out to establish whether wood ants have moved into the construction area. If this is the case, then where possible an exclusion zone will be erected around nests to prevent damage during the works. Where this is not feasible, the nests will be translocated out with the working area before construction. This method has had some success when pioneered at a road-widening scheme on the A9 near Carrbridge (Fullarton, 2012).

6.8 Difficulties Encountered

The surveys were undertaken over a 5-year period and in that time the distribution of species has changed within the survey area e.g. wood ants moving into the area. This highlights the value of regularly updating surveys to ensure that the design of mitigation measures is based on the most up-to-date information. Provided this approach is continued until construction is undertaken, and where necessary, measures are tailored to reflect the distribution of species, this is not considered to be a significant difficulty.

Timing of the surveys presented another limitation, with dense bracken growth in summer and autumn preventing access to certain areas of the site. Full access to the survey areas was enabled by resurveying in winter.

The main difficulty encountered was in surveying the River Moriston for freshwater pearl mussels. Several attempts were made to complete the survey, which was hampered by a particularly deep (2 m+) section below the mid-point of the survey area. Even during low summer flows, the full survey site was not accessible and it was agreed with SNH that the level of survey undertaken already was appropriate.

6.9 Summary

With appropriate mitigation measures in place, the majority of the impacts on ecology and nature conservation are predicted to be **Not Significant**. Due to the permanent loss of a small area of ancient woodland, the predicted impact on this terrestrial habitat receptor is considered to be **Significant** at a **County scale.** In addition, due to the permanent loss of the Daubenton's bat roost, the predicted impact on bats is considered to be **Significant** at a **County Scale**.

The loss of ancient woodland is a permanent impact and cannot be mitigated for, although in time, the woodland will regenerate. Similarly, while the loss of the small pipistrelle roost in the existing bridge can be compensated for using bat boxes, the permanent loss of the Daubenton's roost and possible winter roost (Daubenton's bat and soprano pipistrelle) in the old bridge is difficult to fully compensate. It can only be partially compensated for and it is unlikely that bat boxes will be fully effective. The position of the roost over water is ideal for Daubenton's bats, providing a clear flight line along the Allt Lagain Bhain to feeding areas on the River Moriston and within the surrounding woodland. It offers enough shelter to provide stable temperatures allowing for winter roosting. Without rebuilding the masonry arch bridge further upstream (an option which is considered to be cost-prohibitive), it is difficult to fully compensate for the loss of this roost. However, provision of artificial roosting opportunities, probably in the form of bat boxes will be made in liaison with a licensed bat worker and SNH.

It must therefore be concluded that the impacts on both bats and ancient woodland are considered to be Significant at the scales discussed earlier.

7 Landscape Effects

7.1 Introduction

Landscape is regarded as an important national resource and in Scotland our natural and cultural inheritance is valued for both its intrinsic beauty and its contribution to regional identity and sense of place.

The Landscape and Visual Impact Assessment seeks to identify and assess potential effects of the proposed development on the landscape resource of the site and its environs, and visual amenity of the site and surrounding areas.

This section examines the landscape and visual impacts associated with the construction and operation of the replacement A887 Allt Lagain Bhain Bridge. The assessment considers the baseline landscape character and features of the area together with the visual context of the proposed bridge and road tie-in and makes an assessment of landscape and visual impacts in relation to this. The assessment was initially prepared with reference to the DMRB Volume 11, Section 3, Part 5 and subsequently updated to reflect IAN135/10.

7.2 Criteria for Evaluation of Landscape and Visual Impacts

7.2.1 Landscape

Landscape and visual impacts have been determined by assessing the degree of change resulting from building the new bridge and road tie-ins, removal of the existing structures, removal of trees and associated earthworks on the existing landscape character and features. Main views from the surrounding publicly accessible areas are also considered.

Landscape impacts are those changes which arise as a result of the proposed scheme. Impacts on landscape character areas have been assessed, including both landscape features and designations.

Landscape quality is identified in IAN/135/10 as being 'the quality or condition of the landscape, which involves consideration of the physical state of the landscape and of the features and elements which make up landscape character'. This definition is in line with current guidance set out in Guidelines for Landscape and Visual Impact Assessment 3rd Edition (2013).

The quality of the existing landscape is determined using criteria as listed below.

7.2.2 Criteria for evaluation of landscape quality

Highest

Consideration of the physical state of the landscape and of the features and elements which make up landscape character which may include:

- Distinctive, unique or outstanding natural landscape character, including significant degrees of amenity and tranquillity.
- Strong landscape structure, characteristic patterns and balanced combination of landform and land cover.
- Appropriate management for land use and land cover.
- Distinct features worthy of conservation.
- No detracting features.
- Sense of place.
- Internationally or Nationally recognised e.g. all or great majority of World Heritage Site and/or National Park and/or National Scenic Area.

High

Consideration of the physical state of the landscape and of the features and elements which make up landscape character which may include:

- Strong landscape structure, characteristic patterns and balanced combination of landform and land cover.
- Appropriate management for land use and land cover, but potentially scope to improve.
- Distinct features worthy of conservation.
- Occasional detracting features.
- Sense of place.
- Nationally recognised e.g. localised areas within National Park and/or National Scenic Area.

Good

Consideration of the physical state of the landscape and of the features and elements which make up landscape character which may include:

- Recognisable landscape structure, characteristic patterns and balanced combination of landform and land cover still evident.
- Scope to improve management for land use and land cover.
- Some features worthy of conservation.
- Occasional detracting features.
- Sense of place.
- Regionally, locally recognised e.g. all or great majority of Special (Local) Landscape Areas.

Ordinary

Consideration of the physical state of the landscape and of the features and elements which make up landscape character which may include:

- Distinguishable landscape structure, characteristic patterns and combinations of landform and land cover often masked by land use.
- Scope to improve management for land use and cover.
- Some features worthy of conservation.
- Prominent detracting features.

Poor

Consideration of the physical state of the landscape and of the features and elements which make up landscape character which may include:

- Weak or degraded landscape structure, characteristic patterns of landform and land cover often masked by land use.
- Mixed or single land use dominates and/or is evident.
- Lack of management and intervention has resulted in degradation and disturbed or derelict land which could require treatment.

The defined landscape character areas have also been assessed according to their landscape sensitivity, which is informed by landscape quality. Landscape sensitivity refers to the degree to which the landscape could accommodate change due to road development without causing detrimental effects on character and quality. Landscape sensitivity is defined below.

7.2.3 Criteria for Evaluation of Landscape Sensitivity to Change

High

Highest or very attractive quality landscape that would be unlikely to tolerate change and effective mitigation would be difficult to achieve.

Medium

Good or ordinary landscape quality that would be tolerant of a small degree of change and effective mitigation would be possible, but results could take time to be effective.

Low

An ordinary or poor quality landscape that would be tolerant of a large degree of change and effective mitigation would be readily achievable.

The magnitude of impact is determined using the below as a guide.

7.2.4 Assessment of Magnitude of Impact on Landscape Character

Major Adverse

Total loss or large scale damage to existing character of distinctive features and elements, and/or the addition of new but uncharacteristic conspicuous features or elements.

Moderate Adverse

Partial loss or noticeable damage to existing character or distinctive features or elements and/or the addition of new but uncharacteristic noticeable features and elements.

Minor Adverse

Slight loss or damage to existing character or features and elements, and/or the addition of new but uncharacteristic features and elements.

Negligible Adverse

Barely noticeable loss or damage to existing character or features and elements, and/or the addition of new but uncharacteristic features and elements.

No Change

No noticeable loss, damage or alteration to character or features or elements.

Negligible Beneficial

Barely noticeable improvement of character by the restoration of existing features or elements, and/or the removal of uncharacteristic features and elements, or by the addition of new characteristic elements.

Minor Beneficial

Slight improvement of character by the restoration of existing features and elements, and/or the removal of uncharacteristic features and elements, or by the addition of new characteristic elements.

Moderate Beneficial

Partial or noticeable improvement of character by the restoration of existing features and elements, and/or the removal of uncharacteristic and noticeable features and elements, or by the addition of new characteristic features.

Major Beneficial

Large scale improvement of character by the restoration of features and elements, and/or the removal of uncharacteristic and conspicuous features and elements, or by the addition of new distinctive features.

The derivation of significance of impacts on landscape character is given in Table 7.1. Both positive and negative impacts can occur and the different levels of significance S outlined below.

Table 7.1 Derivation of significance of impacts on landscape character

Impact Magnitude	High character sensitivity	Medium character sensitivity	Low character sensitivity
Major	Very large/large	Large/moderate	Moderate/slight
Moderate	Large/moderate	Moderate/slight	Slight
Minor	Moderate/slight	Slight	Slight/neutral
Negligible	Slight/neutral	Neutral	Neutral
No change	Neutral	Neutral	Neutral

7.2.5 Significance of Landscape Impacts on Landscape Character

Moderate beneficial

Provides an opportunity to enhance the landscape as the project:

- fits well with the scale, landform and pattern of the landscape;
- enables the restoration of characteristic features through mitigation which have been partially lost or diminished as the result of changes resulting from intensive farming or inappropriate development;
- enables a sense of place and scale to be restored through well designed planting and mitigation measures, whereby characteristic features are enhanced through the use of local materials and species used to fit the proposal into the landscape;
- enables some sense of quality to be restored or enhanced through beneficial landscaping and sensitive design in a landscape which is not of any formally recognised quality; and/or
- furthers government objectives to regenerate degraded countryside.

Slight beneficial

The project:

- fits well with the scale, landform and pattern of the landscape;
- incorporates measures for mitigation to ensure they would blend in well with the surrounding landscape;
- enables some sense of place and scale to be restored through well designed planting and mitigation measures;
- maintains or enhances existing landscape character in an area which is not a designated landscape, nor vulnerable to change; and/or
- avoids conflict with government policy towards protection of the countryside.

Neutral

The project:

- fits within the scale, landform and pattern of the landscape but does not provide benefit;
- is not visually intrusive;
- maintains the existing landscape character; and/or
- avoids conflict with government policy.

Slight adverse

The project:

- does not quite fit the landform and scale of the landscape;
- is not in itself very visually intrusive but would impact on certain views into and across the area;
- will not be completely mitigated for because of the nature of the proposal itself or the character of the landscape through which it passes;

- affects an area of recognised landscape quality; and/or
- conflicts with local authority policies for protecting the local character of the countryside.

Moderate adverse

The project:

- is out of scale with the landscape, or at odds with the local pattern and landform;
- is visually intrusive and would adversely impact on the landscape;
- will not be possible to fully mitigate for i.e. long-term scarring the landscape as some features of interest would be partly destroyed or their setting reduced or removed;
- has an adverse impact on a landscape of recognised quality or on vulnerable and important characteristic features or elements; and/or
- is in conflict with local and national policies to protect open land and nationally recognised countryside.

Large adverse

The project:

- has considerable variance with the landform, scale and pattern of the landscape;
- is visually intrusive and would disrupt fine and valued views of the area;
- is likely to degrade, diminish or even destroy the integrity of a range of characteristic features and elements and their setting;
- is substantially damaging to a high quality or highly vulnerable landscape, causing it to change and be considerably diminished in quality;
- cannot be adequately mitigated for; and/or
- is in serious conflict with government policy for the protection of nationally recognised countryside.

Very large adverse

The project:

- is in complete variance with the landform, scale and pattern of the landscape;
- is highly visual and extremely intrusive, destroying fine and valued views both into and across the area;
- will irrevocably damage or degrade, badly diminish or even destroy the integrity of characteristic features and elements and their setting;
- causes a very high quality or highly vulnerable landscape to be irrevocably changed and its quality very considerably diminished; ad/or
- cannot be mitigated for, that is, there are no measures that would protect or replace the loss of a nationally important landscape.

7.2.6 Visual Impact Assessment

The Visual Envelope (VE) is defined in the DMRB as the area from which a proposed scheme feature is potentially visible. It further states adverse visual impacts in flat areas at more than 1,000 m from the road are unlikely to be significant. Key visual receptors have been identified and the VE was therefore used to define the limits of the study area for the visual impact assessment. An analysis of the likely degree of change resulting from the proposed scheme has been made.

The sensitivity of each visual receptor is assessed, as defined below.

7.2.6.1 Visual receptor sensitivity

High

Viewers with high interest in their everyday visual environment and/or with prolonged and regular viewing opportunities, such as:-

- residents; or
- users of outdoor recreational facilities whose attention or interest could be focused on the landscape e.g. walkers and horse riders.

Medium

Viewers with moderate interest in their environment and discontinuous and/or irregular viewing periods, such as:-

- workers (outdoors); or
- users engaged in outdoor sport or recreation other than appreciation of the landscape e.g. golf, hunting, angling or water based activities.

Low

Viewers with a passing interest in their surroundings and momentary viewing periods, such as:-

- drivers/travellers/passengers of moving vehicles; or
- people at their place of work

The scale or magnitude of visual change relates to the extent of change upon visual amenity as a result of the proposed scheme. Visual impacts have been determined by:

- The change in view with respect to loss or addition of features in the view and changes in its composition including the proportion of view occupied by the proposed scheme.

- The degree of contrast and/or change in the landscape with the existing landscape elements and characteristics.

- The duration and nature of effect.
- The angle of view in relation to the main activity of the receptor.
- The distance of viewpoint from the proposed development.
- The dominance of the impact feature in the view.

Definitions used to determine the magnitude of visual impact are shown below.

7.2.6.2 Assessment of magnitude of visual impact

Major

The proposed scheme would dominate or form a significant and immediately apparent part of the view that affects and changes its overall character or it would cause a very significant deterioration in the existing view.

Moderate

The proposed scheme would form a visible and recognisable new element of the view within the overall character and a noticeable deterioration in the existing view.

Minor

The proposed scheme would constitute only a minor component of the wider view and would cause a barely perceptible deterioration in the existing view.

Negligible

Only a very small part or no part of the proposed scheme would be visible. No discernible deterioration or improvement in the existing view.

No change

No observable change in view.

The significance of the visual impact is determined by correlation of the sensitivity of the visual receptor and the magnitude of impact with the resulting significance of visual effect matrix detailed in Table 7.2.

Table 7.2 Significance of visual effects

Impact Magnitude	High	Medium	Low
Major	Very large/large	Large/moderate	Moderate/slight
Moderate	Large/moderate	Moderate/slight	Slight
Minor	Moderate/slight	Slight	Slight/neutral
Negligible	Slight/neutral	Neutral	Neutral
No change	Neutral	Neutral	Neutral

7.3 Policy/Regulatory Framework

7.3.1 Planning

- Highland-wide Local Development Plan (HwLDP) is the Highland Council's vision for the whole area (Highland Council, 2012). It sets out how land can be used by developers for the next 20 years, but excludes the area covered by the Cairngorms National Park, which has its own plan.

- Planning Advice Note (PAN) 75 Planning for Transport. This PAN aims to create greater awareness of how linkages between planning and transport can be managed. It highlights the roles of different bodies and professions in the process and points to other sources of information.

- Scottish Planning Policy, Scottish Government, 2014.

7.4 Study area

For the visual impact the study was confined to the Zone of Visual Impact (Figure 7.2), defined as the theoretical boundary at which the proposed scheme would be visible and largely depending on surrounding topography and habitats. The landscape study area was considered within its wider setting in relation to existing Landscape Character Assessment. A search for areas with existing landscape designations was undertaken within 10 km of the proposed scheme footprint.

7.5 Character of the Existing Baseline

7.5.1 Landscape

- The proposed works are not located within a National Scenic Area (NSA), National Park or Special Landscape Area.

- The bridge is located in a rural location (Figure 7.1) with views of the surrounding woodland and hills beyond.

- The verges are mainly grass and are fringed with intermittent broadleaf trees.

- Land use within the study area is predominantly a mixture of rough pasture and broadleaf woodland.

- There is an old masonry arch bridge directly adjacent to the trunk road bridge which adds interest to the landscape.

- The trunk road follows the line of the nearby River Moriston and is currently single track with passing places at this location.

- There are no public footpaths within the proposed scheme, however, there is an old drove road which runs to the north of the proposed scheme linking Fort Augustus to Tomich (Strathglass). This is part of the long distance drove route between Wester Ross and on to the south via the Corrieyairack Pass (see Scotways Heritage Paths Project website).

- There is minimal development within the area of the proposed scheme. There is, however, major linear infrastructure in the form of the Beauly to Denny power line which has recently been upgraded and runs to the west of the proposed scheme.

Figure 7.1 Showing the rural location of the proposed scheme

A review of Landscape Character Assessment within the study area shows the site lies within the Wooded Glen landscape type, as identified in the Inverness District Landscape Character Assessment (SNH Review No 114). The key characteristics of the Wooded Glen are:

- Broad glen with steep upper slopes undulating lower slope and a narrow floor mostly occupied by river terraces.

- Character strongly influenced by human occupation.

- Mix of broadleaf woodland, small plantations and pastures covering the lower slopes.

- Large plantations and open moorlands covering the upper slopes.

- Limited visibility with the glen floor creating an intimate semi-enclosed landscape.
- Areas of open hill ground allowing distant views of the glens creating a feeling of openness and exposure.
- Varying pattern of woodland on the glen sides and hill tops.
- Broadleaf woodland common along steep gully sides, lining river banks and often associated with farmland, sheltering farmsteads and dividing fields.

Features of cultural heritage interest within the landscape are described in Chapter 5: Section 5.5.

There is a recognisable structure and features worthy of conservation, however, given the lack of landscape designation at a local, regional or national level, the landscape value is considered to be **Ordinary**.

The landscape quality would be susceptible to a medium level of change and effective mitigation is considered possible although this may take time to be effective. The sensitivity is, therefore, considered to be **Medium**.

7.5.2 Visual

The A887 trunk road forms part of the main route between Inverness and the Isle of Skye and is used by commercial, local and tourist traffic.

