BIODIVERSITY REPORTING DUTY
2015-2017

TRANSPORT SCOTLAND

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2015 – 2017

CONTENTS

Executive Summary

This document is intended to encapsulate the processes employed by Transport Scotland, the national transport agency, in support of the Government's commitment to the protection and, where practicable, enhancement of Scotland's rich biodiversity. The document covers a three year reporting period, as required by the Wildlife and Natural Environment (Scotland) Act 2011, from January 2015 until December 2017.

This is the second such report prepared by the Agency since the WANE Act came into force and it provides a flavour of the range of works Transport Scotland is involved with, primarily through the road and rail delivery divisions, and some of the outcomes achieved for the benefit of the Nation's ecological resource. The report discusses how biodiversity is embedded into the processes guiding the management of Scotland's strategic road and rail networks as well as forming a key element in the various stages through which new national transport infrastructure is developed in Scotland.

The report also looks at how the Agency is making serious consideration of the global changes affecting our planet and the impact this is likely to have on our fragile ecosystems. The agency is leading in a number of initiatives aimed at reducing these impacts, as far as practicable, whilst working in partnership with other organisations at home and abroad to ensure the protection of biological diversity remains a key focus for the future.

Ministerial Foreword

Mr Humza Yousaf

Minister for Transport and the Islands

Scotland is fortunate to enjoy many wonderful landscapes supporting a rich variety of wildlife and habitats. These combine as a major influence on our development as a nation, whilst also drawing multitudes of visitors every year to experience for themselves this natural splendour. However, we are all now aware that these ecosystems are complex and fragile and require very careful management if they are to continue.

As we grow and develop as a nation and as the wider world changes, with an ever increasing population and the associated impacts this brings, so the pressure on our natural resources grows. It is vital that we place sustainability at the heart of our plans and processes – seeking to harness new and innovative ways to expand our economic and social development whilst respecting and protecting our natural environment and safeguarding a high quality of life for future generations.

The Scottish Government is committed to this goal through positive leadership and collaborative working. As the national transport authority and a major government agency, Transport Scotland is leading by example – demonstrating how infrastructure development and the management of the national transport networks can be undertaken in a sustainable manner, incorporating the protection and celebration of the country's natural assets.

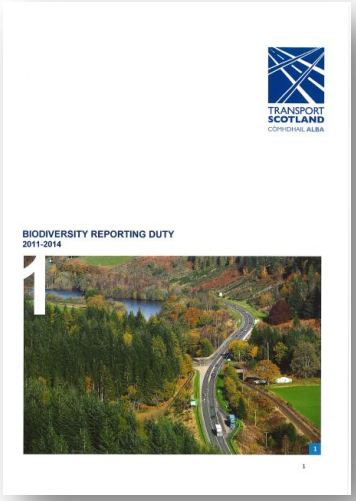
I commend the agency for rising to the challenge and look forward to seeing this on-going commitment leading up to the culmination of the current Scottish Biodiversity Strategy in three years' time.

Introduction

Under the Nature Conservation (Scotland) Act (2004), all public bodies in Scotland are required '...in exercising any functions, to further the conservation of biodiversity so far as it is consistent with the proper exercise of those functions" when carrying out their responsibilities. We must go beyond implementing measures to protect specific sites; we must also consider how we manage biodiversity in the wider environment through asset management, procurement and staff engagement. This report implements the requirements of the Wildlife and Natural Environment (Scotland) Act (2011) (commonly referred to as the WANE Act) which requires public bodies in Scotland to provide a publicly available report on the actions which they have taken to meet this biodiversity duty.

For the purpose of this report, biodiversity means 'the variety and variability of life around us and includes every species of plant and animal in earth's natural system, the genetic material that makes them what they are, and the communities that they form'[12].

Biodiversity Reporting Cycle



A Biodiversity Report in response to the duty imposed by the WANE Act is required to be published every three years and this is the second such report from Transport Scotland, prepared to cover the period from January 2015 until December 2017. The three year cycle is not a particularly long period and whilst there are always new examples to bring forward of biodiversity interventions within the trunk road and national rail networks it should be noted that the wider Transport Scotland policy background remains the same. This was covered in detail in the 2011 – 2014 report, with a summary included in this update.

We have undertaken a range of biodiversity conservation actions, as outlined in our 'actions taken to improve biodiversity' section, given that we are involved in the management and use of both land and natural resources.

About Transport Scotland

Transport Scotland is the national transport agency for Scotland. The agency is responsible for delivering a safe, efficient, cost-effective and sustainable transport system for the benefit of the people of Scotland. We operate within the remit of the National Transport Strategy[3] (NTS), which is endorsed by the Minister for Transport and Islands and sets a framework for enhancing transport in Scotland.

[1] http://www.snh.gov.uk/docs/B836048.pdf
[2] http://scotland.forestry.gov.uk/supporting/strategy-policy-guidance/biodiversity
[3] http://www.transport.gov.scot/strategy/national-transport-strategy

The NTS was refreshed in 2016 and is currently under a further broad and collaborative review involving the agency's stakeholders and communities across Scotland to ensure all have a greater say in influencing the development of transport policy at local, regional and national level. Once completed in summer 2019, the new National Transport Strategy will provide a clearly defined set of strategic transport objectives, which will underpin a new Strategic Transport Projects Review (STPR) to set the priorities for future investment.

The NTS offers five strategic objectives that inform the Transport Scotland policy development, resource investments and measurement of our effects.

Objective number 3: ***Protect our environment and improve health*** - encapsulates and underpins the agency's approach to biodiversity. The 2020 Challenge for Scotland's biodiversity[4][5] and the accompanying Route Map to 2020[6] focus on the need for action to halt biodiversity loss and restore our ecosystems. The NTS draws attention to the importance of managing Scotland's transport network in a manner that contributes to improving biodiversity in Scotland, and draws attention to the provision and maintenance of green networks that both encourage walking and cycling whilst providing space for biodiversity.

[4] http://www.gov.scot/Resource/0042/00425276.pdf
[5] As noted in the Scottish Government's own Biodiversity Report 2012-14, the Scottish Biodiversity Strategy entitled 'Scotland's Biodiversity: It's in Your Hands' was published in 2004 with the aim to "conserve biodiversity for the health, enjoyment and well-being of the people of Scotland, now and in the future". The 2020 Challenge for Scotland's Biodiversity is a supplement to the 2004 Strategy.
[6] http://www.gov.scot/Resource/0048/00480289.pdf

The Transport Scotland 2012-2016 Corporate Plan included key considerations in support of biodiversity and the protection of the natural environment through the delivery of national transport works and the on-going management of the strategic transport networks. This Plan was recently updated – the new Transport Scotland 2017-2020 Corporate Plan has the following main aims:

"An accessible Scotland with safe, integrated and reliable transport that supports economic growth, provides opportunities for all and is easy to use; a transport system that meets everyone's needs, respects our environment and contributes to health; services recognised internationally for quality, technology and innovation, and for effective and well-maintained networks; a culture where transport providers and planners respond to the changing needs of businesses, communities and users, and where one ticket will get you anywhere."

Environmental Sustainability is at the heart of all of Transport Scotland's activities, and over this Corporate Plan period there is a significant emphasis on air quality and climate change.

Commitment number 12: *Demonstrate environmental sustainability through the delivery of environmental protection, community benefit and climate change mitigation/adaptation across our operations, projects and maintenance activities*.

Protecting Scotland's physical and natural environment is a key element of the Transport Scotland ethos. All agency policies, projects and interventions will:

- deliver community benefits
- manage air, noise and carbon emissions
- prepare for and adapt to climate change
- protect historic environments and support biodiversity.

Our approach to biodiversity is captured within our landscape policy document Fitting Landscapes[7], which was published in January 2014 and has been endorsed by Scottish Ministers and is mandatory for all working on the trunk road. In addition to the brief policy summary below, the broad basis of the document is covered within the 'mainstreaming' section of this report.