7.5.2.1 Zone of Visual Influence

The Zone of Visual Influence (ZVI) of the proposed scheme as well as the extent and the location of visual receptors used to assess baseline conditions is shown in Figure 7.2.

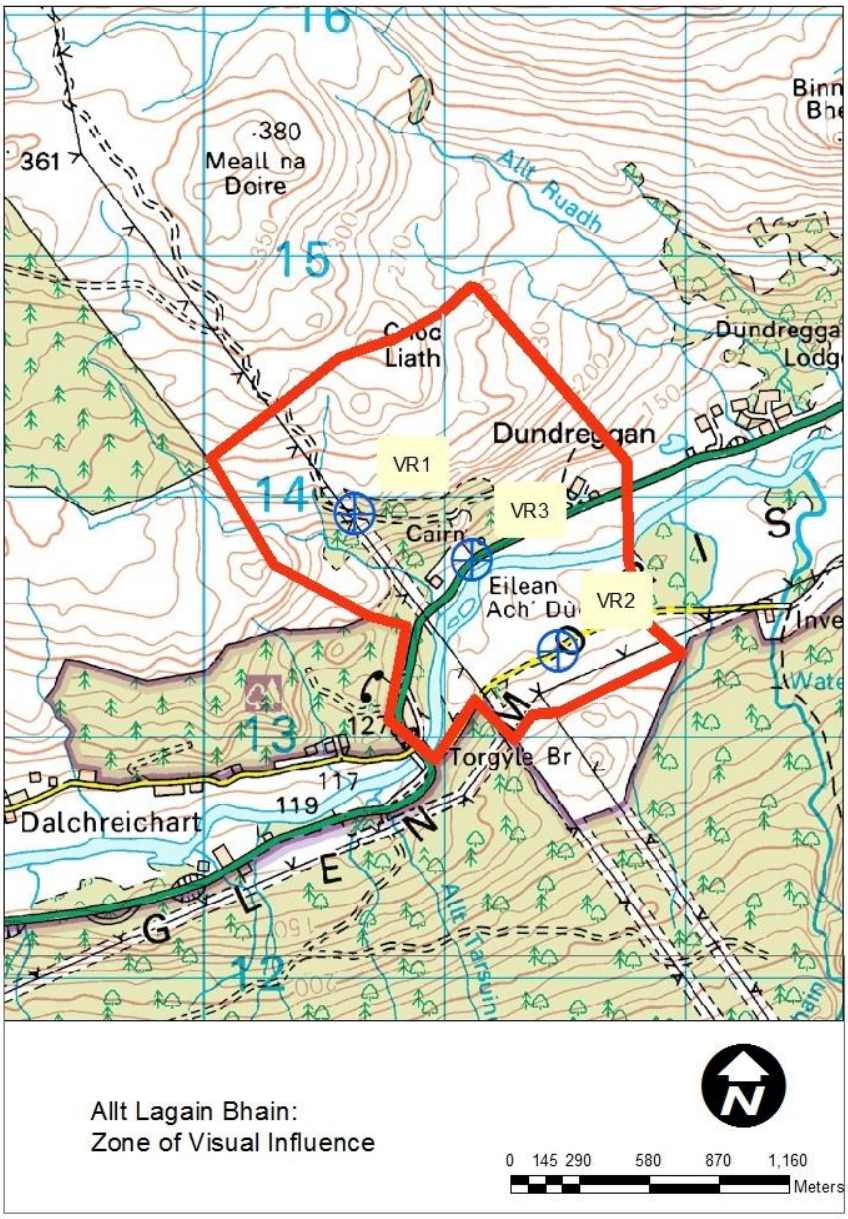


Figure 7.2 Allt Lagain Bhain: Zone of visual influence and locations of visual receptors

The ZVI is determined by the surrounding topography and is restricted to the areas north and south of the bridge. Much of the area to the west of the proposed scheme has restricted views due to the presence of surrounding forest.

7.5.2.2 Existing Views

There are no public viewpoints that afford an overview of the proposed scheme. The surrounding area is accessible and views can be obtained from the old drove road that runs north under the power line and past the 380 m high Meall na Doire hill. In addition, views can be gained from the minor road leading to Inverwick on the south side of the river. The existing A887 is screened by trees

particularly in the summer. In winter, the moving cars make the trunk road a more visible element within the landscape.

The visibility of the elements within the site will change in relation to the location of the viewer. The different type of views can be categorised as:

- External: where the site is viewed from various viewpoints and distances allowing it to be considered in its wider landscape context.
- Internal: where the site is viewed while travelling along the A887. The view will vary according to season.
- Sequential: viewing the changing aspect during approach whereby the context and different angles of view vary with distance from the proposed scheme.

7.5.2.3 Receptors

The nearest houses are at Torgyle to the south and Dundreggan to the north. The bridge is not visible to any of the properties and so they have not been identified as visual receptors. The A887 runs through a rural area at this point and there are few permanent receptors. The receptors chosen reflect the view from the road, for walkers using the drove road and from vehicles using the minor road on the far side of the river. The receptors (shown in Figure 7.2) are detailed in the following section.

VR1: view from drove road. The line of the drove road runs up the west side of Meall na Doire hill (380 m), however, the valley landforms block any possible view of the road from this altitude (Figure 7.3). In both summer and winter the view from the drove road is obscured by trees (Figure 7.4 and Figure 7.5). The current view comprises glimpses of the road, the River Moriston and its flood plain and the surrounding area is dominated by semi-natural broadleaf woodland along with conifer plantation in the distance. This is juxtaposed by the newly-constructed Beauly to Denny line electricity pylons and the visual impact caused by the new access road. This has resulted in removal of the original drove road immediately to the north of this visual receptor.

As walkers using this route are principally there to enjoy the landscape it is considered that the sensitivity is **High**. This receptor experiences an external view which changes as walkers move along the route.

Figure 7.3 View from 'drove road' adjacent to Meall na Doire hill

Figure 7.4 View from VR1 (summer) - drove road (bridge location circled in red)

Figure 7.5 View from VR1 (winter) - drove road (bridge location circled in red)

VR2: view from Inverwick minor road (Figure 7.6 and Figure 7.7). The route is considered to be used infrequently, terminating at Inverwick and is mainly used for local access. There are also likely to be anglers and other recreational users of the countryside in the area. There are occasional views of the A887 road and houses, the main view being a wide vista of hills and forest, and river valley. The view is obscured by trees in both summer and winter. The key characteristics of the landscape character are the surrounding hills and forestry and the form of the river valley. The most obvious form of current land management is the existing arrangement plus the new Beauly to Denny pylon line and associated access track.

It is considered that this visual receptor has an external view of the bridge with **High** sensitivity.

Figure 7.6 VR2 (summer): Inverwick minor road (bridge location circled in red)

Figure 7.7 VR2 (winter): Inverwick minor road (bridge location circled in red)

VR3: view from A887 trunk road (Figure 7.8 and Figure 7.9). This is the most significant receptor in terms of the number of travellers that will view the site. The existing view is dominated by the river and its floodplain and the surrounding forest as the single track road winds its way through the valley. The existing bridge is noticeable only briefly to vehicle travellers as they pass, although pedestrians and cyclists using the route will experience views of the bridge for a longer period of time. There is little evidence of obvious land management and the pylon line, though visible, is less dominant at this visual receptor.

Many of the travellers will be tourists or locals using the road on a regular basis and there is thus a **Medium** sensitivity to change in the view of the surrounding landscape. This receptor will experience both internal and sequential views.

Figure 7.8 VR3 - view from A887, summer (bridge location circled in red)

Figure 7.9 VR3 - view from A887, winter (bridge location circled in red)

7.6 Landscape Impact

The impacted area of landscape will be restricted to the area of the works which totals 9895m^2 (based on land purchase requirements). The landscape value is considered to be **Ordinary** and the sensitivity is **Medium**.

The main permanent impacts will be:

- loss of areas of trees in the vicinity of the bridge;
- re-profiling of land;
- increasing the width of bridge and tie-ins from single track to double track; and
- demolition of historic masonry arch bridge.

Landscape impacts are detailed as follows and summarised in Table 7.3. Impacts are adverse unless stated otherwise.

The loss of trees will be particularly noticeable at year 1 and the impact would be considered to be **Minor Adverse** magnitude and **Slight Adverse** significance, however, this will only comprise a relatively small part of the total area of surrounding woodland and will be considered to be **Negligible** magnitude and **Neutral** significance by year 15 through compensation planting. These effects are not considered significant in the context of the EIA Regulations.

The areas of cut and fill are unavoidable and necessary for the construction of the bridge and road tie-ins. Where possible this will be softened and made to reflect the contours of the surrounding landscape. Due to the loss of ground vegetation this will be particularly noticeable at year 1 with an impact of **Moderate Adverse** magnitude and **Slight Adverse** significance but will be softened by year 15 with a **Negligible Adverse** magnitude and **Neutral** significance.

Table 7.3 Summary of landscape impacts

Potential Impact	Duration of impact	Significance Year 1	Significance Year 15
Loss of trees	Permanent	Slight Adverse	Neutral
Reprofiling of land	Temporary	Slight Adverse	Neutral
Widening of road/bridge	Permanent	Slight Adverse	Neutral
Loss of bridge	Permanent	Moderate Adverse	Moderate Adverse
Construction	Temporary	Neutral	Neutral

		(Slight Adverse during construction)	

The increase in width of the road and bridge will change the character of the road within one of the last remaining single track sections on the A887 trunk road. However, this represents a safety improvement for drivers which must be balanced against the potential landscape impact. The impact will also be softened through appropriate mitigation measures. Overall, it is considered to be **Minor Adverse** magnitude and **Slight Adverse** significance at year 1 with a **Negligible Adverse** magnitude and **Neutral** significance by year 15. These effects are not considered significant in the context of the EIA Regulations.

The structure of the historic masonry bridge is not currently visible from the road, only the grassed-over surface is visible. The only real view is when approaching from the north side (Figure 7.10). There is no possible mitigation measure for the loss of the bridge and the impact from this specific aspect must be considered **Major Adverse** magnitude and **Moderate Adverse** significance at both year 1 and 15. This is considered to be a significant effect in the context of the EIA Regulations. Note there is no viable alternative to demolition of the bridge (see Chapter 5: Cultural Heritage, Section 5.7). Other potential impacts on features of cultural heritage interest in the landscape is given in Chapter 5, Section 5.6.

Figure 7.10 View of the historic masonry arch bridge from the north

There will also be construction-related impacts during the works through:

- presence of plant, vehicles and machinery;

- presence of a site compound; and
- a temporary bridge and associated tie-ins.

These construction impacts are considered to be temporary and unavoidable and during the works are considered to be of **Moderate Adverse** magnitude and **Slight Adverse** significance. Provided the site compound area is reinstated, and the site is left clean and tidy, the construction impact is considered to be **Negligible Adverse** magnitude and **Neutral** significance at both year 1 and year 15. In the context of the EIA Regulations, these effects are not considered to be significant.

7.7 Visual Impact

Visual impact assessment is detailed as follows and summarised in Table 7.4. Impacts are adverse unless stated otherwise.

Table 7.4 Summary of visual impacts

Receptor ID	Sensitivity	Duration of impact	Magnitude	Significance
VR1 View from drove road	High	Permanent	Minor	Slight
VR2 View from Inverwick minor road	High	Permanent	Minor	Slight
VR3 View from A887 trunk road	Medium	Permanent	Minor	Slight

VR1: there will be **No Change** to views from the drove road during the summer leading to a **Neutral** significance of effect. However, the new bridge will be more visible during the winter. The view from the drove road will also be brief and will change as walkers move along the route. The magnitude of the impact is considered to be **Minor** with a **Slight** significance of effect in winter.

VR2: again there will be **No Change** to views from the minor road and recreation users on this side of the river during the summer leading to a **Neutral** significance of effect. During winter, the new bridge will be more visible but with mitigation, the magnitude of impact is considered to be **Minor** with a **Slight** significance of effect.

VR3: there will be a **Minor** impact on the view experienced from the A887. There will be no difference between summer and winter, and the significance of effect is considered to be **Slight**.

None of the above effects on the visual receptors are considered to be significant in the context of the EIA Regulations.

7.8 Design, Mitigation and Enhancement

There are a number of measures that can be incorporated to reduce the residual landscape and visual impact.

- The design will seek to minimise the footprint of the works.
- Topsoil will be carefully stripped and stored separately for the duration of the works.
- Areas required for site compound and temporary bridge will be restored with landforms that fit in with the contours of the surrounding landscape.

This principle will also be applied to the general landscaping of the site following completion of the works.

- Site-won topsoil will be used for landscaping to ensure the re-establishment of the ground flora.
- Existing masonry from the demolished masonry arch bridge will be used to face the new parapets to soften the impact.
- Woodland areas that are removed will be replanted using native species of local provenance.
- An appropriate light seed mix will be applied to introduce ground cover while the seed bank re-establishes the native flora.
- The effectiveness of the mitigation should be monitored for up to 5 years post-construction.

The design is currently at an early stage. The relevant roads Operating Company will employ the services of an appropriately-qualified Ecological Clerk of Works (ECoW) to oversee the most sensitive operations during construction. Taking consideration of the design requirements and with the implementation of the proposed mitigation measures, it is anticipated that the proposed scheme will comply with relevant policies and plans including Scottish Planning Policy, 2014.

7.9 Summary

Overall it is considered that the visual impact will be minimal. The only receptor with a clear unobscured view of the bridge is from the A887 trunk road (VR3). With the new parapet faced in stone it is considered that visual impact will be minimised and will be **Slight** significance at most.

The main landscape impact will be the loss of the historic masonry arch bridge. This is irreversible and cannot really be mitigated for. However, it is only really visible in the landscape when approaching from the woodland to the north. The loss of the structure will represent a **Moderate** adverse impact significance. In the context of the EIA Regulations, this is considered to be a significant effect. However, the overall impact on the landscape character is assessed as a **Slight** adverse significance.

8 Road Drainage and the Water Environment

8.1 Introduction

Water quality and quantity is not only essential for flora and fauna that live within it and that are dependent on it but it is also a valuable resource for anthropogenic related activities such as fisheries, drinking, hydropower and recreation. Protection of the water environment, including surface water and groundwater is a high priority. In addition, watercourses and lochs form key features in the landscape (refer to Chapter 7: Landscape Effects) and support important habitats and species (refer to Chapter 6: Ecology and Nature Conservation).

The objective of this chapter is to evaluate the importance of the existing water features within the locality of the proposed scheme, identify potential impacts from the proposed scheme, assess the likely degree of impact and propose mitigation measures to reduce or control impacts or risks to the water environment. Chapter 6: Ecology and Nature Conservation covers information on species present in the study area, whilst this chapter focusses on the water environment itself.

8.2 Methodology and Criteria for Evaluation of Water Environment

The methodology used for the Road Drainage and the Water Environment assessment has been based on DMRB Volume 11, Section 3, Part 10, also referred to as HD 45/09 (Highways Agency, 2009).

The framework for assessing the importance of water environment features, the magnitude of impact and the significance of impact is detailed in Tables 8.1, 8.2 and 8.3. Professional judgement has also been used in the evaluation of features and the assessment of impacts.

The methodology for sizing the proposed new box culvert is given in Section 8.7.1.1. The method used for assessing potential impacts on water quality during operation is described in Section 8.7.1.3.

Table 8.1 Importance of water environment features (based on DMRB Volume 11, Section 3, Part 10 HD 45/09 Table A4.3 with fluvial geomorphological characteristics added

Importance	Criteria	Typical Examples
Very High	Attribute has a high quality and rarity on regional or national scale.	**Surface Water:** Water Framework Directive (WFD) Status 'High'. Site designated under European or UK legislation (SAC, SPA, SSSI, Ramsar site, salmonid water). Species protected by European legislation. Water feature displaying no signs of previous modification and/or experiencing no morphological pressures at the current time, with natural fluvial and sediment transportation processes. **Groundwater:** Aquifer providing a regionally important resource or supporting site protected under European and UK habitat legislation. **Flood Risk:** Floodplain or defence protecting more than 100 residential properties from flooding.
High	Attribute has a high quality and rarity on local scale.	**Surface Waters:** WFD Status 'Good'. Species protected under European or UK habitat legislation. Water feature displaying no/very few signs of previous modification and/or experiencing no/very few morphological pressures at the current time, with natural fluvial and sediment transportation processes. **Groundwater:** Aquifer providing locally important resource or supporting river ecosystem. **Flood Risk:** Floodplain or defence protecting between 1 and 100 residential properties or industrial premises from flooding.

Importance	Criteria	Typical Examples
Medium	Attribute has a medium quality and rarity on local scale.	**Surface Waters:** WFD Status 'Moderate'. Water feature displaying signs of previous modification and/or pressures, but is recovering towards a natural state. Mostly natural fluvial and sediment transportation processes occurring. **Groundwater:** Aquifer providing water for agricultural or industrial use with limited connection to surface water. **Flood Risk:** Floodplain or defence protecting 10 or fewer industrial properties from flooding.
Low	Attribute has a low quality and rarity on local scale.	**Surface Waters:** WFD Status 'Poor', 'Bad'. Artificial channels (such as drains) and previously natural but now highly modified channels with very limited signs of natural recovery or natural fluvial and sediment transport processes occurring. **Groundwater:** Unproductive strata. **Flood Risk:** Floodplain with limited constraints and a low probability of flooding of residential and industrial properties.

Table 8.2 Estimating magnitude of impact (based on DMRB Volume 11, Section 3, Part 10 HD 45/09 Table A4.4 with fluvial geomorphological impacts added)

Magnitude	Criteria	Typical Examples
Major Adverse	Results in loss of attribute and/or quality and integrity of attribute.	**Surface Water:** Failure of both soluble and sediment-bound pollutants in Highways Agency Water Risk Assessment Tool (HAWRAT) and compliance failure with Environmental Quality Standard (EQS) values. Calculated risk of spillage > 2% annually. Loss or extensive change to a fishery. Loss or extensive change to a designated nature conservation site. Causes deterioration in the overall water body status or WFD quality elements and prevents the water body from achieving an overall status of 'Good'. Failure of hydromorphological elements (morphology, quantity and dynamics of flow) as a result of the works. Loss or extensive damage to physical habitat due to extensive modification. Replacement of a large extent of the natural bed and/or banks with artificial material. Extensive change to channel planform. **Groundwater:** Loss of, or extensive change, to an aquifer. Potential high risk of pollution to groundwater from routine runoff – risk score >250. Calculated risk of pollution from spillages > 2% annually. Loss of, or extensive change to, groundwater supported designated wetlands. **Flood Risk:** Increase in peak flood level (1% annual probability) > 100mm.
Moderate Adverse	Results in effect on integrity of attribute, or	**Surface Waters:** Failure of both soluble and sediment-bound pollutants in HAWRAT but compliance with EQS values. Calculated risk of pollution from spillages > 1% annually and < 2% annually. Partial loss in productivity of a fishery.

Magnitude	Criteria	Typical Examples
	loss of part of attribute.	Prevents a water body from achieving an overall status of 'Good'. Failure of one or more hydromorphological elements (morphology, quantity and dynamics of flow) as a result of the works. Partial loss or damage to habitat due to modifications. Replacement of the natural bed and/or banks with artificial material (total length is more than 3% of water body length). **Groundwater:** Partial loss or change to aquifer. Potential medium risk of pollution to groundwater from routine runoff – risk score 150-250. Calculated risk of pollution from spillages > 1% annually and < 2% annually. Partial loss of integrity of groundwater supported designated wetlands. **Flood Risk:** Increase in peak flood level (1% annual probability) > 50mm.
Minor Adverse	Results in some measurable change in attribute quality or vulnerability.	**Surface Waters:** Failure of either soluble or sediment-bound pollutants in HAWRAT. Calculated risk of pollution > 0.5% annually and < 1% annually. Potential for failure in one of the hydromorphological elements (morphology, quantity and dynamics of flow) as a result of the works. Slight change/deviation from baseline conditions or partial loss or damage to habitat due to modifications. **Groundwater:** Potential low risk of pollution to groundwater from routine runoff – risk score < 150. Calculated risk of pollution from spillages > 0.5% annually and < 1% annually. Minor effects on groundwater supported wetlands. **Flood Risk:** Increase in peak flood level (1% annual probability) > 10mm.
Negligible	Results in effect on	**Surface Waters:** No risk identified by HAWRAT (passes both soluble and sediment-bound pollutants).

Magnitude	Criteria	Typical Examples
	attribute, but of insufficient magnitude to affect use or integrity.	Risk of pollution from spillages < 0.5%. No direct engineering impact but potential indirect impact due to proximity of the watercourse to the proposed route options, such as pollution by sediment release or reduction in riparian corridor. **Groundwater:** No measurable impact upon aquifer and risk of pollution from spillages < 0.5%. **Flood Risk:** Negligible change in peak flood level (1 % annual probability) <+/- 10mm.
Minor Beneficial	Results in some beneficial effect on attribute or a reduced risk of negative effect occurring.	**Surface Waters:** HAWRAT assessment of either soluble or sediment-bound pollutants becomes Pass from the existing site where the baseline was a Fail condition. Calculated reduction in existing spillage risk by 50% or more (when existing spillage risk is < 1% annually). Potential for improvements in one of the hydromorphological elements (morphology, quantity and dynamics of flow) as a result of the works. Slight change/deviation from baseline conditions or partial improvement or gain in riparian or in-channel habitat. Note: beneficial impacts will only arise on impacted/modified/artificial water features. The greatest improvement will occur on water features that have a uniform morphology, acting as a transfer (larger watercourses) or sink (minor watercourses with limited flow and overgrown vegetation) of sediment and no signs of active fluvial processes. **Groundwater:** Calculated reduction in existing spillage risk by 50% or more to an aquifer (when existing spillage risk < 1% annually). **Flood Risk:** Reduction in peak flood level (1% annual probability) > 10mm.

Magnitude	Criteria	Typical Examples
Moderate Beneficial	Results in moderate improvement of attribute quality.	**Surface Waters:** HAWRAT assessment of both soluble and sediment-bound pollutants becomes Pass from an existing site where the baseline was a Fail condition. Calculated reduction in existing spillage by 50% or more (when existing spillage risk is > 1% annually). Provides improvements in the water body that could lead to it achieving an overall status of 'Good'. Improvement in one or more hydromorphological elements (morphology, quantity and dynamics of flow) as a result of the works. Partial creation of both in-channel and riparian habitat. Removal of an existing superfluous structure or artificial channel bed/bank. **Groundwater:** Calculated reduction in existing spillage risk by 50% or more (when existing spillage risk is > 1% annually). **Flood Risk:** Reduction in peak flood level (1% annual probability) > 50mm.
Major Beneficial	Results in major improvement of attribute quality.	**Surface Waters:** Removal of existing polluting discharge, or removing the likelihood of polluting discharges occurring to watercourse. The water body would improve in status from the current overall water body status and the improvements could lead to achieving 'Good Status'. Extensive creation of both in-channel and riparian habitat, vastly improving the water body from baseline conditions. Removal of an existing superfluous structure or artificial channel bed/bank. **Groundwater:** Removal of existing polluting discharge to an aquifer or removing the likelihood of polluting discharges occurring. Recharge of an aquifer. **Flood Risk:**

Magnitude	Criteria	Typical Examples
		Reduction in peak flood level (1% annual probability) > 100mm.

Table 8.3 Estimating the magnitude of impact in relation to the importance of the attribute

Importance of Attribute	Negligible	Minor	Moderate	Major
Very High	Neutral	Moderate/Large	Large/Very Large	Very Large
High	Neutral	Slight/Moderate	Moderate/Large	Large/Very Large
Medium	Neutral	Slight	Moderate	Large
Low	Neutral	Neutral	Slight	Slight/ Moderate

8.3 Policy and Regulatory Framework

This Road Drainage and the Water Environment assessment has been undertaken in accordance with DMRB Volume 11, Section 3, Part 10 (HD 45/09). It has also taken into consideration the legislation, guidance and policies listed below.

Design Manual for Roads and Bridges, Volume 11, Section 3, Part 10, HD 45/09.

EU Directive 2000/60/EC: Water Framework Directive (WFD).

Water Environment and Water Services (Scotland) Act 2003 (WEWS Act).

Flood Risk Management (Scotland) Act 2009.

Scottish Planning Policy, Scottish Government, 2014. pp. 57-60 (includes a section on Managing Flood Risk and Drainage).

SEPA Policy No. 19: Groundwater Protection Policy for Scotland V3, November 2009.

SEPA Policy No. 22: Flood Risk Assessment Strategy.

SEPA: The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended): A Practical Guide. Version 7.3 June 2016.

SEPA: The River Basin Management Plan for the Scotland River Basin District 2015-2027 (2015).

The Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended).

8.4 Study Area

The study area included all surface waters within the proposed scheme footprint as well as beyond, where connectivity existed. Groundwater bodies were similarly identified within the proposed scheme area. Surface and groundwater protected areas were also identified within the proposed scheme area. Activities licensed under the Controlled Activities Regulations were also identified within 1.5 km of the site. Refer to Figure B2 in Appendix B.

8.5 Character of the Existing Baseline

8.5.1 Surface Water Features

The Allt Lagain Bhain is a watercourse within the River Ness catchment (Figure 8.1 and Figure 8.2). It rises in hills to the north of the A887 and flows in a general southwards direction under the A887 to join the River Moriston (Figure 8.3). It is approximately 3 km in length. Also refer to Section 6.5.1.2 and Figure 6.7 in Chapter 6: Ecology and Nature Conservation. The River Moriston flows in a north-easterly direction from the Cluanie Dam to the west to the shore of Loch Ness in the east.

Figure 8.1 Allt Lagain Bhain looking upstream from A887 Road Bridge

The River Moriston and the Allt Lagain Bhain downstream of the A887 is designated as a SAC, the qualifying interests of which are:

- freshwater pearl mussel; and
- Atlantic salmon.

More detailed information on the Special Area of Conservation (SAC) is described in Chapter 6: Ecology and Nature Conservation, Section 6.5.1.

Figure 8.2 Allt Lagain Bhain downstream of A887 Road Bridge

Figure 8.3 River Moriston near confluence with Allt Lagain Bhain

SEPA hold no data on the Allt Lagain Bhain, but have identified the River Moriston as a heavily modified water body (HMWB). This is because of flow regulation pressures resulting from Dundreggan Dam (located approximately 5 km downstream from the proposed scheme and part of the Garry-Moriston Hydroelectric Power Scheme) and morphological alterations due to forestry. In 2014, SEPA classified the reach of the river from Dundreggan Dam to Bun Loyne as having an overall condition of Good.

There is also a small un-named watercourse, less than 1 m wide, culverted under the A887 trunk road to the west of the bridge (see Figure 6.9 in Chapter 6). This small watercourse has been evaluated overall as being of **Medium** importance but it is important to note that it flows into the SAC designated River Moriston.

The Allt Lagain Bhain has habitat suitable for salmon and trout spawning upstream and downstream of the bridge (refer to Chapter 6: Ecology and Nature Conservation). The surface water resource upstream of the road bridge is, therefore, considered overall to be of **High** importance. Owing to the SAC designation (see Chapter 6) downstream of the road bridge, the Allt Lagain Bhain at this location is considered overall to be of **Very High** importance.

The River Moriston is considered to be of **Very High** value due to its designation as an SAC for Atlantic salmon and freshwater pearl mussels.

Land use in the immediate vicinity of the A887 Allt Lagain Bhain Bridge is dominated by native broadleaved woodland. The wider catchment of Allt Lagain

Bhain includes rough pasture and coniferous forest. Some of the terrain is rocky particularly in the upland areas. It is considered that land use in the Allt Lagain Bhain catchment is unlikely to significantly adversely affect water quality in Allt Lagain Bhain. There have been recent works to upgrade the power lines nearby. The works could have posed a risk of adverse impact on the watercourse; this is no longer likely since the main construction works have largely been completed although further works to remove old power lines are likely to be required. There is forestry within the catchment of the River Moriston which could pose a risk of some limited adverse impacts on the water body. However, there are no forestry pressures recorded on the River Moriston (SEPA Water Environment Hub).

8.5.2 Groundwater

The proposed scheme is within the North Highland Groundwater as identified on the SEPA Water Environment Hub (SEPA, 2016). This groundwater body was classified by SEPA in 2014 as having an overall status of Good. It was classified as Good for water flows and levels and Good for water quality. It is forecast by SEPA to have an overall status of Good in 2021, 2027 and beyond. It is also designated as a Drinking Water Protection Area (DWPA).

British Geological Survey (BGS) mapping (2013) shows the bedrock geology in the area as Tarvie Psammite Formation – Psammite. Psammite normally refers to metamorphosed sandstones and BGS refers to this particular Psammite as "well bedded, flaggy, fawn to brown and white quartzose psammite, where predominant pelites (metamorphosed mudstones) pass into predominantly psammitic lithologies". The superficial geology (deposits overlying the bedrock) at the location comprises Glaciofluvial Ice Contact Deposits, Devensian – gravel, sand and silt. Nearer the river, there are also areas of Alluvium – sand, gravel and boulders. If groundwater is present in the alluvium, it is likely to be in hydraulic continuity with the River Moriston.

The nearest wells marked on 1:25,000 Ordnance Survey (OS) mapping are located 0.8 km to the north-east of the proposed scheme location and are associated with the settlement of Dundreggan. SEPA CAR authorisations (see Section 8.5.6) for the area do not include these wells.

The groundwater has been evaluated as being of **High** importance as it forms part of a DWPA and is likely, at least to some degree, to be in hydraulic continuity with the Allt Lagain Bhain and the River Moriston.

8.5.3 Hydrology and Flood Risk

Much of the area on the south side of the A887 is floodplain associated with the River Moriston and is shown as an 'area at risk of flooding from rivers' on the SEPA Floodmap (SEPA, 2016). The land beside the burn upstream of the A887 road bridge is not shown to be at risk of flooding. The land slopes steeply up from the burn on both sides and during extreme storm events, high flows in the

burn are likely to be contained within these slopes until and if the road level is reached.

The flow in the river is artificially regulated by the Dundreggan Dam 5 km downstream. There are other hydropower structures upstream, i.e. Cluanie Dam, controlling flow of the River Cluanie and River Moriston; Loch Loyne Dam controls flow on a tributary, the River Loyne.

Allt Lagain Bhain is approximately 3 km in length with its source on the western slopes of Meall na Doire, a hill rising to 380 m north of the A887. A tributary of similar size, the An Leth-allt, joins Allt Lagain Bhain approximately 1 km upstream from the A887 bridge. A small un-named watercourse flows into Allt Lagain Bhain 0.5 km upstream of the road bridge. The catchment comprises open moorland, rough pasture, coniferous forest and, near the lower reaches, native broadleaved woodland. Allt Lagain Bhain flows within a steep-sided valley just upstream of the road bridge.

SEPA have assessed the Allt Lagain Bhain as having a catchment of less than 3 km^2 and therefore it has not been incorporated into the SEPA Flood Map (SEPA Flood Map website, 2016). The area is relatively undeveloped and SEPA hold no records of historical flooding in the vicinity although this does not necessarily mean there have been no flooding problems in the area.

The area at risk of flooding from Allt Lagain Bain is limited in extent by the steep-sided valley and no properties are located in very close proximity. Consequently, it has been evaluated as being of **Low** importance. The floodplain of the River Moriston has been evaluated as being of **High** importance as there are properties within Glen Moriston in the general vicinity of the proposed scheme and the floodplain. Downstream of Allt Lagain Bhain Bridge and upstream of Dundreggan Dam, these properties are located on land slightly elevated above the floodplain (approximately 0.5 km to 5 km downstream of the proposed scheme).

8.5.4 Fluvial Geomorphology

Allt Lagain Bhain is a typical highland watercourse with a small catchment and relatively high energy, having cut a steep V-sided dell before flowing into the River Moriston. The source of the watercourse is on moderately high hills up to approximately 380 m AOD located north of the proposed scheme with its elevation being close to 115 m AOD at the A887 road bridge. It flows through a mixture of heath, moorland and commercial forestry plantations. The bed of the burn comprises angular pebbles with some loose rock. It is likely that during spate conditions, considerable material is brought downstream from the upper parts of the catchment as much of the watercourse will act as a sediment transfer zone. The channel has been modified at the location of the trunk road bridge. As would be expected, the longitudinal gradient noticeably slackens as it approaches the floodplain of the River Moriston. Strictly in terms of fluvial geomorphology, Allt Lagain Bhain is considered to be of **High** importance as the

watercourse has a largely natural planform and bed and has typical characteristics of a highland watercourse with only very localised modifications.

The River Moriston is classed by SEPA as a heavily modified water body (HMWB) for water storage for hydro power generation. Strictly in terms of fluvial geomorphology, it has been assessed as of **Medium** importance.

The small un-named watercourse that flows into the Allt Lagain Bhain is considered to be of **Low** importance in terms of fluvial geomorphology.

8.5.5 Water Quality

The SEPA Water Environment Hub indicates that the River Moriston achieved high status for water quality in 2014 indicating that it meets water quality requirements under the Water Framework Directive. Although Allt Lagain Bhain is not classified by SEPA (i.e. it is not routinely monitored for water quality), during the site visit on 21st January 2016, the water was clear, indicating a low suspended solid loading. There had been snow on preceding days and snow was still lying on the ground when the site was visited. Flow was relatively low for winter and similar to flows observed during summer. Some microbial growth was noted on a previous survey but it is likely that this was of natural origin rather than 'sewage fungus'.

8.5.6 Existing CAR Authorisations and Private Water Supplies in the Vicinity

Information on existing CAR Licences and Registrations in the vicinity of the proposed scheme was obtained from SEPA in April 2015. There are 17 existing CAR Licences / Registrations for locations within 1.5 km of the proposed scheme as shown in Table 8.4 and Figure B2 in Appendix B. None of these authorisations are for drinking water abstraction and none of them are from groundwater; they are all surface water abstractions. It should be noted that abstractions do not require a Licence or Registration if they are for less than 10 m^3 of water per day.

Table 8.4 Existing CAR Licences and Registrations within 1.5 km of Proposed Scheme

Ref. on Figure B2 in Appendix B	Licence / Registration Number	NGR	Activity
1	CAR/L/1003069	NH 30088 12684	Fish farm freshwater tank or hatchery
2	CAR/L/1024870	NH 29975 12579	Abstraction fish production
3	CAR/R/1007738	NH 32100 14350	Sheep dip onto land
4	CAR/S/1017394	NH 32110 14320 and NH 32100 14350	Sheep dip onto land
5	CAR/R/1089500	NH 30477 13923	Bridging culvert
6	CAR/R/1089499	NH 30450 13998	Bridging culvert
7	CAR/R/1058025	NH 30840 13142	Sewage (private) primary
8	CAR/R/1081083	NH 30857 13104	Sewage (private) primary
9	CAR/R/1040120	NH 30550 12990	Sewage (private) primary
10	CAR/L/1112111	NH 32361 13401	Abstraction return
11	CAR/R/1097846	NH 30350 12530	Sewage private secondary
12	CAR/R/1099138	NH 30290 12480	Other effluent
13	CAR/R/1076976	NH 30140 12430	Sewage (private) primary
14	CAR/R/1073232	NH 30010 12770	Sewage (private) primary
15	CAR/R/1016121	NH 29842 12789	Sewage (private) primary
16	CAR/R/1037463	NH 29806 12776	Sewage (private) primary

17	CAR/R/1038440	NH 29910 12790	Sewage (private) primary

There are a number of registered sewage discharges within 1.5 km, however, none of these are to the Allt Lagain Bhain catchment. The nearest of the CAR Licence / Registration in Table 8.4 is approximately 400 m to the south of the proposed scheme (CAR/R/1058025) and it is for a private sewage discharge. The fish farm located approximately 1.3 km south west of the proposed scheme has a CAR Licence for an abstraction and for the fish farm / hatchery. In addition to the above CAR authorisations, there are three known private water abstractions within 1.5 km of the proposed scheme (information received from Highland Council Environmental Health department). These are as follows (the letter references refer to Figure B2 in Appendix B);

- A: 3 Torgoyle Crescent, (ID: 30004) Domestic, NH 30569 12975, water supply type: hill loch.
- B: Inchmore Distillery, (ID: 30010) Domestic, NH 30171 12450, water supply type: stream.
- C: Allt Ruadh, (ID: 30017) Domestic, NH 32136 14354, water supply type: spring.