[7] http://www.transport.gov.scot/report/j279083-00.htm

- The policy **vision** of Fitting Landscapes is ‘to promote the more sustainable design, implementation, maintenance and management of the transport estate and ensure that the landscapes we create and manage are of high quality, well integrated, bio-diverse, adaptable and deliver a meaningful contribution to national sustainability targets’

- Our key biodiversity **principles and commitments** can be summarized within aim 2 of Fitting Landscapes which is to ‘enhance and protect natural heritage [by delivering] effective mitigation of adverse impacts on species and ecosystems...[along with] the positive enhancement of biodiversity through the creation and management of new habitats and green networks’

- Project **objectives** should identify areas of opportunity for biodiversity protection and enhancement, such as supporting native planting and/or incorporating relevant national and local biodiversity targets into schemes. Objectives are required to be set at the beginning of each project development and can relate to any aspect of the intended works and outcomes. The objectives are a useful benchmark against which to measure the delivery of the scheme and are intended to be refined and adjusted as the works progress and more detailed information becomes apparent.

Governance, leadership and management

Transport Scotland is committed to ensuring the protection of Scotland’s natural heritage is a major consideration in all that we do. The endorsement of Fitting Landscapes by Ministers is reflected by Senior Management within the Agency, ensuring that environmental and ecological interests are at the forefront of scheme and operational objectives.

Transport Scotland employs a range of in-house professionals to cover all aspects of Environment and Sustainability matters, including Carbon Management, Climate Change, Air Quality, Environmental Impact Assessment, Landscape and Biodiversity etc. In additional, the Agency also works closely with a number of industry-leading consultants and other professionals from within our supply chain to ensure emerging environmental design concepts and ideas, whether related to new schemes or the management of the existing asset, are transformed into tangible action that can be delivered and measured across the national transport networks.

The ethos of the transport agency is to work towards biodiversity being embedded into all interventions planned for the national road and rail corridors.

In this way, staff and consultants are encouraged to consider the potential impacts that all operations may have on the natural environment even if, at first inspection, there is no obvious connection. Similarly, we are looking to incorporate all practicable opportunities to provide ecological and environmental enhancements as an integral part of those interventions. By changing the mind-set of the workforce, and focussing on the steps that can be taken as part of our day-to-day work, Transport Scotland believes we can make a much greater positive impact on the nation's biodiversity.

Consideration of biodiversity impacts and opportunities takes place at all stages of our development work as well as the decisions taken daily on the management of the national transport networks. Transport Scotland's internal procedures ensure this occurs at the following times:

- **Appraisal**
- **Design**
- **Procurement**
- **Construction**
- **Maintenance**

Refer to **Appendix B** for more detailed information on the above.

Biodiversity and Climate Change

There is little doubt that our climate is changing and this change is primarily due to the our own activities – 97 *per cent* or more of actively publishing climate scientists agree that climate-warming trends over the past century are extremely likely due to human activities.

> J. Cook, et al, "Consensus on consensus: a synthesis of consensus estimates on human-caused global warming," *Environmental Research Letters* Vol. 11 No. 4, (13 April 2016); DOI:10.1088/1748-9326/11/4/048002

"Observations throughout the world make it clear that climate change is occurring, and rigorous scientific research demonstrates that the greenhouse gases emitted by human activities are the primary driver." (*American Association for the Advancement of Science - 2009*).

The Paris Climate Accord came into force on 4 November 2016 and is currently ratified by 170 countries of the 197 possible. The central aim is to strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius.

Additionally, the agreement aims to strengthen the ability of countries to deal with the impacts of climate change. To reach these ambitious goals, appropriate financial flows, a new technology framework and an enhanced capacity building framework will be put in place, thus supporting action by developing countries and the most vulnerable countries, in line with their own national objectives.

It is difficult to fully appreciate the impact that climate change will have on Scotland's biodiversity, but most agree it has the potential to be highly significant. There are already indications of species migration and we need to consider appropriate mitigation and adaption strategies. Currently, transport accounts for 28% of total Scottish emissions, and although we have seen significant reductions recently (13% reduction in seven years) transport emissions from the road sector still account for the largest contribution.

Transport Scotland is working hard across the business to achieve these reductions:

Climate change
The general conclusion from the Scottish Road Network Climate Change Study: UKCP09 Update (Autumn 2011) is that the climatic changes expected in Scotland in the near future, until the 2020s, are relatively small. However, even these small changes can make a big enough impact to warrant adjustment of current practices.

The Climate Change (Scotland) Act set out the target of reducing CO2 emissions by 80% before 2050. Transport Scotland are playing a large part in meeting this target, including the publishing of our strategy as part of the Scotland wide emissions reduction plan, The Climate Change Plan. The draft version of the Plan was published in January 2017. The strategy aims to reduce greenhouse gas emissions wherever practicable from our operations, projects and maintenance activities.

Low Carbon Society
At the same time, the agency is seeking to reduce carbon emissions from the road transport sector in support of the Scottish Government's commitment to almost complete decarbonisation of the road transport sector by 2050. To deliver this Transport Scotland is actively promoting the adaption of low-carbon and plug-in/electric vehicles, as well as encouraging use of car clubs, and is ensuring that access to charging points is a major consideration in all new infrastructure projects.

ChargePlace Scotland
electric vehicle charging

Air quality
Transport Scotland has introduced mechanisms for measuring and monitoring potential environmental effects related to our activities in order to minimise impacts on air quality. This includes playing a major role in the Scottish Transport Emissions Partnership and the collaborative sensor rotation sensor programme for more accurate and reliable air quality management data.

Sustainability
Transport Scotland is taking forward a range of sustainable transport initiatives, including cycling infrastructure, freight modal shift and low carbon vehicles, in support of the drive towards more sustainable development and in order to reduce the impact of transport on our environment.

Landscape and biodiversity
Through application of its landscape policy Transport Scotland aims to ensure our country's remarkable landscape and wildlife are respected and protected in all that we do, whether during the management of the national road and rail networks or as part of the delivery of new infrastructure interventions. Examples of such actions are included later in this report.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Biodiversity actions are integrated into the core work activities undertaken across the delivery cycle of our transport schemes and activities, with the following approach taken at appraisal, design, procurement, construction and maintenance stages.


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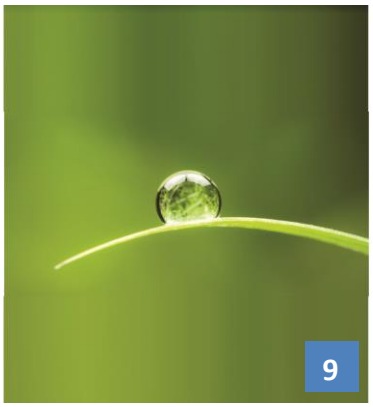
Mainstreaming

The key to the Transport Scotland approach to the protection and enhancement of biodiversity is ensuring that all staff within the office are aware of the difference we can all make. Clearly, due to the nature of the varied roles within the organisation, some staff will have a greater opportunity to influence biodiversity outcomes than others. However, encouraging a cross-organisational understanding of the wider issues is seen as a vital factor in engendering a positive attitude towards our natural environment.



We therefore seek to mainstream our approach and good practice on biodiversity through the promotion, communication and implementation of the vision and aims outlined in our landscape policy, Fitting Landscapes. We also ensure that all our supply chain – the consultants and specialists we work with to develop plans and projects, and the contractors and suppliers who deliver the works on our behalf – are fully aware of this mandatory policy and incorporate its ideals in all the works they undertake.

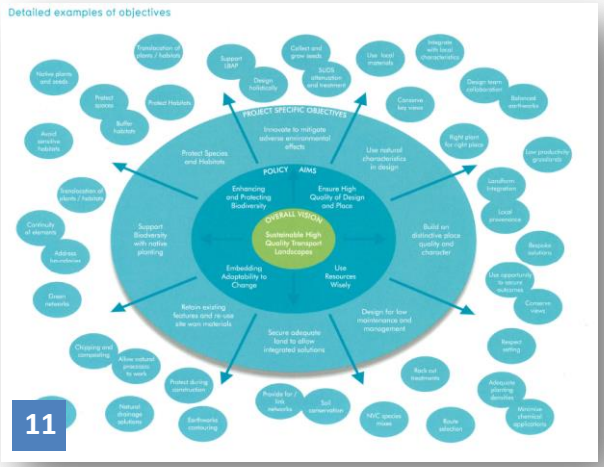
The policy vision of Fitting Landscapes is to promote the more sustainable design, implementation, management and maintenance of the transport estate and ensure that the landscapes we create and manage are of high quality, well integrated, bio-diverse, adaptable and deliver a meaningful contribution to national sustainability targets.