A summary of key water features and their importance is given in Table 8.5.

Table 8.5 Water features and importance

Feature	Aspect	Importance
Allt Lagain Bhain upstream of A887 bridge	Water quality	High
Allt Lagain Bhain downstream of A887 bridge	Water quality	Very High
River Moriston	Water quality	Very High
Small un-named burn	Water quality	Medium
Allt Lagain Bhain	Fluvial geomorphology	High
Small un-named burn	Fluvial geomorphology	Low
River Moriston	Fluvial geomorphology	Medium
Allt Lagain Bhain flood area	Hydrology and flood risk	Low
River Moriston floodplain	Hydrology and flood risk	High
Groundwater	Water quality	High

Feature	Aspect	Importance
Groundwater abstraction	Water quality and quantity	High
Surface water abstractions	Water quality and quantity	High

8.6 Potential Impacts and Mitigation during Construction

8.6.1 Potential Impacts during Construction

8.6.1.1 Hydrology and Flood Risk

The works will involve removal of vegetation within the working area and disturbance of soil. There will be some unavoidable compaction of the soil as a result of tracking of site vehicles and plant. As a result, surface runoff from the working area is likely to be increased. However, the working area will be relatively small in relation to the catchment of Allt Lagain Bhain and a very small fraction of the River Moriston catchment. Runoff control measures are proposed in Section 8.6.2.

8.6.1.2 Fluvial Geomorphology

During the construction phase, the in-channel works and provision of a temporary bridge have the potential to adversely affect fluvial geomorphology as a result of the following:

- Alterations to channel morphology, flow patterns and sediment dynamics during the construction of the new bridge, demolition of old bridges and associated channel modifications (such as channel realignments).
- Sediment release during in-channel works, site clearance operations and earthworks in the vicinity of water features. This could result in reduced morphological diversity due to smothering of channel bed by sediment, an increase in turbidity and loss of active features such as gravel deposits.
- Reduced bank stability during the demolition of the old bridges and construction of the new bridge, which will require vegetation clearance on the banks of the watercourses. This could result in increased bank erosion and associated sediment release.
- Disturbance of existing channel bed forms and morphological features as a result of in-channel working.
- Temporary removal of riparian habitat and floodplain connectivity due to construction activities and access.

- Disturbance of banks leading to increased scour and deposition.

- Disturbance of the channel bed resulting in an unnatural alteration to the longitudinal gradient.

- Risk of creating a knick point which could migrate upstream and cause further bank and bed instability if culvert not designed correctly.

- Changes to the flow regime as a result of diversion of flows / over-pumping during the in channel works.

- Risk of scour where the channel is diverted or over-pumping is undertaken.

The main risk during construction is likely to be scour and erosion and associated deposition of sediments downstream. This also poses a risk to water quality as discussed in the following section.

8.6.1.3 Water Quality

During construction there will be a risk of pollution from the following:

- Removal of vegetation, excavation and disturbance of soil, in-channel working and watercourse bank works would pose a risk of mobilisation of soil particles during rainfall events. Such sediment, particularly if composed of fine material could interfere with the gills of fish and affect other aquatic organisms. Such material would also be deposited either downstream in Allt Lagain Bhain or in the River Moriston. Deposition of sediments on the beds of watercourses can be detrimental to spawning grounds of fish, particularly salmonids with a risk of smothering redds. There is also a risk that such sediment could flow overland or via the construction site drainage system into Allt Lagain Bhain, the nearby un-named watercourse or potentially into the River Moriston.

- Spillage or leakage of oil, fuel or chemicals. There is a risk of leakage of oil or fuel such as hydraulic oil from excavators, fuel from refuelling and leakage from static plant such as generators and pumps. Chemicals used on site are likely to include shutter release oils which are used to facilitate removal of wooden shuttering from concrete cast on site. Waterproofing chemicals will also be used.

- Spillage of uncured concrete, cement or mortar. Where concrete is mixed and poured on site, there would be a risk of spillage. There would also be a risk of spilling dry cement and additives.

- The physical disturbance of the bed and banks of Allt Lagain Bhain could have detrimental effects on the structure of the burn channel and lead to mobilisation of sediment leading to increased suspended solid concentrations downstream.

The private water supplies from surface water (labelled A and B on Figure B2 in Appendix B) and the abstraction licensed under CAR (labelled 2 on Figure B2) will not be affected as they are well upstream of the working area.

8.6.1.4 Groundwater

During construction, activities could pose a risk of pollution to groundwater. For example, spillage or leakage of oil, fuel and chemicals on permeable ground could pass though soil and into groundwater.

There are no known drinking water abstractions within or immediately adjacent to the working area. The nearest known private water supply abstraction from groundwater (Private Water Supply C on Figure B2 in Appendix B) is located approximately 1.1 km from the working area and upslope from the A887. Consequently, no impact is predicted on drinking water.

8.6.1.5 Fish

The works have the potential for temporary impacts on Atlantic salmon and other species of fish during construction. There is likely to be some restriction to fish passage during the in-channel works but this will be temporary in nature as the in-channel works will be restricted to outside the salmon spawning season (15th October to 31st May is the period considered to be the spawning season). Mitigation measures will be put in place as described in Section 6.7.3.3 and 6.7.3.5 of Chapter 6 (Ecology and Nature Conservation) and 8.6.2.

8.6.2 Proposed Mitigation during Construction

CAR authorisation will be required for works within Allt Lagain Bhain. SEPA has advised that an engineering simple licence will be required for two activities under the CAR legislation. The two activities are:

- bridge construction; and
- watercourse realignment.

8.6.2.1 Hydrology and Flood Risk

The contractor will be required to implement measures to control runoff from the site working area. Measures will include Sustainable Drainage Systems (SUDS) to attenuate runoff flows to greenfield rates and these will also be designed to provide pollution control as described in the Water Quality section. Where practicable, a buffer strip will be retained alongside the banks of Allt Lagain Bhain, the un-named burn and along the banks of the River Moriston.

The temporary bridge will be designed to accommodate flood flows. The works will take account of flows within Allt Lagain Bhain and if flood flows occur work will be temporarily postponed within the area influenced by such flows. Demolition of the bridges will not be undertaken during flood flows.

8.6.2.2 Fluvial Geomorphology

The contractor will be required to implement the following mitigation measures:

- Reduce the risk of scour by providing temporary scour protection or controlling flows to avoid bank and bed erosion.
- Where flows are diverted or over pumped, reduce the risk of scour through scour protection or controlling flows to avoid bed and bank erosion.
- Avoid unnecessary disturbance of the bed and banks.
- Retain as much of the bank side vegetation as practicable to reduce risk of scour and help to reduce ingress of suspended sediment from site runoff.
- Realignment of Allt Lagain Bhain: The creation of a new channel for Allt Lagain Bhain will be carried out in the dry with the flow diverted or continuing to run in the existing channel but separated from the new channel works. The works will follow advice given in SEPA Engineering in the Water Environment Good Practice Guide: Temporary Construction Methods (2009). Once the new channel has been formed, the flow should be allowed to gradually enter the new channel to avoid scour and prevent mobilisation of large amounts of sediment. If practicable and the programme allows, vegetation should be allowed to colonise the banks of the new channel to help stabilise the bare earth. If this is not practicable, consideration should be given to stabilisation of the banks with biodegradable materials such as coir. The bed of the new channel should be formed using bed material from the abandoned section of the existing channel, if practicable. The contractor will be required to carry out this work in a sensitive manner to reduce the impacts on aquatic organisms such as macro-invertebrates (i.e. not to disturb any more of the existing bed than is necessary to carry out this activity). The transfer of bed material will be undertaken outside the salmonid fish spawning season (15th October to 31st May is the period considered to be the salmonid spawning season).
- It is recommended that a review of the contractor's method statements is undertaken by those with appropriate water environment experience so that all appropriate mitigation is included.
- In addition, the design team will engage a fluvial geomorphologist to assist in the detailed design of the culvert and channel realignment.

8.6.2.3 Water Quality

The contractor will be required to implement the following mitigation measures during the construction period:

- Compliance with the conditions of the SEPA CAR licence.
- Compliance with relevant SEPA Pollution Prevention Guidelines (PPGs), in particular:
    - PPG 4: Treatment and disposal of sewage where no foul sewer exists.
    - PPG 5: Works and maintenance in or near water.
    - PPG 6: Working at construction and demolition sites.
    - PPG 8: Safe storage and disposal of used oils.
    - As far as it is applicable to the site: PPG 22: Incident response – dealing with spills.
    - Vehicle washing must be carried out in strict accordance with PPG 13: Vehicle washing and cleaning.
- Compliance with advice in SEPA Engineering in the Water Environment Good Practice Guide: Temporary Construction Methods (2009).
- Incorporation of relevant good practice measures included in CIRIA guidance documents CIRIA C648 (2006a) and C649 (2006b).
- The contractor will be required to prepare a method statement for prior approval by SEPA as to how they intend to carry out the works including specific aspects of the work including installation of the temporary bridge, demolition of the existing bridges, construction of the box culvert, realignment of the channel and scour protection measures.
- Restrict vegetation removal and excavation / disturbance of soil to the minimum required to carry out the work. Avoid unnecessary tracking of vehicles and plant. Where feasible keep a buffer of vegetation alongside the banks of the watercourse. Vegetation must be disposed of safely and legally in compliance with waste management regulations. It must not be disposed of in the channel.
- Refueling on site is to be undertaken on an impermeable surface within an impermeably-bunded secure area. Where there is a risk of dripping oil or fuel (e.g. at refueling site, under generators and other static plant or equipment), drip trays must be placed to catch any drips. The drip trays must be appropriately maintained to avoid overflow and any contaminated water disposed of off-site at an appropriately licensed disposal facility. The drip trays must have a capacity of 110% of the fuel tank supplying the static plant or equipment.

- All site vehicles and plant must be appropriately maintained in accordance with best practice.

- Vehicles and plant must be kept out of the watercourse unless there is no practicable alternative. Disturbance of the bed and banks of Allt Lagain Bhain must be kept to the minimum practicable for the works to be undertaken.

- The concrete works must be carried out in the dry to avoid contact of uncured concrete and unset waterproofing materials with the burn water.

- Works within the watercourse must be undertaken outside the salmonid fish spawning season. In-stream works are to be undertaken from 1st June to 14th October to avoid the fish spawning season (15th October to 31st May). The overall construction works are anticipated to take approximately nine months. It will be critical to programme the works carefully to allow for the in-channel works outside the salmonid spawning season. Fish are to be removed according to good practice methods prior to dewatering of the channel (refer to Chapter 6: Ecology and Nature Conservation).

- Measures are to be put in place to reduce the risk of suspended solids entering Allt Lagain Bhain, the small un-named watercourse and the River Moriston. Such measures will include installation of silt fencing along the margins of the Allt Lagain Bhain and the small un-named watercourse above the top of the channel and on the site boundary between the site and the River Moriston.

- Appropriate measures must be employed to control overland flow and site drainage. These measures must be able to accommodate heavy rainfall events as well as preventing the discharge of high suspended solids concentrations into Allt Lagain Bhain, the small un-named watercourse or the River Moriston. In order to achieve these requirements, the contractor will be required to incorporate SUDS into the site drainage to settle out suspended solids to avoid unacceptably high concentrations entering Allt Lagain Bhain, the small un-named watercourse or the River Moriston. It will be a requirement that such SUDS be designed and installed based on CIRIA guidance C753: The SuDS Manual (CIRIA, 2015).

- During construction of the new A887 box culvert, the contractor will be required to implement measures to avoid pollution to Allt Lagain Bhain from debris, uncured concrete, cement, mortar, additives, oil, fuel, chemicals and suspended solids.

- The type of protection measures would be dependent on the method of demolition. If scaffolding is used at any stage, double sheeting and debris nets or an equivalent system would be required.

- During installation of the temporary bridge and in-channel working, the work must be carried out as far as practicable using methods to avoid damage to the banks of the watercourse.

- Appropriate control monitoring points shall be identified to provide data on the characteristics of surface water within the wider catchment.

- Baseline water quality shall also be assessed for the Allt Lagain Bhain, the unnamed watercourse and the River Moriston (near the confluence with Allt Lagain Bhain). Parameters for analysis will include suspended solids, dissolved oxygen, temperature, dissolved and total metals, pH, ammonia, conductivity, turbidity and total petroleum hydrocarbons.

- Water quality will be monitored upstream and downstream of the works through daily visual inspections to observe and record whether any oil, construction debris or increased turbidity is present. The visual inspections will be assisted with the use of a portable meter to measure turbidity, pH and conductivity. Temperature and dissolved oxygen will also be measured. In the event of observation of oil, construction debris or noticeably increased levels of turbidity downstream compared with upstream, SEPA must be informed within 24 hours of the incident. Suitable actions must be taken immediately to determine the cause of the problem and to rectify the situation.

- During the full construction period, chemical water quality monitoring will be undertaken on Allt Lagain Bhain, the River Moriston and the small un-named watercourse on a fortnightly basis or as otherwise agreed with SEPA. Samples will be sent to a United Kingdom Accreditation Service (UKAS) laboratory. Parameters are to include suspended solids, dissolved oxygen, temperature, dissolved and total metals, pH, ammonia, conductivity, turbidity and total petroleum hydrocarbons. Results will be compared against those from the baseline assessment and from appropriate control monitoring points. The detection limits must be sufficiently low to determine whether compliance with Environmental Quality Standards (EQSs) is being achieved. If any samples show that an EQS for a parameter has been exceeded, SEPA must be informed. Suitable actions must be taken to investigate and rectify the situation if it is due to the proposed scheme construction works.

- Biological (macro-invertebrates) water quality monitoring is to be undertaken prior to the works commencing, on at least two occasions (preferably between April and September inclusive) and following construction in order to determine the long-term pollution status of the site prior to, during and post construction. Samples are to be taken upstream of the works and downstream on each occasion in order to allow comparison.

8.6.2.4 Groundwater

A number of the mitigation measures described above for protection of water quality will also reduce the risks of pollution to groundwater. For example, compliance with relevant SEPA PPGs will also help to protect groundwater. The controls relating to refueling and provision of drip trays under static plant with potential to leak oil will also assist in protecting groundwater. In addition, the appropriate maintenance of site vehicles and plant will be important in reducing leakage of oil and fuel which otherwise could pose a risk to groundwater.

8.6.2.5 Fish

As described in Chapter 6 (Ecology and Nature Conservation) the following mitigation measures will be put in place during construction to protect Atlantic salmon and other fish species:

- No in-channel works during the fish spawning season (15th October to 31st May).
- Electro-fishing to be carried out safely to remove fish prior to channel realignment and in channel works.

8.7 Potential Impacts and Mitigation during Operation

8.7.1 Potential Impacts during Operation

The proposed scheme predominantly involves the provision of a new submerged invert box culvert and widening of the existing single track road to standard single carriageway width. The overall length of the proposed widened road is approximately 160 m which will increase the impermeable area from approximately 800 m^2 (average width 5 m) to approximately 1120 m^2 (average width 7 m). Consequently, the runoff volume during a storm event will increase as a result of the proposed scheme and measures will need to be included in the drainage design to accommodate the resulting additional flow (see Section 8.7.1.1 and 8.7.2.1 below).

8.7.1.1 Hydrology and Flood Risk

Sizing of the box culvert has been determined using methodology based on IH124 (Flood Estimation for Small Catchments, Institute of Hydrology, 1994) (see Appendix F). This is considered suitable for small catchments (Technical Flood Risk Guidance for Small Catchments, SEPA, 2015). As described in the mitigation section the submerged invert box culvert will be designed to convey a 1 in 200 year event (plus 20% for climate change) and an additional 600 mm freeboard. As a result, the proposed scheme should not increase flood risk upstream. The new box culvert may allow increased flows to be conveyed downstream to the River Moriston but the contribution from the flow in the small Allt Lagain Bhain watercourse to the overall flow in the River Moriston based on catchment sizes would be minimal. Correspondence with SEPA in 2014

confirmed that they had no concerns regarding the design of the bridge in terms of flood risk.

In addition, flows along the River Moriston are partially controlled by hydroelectricity power generation schemes, as described in Section 8.5.3.

8.7.1.2 Fluvial Geomorphology

The provision of a new submerged invert box culvert, associated scour protection and channel realignment has the potential to affect the fluvial geomorphology of the watercourse in a number of ways. They include the following two beneficial impacts and single adverse impact:

- Increase in channel cross-sectional area at the crossing, which previously constrained flow. This is a permanent beneficial impact, which will encourage natural bed to form by allowing natural geomorphological fluvial and sediment transport processes to occur.

- Potential for improvement in channel planform from realignment provided appropriate geomorphological input is used in designing the new channel.

- Potential for initial increased scour with associated increased deposition downstream but eventually reaching equilibrium provided new bridge and channel realignment are designed to consider geomorphological processes.

The potentially adverse impact will be controlled by the mitigation measures proposed below in Section 8.7.2.2.

8.7.1.3 Water Quality

Road runoff tends to contain a number of pollutants including sediments, hydrocarbons (from oil and fuel) and metals such as iron, copper and zinc from wear of car parts. Particulates can include carbon, rubber, plastics, grit, silt, rust and metal filings. In winter, especially in Scotland, road runoff often contains de-icing salt. Impurities in rock salt can include metals such as cadmium. Road salt may enhance release of toxic metals from sediments.