To achieve the vision, the policy supports the following key aims:

- Ensure high quality of design and place
- Enhance and protect natural heritage
- Use resources wisely
- Build in adaptability to change

The policy is deliberately set as a high level document which sets an agenda for policymakers, planners, designers, contractors, operational managers and maintenance teams; helping address the challenges of delivering and managing a transport network that offers a demonstrable contribution to national policy targets, supports the natural heritage resource and ensures a ‘best fit’ with the local landscape character.

It is felt important that the policy does not offer a ‘how to’ guide which can quickly become narrowly focussed on achieving potentially meaningless imposed targets. Instead, the policy provides a framework and the inspiration for adopting a flexible approach where individuals are encouraged to use ingenuity and innovation to introduce meaningful objectives and delivering biodiversity outcomes that reflect the character of the local landscape and support the needs of the wider environment, wherever that may be.



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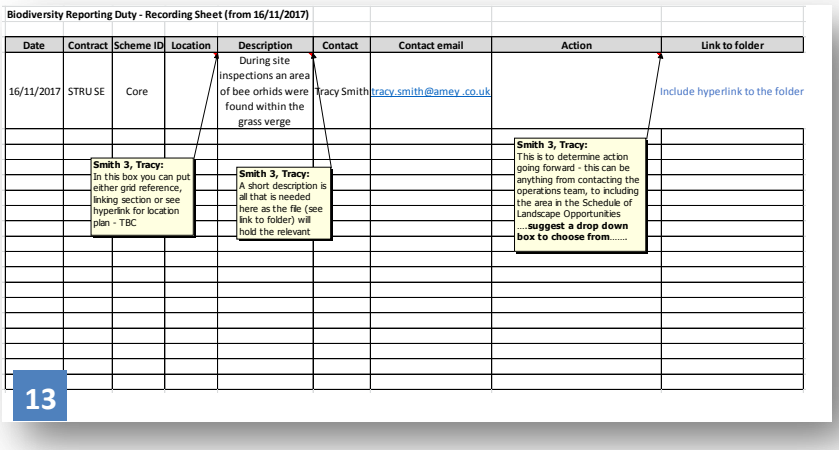
In order to achieve this the policy requires landscape and environmental objectives to be set to inform the planning, design, implementation and management of new transport infrastructure as well as the management of existing networks. Objectives are established on a project-by-project basis and are seen as central to the design process. Engagement with statutory consultees is a key part of this process (see the ‘partnership working and communications section).

For objectives relating to biodiversity and the protection of the natural heritage it is crucial that that there is a keen understanding and respect for the local relevant ecosystems and natural processes. Designers are required to be aware of the conservation status and requirements of any relevant protected species and priority habitats and how these may be impacted by the proposed works. This, in turn, requires an appreciation of the project context and its capacity to support the local natural heritage and enhance and/or create a range of existing and new habitats.


Biodiversity Reporting Duty - Recording Sheet (from 16/11/2017)

Date	Contract	Scheme ID	Location	Description	Contact	Contact email	Action	Link to folder
16/11/2017	STRU SE	Core		During site inspections an area of bee orhids were found within the grass verge	Tracy Smith	tracy.smith@amey .co.uk		Include hyperlink to the folder

Smith 3, Tracy: In this box you can put either grid reference, linking section or see hyperlink for location plan - TBC

Smith 3, Tracy: A short description is all that is needed here as the file (see link to folder) will hold the relevant

Smith 3, Tracy: This is to determine action going forward - this can be anything from contacting the operations team, to including the area in the Schedule of Landscape Opportunities ….**suggest a drop down box to choose from**……

13

Designers are encouraged to support local biodiversity action plan priorities and help address fragmentation issues, as far as this is practical.

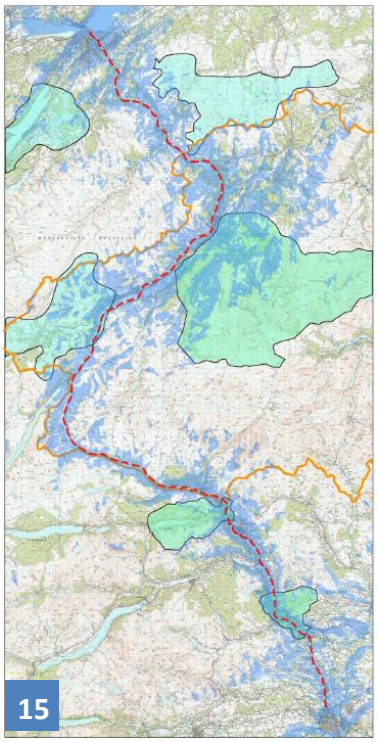
This could range from the addition of well-designed culverts and other crossing opportunities on new schemes, to the use of native species of local provenance in planting and seeding mixes. Depending on the site location and context it may also be appropriate to create the right conditions to encourage the re-establishment and re-colonisation of local species and habitats.

Monitoring

Trunk roads

Before Construction: For trunk road schemes, evaluation *prior to* their construction is set out in the Scottish Transport Appraisal Guidance (STAG). STAG advocates evaluation against indicators and targets derived for the Transport Planning Objectives originally set for a scheme or project. STAG criteria covers Environment, Safety, Economy, Integration and Accessibility & Social Inclusion, with biodiversity and habitats included in section 7.4.6 of the Environment section. STAG aims to identify:

- Whether the project is performing as originally intended
- Whether, and to what extent, it is contributing to established policy directives
- Whether the implemented project continues to represent value for money



With respect to biodiversity and habitats, STAG notes that transport infrastructure has a number of potential effects on biodiversity, including (1) Direct damage to important nature conservation sites or the habitats of protected species; (2) Fragmentation or loss of habitats (3) Creation of barriers to the movement and genetic interchange between populations; and (4) Disturbance of habitats and species due to factors such as noise, light pollution and contaminated run-off. The overall objective of a STAG appraisal is that schemes should aim to maintain biodiversity in the study area, including wildlife habitats and species and to improve the status of rare and vulnerable species wherever possible.

Qualitative assessments are recommended at both strategic and project level to appraise biodiversity. At the strategic level, this means that a study should broadly appraise biodiversity and identify the presence of designated sites in the study area. Typically, this evaluation may be undertaken at a broad-brush level based on desk study or initial site survey.

At a project level, a more detailed assessment of the biodiversity may be required and this is likely to require a Phase 1 Habitat Survey, supplemented by specialist surveys of flora and fauna. For both strategic and project assessments, if there is the potential for an option to have significant effects on an European site (SAC or SPA) then the requirement for an appropriate Assessment under the Habitats Regulations (1997) should be considered at an early stage.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During Construction: Each new construction scheme is supported by a number of contract documents, possibly (although not necessarily) including an Environmental Statement – which places a legal obligation on the contractor (under the auspices of the Habitat Regulations) to deliver any contained environmental commitments. Even where there is no requirement for an ES, all schemes prepared on behalf of Transport Scotland will require a robust environmental impact assessment which records all aspects of the likely impact the scheme may have on the existing environment, and the means by which these impacts are to be mitigated.


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The contract framework will require the contractor to meet all the environmental obligations associated with the scheme, whether in terms of protecting the existing assets during construction, or delivering the relevant ecological and landscape design objectives.

The contractor is responsible for providing a suitably qualified staff to oversee the works, including an experienced Ecological Clerk of Works and a Landscape Clerk of Works. Transport Scotland will also provide a corresponding set of inspectors to work with contractor and ensure the design is delivered as specified and any unforeseen issues or opportunities are resolves appropriately.

After Construction: The evaluation of trunk road projects *after* construction is set out in Scottish Trunk Road Infrastructure Project Evaluation (STRIPE), where requirements for evaluation draw from Design Manual for Roads and Bridges and STAG. STRIPE was published in 2013. STRIPE states that two programmed evaluations should be carried out on relevant projects, as follows:


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- A one-year after Evaluation (1YA) – prepared one year after opening, this report should "provide Transport Scotland with an early indication (as far as is practicable) that the project is operating as planned and is on-track to achieve its objectives. This includes a detailed assessment of the environmental objectives of the scheme, including delivery against any biodiversity targets. As this evaluation is within the establishment period of the works there is ample opportunity to redress any noted failings

- A Detailed Evaluation – undertaken three or five years after opening. This second evaluation considers a project's impacts, whether it has achieved its objectives and reviews the actual impacts against forecasts and determines the causes of any variances. This is important as a 'lessons learnt' approach for the preparation, delivery and maintenance of future schemes

Scheme Maintenance: All new interventions have an associated maintenance period as part of the contract requirements. For Transport Scotland trunk road schemes this is usually between 3 – 5 years. The contractor is required to manage and maintain the scheme in accordance with the obligations set out in the contract and there are periodic inspections to monitor progress towards delivery before the scheme is fully complete and subsumed as part of the trunk road network.

Network management: The existing trunk road network is managed and maintained by Operating Companies working to term commissions of between 5 – 7 years duration. There are four main Operating Company units covering the whole of Scotland with additional specific routes resulting from private finance partnershiping (Design Build Finance and Operate DBFO) being managed separately (e.g. the M74, the M80 and the M8, M73, M74 schemes).

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Each Operating Company and DBFO Concession is required to follow the specifics of the contract requirements whilst also taking account of the Transport Scotland mandatory landscape policy, Fitting Landscapes.

The actions of these companies is monitored, assessed and audited by an independent company termed the Performance Audit Group (PAG). PAG employ suitable specialists to ensure the contractors deliver all their contract obligations and that all interventions are undertaken in accordance with the contract requirements. This includes all environmental matters, from grass cutting to discrete design projects. This assessment and monitoring is supported by Transport Scotland in-house staff.

Partnership working and communications

Transport Scotland holds regular liaison meetings with other agencies and organisations, both public and private. Together, we aim to respond to all environmental matters, whether of a local, regional or national scale, in the swiftest and most appropriate manner. Any mitigation will always have respect for the natural characteristics and local distinctiveness of the environment within which we operate.

We work closely with Scottish Government, Historic Scotland (now Historic Environment Scotland), Scottish Natural Heritage, Cairngorms National Park Authority, Loch Lomond and the Trossachs National Park Authority, Marine Scotland, Forestry Commission/Forest Enterprise Scotland and numerous local authorities, public bodies and third sector charities to incorporate biodiversity into our transport schemes.

This working partnership is partly derived from the statutory obligation for the agency to consult with many of these bodies during the preparation of road projects, but it extends further than this. We have established excellent connections with a number of key personnel within each organisation and maintain regular public sector liaison. This helps to ensure there is a direct, two-way conduit for the consideration of environmental issues affecting the trunk road corridor and also means that more time is spent on practical delivery rather than extended dialogue.

Transport Scotland also provides advice and recommendations to Highways England, as the custodian of the Design Manual for Roads and Bridges. This role includes regular liaison with colleagues within the other UK devolved administrations in the Welsh Assembly Government and the Northern Ireland Assembly.

Building Capacity

Transport Scotland staff maintain numerous contacts and professional relationships across a wide range of other organisations – from nature conservation groups (both statutory and non-statutory) to other infrastructure delivery organisations. This is both on an informal day-to-day level as well as more formal meetings, workshops and seminars. Each form of liaison is useful in terms of information exchange and partnering.

Transport Scotland runs a series of lunch time seminars and internal seminars that allows all staff, whatever part of the business they represent, to learn from and input to new areas of information.

Internal staff are encouraged to keep up to date with new developments in their particular fields and maintain their Continuing Professional Development records as required by the relevant institute. This includes attending events and training courses in Scotland, the wider UK and sometimes further afield, whether as a presenter or member of the audience. Transport Scotland is a progressive organisation and strives hard to be at the forefront of all that it does. However, its professional staff is aware that there are other similar organisations operating in Scotland and elsewhere and it is important to learn lessons appropriate.

Highlights of the past three years

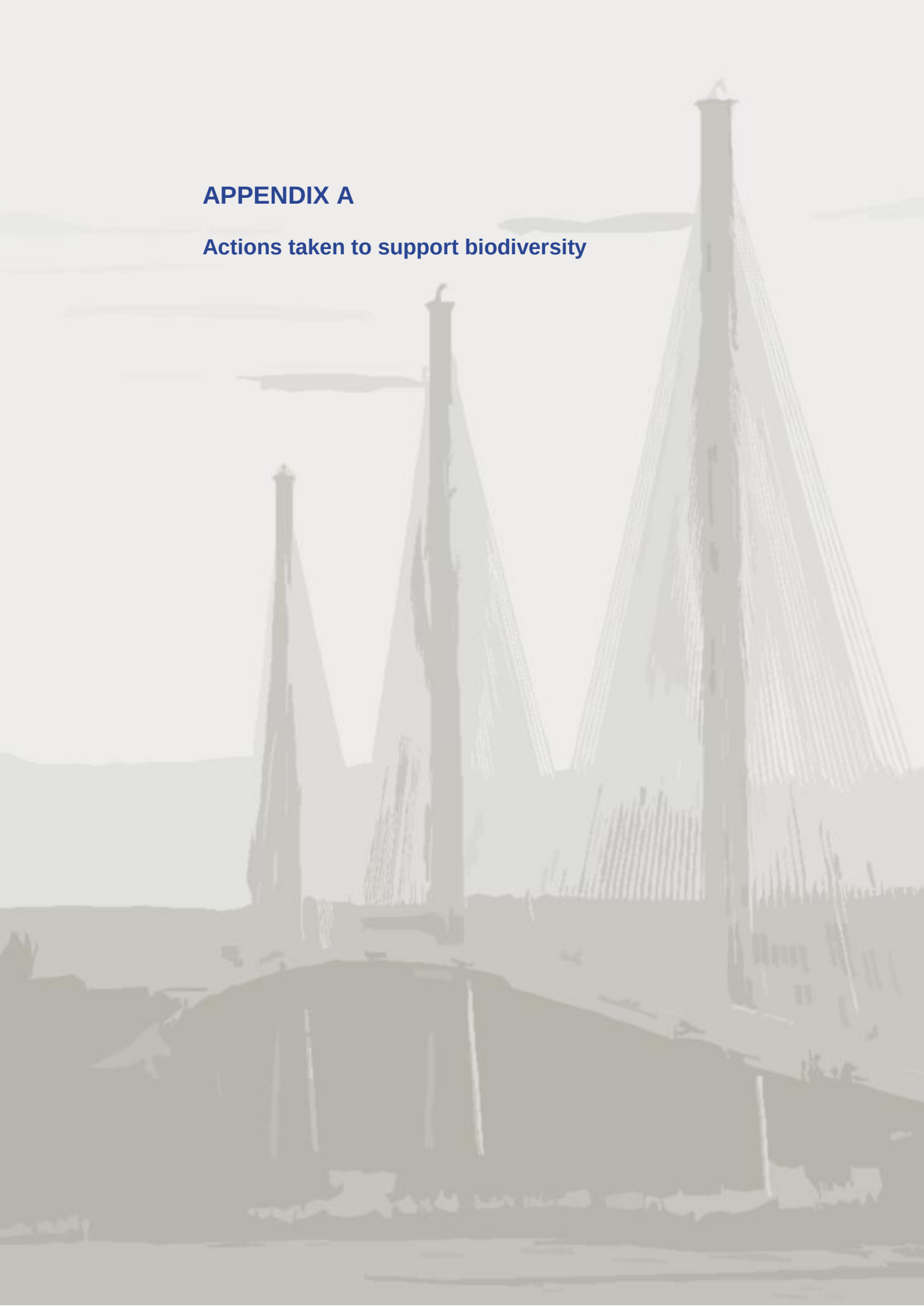
Transport Scotland is fully committed to ensuring the protection and, where possible, enhancement of the nation's natural resource is a key consideration in all that the agency does. The success of this aspiration is evident in the significant number of transport projects delivered over the past three years. However, it can also be reflected in the smallest of interventions, not normally associated with biodiversity, or The transfer of knowledge that leads to a change of mind-set in those whose work or decisions have the potential to make a difference.