The DMRB (Highways Agency, 2009) Method A (Assessment of Pollution Impacts from Routine Runoff to Surface Waters) has been used to assess potential impacts from routine runoff on water quality. Method A entails the use of a Microsoft Excel based tool to assess water quality of watercourses receiving road drainage. This Highways Agency Water Risk Assessment Tool (HAWRAT) has been used to estimate the potential effects of road drainage discharge on Allt Lagain Bhain (see Appendix E). The assessment uses a tiered approach. The first tier estimates the concentration of key pollutants (see below) in highway runoff. These concentrations are then compared with Runoff Specific Thresholds (RSTs) for soluble pollutants and Threshold Effects Levels (TELs) for sediment-bound pollutants to assess whether there could be an impact, not taking account of dilution from the receiving watercourse. If the predicted concentrations do not exceed the threshold values, there is no need for further assessment using HAWRAT. However, if the RSTs or TELs are exceeded for any parameter, the second tier of the assessment needs to be carried out.

HAWRAT provides an estimate of water quality and is not designed to accurately predict concentrations of pollutants. Consequently, sensitivity testing of the results was carried out whereby key input parameters, particularly the 95-percentile flow (flow exceeded for 95% of the time) were changed to see the effect on HAWRAT results. Where results are close to failing thresholds, sensitivity testing proves useful in assessing whether failures could occur if key input parameters have been over or under estimated. The HAWRAT tool has been developed using data from roads where traffic flows were greater than 10,000 AADT. The A887 has an AADT of less than 1000 but for the purposes of the HAWRAT assessment has been placed in the band 10,000 to 50,000 AADT (i.e. the lowest category available). As a result the tool is likely to overestimate pollutant concentrations in this case.

For each key soluble pollutant, two RSTs are used, namely RST 24 hour and RST 6 hour. These are used to protect aquatic organisms from short-term exposure to soluble pollutants. The RST 24 hour is designed to protect aquatic organisms against worst case conditions whereas RST 6 hour is designed to protect against more typical exposure conditions. Copper and zinc are used as indicative pollutants as they are commonly present at detectable concentrations in highway runoff and they are known to have toxic effects on aquatic organisms such as fish and macro-invertebrates above certain concentrations.

Tier 2 calculates predicted concentrations of key pollutants following dilution within the receiving watercourse. If RSTs or TELs are still exceeded, the third tier of HAWRAT is undertaken to assess the level of mitigation required.

The key pollutants assessed in HAWRAT are as follows:

- dissolved copper;
- dissolved zinc;
- sediment-bound copper;
- sediment-bound zinc;
- sediment-bound cadmium;
- sediment-bound total polycyclic aromatic hydrocarbons (PAH);
- sediment-bound pyrene;
- sediment-bound fluoranthene;
- sediment-bound anthracene; and
- sediment-bound phenanthrene.

PAHs are hydrocarbons generally derived from oils and fuels present in highway runoff. The latter four pollutants in the above list are specific types of PAH.

In Scotland, mitigation measures in the form of SUDS are normally a legal requirement under CAR for new road schemes; even if Tier 1 predicted no failure, SUDS would need to be incorporated into the drainage design.

The results of the Tier 1 HAWRAT assessment (Refer to Appendix E) indicate that concentrations of key pollutants in the highway runoff would be likely to exceed RSTs for soluble pollutants (dissolved copper and dissolved zinc).

Consequently, the assessment was extended to Tier 2 to assess whether dilution in the watercourse would be sufficient to reduce key pollutant concentrations to below the RSTs. The results of the Tier 2 assessment predicted that the dilution in Allt Lagain Bhain at low flow (95-percentile flow) would be sufficient to dilute soluble copper and zinc concentrations to below the relevant RSTs. Sensitivity testing was undertaken entailing reducing the permeable area draining to the outfall to zero and reducing the input parameter for 95-percentile flow considerably to below $0.001m^3/s$ from the estimate of $0.009m^3/s$ based on Institute of Hydrology 1992 guidance (IH108: Low flow Estimation in the UK). With these input values reduced to this extent, predicted failures of the zinc RSTs can begin to occur.

Sediment-bound pollutant concentrations are predicted to be below the TELs.

The presence of the River Moriston SAC downstream was highlighted in the HAWRAT assessment. The HAWRAT calculations suggest that following mixing and dilution within the Allt Lagain Bhain, soluble pollutants would be within the limits required. However, sensitivity testing suggests that on rare occasions, concentrations of soluble zinc could be close to exceedance within Allt Lagain Bhain downstream of the discharge point. There is also a low risk that sediment-bound pollutants could be slightly elevated. These results should be treated with caution as they probably over-estimate the pollution risk because the calculations assume that traffic flows are considerably higher than the actual flows.

Although the HAWRAT assessment does not in itself indicate the need for pollution control for routine runoff, SUDS will be required under the CAR legislation. The proposed SUDS will also help to protect the water quality of the River Moriston SAC. Sediment removal will be a key aim of the SUDS in order to protect the gravel bed of Allt Lagain Bhain and the bed of the River Moriston.

The proposed road widening extends beyond the small un-named watercourse. If discharges are proposed to this watercourse, there would be a risk of pollution and this would be addressed by the provision of SUDS as outlined in the Mitigation section.

Spillage risk has been assessed using the Method D given in DMRB Volume 11 Section 3 Part 10 and included as part of the HAWRAT assessment tool. The results of the spillage risk assessment indicate that there is a very low risk, i.e. an annual probability of less likelihood than 0.00001 (1 in 100,000 years) of a serious spillage resulting in a serious pollution event. This is largely because of the low traffic flows with less than 1000 Annual Average Daily Traffic (AADT) flow (Transport Scotland, 2016) along the A887 at the location and the lack of junctions within 100 m of the proposed scheme. Even when a sensitivity test is undertaken where the input risk factor is increased, the spillage risk is still very low.

The private water supplies sourced from surface water (labelled A and B on Figure B2 in Appendix B) and the abstraction licensed under CAR (labelled 2 on Figure B2) will not be affected as they are upstream of the proposed scheme.

8.7.1.4 Groundwater

The trunk road has a low traffic flow as described in Section 8.7.1.3 above and the pollution risk to surface water is assessed as being low. The risk to groundwater from routine runoff is also considered to be low. As discussed, spillage risk is very low and this applies to groundwater as well as surface water. The proposed scheme will not increase the risk of pollution to groundwater compared with the existing situation.

The nearest known groundwater abstraction for drinking water is approximately 1.1 km from the proposed scheme and therefore will not be affected by the proposed scheme.

8.7.1.5 Fish

Following completion of the bridge, fish will continue to be able to move upstream and downstream of the bridge. However, the bridge will be wider than the existing and a wider invert without any mitigation would result in a lower depth of flow. This is unlikely to be an issue in winter during relatively elevated flows but during summer months when flows are likely to be lower, the reduced depth of flow could pose a barrier to migratory fish movement upstream and downstream. The bridge design will incorporate a low flow channel to ensure migratory fish passage is not affected.

8.7.2 Proposed Mitigation during Operation

Proposed mitigation measures during the operational phase include:

8.7.2.1 Hydrology and Flood Risk

The following measures will be included in the design:

- Provision of SUDS based on guidance given in CIRIA C753: The SuDS Manual (CIRIA, 2015) to provide suitable attenuation of flows prior to discharge to Allt Lagain Bhain.

- The box structure will be designed to convey flows from a 1 in 200 year flood event plus 20% to allow for climate change. In addition, a freeboard of 600 mm has been included to allow for large debris such as branches to flow through the bridge during spate or flood flows.

8.7.2.2 Fluvial Geomorphology

The following mitigation measures are proposed to reduce the impact on fluvial geomorphology during the operational phase.

- Appropriate geomorphological input will be used to design a new channel realignment under the new bridge. Realignment should be limited as far as practicable. This design will consider the natural geomorphological processes in this location and limit the risk of undermining of the structure and downstream environmental impacts. The realignment design may incorporate a low flow channel which will reduce the risk of siltation.

- Appropriate geomorphological input will be used to design the box culvert so that it is at least as wide as the natural watercourse width in this location and that a suitable gradient underneath the road is adopted.

- The box culvert will have a submerged invert to encourage the deposition of sediment and formation of a more natural bed under the road. The box culvert and scour protection will be designed with the aim of avoiding a step in bed level developing at the downstream end of the box culvert or scour protection.

- Scour protection will be required to protect the structure of the box culvert, particularly the side walls. The scour protection will be designed with the aim of reducing the risk of scour immediately upstream and downstream of the hard protection. This will include tying in the upstream and downstream ends of the bank protection into the natural bank as far as practicable.

- Consideration should be given to the use of green-bank protection immediately upstream and downstream of the hard engineered scour protection in order to merge the engineered bank into the natural bank.

- Follow best practice identified in the following:

    i. SEPA's Position Statement to support the implementation of the Water Environment (Controlled Activities) (Scotland) Regulations 2005: WAT-PS-06-02: Culverting of Watercourses (SEPA, 2006);

ii. SEPA's Engineering in the Water Environment Good Practice Guide: Bank Protection Rivers and Lochs (WAT-SG-23) (SEPA, 2008a);

iii. SEPA's Engineering in the Water Environment Good Practice Guide: Intakes and Outfalls (WAT-SG-28) (SEPA, 2008b); and

iv. SEPA's Position Statement to support the implementation of the Water Environment (Controlled Activities) (Scotland) Regulations 2011: WAT-PS-07-02: Bank Protection (SEPA, 2012).

v. SEPA's Engineering in the Water Environment Good Practice Guide: River Crossings (WAT-SG-25) (SEPA, 2010a).

vi. SEPA's Engineering in the Water Environment Good Practice Guide: Sediment Management (WAT-SG-26) (SEPA, 2010b).

vii. SEPA's Engineering in the Water Environment Good Practice Guide: Temporary Construction Methods (WAT-SG-29) (SEPA, 2009)

- It is recommended that a review of the contractor's method input statements is undertaken by those with appropriate water environment expertise so that all appropriate mitigation is included.

8.7.2.3 Water Quality

Based on the importance of the downstream aquatic habitat (River Moriston SAC), facilities to promote the settlement of suspended solids must be provided prior to discharge to Allt Lagain Bhain. In any case, SUDS are required for new and widened roads in Scotland under CAR. The following mitigation measures are proposed:

- Two levels of SUDS (as far as practicable, in line with the SUDS Manual, CIRIA, 2015) to promote settlement of suspended solids and removal of a proportion of dissolved metals within the road drainage system prior to discharge to Allt Lagain Bhain.

- Provision of SUDS prior to any discharge to the small un-named watercourse.

The risk of a serious spillage causing a serious pollution event is less than 0.00001 probability of occurrence in any one year. Consequently, there is no requirement for major spillage containment. In view of the sensitivity of the water environment in the vicinity, it is proposed that the SUDS include simple provision for containment of small spillages such as check dams (low dams which slow the flow of drainage water). They should be incorporated within a linear SUDS such as a vegetated ditch or swale. If ground conditions allow, the base of the SUDS should be lined with an impermeable liner for a few metres upstream of the check dam.

8.7.2.4 Groundwater

The mitigation measures to protect water quality will also assist in protecting groundwater. In terms of spillage control, the proposed lining of linear SUDS for a few metres upstream of check dams will reduce the risk to groundwater in the unlikely event of a major spillage resulting from a vehicular collision.

Fish

As described in the Ecology and Nature Conservation chapter (Section 6.7.3.5) the bed of the channel will not have a hydraulic drop either upstream of downstream of the new bridge and no obstacle to fish migration will be created. A low flow channel will be provided along the invert of the new bridge to facilitate fish passage upstream and downstream during low flows.

8.8 Summary and Residual Impacts during Construction and Operation

Residual impacts on the water environment are shown in Table 8.6 (construction period) and Table 8.7 (operational period). Impacts are adverse unless stated otherwise. Table 8.6 indicates that some construction activities following mitigation could still result in effects of Moderate significance (i.e. a significant effect in the context of the EIA Regulations), largely because of the Very High importance of Allt Lagain Bhain downstream of the bridge and the River Moriston. These impacts, however, are likely to be temporary, localised and short-term in nature. The potential for medium-term effects relate to the mobilisation of sediments and subsequent deposition of such sediments downstream and this risk would be controlled by the proposed mitigation measures which incorporate current best practice. It is also anticipated that in the long-term, erosion and deposition would revert back to the equilibrium similar to that which currently exists. Therefore, the long-term impact is not anticipated to be significant. It is considered that with the implementation of the proposed mitigation measures, the proposed scheme will comply with relevant legislation and policy in relation to the water environment.

Table 8.7 indicates that, with the implementation of the proposed mitigation measures, there should be no significant effects from the proposed scheme during the operational phase.

Table 8.6 Residual impacts during construction period

Potential Impact	Feature	Aspect	Import-ance	Mitigation	Magnitude	Signifi-cance
Decrease in water quality from site runoff	Allt Lagain Bhain upstream of A887 bridge	Water quality	High	Silt fences; SUDS.	Minor, short-term	Slight
Decrease in water quality from site runoff	Allt Lagain Bhain downstream of A887 bridge	Water quality	Very High	Silt fences; SUDS.	Minor, short-term	Moderate
Decrease in water quality from site runoff	River Moriston	Water quality	Very High	Silt fences; SUDS.	Negligible, short-term	Neutral
Decrease in water quality from site runoff	Small un-named burn	Water quality	Medium	Silt fence; SUDS.	Minor, short-term	Slight
Restriction of flows	Allt Lagain Bhain	Fluvial geomorphology	High	Avoid over-restriction of the channel.	Minor, short-term	Slight
Disturbance of banks	Allt Lagain Bhain	Fluvial geomorphology	High	As far as practicable, retain existing bank vegetation along Allt Lagain Bhain.	Minor, temporary (vegetation should re-establish following works)	Slight
Increased scour and subsequent deposition in burn	Allt Lagain Bhain	Fluvial geomorphology	High	As far as practicable, retain existing bank vegetation	Minor, short-term with potential	Slight

Potential Impact	Feature	Aspect	Import-ance	Mitigation	Magnitude	Signifi-cance
				along Allt Lagain Bhain. Care during diversion works and any over pumping. Temporary scour protection.	for medium-term	
Increased deposition resulting from scour of Allt Lagain Bhain banks and bed and transport of sediments downstream to river	River Moriston	Fluvial geomorphology	Medium	As far as practicable, retain existing bank vegetation along Allt Lagain Bhain. Care during diversion works and any over pumping. Temporary scour protection.	Minor, short-term with potential for medium-term	Slight
Increased surface water runoff from working area leading to elevated watercourse flows	Allt Lagain Bhain flood area	Hydrology and Flood Risk	Low	SUDS	Negligible, short-term	Neutral
Increased surface water runoff from working area leading to elevated watercourse flows	River Moriston floodplain	Hydrology and Flood Risk	High	SUDS	Negligible, short-term	Neutral

Table 8.7 Residual impacts during operational period

Potential Impact	Feature	Aspect	Import-ance	Mitigation	Magni-tude	Signifi-cance
Decrease in water quality from site runoff	Allt Lagain Bhain upstream of A887 bridge	Water Quality	High	Two levels of SUDS.	Negligible, long-term	Neutral
Decrease in water quality from site runoff	Allt Lagain Bhain downstream of A887 bridge	Water Quality	Very High	Two levels of SUDS.	Negligible, long-term	Neutral
Decrease in water quality from site runoff	River Moriston	Water Quality	Very High	Two levels of SUDS.	Negligible, long-term	Neutral
Decrease in water quality from site runoff	Small un-named burn	Water Quality	Medium	Two levels of SUDS.	Negligible, long-term	Neutral
Spillage from vehicular collision resulting in pollution to burn	Allt Lagain Bhain upstream of A887 bridge	Water Quality	High	SUDS with simple spillage control.	Negligible, long-term	Neutral
Spillage from vehicular collision resulting in pollution to burn	Allt Lagain Bhain downstream of A887 bridge	Water Quality	Very High	SUDS with simple spillage control.	Negligible, long-term	Neutral
Changes in flood risk	Allt Lagain Bhain	Hydrology and Flood Risk	Low	New crossing designed to accommodate flood flows.	Negligible, long-term	Neutral

Changes in flood risk	River Moriston	Hydrology and Flood Risk	High	N/A	Negligible, long-term	Neutral
Changes in cross-sectional area at new crossing structure, risk of knick point	Allt Lagain Bhain	Fluvial Geomorphology	High	Use of geomorphologist to assist in detailed design so that planform and culvert are designed using best practice.	Negligible beneficial, long-term	Neutral
Changes in scour and deposition	Allt Lagain Bhain	Fluvial Geomorphology	High	Following realignment, the burn is likely to adjust through natural processes.	Negligible, long-term	Neutral
Change in planform of channel	Allt Lagain Bhain	Fluvial Geomorphology	High	The realignment to a naturalised planform should provide a benefit.	Negligible beneficial, long-term	Neutral
Pollution risk	Groundwater	Water quality	High	The pollution control measures to protect surface water will also	No change	Neutral

				assist in reducing the risk to groundwater.		

9 Assessment of Cumulative Effects

The cumulative effects of the project have been assessed in accordance with the EIA Regulations and guidance contained in DMRB Volume 11.

Cumulative impacts result from multiple actions on receptors and resources over time and can be additive or interactive in nature. They can also be considered as impacts which result in incremental changes caused by other projects in the past, present or reasonably-foreseeable future.

"Reasonably-foreseeable" is interpreted in the DMRB guidance as projects that are "committed". There are two types of cumulative effects:

- Those arising from a single project due to the interaction of a number of different environmental topics and impacting upon a single receptor/resource;

- Those arising as a result of the combined action of a number of different projects in combination with the project being assessed on a single receptor/resource. This could include multiple impacts of the same type from various projects on the same receptor/resource.