The main achievements for biodiversity within the current reporting period are:

- The continued integration of meaningful environmental considerations in all works the agency is involved with
- Academy9 – information exchange, knowledge building and community consultation programme

In the coming years Transport Scotland will continue the agency's responsibility to the environment for both large and smaller scale projects as well as though the general management of the landscape resource.

The previous Biodiversity Duty Report identified the benefit of early liaison and consultation on projects, plans and proposals under consideration, particularly for the major infrastructure projects. It is encouraging that this process has continued to be rolled out and is clearly heralding positive results in terms of integrating the protection of our natural resources alongside delivery of national strategic transportation targets.



APPENDIX A

Actions taken to support biodiversity

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Actions taken to support biodiversity

Action to protect and enhance biodiversity is a common theme across our transport schemes and operations, with a particular focus on our road and rail activities. Examples of actions we have taken, and outcomes we have delivered, are shown below, with the examples sub-divided across the five stated objectives of the 2004 Scotland's Biodiversity Strategy[8]:

1

Species & Habitats - To halt the loss of biodiversity and continue to reverse previous losses through targeted action for species and habitats;

As highlighted in the main body of the report, all Transport Scotland schemes are carefully planned, designed and delivered to fit into the landscape as far as practicable - limiting any negative impact on the natural environment and seeking to enhance opportunities for habitat creation and the protection of wildlife. The following schemes constructed within the last three years are provided as examples of this approach.

A9 Kincraig – Dalraddy trunk road improvements

This scheme is the first section to be commenced of the proposed A9 Perth to Inverness Dualling Programme. The scheme is approximately 7.5 km long and is located a few miles south of Aviemore. The project was first promoted as an online widening scheme, with an extra overtaking lane to be added to the existing single carriageway road. With the announcement by Ministers of the proposed A9 Dualling Programme, the scheme was adjusted to encompass full dualling. However, there was no opportunity to purchase additional land for the scheme so the extra width of carriageway had to be constructed within a particularly tight site area. Whilst this limited the physical impact on the adjacent landscape resource, it presented a challenge for the environmental team to deliver a design that fitted into the rolling landscape and provided appropriate environmental connectivity.


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Particular care was taken during the planning and design stages to avoid impacting on the character and content of the local ecological resources. This included the identification and translocation of a significant number of wood ant nests which would otherwise have been obliterated by the works.

[8] Note that these objectives cross-reference to the three aims of Scotland's *2020 Challenge*

The design also considered the potential impact on the passage of fish and other aquatic life along the many burns bisected by both the existing road and planned new dual carriageway. This led to the inclusion of location specific mitigation proposals including ledges, bespoke culverts and realigned inverts with integrated fish ladders.

The scheme lies at the edge of the area near to Rothiemuchus which is associated capercaillie – populations of this iconic bird are under threat due to habitat loss and predation. The scheme acknowledged the potential impact the widened road might have on capercaillie and included specialised adjustments to the deer fencing to help the birds avoid damaging collisions with both the fencing and traffic using the new road.

Common with many areas around Scotland in the early-mid 20th Century significant tracks of non-native, commercial woodland were planted in and around Speyside, particularly immediately after the Second World War. There is now a strong drive, headed by organisations such as SNH, the Woodland Trust for Scotland and the Cairngorms National Park to reverse the balance and introduce more native broadleaved woodland. Transport Scotland's landscape policy has long promoted the same strategy and the planting design for the Kincraig – Dalraddy scheme reflects this perfectly. Great effort was made to use only native plant and seed materials of local provenance and this involve close liaison with local nurseries and suppliers.

In a similar fashion, as part of the proposals to mitigate unavoidable tree lose to accommodate the scheme, an area of low quality non-native coniferous tree planting was identified between the *Allt Coire Chleirich* and Loch Alvie. This was felled as part of the works and left to regenerate naturally through seed from local native species, assisted with selective native tree planting. An associated management plan was also produced to ensure this compensatory habitat area establishes to its full potential.

M8, M73, M74 Motorway Improvements

Following the successful delivery of the M80 Stepps to Haggs motorway and the M74 Completion project, the M8 M73 M74 Motorway Improvements project has now completed the Central Scotland motorway network - removing a significant bottleneck on the M8 motorway between Edinburgh and Glasgow whilst upgrading the strategic links north and south.

This is one of the largest infrastructure developments recently undertaken in Scotland and it is inevitable that it brings with it some impact on the environment. However, as with all of Transport Scotland's major road schemes, a comprehensive Environmental Impact Assessment (EIA) was carried out and the results published in an Environmental Statement. This, in turn, led to further comprehensive environmental studies and surveys during the design and construction stages to deliver appropriate mitigation measures and alleviate the impact as far as possible.

These measures included:

<u>Artificial otter holts</u>
Otter (*Lutra lutra*) is an EU protected species and were present on watercourses throughout the project area. It was vital that robust monitoring work was incorporated into the scheme requirements to ensure compliance with legislation and the protection of the species.


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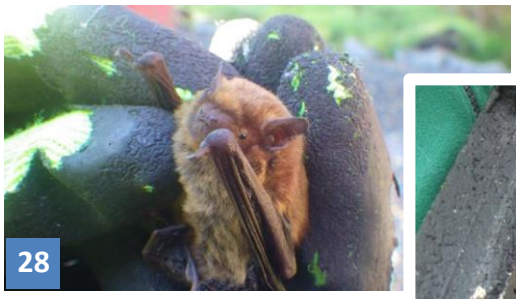
To enhance the local habitat for otters four artificial holts were designed to support potential for breeding, whilst resting up sites were incorporated into the scheme design.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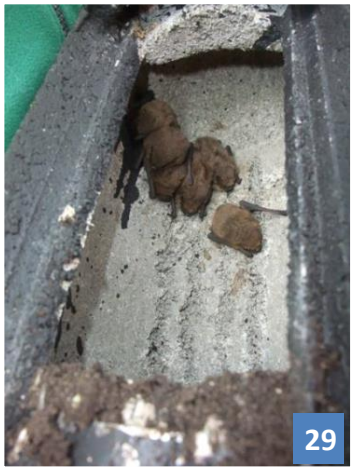
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Bat boxes

All species of bats present in Scotland are granted full protection in Scotland under the Conservation (Natural Habitats, &c.) Regulations 1994 (as amended). To compensate for lost roost sites and potential roost sites and to enhance habitat for bats, 46 bat boxes have been installed, to date, to provide opportunities for bats to roost.

In recent monitoring pipistrelle bats have been found using many of the boxes, especially near the North Calder and BT wood sites.

Badger mitigation

Badgers (*Meles meles*) and their setts are protected under The Protection of Badgers Act 1992 (as amended). The site was surveyed as part of the pre-works assessment and it was found that there was a very healthy badger population living in distinct clans. This meant that suitable mitigation works need to be designed to prevent permanent impact on the species.

All relevant project works were performed under licence in liaison with SNH. On-going monitoring took place of during the project. To maintain and enhance habitat for badgers a number of measures were implemented, including the temporary and permanent exclusion of badgers from certain setts altering the scheme design and adding new areas of permanent wildlife fencing to retain major setts and constructing artificial setts where required to compensate for unavoidable loss.

Water voles

A large population of water vole (*Arvicola amphibious*) was discovered within the project site. Information on how this was dealt with is included in the section below describing exchange of biodiversity **Knowledge**, on page 41.

Kinclair Viaduct, Ayrshire

Scotland's rail corridors support a rich mosaic of habitats for a wide variety of native species as well as a few more exotic ones, some more welcome than others. The environmental teams involved in the management of this resource operate a robust approach, applied to all works, identifying and mitigating the impacts of all potential risks, whilst seeking enhancement opportunities during project and programme planning, design and construction stages.

This approach incorporates engagement and collaboration with a myriad of industry and external stakeholders including town planning managers, regulators, SNH, SEPA, Marine Scotland, Scottish Heritage, responsible authorities, local councils, businesses, passengers, public, charitable or community organisations and other stakeholders living and working adjacent to the infrastructure.