Determination of significance of cumulative effects is based on the extent that the receptor/resource is able to accommodate them. The determination takes into account:

- the nature of the receptor/resource;
- how the activity or activities will affect the condition of the resource;
- what the probabilities of such effects occurring are; and
- how able the receptor/resource is to absorb further impacts before irreversible changes occur.

Assessment of cumulative effects arising from the combined action of a number of different projects is summarised in Table 9.1. This includes those arising from this particular project and the combined effects from other current or reasonably foreseeable projects in the vicinity of the proposed works.

Works have been carried out on upgrading electricity cables and pylons near Allt Lagain Bhain (see Figure 9.1). However, there could still be some site works associated with upgrading the electricity power lines adjacent to the A887 Allt Lagain Bhain Bridge. Consequently, there could be construction-related

cumulative impacts in combination with the A887 Allt Lagain Bhain Bridge Replacement scheme.

Figure 9.1 Works on electricity cables and pylons (2013) near Allt Lagain Bhain

Expansion of the Marine Harvest Inchmore Fish Hatchery, located adjacent to the A887 west of Lagain Bhain Bridge, is currently being carried out (2016).

Planning permission (Ref. 13/01878/FUL) was obtained in 2013 for retaining a road to provide permanent access from land north west of Torgoyle Lodge to the A887. This road includes three crossings of the Allt Lagain Bhain, the nearest of which is approximately 350 m upstream of the A887 bridge. It is believed that at least part of this road follows the line of the Beauly Denny access road used for upgrade of the electricity power cables.

Outline planning permission (Ref. 05/01053/OUTIN) was given in 2007 for two dwelling houses near Allt Lagain Bhain upstream of the A887 Bridge. Access was to be from the existing field onto the A887 and this is in close proximity to the scheme. However, the Highland Council Planning Portal website does not indicate that full planning permission was given. No houses have been built at this location. If access was to be gained to the A887, it is understood that this would require approval from Transport Scotland.

Works have been undertaken by BEAR Scotland in 2016 to slightly widen a single track section of the A887 (within the trunk road boundary) between

Torgolye Bridge and Allt na h-Innse Beag approximately 0.6 km south of the proposed scheme. Minor culvert and ditch clearance maintenance works were also proposed in 2016, further west from Allt na h-Innse Beag, approximately 1.2 km south-west of the proposed scheme. None of these works are likely to cause construction-related cumulative effects, since they are complete or are likely to be complete by the time the proposed scheme (A887 Allt Lagain Bhain Bridge replacement scheme) commences. No significant construction or operational impacts were identified for the widening or ditch clearance works. Consequently, it is considered that there will be no significant cumulative operational impacts in combination with the proposed scheme.

The only other foreseeable larger Transport Scotland project in the vicinity of the works is the replacement of the Allt na h-Innse Beag Bridge located approximately 1 km to the west. Construction is likely to be staggered with that of the proposed scheme (A887 Allt Lagain Bhain Bridge) to avoid cumulative effects to vehicular travellers and local residents although it is possible that construction could be concurrent with the proposed scheme. In the latter case, careful consideration should be given to the traffic management arrangement to mitigate the effects of two schemes within approximately 1 km.

Table 9.1 Assessment of cumulative effects from combined action of a number of different projects

Issue	Resource Value or Sensitivity	Cumulative Effect	Mitigation (numbers refer to Item Nos. in Table 11.1)	Significance of Cumulative Effect
Air Quality	High	**Construction:** No residential receptors within 200 m; expansion of Inchmore Fish Hatchery and minor maintenance works likely to be complete before the proposed scheme (A887 Allt Lagain Bhain) commences. Proposed scheme is far enough away from Allt na h-Innse Beag not to affect receptors there. **Operation:** No change and no significant effects are predicted from the proposed scheme (A887 Allt Lagain Bhain) during operation.	1, 2, 76-79, 82, 86-90, 92	Not significant.
Cultural Heritage	High	**Construction and Operation:** Effect from the proposed scheme (A887 Allt Lagain Bhain), however no further significant effect anticipated from Allt na h-Innse Beag or minor maintenance works. Based on the Historic Environment Scotland PastMap website, it is considered unlikely that the Inchmore Fish Hatchery expansion scheme will have significant effects on recorded sites of cultural heritage significance although potential effects on unrecorded remains are not known.	1, 2, 3-8	Not significant.
Ecology and Nature Conservation	Very High	**Construction:** Effect from the proposed scheme (A887 Allt Lagain Bhain). The Allt na h-Innse Beag watercourse also flows into River Moriston so there is	1, 2, 9-42	**Significant: Moderate** during construction if construction phases for both Allt na h-

Issue	Resource Value or Sensitivity	Cumulative Effect	Mitigation (numbers refer to Item Nos. in Table 11.1)	Significance of Cumulative Effect
(refer to Chapter 6)		potential for effect. The fish hatchery expansion is adjacent to the River Moriston and there is potential for effects from this scheme, for example there is a risk of pollution during construction. **Operation:** During operation of the proposed scheme (A887 Allt Lagain Bhain), there are predicted to be no significant effects. If there is an abstraction and/or discharge for the Inchmore Fish Hatchery expansion scheme, this will be regulated by SEPA under the CAR regime. Consequently, potential effects on the River Moriston are anticipated to be appropriately controlled. Therefore, no significant in-combination operational phase effects are predicted from the proposed scheme (A887 Allt Lagain Bhain), A887 Allt na h-Innse Beag and the Inchmore Fish Hatchery expansion.		Innse Beag and the proposed scheme are simultaneous. (If the proposed scheme works and Allt na h-Innse Beag coincide with any works on the nearby electricity power cables, the effect is not predicted to be any greater than Moderate.) Not significant: **Slight** if construction staggered. The hatchery expansion project is expected to be complete by construction date for Allt Lagain Bhain.
Landscape Effects	Low	**Construction and Operation:** Potential for both bridge replacement projects to create a local impact if not reinstated properly. Planting schemes could affect ecology either in a positive or negative way depending on species chosen. Inchmore Fish Hatchery is well-screened by trees in summer but not in winter.	1, 2, 43-49	Not significant: **Slight** (If any of the proposed scheme works and Alt na h-Innse Beag coincide with works on the electricity cables, the cumulative effect

Issue	Resource Value or Sensitivity	Cumulative Effect	Mitigation (numbers refer to Item Nos. in Table 11.1)	Significance of Cumulative Effect
				is not anticipated to be any greater than Slight.)
Land Use	Low	None predicted	48, 49	Not Significant.
Noise and Vibration	Medium	**Construction:** No residential receptors within 200 m; expansion of Inchmore Fish Hatchery and minor maintenance works likely to be complete before the proposed scheme (A887 Allt Lagain Bhain) commences. Far enough away from A887 Allt na h-Innse Beag Bridge not to affect receptors there. **Operation:** No change and no significant effects are predicted from the proposed scheme (A887 Allt Lagain Bhain) during operation.	86-92	Not significant.
Pedestrians, Equestrians, Cyclists and Community Effects (see Item 93 in Table 11.1)	High	**Construction:** No cumulative impact in combination with the Inchmore Fish Hatchery expansion is anticipated. If the proposed scheme (A887 Allt Lagain Bhain) and A887 Allt na h-Innse Beag construction phases are staggered, no cumulative impact is predicted. **Operation:** The proposed scheme (A887 Allt Lagain Bhain) will have no significant effects. No anticipated impacts from the fish hatchery expansion and minor	93-94	Not significant: Temporary disruption during construction. Unlikely to be a cumulative effect unless A887 Allt na h-Innse Beag is constructed at the same time, in which case cumulative impact is assessed as **Slight**. (If any of the proposed scheme works and Alt na h-

Issue	Resource Value or Sensitivity	Cumulative Effect	Mitigation (numbers refer to Item Nos. in Table 11.1)	Significance of Cumulative Effect
		maintenance works once these schemes are completed.		Innse Beag coincide with works on the electricity cables, the cumulative effect is not anticipated to be any greater than Slight.)
Vehicle Travellers (see Item 93 in Table 11.1)	Medium	**Construction:** Timing of construction for both bridges likely to be staggered. Fish hatchery expansion and minor maintenance works likely to be complete before construction of A887 Allt Lagain Bhain. **Operation:** Overall beneficial impact on completion. No significant adverse impacts are predicted for the proposed scheme (A887 Allt Lagain Bhain).	93-94	Not significant. If works are not staggered, there will be a cumulative impact considered to be **Slight**. (If any of the proposed scheme works and Alt na h-Innse Beag coincide with works on the electricity cables, the cumulative effect is not anticipated to be any greater than Slight.)
Road Drainage and the Water Environment	Very High	**Construction:** Potential cumulative impacts along with A887 Allt na h-Innse Beag. The Inchmore Fish Hatchery expansion project is expected to be complete by construction date for the proposed scheme (A887 Allt Lagain Bhain).	1, 2, 50-75	**Significant: Moderate** during construction if construction phases for the proposed scheme (A887 Allt Lagain Bhain Bridge Replacement) and A887 Allt na h-Innse

Issue	Resource Value or Sensitivity	Cumulative Effect	Mitigation (numbers refer to Item Nos. in Table 11.1)	Significance of Cumulative Effect
(refer to Chapter 8)		**Operation:** No significant impacts are predicted for the proposed scheme (A887 Allt Lagain Bhain).		Beag Bridge Replacement are simultaneous. (If the proposed scheme works and Allt na h-Innse Beag coincide with any works on the nearby electricity power cables, the effect is not predicted to be any greater than Moderate.) Not significant: **Slight** if staggered.
Geology and Soils	Low	**Construction and Operation:** None predicted	48, 49	Not significant.

Effects arising from the proposed scheme (A887 Allt Lagain Bhain) owing to the interaction of different environmental topics on a single receptor or resource are discussed in the following paragraphs.

There will be an interaction between cultural heritage and landscape in terms of effects on the old masonry bridge. Chapter 5 (Cultural Heritage) identifies a residual effect of Moderate significance as a result of the loss the old masonry bridge whilst Chapter 7 (Landscape Effects) identified a residual effect of Moderate significance. However, it is not considered that there would be an additional significant cumulative effect when these effects from these two topic areas are taken together.

The loss of woodland trees will entail an effect in terms of ecology and landscape. Chapter 6 (Ecology and Nature Conservation) identifies the residual effect on woodland on the Ancient Woodland Inventory as significant at a County scale. Chapter 7 (Landscape Effects) identifies the effect on woodland from a landscape perspective as of Slight significance during the first year after construction and Neutral significance by 15 years. In this case, the main effect is considered to be ecological as from a landscape perspective, the planted trees will in time bring the landscape back to a similar quality. Consequently, there is considered to be no significant additional cumulative effect.

There is predicted to be a residual effect of Moderate significance on Allt Lagain Bhain in Chapter 8 (Road Drainage and the Water Environment). Chapter 6 (Ecology and Nature Conservation) assesses the potential effects on aquatic species such as Atlantic salmon but the effect on Allt Lagain Bain itself is covered in Chapter 8. There is not considered to be an additional cumulative effect as Chapter 8 inherently takes account of potential effects on aquatic ecology.

Overall, there will be moderate cumulative effects in relation to ecology and the water environment. These will be reduced, as far as practicable, through mitigation measures, as detailed in Chapter 11 (Schedule of Environmental Commitments) of this ES. With the implementation of these mitigation measures, the residual cumulative effects are predicted to still be of **Moderate** significance. However, if the proposed scheme and A887 Allt na h-Innse Beag scheme construction phases are staggered, the cumulative effects are predicted to be of **Slight** significance.

10 Summary of Effects

This chapter summarises the environmental impacts that have been identified within this ES which are presented in **Error! Reference source not found.** to Table 10.6. The table cross references mitigation identified in Table 11.1 to Table 11.11 to reduce the impacts then details the significance of the effect post mitigation. Impacts and effects are adverse unless otherwise stated. Those residual effects that are considered to be significant are shown in bold in the "Significance" column of the tables.

The tables identify significant residual effects for demolition of the historic masonry bridge; unrecorded remains at Lagganbane; loss of ancient woodland; loss of Daubenton's bat and soprano pipistrelle bat roost; construction effects on Allt Lagain Bhain and cumulative construction effects on ecology and the water environment.

Table 10.1 Cultural Heritage

Potential Impact	Mitigation no.	Value/sensitivity of receptor	Duration of impact	Magnitude	Significance
Demolition of trunk road bridge	8	Low	Permanent	Major	Slight
Demolition of historic masonry bridge	5, 6, 7, 8	Medium	Permanent	Major	**Moderate**
Disturbance or damage to Chapel, Torgyle house and Glenmoriston footprints during works	3, 4, 8	Medium	Temporary	No change	Neutral
Disturbance or damage to unrecorded remains at Lagganbane	3, 4, 6, 8	Medium	Temporary Permanent	Minor to Moderate	Slight to **Moderate**

Table 10.2 Ecology and Nature Conservation

Potential Impact	Mitigation no.	Value/sensitivity of receptor	Duration of impact	Magnitude	Significance
Potential to impact designated sites	1, 2, 12, 43	International	Temporary	See Appendix D	Not significant

Loss of ancient woodland and trees.	9, 43	County	Permanent	See Appendix D	**Significant at County scale**
Impact on juniper	10	Local	Permanent	See Appendix D	Not significant
Disturbance of otter	13,14,15,16,17, 18,19,20	County	Temporary	See Appendix D	Not significant
Loss of Daubenton's bat roost	13,18, 21, 22, 23, 24, 25, 26, 27, 28	County	Permanent	See Appendix D	**Significant at County scale** but with potential to be not significant
Loss of soprano pipistrelle bat roost	13,18, 21, 22, 23, 24, 25, 26, 27, 28	Local	Permanent	See Appendix D	**Significant at Local scale** with potential to be not significant
Potential to disturb / affect freshwater pearl mussels	13, 29, 31	Local (Allt Lagain Bhain and River Moriston to 150 m downstream of confluence) International (rest of River Moriston)	Temporary	See Appendix D	Not significant
Impact on pine marten	20, 32	County	Temporary	See Appendix D	Not significant

Impact on Atlantic salmon	13, 29, 31, 33, 34, 62	Regional	Temporary	See Appendix D	Not significant
Disturbance of badger	13, 20, 35, 36, 37, 38	Local	Temporary	See Appendix D	Not significant
Disturbance of breeding birds	13, 39, 40, 41	Local	Permanent	See Appendix D	Not significant
Damage to wood ant colonies	13, 42	Local	Temporary	See Appendix D	Not significant

Table 10.3 Landscape Effects

Potential Impact	Mitigation no.	Value/sensitivity of receptor	Duration of impact	Magnitude	Significance
Loss of trees	48		Permanent	Negligible	Neutral
Reprofiling of land	45		Temporary	Moderate	Slight Adverse
Widening of trunk road/bridge	43, 47		Permanent	Negligible	Neutral

Loss of old masonry bridge	None achievable		Permanent	Major	**Moderate Adverse**
Construction	44, 46, 49		Temporary	Negligible	Neutral

Table 10.4 Water Quality (Construction)

Potential Impact	Mitigation no.	Value/sensitivity of receptor	Duration of impact	Magnitude	Significance
Allt Lagain Bhain - Decrease in water quality from site runoff	31, 50, 52, 54, 55, 56, 57, 58, 59, 60, 61, 62, 66, 68, 70, 81	Very High (downstream of road bridge) High (upstream of road bridge)	Temporary	Minor	**Moderate (downstream of road bridge)** Slight (upstream of road bridge)
River Moriston - Decrease in water quality from site runoff	31, 50, 52, 54, 55, 56, 57, 58, 59, 60, 61, 62, 66, 68, 70, 81	Very High	Temporary	Negligible	Neutral
Un-named burn - Decrease in water quality from site runoff	31, 50, 52, 55, 56, 57, 58, 59, 60, 61, 62, 70, 81	Medium	Temporary	Minor	Slight
Allt Lagain Bhain - Restriction of flows	54	High	Temporary	Minor	Slight

Allt Lagain Bhain - Disturbance of banks	53, 58, 64	High	Temporary /permanent	Minor, temporary	Slight
Allt Lagain Bhain - Increased scour and subsequent deposition in burn	51	High	Temporary/permanent	Minor	Slight
River Moriston - Increased deposition resulting from scour of Allt Lagain Bhain banks and bed and transport of sediments downstream to river	51	Medium	Temporary/permanent	Minor	Slight
Allt Lagain Bhain flood area - Increased surface water runoff from working area leading to elevated watercourse flows	63	Low	Temporary	Negligible	Neutral
River Moriston floodplain - Increased surface water runoff from working area leading to elevated watercourse flows	63	High	Temporary	Negligible	Neutral

Table 10.5 Water Quality (Operation)

Potential Impact	Mitigation no.	Value/sensitivity of receptor	Duration of impact	Magnitude	Significance
Allt Lagain Bhain - Decrease in water quality from site runoff	63	Very High	Permanent	Negligible	Neutral
River Moriston - Decrease in water quality from site runoff	63	Very High	Permanent	Negligible	Neutral
Small un-named burn - Decrease in water quality from site runoff	63	Medium	Permanent	Negligible	Neutral
Allt Lagain Bhain - Spillage from vehicular collision resulting in pollution to burn	63	Very High	Permanent	Negligible	Neutral
Allt Lagain Bhain - Changes in flood risk	70	Low	Permanent	Negligible	Neutral
Changes in flow pathway at new crossing structure	70, 71	High	Permanent	Negligible beneficial	Neutral
Allt Lagain Bhain - Changes in scour and deposition	71, 72	High	Permanent	Negligible	Neutral

Allt Lagain Bhain - Change in planform of channel	71, 72	High	Permanent	Negligible beneficial	Neutral

Table 10.6 Cumulative Effects

Potential Impact	Mitigation no.	Value/sensitivity of receptor	Duration of impact	Magnitude	Significance
Potential for in-combination effects on ecology if A887 Allt na h-Innse Beag scheme is constructed at the same time as the proposed scheme.	95	Up to Very High	Temporary	Minor to Moderate	**Moderate** if construction phases for both schemes are simultaneous.
Potential for in-combination effects on the water environment if A887 Allt na h-Innse Beag scheme is constructed at the same time as the proposed scheme.	95	Up to Very High	Temporary	Minor to Moderate	**Moderate** if construction phases for both schemes are simultaneous.

11 Schedule of Environmental Commitments

All mitigation measures identified in this ES are necessary to protect the environment prior to and during construction, or during operation of the replacement bridge. These measures will be incorporated into the Contract Documents. This will provide a mechanism to ensure compliance with environmental commitments.

The purpose of the Schedule of Environmental Commitments is to collate mitigation measures identified throughout the ES, both for ease of reference and for use by those overseeing the Contract Documents. It is intended to provide a record of commitments that will be incorporated within the Contract Documents and to which the contractor will be obliged to adhere throughout the Contract period. It is, however, recognised that there may be a need to revise or supplement the commitments by agreement between the Contractor, the Scottish Government, the planning authority, SEPA, SNH, the Ness District Salmon Fishery Board and other interested parties as construction proceeds.

Error! Reference source not found. to Table 11.11 provides a summary of the mitigation measures, which are detailed more fully in the relevant sections of this ES. Reference should be made to individual sections of the ES for further explanation. Specifically, the following has been incorporated:

- the mitigation measure;
- the effect of the mitigation on the impact;
- the timing of the mitigation measure;
- any monitoring requirements; and
- any additional consultation required.

Should the operating company and/or contractor propose significant changes or modifications to the proposed scheme assessed for this EIA, this would mean that the impacts could be different. In this case, appropriate mitigation will be designed and implemented. In such a situation, the operating company or contractor will be required to publish an addendum to the ES, within which appropriate impacts and mitigation measures will be laid out. This addendum will include a revised Schedule of Environmental Commitments to reflect any changes. The revised commitments will then be included in the contract documents. The final design will not give rise to impacts which are any worse than those described in this ES unless a subsequent addendum is issued for consultation.

Table 11.1 Pre-Construction General

Item no.	Mitigation Measure	Effect of Mitigation on Impact	Timing of Mitigation Measure	Monitoring Requirements
1	The contractor will be required to produce a site specific Construction Environmental Management Plan (CEMP) prior to work commencing which will incorporate all the measures detailed within this schedule of environmental commitments, indicate the timing of the measures as well as detailing environmental responsibilities on site, environmental procedures including details of auditing of environmental commitments, providing environmental risk assessments and contingency plans to deal with spills and environmental incidents on site and method statements. The contractor will also produce a site waste management plan (SWMP) which will be incorporated into the CEMP. The SWMP will apply the waste hierarchy at all times whereby in order of preference waste should be prevented, minimised, re-used, recycled, used for energy recovery and only as a final option, disposed of at an appropriately licensed waste facility.	This will clearly set out roles and responsibilities and detail how environmental commitments are incorporated into the work programme as well as providing clear procedures in the event of an incident which will serve to minimise the potential construction impact.	Prior, during and post construction.	Sign off of CEMP by operating company prior to work commencing with regular (weekly) auditing by the ECoW.

2	An ecological/environmental clerk of works (ECoW) will be employed on site by the contractor. The ECoW must be suitably experienced and appropriately qualified and accredited by an appropriate professional body such as the Chartered Institute of Ecology and Environmental Management (CIEEM). The ECoW will be responsible for monitoring and auditing the mitigation contained in this table and the contractor CEMP. It is expected that the ECoW will visit the site at least weekly throughout the course of the contract with audit reports being produced on each occasion and submitted to the operating company environment team. The ECoW will also undertake any necessary ecological surveys or ensure a specialist is engaged as required. Where the ECoW does not hold the required protected species licence or specialist knowledge for a specific mitigation measure, then a suitably qualified specialist with the appropriate licence or specialist knowledge must be engaged for that specific mitigation measure. These mitigation measures are to be identified prior to the start of construction to avoid delays in appointing a suitable specialist.	Ensure good environmental site practice and that the environmental commitments are undertaken on the ground.	Prior, during and post construction.	Weekly auditing and reporting. Surveys undertaken as required.

Table 11.2 Cultural Heritage (Chapter 5)

Item no.	Mitigation Measure	Effect of Mitigation on Impact	Timing of Mitigation Measure	Monitoring Requirements
3	The location for the site compound is to be agreed first with the operating company Environment Team.	To minimise the possibility of damage to cultural heritage assets (or other environmentally sensitive receptors) through a poorly chosen site.	Pre-construction.	None.
4	Protection zones to be established around existing cultural heritage assets as shown in Figure 5.8 of the ES. This should further extend to the former location of Lagganbane settlement and smiddy.	To prevent accidental damage to existing assets.	Pre-construction.	Integrity to be checked throughout the works by ECoW and daily by contractor.
5	A metric survey, analytical recording and further photographic survey commensurate with a Level 3 (English heritage) Standing Building survey with a view to creating an accurate and comprehensive record of the historic masonry arch bridge. This information will be provided to Highland Council Archaeological Unit.	To ensure the existence of the bridge is recorded for future generations.	Pre-construction.	Compliance to be confirmed by operating company environment team.

6	A watching brief to be undertaken during demolition of the historic masonry arch bridge by an appropriately qualified archaeologist in order to record additional relevant information. This will require extending to the areas of Lagganbane smiddy and settlement should they also be impacted by the works.	To ensure archaeological evidence can be properly recorded.	During construction.	Compliance to be confirmed by operating company environment team.
7	Stone to be reclaimed from the existing bridge and reused on site in the building/facing of the new bridge. Any remaining stone to be passed to the Highland Council (with suitable waste exemption in place) to provide material for repair of their historic bridges.	Ensures new bridge blends into landscape and allows excess stone to be used elsewhere.	During / post construction.	Compliance to be checked by ECoW.
8	Where unexpected archaeological finds are identified, the archaeologist undertaking the watching brief should be alerted immediately (or if not on site, the ECoW) and direction taken as to how to proceed.	Ensures the site integrity can be maintained in an archaeological context and that potentially important assets are not destroyed.	During construction.	Compliance to be checked by ECoW who is to inform the operating company environment team of any unexpected finds if there is no archaeologist on site.

Table 11.3 Ecology and Nature Conservation (Chapter 6)

Item no.	Mitigation Measure	Effect of Mitigation on Impact	Timing of Mitigation Measure	Monitoring Requirements
9	Root protection zone, consisting of robust silt fencing, will be established to protect adjacent trees.	Prevent accidental damage to woodland during works.	Pre-construction.	Integrity to be checked throughout the works by ECoW and daily by contractor. These checks are to be recorded in the weekly reports from the ECoW to the operating company environment team.
10	Consultation with SNH will be undertaken to ascertain whether it is advisable to transplant the two stands of juniper to an area out with the immediate works.	Prevent loss of UKBAP priority species.	Pre-construction.	Condition to be monitored by ECoW throughout the works and reported weekly to operating company environment team. Contractor to water regularly during dry periods in accordance with guidance to be sought from Forestry Commission Scotland and/or SNH to aid establishment.

11	Compensation planting will be carried out following the works with local provenance broadleaf trees. Trees to be protected from grazing/browsing by suitable biodegradable tree guards.	Provides compensation for loss of woodland as a result of works.	Post-construction.	Contractor to monitor during the contract maintenance period. If the planting is unsuccessful, remedial measures are to be taken to bring the planting up to the standard specified.
12	All personnel and sub-contractors on site will be briefed as to the environmentally sensitive nature of the habitats and species around the works. This will be achieved through inclusion in the mandatory site induction and regular toolbox talks.	Raises awareness within workforce and puts message across of importance of environmental measures.	During site induction and throughout construction period.	ECoW to check operative awareness of issues periodically and to report findings in the weekly report to the operating company environment team.

13	A pre-construction otter survey will be carried out 2 weeks prior to the works commencing by experienced ecologists. Other protected species surveys will be undertaken by appropriately qualified specialists prior to construction including freshwater pearl mussel, bats, pine marten, wildcat, badger, red squirrel, water vole, breeding birds and wood ants. These surveys must be sufficiently in advance of construction to allow for appropriate mitigation measures to be developed and licences to be obtained where necessary. Further protected species surveys shall be carried out periodically during the works as considered necessary by the operating company environment team. An otter survey shall be carried out at least monthly during construction either by the ECoW if appropriately qualified or by the operating company environment team.	To determine whether there is any increase or change in otter activity in the area and whether mitigation measures need to be enhanced or the licensing requirements have changed. In the case of the latter, SNH are to be informed and advice sought for appropriate action.	Pre-construction. During construction.	Operating company environment team.
14	An otter licence will be obtained from SNH in advance of the works and any further licence conditions imposed will be fully complied with.	Ensures legal compliance.	Pre, during and post construction,	ECoW to ensure compliance with licence conditions and record this in the weekly reporting.

15	A clearly signed protection zone will be established in the vicinity of all otter resting places which will extend to a distance of 30 m (where possible). This will be fenced off with orange semi-rigid barrier fencing (or similar) to keep the workforce out but not impede access for otters. The positioning of the fencing will be supervised by a suitably experienced ecologist.	To minimise risk of disturbance.	Pre-construction. During construction.	Integrity to be checked throughout the works by ECoW and daily by the contractor. Weekly ECoW report to be sent to operating company environment team.
16	All persons on site to be made aware of the otter licence, mitigation measures in place and their obligations during the induction process and through communication from the site supervisor and use of otter information sheets and toolbox talks, which will be given to all members of the work force. Staff to remain vigilant for presence of otter throughout the works.	Raise awareness with workforce and ensure they are aware of licence conditions and their obligations.	Pre-construction. During construction.	ECoW to check operative awareness of issues periodically and report this in weekly reports.
17	If otter are encountered, work must stop temporarily in the vicinity and the site supervisor informed who should take further advice from the ECoW.	Ensure disturbance to otter is minimised.	During construction.	None.
18	Any temporary lighting required during the works will be directed away from the watercourse and the otter protection zone. Lighting will also be shielded and projected downwards to prevent disturbance to bats.	Minimise disturbance to otters and bats.	During construction.	ECoW to ensure compliance.

19	Machinery will be checked at the start of each shift for the presence of resting otter and these checks will be recorded by the Contractor.	Minimise risk of injury to otters.	During construction.	ECoW to ensure compliance.
20	Excavations will be covered over or ramped at end of shift to avoid otters (and other animals) falling into them and becoming trapped or injured.	Minimise risk of injury to otters.	During construction.	ECoW to check compliance.
21	Further summer and winter bat surveys will be undertaken by a licensed bat worker prior to construction. A licence to destroy the existing bat roosts will be obtained from SNH prior to work commencing.	Ensures legal compliance and avoids harm to bats.	Pre-construction for application, monitoring during and post construction.	ECoW to confirm compliance with licence conditions.

22	Durable woodcrete type bat boxes (including hibernation box) will be erected in the vicinity of bridge prior to construction. Numbers, types and locations will be agreed with SNH during the licence application process.	Ensures alternative roost site available for bats.	Pre-construction, monitored post construction.	Erection of bat boxes supervised by ECoW. Effectiveness will be monitored post construction by operating company environment team by arranging appropriate surveys for a period of at least five years following completion of the works. If not effective, then discussions must be held with SNH to adapt the mitigation or develop further mitigation measures to seek to improve the results.
23	The works affecting bat roosts will be time limited - destruction of the bridges will be undertaken during either early summer (April-May) or late summer (August-September) and before the winter hibernation period (historic masonry arch bridge only) unless otherwise agreed with SNH.	Limit disturbance of bats to least critical periods.	Pre-construction planning.	ECoW to confirm to operating company environment team that works programme complies.
24	One way excluder devices to be fitted to the roost entrances to allow the bats to leave the roost but not allow them back into the roost prior to demolition.	Ensures the safe exclusion of bats from the roost.	Pre-construction.	Undertaken by licensed bat worker and overseen by ECoW.

25	The effectiveness of the one way excluders will be established after the devices have been *in situ* for at least seven days of good foraging weather, by carrying out a dusk and dawn activity survey and confirmed by endoscope survey.	Safe exclusion of bats from the roost.	Pre-construction.	To be confirmed to operating company environment team by ECoW / licensed bat worker.
26	Demolition work will not commence until it has been confirmed by a licensed bat worker that the bats are no longer present in the roost.	Safe exclusion of bats from the roost.	Pre-construction.	To be confirmed to operating company environment team by ECoW / licensed bat worker.
27	A bat toolbox talk will be provided to all staff prior to construction.	Raises awareness in case bats are unexpectedly found.	Pre-construction.	ECoW to occasionally assess workforce knowledge and give toolbox talk again where required.
28	Should bats be observed during demolition, work will stop and advice will be obtained from a bat specialist before works are allowed to continue.	Bats not inadvertently harmed.	During construction.	Any instance of bats being observed should be reported to the ECoW immediately.
29	A full crash deck will be erected during the demolition of the existing bridges to prevent debris entering the watercourses.	Provides protection for Allt Lagain Bhain and aquatic species.	During construction, erected prior to commencement of demolition.	Checked for regularly for effectiveness by ECoW.

30	A freshwater pearl mussel survey will be carried out prior to construction by a licensed specialist. The realignment of Allt Lagain Bhain will be carried out "in the dry" using a methodology agreed by SEPA and will be undertaken outwith the fish spawning season (15th October to 31st May inclusive).	Minimise disturbance to fish population as well as FWPM in the wider catchment which depend on juvenile salmonids.	Programming pre-construction.	ECoW to confirm seasonal restrictions are adhered to.
31	Silt fencing will be installed along the banks of the Allt Lagain Bhain within the works area and regularly checked and maintained for the duration of the works.	Minimise the risk of silt and suspended matter entering the watercourse thereby providing protection for aquatic life downstream.	Set up prior to construction and maintained throughout construction.	Integrity to be checked daily by contractor, silt fences to be cleaned out regularly and any breaches or damage to be repaired immediately. ECoW to check compliance.
32	A preconstruction survey will be undertaken for pine marten den sites. Should any new dens be found, an exclusion zone of at least 30 m (where possible) will be established to minimise the risk of disturbance. Where necessary, advice will be taken from SNH and further mitigation developed.	Minimise the risk of inadvertently disturbing pine marten.	Pre and during construction.	Operating Company Environment Team will undertake preconstruction survey. ECoW may require to conduct further surveys during construction.

33	Electro-fishing to be carried out to safely remove fish prior to channel realignment and in channel works.	Minimises the impact on fish.	Pre or during construction.	Specialist contractor will undertake work immediately prior to works in water / dewatering / channel diversion.
34	The bed of the channel will not have a hydraulic drop either upstream or downstream of the new bridge and no obstacle to in channel fish migration to be created.	Minimises the impact on fish.	During design, construction and post construction.	Contractor and ECoW to ensure compliance.
35	A badger protection plan will be produced prior to construction. A preconstruction survey will be undertaken for badgers. If any new setts are identified within 30 m of the works then a badger protection plan will be establised in consultation with SNH and a licence to disturb badger obtained prior to work commencing.	Minimise the risk of inadvertently disturbing badgers.	Pre and during construction.	Licensed badger specialist will produce a badger protection plan. Operating company environment team will undertake preconstruction survey. ECoW may require to conduct further surveys during construction.
36	No works will be undertaken within 30 m of a sett during the badger breeding season (December to June). NOTE: No setts within 30 m of the works have been discovered.	Minimise the risk of disturbance during construction and ensures legal compliance.	Pre/ During construction.	Compliance checked by ECoW.

37	The fencing erected to protect the woodland surrounding the proposed scheme (see item 9) will serve to also form an exclusion area to protect badgers.	Minimise the risk of disturbance during construction and ensures legal compliance.	Pre-construction.	Compliance checked by ECoW.
38	A badger toolbox talk will be provided to all staff.	Raises awares with site staff and reduces the risk of accidental disturbance.	Pre and during construction.	To be provided by ECoW.
39	Site clearance work will be undertaken out with the bird breeding season (March to September) inclusive. Where this is unavoidable a survey will first be undertaken for breeding birds by a suitably qualified ecologist.	Minimise the risk of disturbance during construction and ensures legal compliance.	Pre and during construction.	Compliance checked by ECoW and where required ECoW will also undertake surveys or bring in specialist.
40	At least three breeding bird surveys will be undertaken prior to construction. If any signs of bird breeding are encountered on site then work will stop in the immediate area and an exclusion zone of a minimum of 10 m erected until the young have fledged.	Minimise the risk of disturbance during construction and ensures legal compliance.	Pre and during construction.	Compliance checked by ECoW.
41	A breeding bird toolbox talk will be provided to all site staff.	Raises awares with site staff and reduces the risk of accidental disturbance.	Pre and during construction.	To be provided by ECoW.

42	A preconstruction survey for wood ants will be undertaken. If nests are found within the working area then where possible an exclusion zone will be erected around nests to prevent damage during the works. Where this is not feasible, the nests will be first translocated out with the works area.	Minimise the risk of disturbance during construction and ensures legal compliance.	Pre-construction.	Operating company environment team to undertake survey or arrange survey by suitably qualified specialist. If translocation is required, this must be undertaken by a suitably skilled contractor and supervised by the ECoW.

Table 11.4 Landscape Effects (Chapter 7)

Item no.	Mitigation Measure	Effect of Mitigation on Impact	Timing of Mitigation Measure	Monitoring Requirements
43	The design will seek to minimise the footprint of the works.	Minimises habitat loss.	Design.	Compliance checked by resident engineer.
44	Surface turf and topsoil will be carefully stripped and stored separately for the duration of the works and utilised for site reinstatement.	Minimises the need to import material.	Pre and during construction.	Compliance checked by ECoW.