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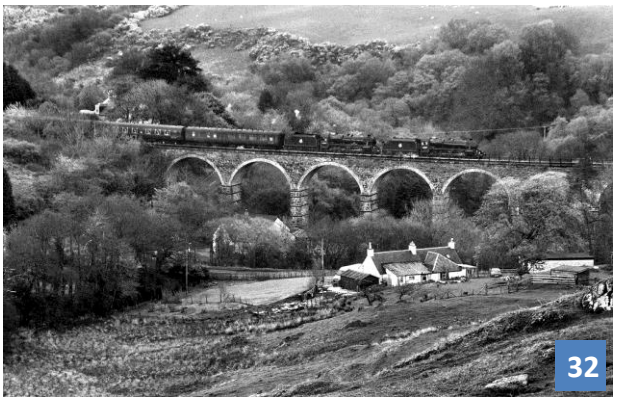
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Much of Scotland's rail infrastructure was established in the 19th Century and requires significant on-going maintenance due to wear and tear and the impact of natural processes. Such was the case or the Kinclair Viaduct, UB 163/022, in Ayrshire which required important scour protection where a tributary of the Water of Assel had washed away the existing rock armour protection and was itself in poor condition.


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Works were planned, agreed and delivered under a CAR Licence, in collaboration with SEPA and ART (The Ayrshire Rivers Trust). The finished works now protect the viaduct infrastructure and enhance the watercourse, providing ideal nursery conditions for salmonid species. ART have confirmed these improved conditions:

'*Before any works had been carried out on the burn it was in bad shape… We did find four salmon parr and a few trout fry which was very surprising considering the lack of suitable substrates*.'

'*After the new works had settled-in the burn had changed dramatically… we found 32 salmon fry and over 20 trout fry which shows that both salmon and trout utilised this burn for spawning last winter. It is always encouraging to see positive results from works such as this and we hope that fish continue to use this burn for spawning in the years to come*.'

http://www.ayrshireriverstrust.org/blog/2016/09/15/kinclair-viaduct-stinchar-catchment/

A82 Pulpit Rock road improvements

The A82 at Pulpit Rock has offered a significant engineering challenge for decades. Prior to these works being undertaken, the A82 narrowed at this stretch to less than 5 metres wide, resulting in road users delayed at traffic signals which were in place to reduce traffic to one lane.

The improvement work at Pulpit Rock has seen the removal of these traffic signals, which have been in place for over 30 years, and the stretch of road widened to provide a two-way carriageway with integrated cycle track.

The scheme was a challenge to construct due to the physical nature of the narrow rocky edge to Loch Lomond and the requirement to maintain traffic flow during the works. The resultant semi-cantilevered viaduct structure is an exciting piece of engineering that adds significant value to the road user's experience of this historic route.

Despite the small geographic scale of the project, there were also a number of interesting environmental challenges to overcome. The main issue was how to retain the large rock mass that had long restricted the use of the road below. The agency worked closely with environmental colleagues in the Loch Lomond and Trossachs National Park and there was a keen awareness of the need to reduce any detrimental impact on the iconic setting.

The rock itself was cut back to provide more space for the new road, but couldn't be taken too far back due the nature of the material and the proximity of the railway line. Earth anchors and steel netting were used to secure the rock, but both can result in significant visual impact. This led to an innovative design for facing the near vertical rock face incorporating the use of a reinforced geotextile system overlaid with a mosaic of soil bags filled with local provenance seed mixes. This was further reinforced with carefully applied hydroseeding, again with a locally prevalent grass/herbaceous mix to encourage rapid development of natural vegetation.

Loch Lomond supports a wide range of fish species and the proximity of the scheme to the loch edge meant that there was an early focus on developing proposals that did not impact on the fresh water habitat. Of particular concern during the early assessment work was the potential presence of Powan – a rare species that is a relic of the last ice age and is only reported to be found in Loch Lomond and Loch Eck in Argyll. There is evidence that the Lomond populations are struggling due to competition for habitat from the accidentally introduced ruffe. Both species favour the shallow gravelly areas for spawning and such sites are actually less common than might be imagines in a body of water the size of Lomond due to the generally steep glacial sides of the loch.

38

There was limited suitable habitat for Powan around the site for this scheme but the decision was taken to avoid construction within the loch. The new road deck was partially cantilevered over the water, providing the cross-section required for the road and cycle path but keeping the supporting columns on dry land. In addition to this, a small mountain burn immediately adjacent to Pulpit Rock itself was realigned as part of the scheme. The burn was directed under the road by means of a large culvert and the lower end of the burn invert was created as a shallow profile to slow the water flow as it entered the loch resulting in the development of silt deposits which may encourage Powan to use the location for future spawning sites.

In other areas along the shore of Loch Lomond a number of rock cavities of value to otters were present. Detailed surveys were undertaken which highlighted that some features would be affected by the A82 works with some otter habitat destroyed (under licence). To compensate for this, the scheme included the installation of three artificial otter holts on the nearby unaffected shore. In addition, two original culverts passing under the road were enlarged to permit passage of otters and discourage them from crossing the road, in order to reduce road traffic casualties.

Some of the rock cavities and many of the mature in and around the site also had potential value as bat roosts. Although detailed surveys resulted in no evidence of bats, it was determined that the scheme should provide compensation for loss of features which would offer potential for future roosts, as a means of delivering net biodiversity enhancement in the local area. Over twenty bat boxes were installed on unaffected nearby trees. In addition bird nesting boxes were also installed throughout the existing woodland to compensate the loss of trees and scrub in front of Pulpit Rock.

The Atlantic broadleaved woodland in this area contains notable lower plants including filmy-ferns. Where sections of felled trees supported epiphytic vegetation of this type, these sections were translocated to similar conditions in adjacent unaffected woodland to encourage continued and enhanced development.

2

People - To increase awareness, understanding and enjoyment of biodiversity, and engage many more people in conservation and enhancement

To generate a greater understanding of biodiversity and what it means at the local level as well as nationally and even internationally, it is important to ensure information on planned and current works is readily available to the general public and all stakeholders. Such engagement can take many forms, from public bulletins and project update posted on local internet forums and websites, to face-to-face dialogues and wider presentations.

Go4SET

Scotland TranServ is one of the Operating Companies responsible for the management and maintenance of Scotland's trunk road.

41

Each year the company takes part in the Go4SET challenge, a 10 week science, technology, engineering and mathematics (STEM) experience for 12 to 14 year olds run by the Engineering Development Trust.

The UK needs to increase the number of pupils pursuing careers in Science, Engineering and Technology.

Support from Industry and business is sought for this initiative and can help to make an important contribution to the future of STEM through inspiring pupils to become involved at this key stage in their education. Work-related learning within an industry and enterprise context is at the core of the Go4SET experience – and this is where TranServ fit in.

Members of the Environment and Sustainability Team take the pupils through an ecological challenge to identify protected species, their habitats, homes and food. This is used as a tool to introduce them to the interdependence of species within habitats as well as the company's work with protected species and the regulations protecting Scotland's wildlife.

M8, M73, M74 ENGAGEMENT

Whilst many of the trunk road projects delivered by Transport Scotland are located in largely rural environments, a proportion is associated with urban or peri-urban areas. Schemes constructed in such locations can have a profound effect on the local population, which may be considerable in size. This generates a challenge for the design teams to ensure they create sufficient opportunities at the appropriate stages of the project to liaise with the local stakeholders and provide them with the opportunity to engage.

Throughout the M8, M73, M74 project efforts were made by all the disciplines involved to engage with the wider community. This was particularly important for the ecologists as there was great interest from local groups and individuals in the planned provision to safeguard the existing wildlife resource.

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Despite the urban-fringe location of the works and the related heavy traffic flows to contend with, the Calder Water area is relatively rich in wildlife and this is a precious resource for many locals.

The ecologist were able to engage frequently with local groups at open events and more select meetings to raise awareness of issues related to wildlife and promote a broader understanding of biodiversity. A key strategy was to target the nearby schools and ensure that the conservation messages were disseminated to the community through the local children. The school visits proved very popular and typically demonstrated how wildlife issues were being managed during the project and how the children can help wildlife in their own communities.