45	Areas required for site compound and temporary bridge will be restored with landforms that fit in with the contours of the surrounding landscape. This principle will also be applied to the general landscaping of the site following completion of the works.	Minimises landscape impact.	During / Post construction.	Compliance checked by ECoW.
46	As far as practicable, site won topsoil will be used for landscaping to ensure the re-establishment of the ground flora.	Ensures re-establishment of local flora and minimises the risk of importing non-native invasive species.	During / Post construction.	Compliance checked by ECoW.
47	Existing masonry will be used to face the new parapets to soften the impact.	Minimises landscape impact.	During / Post construction.	Compliance checked by ECoW.
48	Woodland areas that are removed will be replanted using native species of local provenance. This will also be carried out in a pattern that mimics that of naturally regenerating seedlings and not in a linear manner.	Minimises impact on woodland.	Post construction.	Compliance checked by ECoW.
49	An appropriate seed mix will be applied to introduce ground cover and minimise the effect of unwanted pioneer species. The seed mix will be an EW1 Woodland mix (or similar) applied at sowing rate of 30kg/ha.	Assists in the re-establishment of woodland.	Post construction.	Compliance checked by ECoW.

Table 11.5 Road Drainage and the Water Environment (Chapter 8)

Item no.	Mitigation Measure	Effect of Mitigation on Impact	Timing of Mitigation Measure	Monitoring Requirements
50	The contractor will be required to implement measures to control runoff from the site working area and ensure an effective silt management plan is in operation for the duration of the works.	Minimise the impact on the water environment.	Design / during construction.	Compliance checked by ECoW.
51	Where flows are diverted or over-pumped, the risk of scour will be reduced through scour protection or controlling flows to avoid bed and bank erosion.	Minimise impact on fluvial geomorphology.	During construction.	Compliance checked by ECoW. A fluvial geomorphologist is to advise the ECoW prior to this aspect of the works or a fluvial geomorphologist is to be on site during this activity.
52	Avoid unnecessary disturbance of the watercourse bed.	Minimise impact on fluvial geomorphology.	During construction.	Compliance checked by ECoW.
53	Retain as much of the bank side vegetation as practicable.	Reduce risk of scour and help to reduce ingress of suspended sediment from site runoff.	During construction.	Compliance checked by ECoW.

54	Ensure compliance with the conditions of the SEPA CAR licence.	Ensures legal compliance and minimises potential impact on water environment.	During construction.	Compliance checked by ECoW. Where specific conditions of the CAR licence require specialist knowledge (e.g. fluvial geomorphology), the ECoW shall take advice from an appropriate specialist. If necessary to ensure compliance, the ECoW shall request that an appropriately qualified specialist visits the site to confirm compliance with specific conditions.

55	The contractor will be required to implement measures to avoid pollution to Allt Lagain Bhain, River Moriston and the small un-named burn and will be required to comply with relevant SEPA Pollution Prevention Guidelines (PPGs), in particular: PPG 4: Treatment and disposal of sewage where no foul sewer exists. PPG 5: Works and maintenance in or near water. (or SEPA pollution control guidance that replaces this PPG) PPG 6: Working at construction and demolition sites. PPG 8: Safe storage and disposal of used oils. PPG 22: Incident response – dealing with spills.	Minimise risk of water pollution.	During construction.	Compliance checked by ECoW.
56	CIRIA good practice measures to be adhered to at all times (see CIRIA C648 (2006a) and C649 (2006b)).	Minimise risk of water pollution.	During design and construction.	Compliance checked by ECoW.
57	The contractor will be required to prepare method statement(s) for prior approval by SEPA for works activities that could affect watercourses.	Minimise risk of water pollution.	During construction.	Compliance checked by ECoW.
58	Where feasible keep a buffer of vegetation alongside the banks of the burn. Vegetation (or anything else) must not be disposed of in the channel.	Minimise risk of water pollution.	During construction.	Compliance checked by ECoW.

59	Refueling on site to be undertaken on an impermeable surface within an impermeably bunded secure area. Drip trays must be used and maintained to avoid overflow and any contaminated water disposed of off-site at an appropriately licensed disposal facility. The drip trays must have a capacity of 110% of the fuel tank supplying the static plant or equipment.	Minimise risk of water pollution.	During construction.	Compliance checked by ECoW confirming with contractor.
60	All site vehicles and plant must be appropriately maintained according to relevant legislation.	Minimise risk of water pollution.	During construction.	Compliance checked by ECoW confirming with contractor.
61	No vehicles or plant to access the Allt Lagain Bhain (or any other) watercourse unless absolutely necessary and any access will be agreed first with the ECoW.	Minimise risk of water pollution.	During construction.	Compliance checked by ECoW.
62	Works within the burn must be undertaken outside the salmonid fish spawning season, i.e. in-stream works can only be undertaken from 1st June to 14th October unless otherwise agreed in writing with the Ness District Salmon Fishery Board.	Minimise risk of impact to salmonid fish populations.	During construction.	Compliance checked by ECoW.

63	Sustainable Drainage Systems (SUDS) to be incorporated into design of bridge and road tie ins which will help reduce suspended solids and removal of a proportion of dissolved metals within the road drainage system prior to discharge.	Minimise the risk of water pollution and ensure legal compliance.	Design, implemented during construction. **Operation phase SUDS must not be clogged or contaminated with muddy or dirty water from construction site.**	Compliance checked by ECoW. If necessary to ensure compliance, the ECoW shall request that an appropriately qualified specialist visits the site to confirm compliance with specific conditions.
64	During installation of the temporary bridge, the work must be carried out as far as practicable using methods to avoid damage to the banks of the burn and avoiding in-channel working.	Minimise hydromorphological impact.	During construction.	Compliance checked by ECoW.

65	The concrete works must be carried out in the dry to avoid contact of uncured concrete or unset waterproofing with the burn water. When constructing the realigned section of channel which must be carried out in the dry, vegetation should be allowed to colonise the banks of the new channel to help stabilise the bare earth. If this is not practicable, the banks should be stabilised with biodegradable materials such as coir matting. The bed of the new channel to be formed using bed material from the abandoned section of the existing channel (or similar) and to be placed loosely. The transfer of bed material will be undertaken outside the salmonid fish spawning season. Following construction of the new realigned channel, the watercourse should be allowed to gradually flow into the new channel to avoid scour of the new channel and prevent mobilisation of large amounts of sediment.	Minimimse the impact on hydromorphology and water pollution.	During construction.	Compliance checked by ECoW.

66	Water quality of Allt Lagain Bhain, the unnamed watercourse and the River Moriston (near the confluence with Allt Lagain Bhain) will be monitored upstream and downstream of the works though daily visual inspections to observe and record whether any oil, construction debris or increased turbidity is present. The visual inspections will be assisted with the use of a portable meter to measure turbidity, pH and conductivity on a weekly basis. In the event of observation of oil, construction debris or noticeably increased levels of turbidity downstream compared with upstream, SEPA must be informed as soon as is practicable and within 24 hours. Suitable actions must be taken immediately to determine the cause of the problem and to rectify the situation.	Minimise risk of water pollution.	During construction.	Compliance checked by ECoW.

67	Prior to construction, chemical water quality sampling to be undertaken of Allt Lagain Bhain, the small watercourse and the River Moriston to provide an indication of baseline conditions. During the full construction period, chemical water quality monitoring will be undertaken of Allt Lagain Bhain, the River Moriston and the small unnamed watercourse on a fortnightly basis or as otherwise agreed with SEPA. Samples will be sent to a United Kingdom Accreditation Service (UKAS) laboratory and the parameters analysed are to include suspended solids, dissolved oxygen, temperature, copper (dissolved and total), zinc (dissolved and total), pH, ammonia, conductivity, turbidity and total petroleum hydrocarbons or as otherwise agreed with SEPA. The detection limits must be sufficiently low to determine whether compliance with Environmental Quality Standards (EQSs) is being achieved. If any samples show that an EQS for a parameter has been exceeded, SEPA must be informed and suitable actions taken to investigate and rectify the situation if it is due to the proposed scheme construction works. Water quality sampling to be undertaken post construction on at least four occasions for at least 12 months following completion of construction or as agreed with SEPA.	Minimise risk of water pollution.	Prior to, during and after construction.	Operating Company to carry out prior and post construction water quality sampling. During construction, compliance checked by ECoW.

68	Biological (macro-invertebrate) water quality monitoring is to be undertaken prior to the works commencing, on at least two occasions (preferably between April and September inclusive) and following construction in order to determine the long-term pollution status of the site prior to, during and post construction. A sample is to be taken upstream of the works and one downstream on each occasion in order to allow comparison.	Minimise risk of water pollution.	Prior to and after construction.	Compliance checked by ECoW.
69	Materials will be stored securely at least 10 m distant from watercourses in accordance and in line with current best practice guidelines. Soil stockpiles will be stored at least 10 m from any watercourse.	Minimise risk of water pollution.	During construction.	Compliance checked by ECoW.
70	The new structure will be designed to convey flows from a 1 in 200 year flood event plus 20% to allow for climate change.	Ensures infrastructure can cope with flood events and allows for climate change.	Design.	Compliance confirmed by engineer's representative.
71	The new structure is to have a submerged invert to encourage the formation of a naturalised bed under the road and will have no steps in the bed or other potential obstacles to migratory fish. The concrete channel must also have a naturalised bed.	Minimise the ecological impact.	Design, implemented during construction.	Compliance checked by ECoW.

72	Consideration to be given for the use of green bank protection immediately upstream and downstream of the hard engineered scour protection in order to merge the engineered bank into the natural bank. A fluvial geomorphologist is to be engaged to advise on design including scour protection measures.	Minimimse the impact on hydromorphology.	Design.	Compliance confirmed by engineer's representative.
73	Where clearance is required to accommodate the site compound in an area out with the scope of this assessment, further environmental assessment, including ecological surveys, will be undertaken prior to site clearance.	Minimise the environmental impact when creating site compound.	Pre-construction.	Survey and assessment to be undertaken by ECoW or competent ecologist appointed by ECoW.

Table 11.6 Community Engagement

Item no.	Mitigation Measure	Effect of Mitigation on Impact	Timing of Mitigation Measure	Monitoring Requirements
74	Full consultation to be undertaken with local community including Fort Augustus Glenmoriston Community Council prior to works commencing.	Issues that may affect local community can be raised and addressed as far as practicable.	Design / preconstruction.	Scheme designer.

75	Provide “Being a good neighbour” toolbox talk (or similar). To encompass issues such as site parking, noise on site, radios and offensive language.	Ensures awareness of sensitivities relating to working within local community can be passed on effectively to the work force.	Pre-construction.	ECoW.

Table 11.7 General Housekeeping

Item no.	Mitigation Measure	Effect of Mitigation on Impact	Timing of Mitigation Measure	Monitoring Requirements
76	Road surface to be swept regularly and wheel washes to be used as required.	Ensures dust is kept to a minimum.	During construction.	Compliance checked by ECoW.
77	All material coming to site and waste leaving site to be covered where practicable.	Cuts down debris within and around site.	During construction.	Compliance checked by ECoW.
78	Exposed earth to be wetted where required to keep down dust. Any material stockpiles which could be affected by wind blow to be covered or wind break used while being kept on site.	Minimise dust generation.	During construction.	Compliance checked by ECoW.

79	Ensure site is kept as tidy as possible during works and any litter is picked up regularly.	Minimises the risk of wind-blown debris leaving the site.	During construction.	Compliance checked by ECoW.
80	Ensure the site is secure and vandal proof when not operational.	Minimises the risk of environmental incidents due to vandalism.	During construction.	Compliance checked by ECoW.
81	Spill kits to be available at designated areas on site and within plant/vehicles and staff trained in their use.	Ensures any accidental spills can be cleaned up effectively.	During construction.	Compliance checked by ECoW.
82	A daily visual dust monitoring regime to be implemented, noting also weather and construction activities (location and duration on site).	Minimise the risk of air quality incidents.	During construction.	Compliance checked by ECoW.

Table 11.8 Waste

Item no.	Mitigation Measure	Effect of Mitigation on Impact	Timing of Mitigation Measure	Monitoring Requirements
83	Strictly no burning of waste on site.	Minimises risk of air pollution and ensures legal compliance.	During construction.	Compliance checked by ECoW.

84	All waste receptacles, skips and bins etc. to be covered.	Minimises risk of wind-blown litter.	During construction.	Compliance checked by ECoW.
85	Site waste to be segregated and kept in a clearly labelled designated area and where it is not being re-used on site, it is to be recycled under relevant SEPA exemption or disposed of safely and legally with waste transfer notes being kept as a record.	Ensures compliance with waste legislation and Duty of Care.	During construction.	Compliance checked by ECoW.

Table 11.9 Noise and Air Quality

Item no.	Mitigation Measure	Effect of Mitigation on Impact	Timing of Mitigation Measure	Monitoring Requirements
86	Drop heights from vehicles to be minimised.	Minimises risk of air pollution.	During construction.	Compliance checked by ECoW.
87	Vehicles and plant to be regularly serviced and comply with emission standards. All plant and vehicles to be turned off when not in use.	Minimises risk of air pollution.	During construction.	Compliance checked by ECoW confirming with contractor.

88	Work to take place during normal daytime construction hours avoiding Sundays and public holidays. Any variation to this may require the contractor to produce a document demonstrating "best practicable means" in relation to minimising noise.	Minimises noise impact.	During construction.	Compliance checked by ECoW. If "best practicable means" document is needed, the ECoW is to inform the operating company environment team which will then arrange for a suitably qualified specialist to produce the "best practicable means" document in liaison with the contractor and Highland Council Environmental Health Officer.
89	Reversing on site to be minimised and site vehicles to be fitted with broadband "white noise" type reversing alarms if health and safety requirements allow.	Minimises noise impact.	During construction.	Compliance checked by ECoW.
90	Plant to be operated in the mode that minimises noise emissions and where appropriate, fitted with appropriate noise control equipment such as jackets, hoods, shrouds, doors, silencers etc.	Minimises noise impact.	During construction.	Compliance checked by ECoW confirming with contractor.
91	All material handling to be carried out in a way that minimises noise.	Minimises noise impact.	During construction.	Compliance checked by ECoW.

92	Battery powered generators to be used in preference to diesel powered and especially for traffic management.	Minimises noise and potential for pollution.	During construction.	Compliance checked by ECoW confirming with contractor.

Table 11.10 Traffic Management

Item no.	Mitigation Measure	Effect of Mitigation on Impact	Timing of Mitigation Measure	Monitoring Requirements
93	A traffic management plan will be developed and implemented by the contractor and will take into account the needs of both vehicle and non-vehicular travellers.	Minimises disruption to road users.	Pre-construction, implemented during construction.	Compliance checked by ECoW.
94	Press releases will be used and media informed in order to raise awareness with the travelling public.	Allows road users to plan for possible delays.	Pre-construction.	Compliance checked by operating company environment team.

Table 11.11 Cumulative Effects

Item no.	Mitigation Measure	Effect of Mitigation on Impact	Timing of Mitigation Measure	Monitoring Requirements
95	Consideration should be given to avoiding construction of A887 Allt na h-Innse Beag scheme at the same time as the proposed scheme.	Would reduce the risk of cumulative construction impacts from the A887 Allt na h-Innse Beag scheme and the proposed scheme.	Pre-construction and construction.	Operating company engineering team to discuss with operating company environment team and with Transport Scotland.

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13 Glossary

CIRIA - the Construction Industry Research and Information Association.

Construction Environmental Management Plan (CEMP) - The synthesis of all proposed mitigation and monitoring actions in relation to construction process, set to a timeline with specific responsibility assigned and follow-up actions defined.

DMRB or Design Manual for Roads and Bridges - provides a comprehensive manual system which accommodates all current standards, advice notes and other published documents relating to the design, assessment and operation of trunk roads (including motorways).

Ecology - The relationship of living things to one another and their environment, or the study of such relationships.

Historic Scotland (now Historic Environment Scotland) - an executive agency of the Scottish Government, charged with safeguarding the nation's historic environment and promoting its understanding and enjoyment on behalf of Scottish Ministers.

Mitigation measures - measures that avoid, reduce, remediate, alleviate or compensate for an adverse environmental impact.

National Biodiversity Network (NBN)- a collaborative project which involves many of the UK's wildlife conservation organisations, the government, country agencies, environmental agencies, local records centres and many voluntary groups and seeks to make biodiversity information widely available.

National Cycle Route – part of the National Cycle Network created by the charity Sustrans.

National Grid Reference or NGR – a unique reference system developed by Ordnance Survey for defining any point located in Great Britain.

Ordnance Survey – the national mapping agency for Great Britain

Pollution - A change in the physical, chemical, radiological or biological quality of a resource (air, water or land) caused by man or man's activities that is injurious to existing, intended or potential uses of the resource.

PPGs or Pollution Prevention Guidelines - produced by the Environment Agency, Northern Ireland Environment Agency (NIEA) and SEPA and outline businesses' statutory responsibilities and guidance on good practice to reduce pollution risk. Each PPG is targeted at a particular industrial sector or activity and applies across the UK.

SEPA - Scottish Environment Protection Agency, Scotland's environmental regulator.

SNH – Scottish Natural Heritage, a government body with the role of looking after the natural heritage, helping people to enjoy and value it, and encouraging people to use it sustainably.

Special Area of Conservation or SAC – European designated area as defined by EC Habitats Directive (92/43/EEC), to protect the 220 habitats and approximately 1000 species listed in annex I and II of the directive.

Special Protection Area or SPA – is a designation under the European Union directive on the Conservation of Wild Birds, to protect the habitat of migratory birds and certain species of particularly threatened birds.

Site of Special Scientific Interest or SSSI - conservation designation denoting a protected area in the United Kingdom; they may be of biological, geological or physiographic interest.

SUSTRANS – sustainable transport charity.

Topsoil - the upper layer of soil containing the highest concentration of organic matter and microorganisms**.**

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