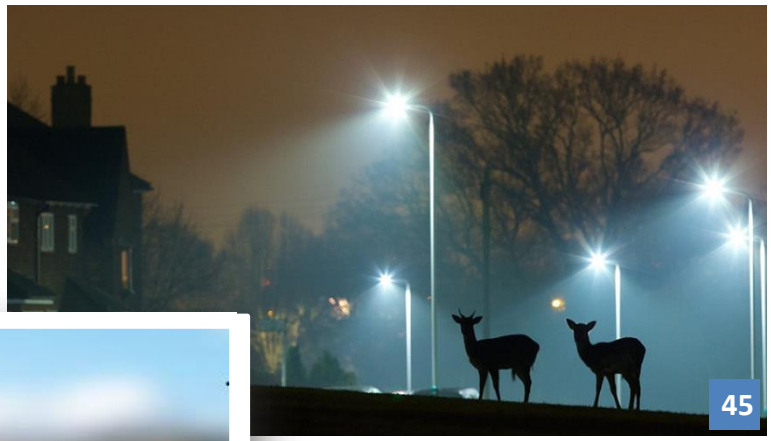
In addition to the wider community, the project placed a lot of emphasis on liaison within the workforce between project staff engaged with other disciplines. Throughout the project, site staff were required to attend briefings with the environmental team and given toolbox talks to ensure on-site awareness of general and specific ecological issues, including bats, badgers, otter and water vole.


44

Deer Management - Gullane gathering

Deer are an integral feature in the Scottish landscape. They represent a key element of Scotland's economy, whether through the large number of visitors and tourists they attract each year, or through managed venison production. Whilst the sight of deer roving the upland hillsides is often considered an iconic sight in the Highlands, there is actually almost a greater opportunity of seeing deer within Scotland's lowland fields, woodlands and even urban fringes. With this growing number of lowland deer (mainly roe) comes an increasing potential conflict with human activity and, particularly, the use roads.

Transport Scotland has a duty under the Wildlife and Natural Environment (Scotland) Act 2011 to prepare Deer Management Plans (DMP) for the trunk road network.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LDNS
lowland deer network scotland

This is undertaken by the trunk road operating companies who manage and maintain the network on behalf of Scottish Ministers. Transport Scotland works closely with the operating companies to ensure they are making the best use of resources, including the road environment itself. Through the agency's involvement with the Lowland Deer Network Scotland, Transport Scotland has attended and presented at local events around the country aimed at engaging with local interest groups and encouraging improved liaison for better deer control.


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One such event was earlier this year in Gullane, East Lothian which attracted a large turnout of mixed interest groups, from recreational deer stalkers to local residents. Presentations covering various deer-related matters were given by Transport Scotland, the operating company, SNH and a deer specialist and have led to a key contacts being established that will facilitate improved liaison for future deer management, helping to reduce the number of Deer-Vehicle-Collisions (DVC) occurring.


47

3

Landscapes & Ecosystems - To restore and enhance biodiversity in all our urban, rural & marine environments through better planning, design & practice

Forth Replacement Crossing Project - FRC (Queenferry Crossing)

The FRC project includes the Queensferry Crossing and associated road networks, M9 J1A improvements (completed February 2013) and Fife Intelligent Transport System (completed December 2012). It is Scotland's biggest transport infrastructure project in a generation and this means it has the potential to impact on local communities and commuting public as well as a significant area of the Forth Estuary and adjacent land. The estuary has a wide variety of natural habitats including inter-tidal habitats such as mudflats, saltmarsh and reed beds, which are important areas for wildlife.

The abundance and diversity of plants and animals to be found in these habitats make the Forth an internationally important wintering site for birds travelling from Scandinavia, Iceland and the Arctic, in addition to supporting breeding populations of seabird species of European Importance. The importance of the Firth of Forth is legally recognised in the international designation of much of the area as a Special Protection Area and Ramsar site.

Development of the new bridge and supporting infrastructure within such an important natural resource required very careful and robust planning, incorporating broad and meaningful coordination with the statutory authorities.

The formation of the Environmental Liaison Group (ELG) was a joint initiative by Transport Scotland and statutory consultation bodies to achieve a collaborative and inclusive approach to ensure the management of environmental matters and mitigation of environmental impacts during construction of the FRC. The ELG provided a positive influence in the way in which the Contractor planned for and implemented construction operations. Separate Community Forums, Noise Liaison Group and Marine Liaison Group were also established for the duration of the project.

Biodiversity aspects that have been achieved or progressed during the construction of the FRC include:

- Replacement habitat and landscape planting: Approximately 66.4ha of replacement planting, including mixed woodland, scrub and grassland was designed as part of the project. This compares with around 25.6 ha area of land lost to construction and operation of the scheme.


48

In June 2011, Transport Scotland established a contract with a plant nursery for the supply of trees for use in the landscape and ecological mitigation planting for the FRC project. This was to ensure the quality of the trees to be planted on site and to allow early establishment by planting as soon as areas became available. In particular, two areas of advance planting were completed in 2012 with a total of approximately 52,000 trees. Since then a further 308,000 trees have been planted with more remaining to be planted in the final planting season of the project. This will provide a benefit to local biodiversity throughout the area of the project due to the underlying ecological integrity and biodiversity benefits from procurement of native species of local provenance. Further benefits have included the flexibility with which plants can be delivered, as determined by the construction programme, and the ease of procuring plants for additional areas to be planted or to enhance existing planting.

- Native bluebells were translocated to aid colonisation in the advance woodland area at Castlandhill. Bluebells are now colonising this area although the source may also be from seeds in the existing adjacent woodland.


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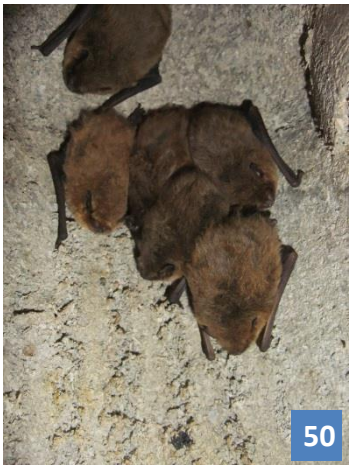
- Replacement habitat for protected species including; 64 bat boxes, 3 badger setts, 1 otter holt, 4 mammal underpasses and extensive badger and otter fencing.

- Bat boxes were inspected annually. Up to 30 bats were recorded in boxes throughout the site.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- Measures to avoid disturbance of wildlife during construction, including; restrictions on underwater noise and acoustic fish deterrent to prevent disturbance to migrating salmon in the Firth of Forth, restrictions on airborne noise to prevent disturbance to seabird populations and Passive Acoustic Monitoring to ensure no marine mammals were present prior to blasting or piling within the marine environment.

- Estuarine Bird surveys were undertaken before and during the construction period. Initial findings indicate that no species were significantly disturbed or displaced by FRC construction activities.


51

- The management of St Margaret's Marsh SSSI is a long-term commitment for Transport Scotland, the aim of which is to enhance existing habitats and bring the SSSI back to favourable status. Access to the site is also being improved to increase its amenity value. Construction of a number of sea-wall and internal sluices has been undertaken to increase the sea-water inundation rate of the marsh with the intention of controlling expansion of the reed bed and enhancing biodiversity. Path construction around the eastern lagoon has commenced with further path clearance still to be undertaken. A steering group has also been established to seek input from Scottish Natural Heritage and the local community.

A9 Dualling Programme – Contract supply

Following on from the evident success of the supply contract for native plant material of local provenance that Transport Scotland put in place for the FRC project (see above), it was decided that a similar approach should be taken for the project to complete the dualling of the A9 between Perth and Inverness.

The A9 dualling programme will upgrade 80 miles (129 kilometres) of road from single to dual carriageway. The £3 billion programme is designed to deliver economic growth through improved road safety and reliable and quicker journey times, as well as better links to pedestrian, cycling and public transport facilities.

The route through areas of outstanding natural beauty that are rich with wildlife and diverse landscapes, including the area established as The Cairngorms National Park, the largest national park in Britain. Conserving this important natural heritage asset is an important part of the developing programme of schemes.


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The plan to provide contract-supplied native planting material is a major consideration in ensuring the protection of biological diversity of the A9 corridor, and the general approach is widely supported. However, the proposal to develop a pre-contract supply of all native material for each various schemes that will ultimately make up the complete dualling programme is a hugely ambitious undertaking; it is believed that this has not previously been attempted for a project of this scale and complexity. The contract is currently being developed and will eventually see the production of over 2 million native trees grown from seed and vegetative material collected from the A9 landscape and destined for a number of large schemes constructed over an eight year period.

In addition to the tree supply contract, Transport Scotland is going further to protect the ecological balance of the environment of the A9 and is preparing a second supply contract for local provenance native ground flora. This will be used in association with natural regeneration to ensure the verges, embankments and cuttings of the new road landscape are fully integrated with the surrounding environment.

A final element associated with this work is a trail currently underway to review options for the treatment of central reservations for the dualling programme.


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The current DMRB standards permit the use of hard materials within these areas, such as gravel chippings. However, it is generally felt that this would not be appropriate in the context of the high quality rural landscape through which most of the A9 passes. However, there are questions connected with the maintenance obligations for a vegetated finish rather than a hard material and the trial is looking to establish a definitive position on what would be acceptable and appropriate. Transport Scotland is working with local Scottish seed growers to develop mixes using native wildflowers and grasses that may suit the road environment.

Aberdeen Western Peripheral Route (AWPR)


56

AWPR is a very large scheme predominately set within a rural environment of variable biodiversity from land under agricultural production of low ecological value to community land in the form of woodland and sites designated for their ecological importance such as the River SAC, SSSI's, DWS and SINS. The sites variously incorporate a number of watercourses and open drainage features as well as habitats that support protected species such as badgers, bats, otters, water voles and red squirrels.

It was therefore always crucial that project was planned carefully and precisely from the outset to avoid irreparable damage to the rich ecological resource, whilst developing robust mitigation and compensation strategies to off-set unavoidable impacts and aim to leave a positive environmental legacy.

Impacts on ecology arising from the AWPR include the potential for wildlife fatalities and the loss, fragmentation and severance of habitat.

Mitigation measures identified in the Environmental Statement form a contractual requirement and are aimed at avoiding or reducing impacts on ecology include as a consequence of the construction of the AWPR and include;

- Protection of the most sensitive areas such as wetland and peat by adjustment of the alignment during scheme design
- Incorporation of measures to reduce habitat fragmentation such as bridges for use by wildlife at Cleanhill Wood and Kirkhill Forest
- Habitat replacement and creation using carefully selected plant species throughout the scheme, including areas at Kingcausie, Kirkhill Forest and Goval Burn
- Use of fencing to prevent wildlife fatalities and preclude anthropogenic access to these areas which can develop naturally without interference
- Extensive seeding of wildflower meadow mix and planting of a diverse range of native tree species selected for their ecological benefit
- Culverts designed to allow fish and mammal passage
- Dry mammal underpasses, in particular for badger and otter movements to ensure connectivity to traditional habitats
- Incorporation of Sustainable Drainage Systems to treat road drainage as well as providing a valuable water resource
- Combination of measures to protect the River Dee SAC including the bridge design itself.

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In addition to the mitigation undertaken within the AWPR corridor, the AWPR Offset Mitigation Initiative was created in response to the desire to augment the mitigation set out in the Environmental Statement in order to address specific residual impacts on species and habitats. The initiative also acknowledges and addresses the wider-area impacts for which a more strategic 'offset' mitigation approach may be particularly effective. Additional funding from the AWPR project was made available to help existing schemes elsewhere (local interest/action groups);

- NE Scotland LBAP Community Based Water Vole Conservation including control of mink and release of water vole into a suitable habitat area

- Aberdeen Red Squirrel Conservation monitoring and trapping for red and grey squirrels project
- Grey Squirrel Control on Forestry Commission land within Aberdeen area
- Red Moss of Netherley Nature Reserve monitoring program and removal of Japanese knotweed
- River Dee Invasive Species Control for Himalayan balsam and Japanese balsam as well as Habitat Restoration
- River Don Invasive Plant Control
- Non-motorised User Access Development Project creating connectivity adjacent to the project and to Aberdeen Core Paths

4

Integration & Co-ordination - To develop an effective management framework that ensures biodiversity is taken into account in all decision making

A82 Crianlarich Peat Management

The Crianlarich Bypass is a new 1.3km single two-lane carriageway road to the west of the village, which allows A82 road users to avoid two low bridges within Crianlarich, whilst providing relief from through traffic impacting the lives of those that live there.


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Despite the small size of this project, great effort was made to ensure the scheme was designed and constructed to fit into the attractive Highland landscape. This was also a crucial consideration to the Loch Lomond and Trossachs National Park Authority who recognised the need for the scheme but was equally concerned to ensure the impact on the village setting was minimised.

One of the major issues that needed to be contended with was the large quantity of deep peat found throughout the area of the works. Peatlands are one of Scotland's most important natural assets in terms of the ecosystem services they provide. They have the potential to play a role in climate change mitigation as healthy peatlands act as a sink for greenhouse gases, whereas degraded peatlands can act as a large source of carbon dioxide. Scottish peatlands also support biodiversity of internationally recognised significance; water quality and flow; and are culturally valuable.

To ensure the peat found at the Crianlarich site was carefully managed within the project and used to best advantage as part of the restoration works the following key actions were undertaken through the design, procurement and construction stages:

- Mitigation measures were included in the Environmental Statement (these included a range of commitments on peat management, re-use, peat slip and geotechnical issues).

- During the detailed design stage of the project a Draft Peat Management Plan (PMP) was prepared setting out a framework for good practice in handling, storing and using peat on site and capturing key requirements and mitigation measures from the ES. The Draft PMP also set out how it was intended the contractor would develop and implement the Plan for use on site.

- A requirement was included in the procurement contract documents (Invitation to Tender) for tenderers to set out their peat management proposals. This formed a quality element of the tenderer's submissions and was scored in the tender evaluation.

- There was also a requirement in the contract Specification for the preparation and adoption of a PMP during construction.

- The successful Contractor then developed and applied their PMP during construction so that peat was managed safely on site and that suitable peaty material was separated during site clearance / earthworks and subsequently used for site restoration. This was monitored on site by the Engineer's representatives.

The project is nearing the end of the maintenance period and the evidence suggests the site restoration has taken well in the last couple of years. The landscape treatment was based on a combination of native species tree planting and natural regeneration.


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The retention and re-use of peat material has likely contributed to the fairly rapid restoration of the site in a naturalistic manner which was an important consideration for the project given its upland and relatively undisturbed environment.

Garriongill, Lanarkshire

Garriongill is a steep sided narrow valley with the Garrion Burn at the bottom. It is located between Overtown and Law on the north side of the Clyde Valley, 3 miles from Carluke in Lanarkshire. A significant embankment slip occurred on the West Coast Mainline at Garriongill, due to a legacy of redundant mine works which were deteriorating. Subsequent monitoring identified continued embankment failing which required intervention to prevent a loss of this vital transport artery.

Garriongill is a designated SSSI (Site of Special Scientific Interest) within the Clyde Valley Woodland SAC (Special Area of Conservation). It is a Priority Habitat, consisting of mixed woodland on base-rich soils associated with rocky slopes.
Collaboration and negotiation with a number of stakeholders and agencies was required to reach a solution acceptable to all parties for working in the SSSI.

The parties involved in agreeing the plans included SNH and North Lanarkshire Council. The works affected 0.46 hectares of habitat and as part of the planning approval a compensatory area of 10 hectares of SAC qualified habitat is to be provided at Cabusnethan to bring those woods into recovering / good condition.

A 15 year CHMP (Compensatory Habitat Management Plan) has been agreed in principle and will be delivered collaboratively via a Working Group with representatives from the key stakeholders, expert advisors and with public consultation. 100 tonnes of topsoil with the original seedbank was stored and reused as part of the works and a water supply was installed to mitigate traffic impacts. Water recovery and reuse during the grouting of old mine workings saved 1 million litres of water.

Project-based Environmental Steering Groups

All schemes planned and promoted by Transport Scotland are required to undergo robust and detailed environmental scrutiny, regardless of the relevant size of the project. There is a legal requirement on the agency to ensure an appropriate environmental assessment has been undertaken to safeguard the landscape and its component assets as far as practicable, whilst ensuring that the resulting proposals

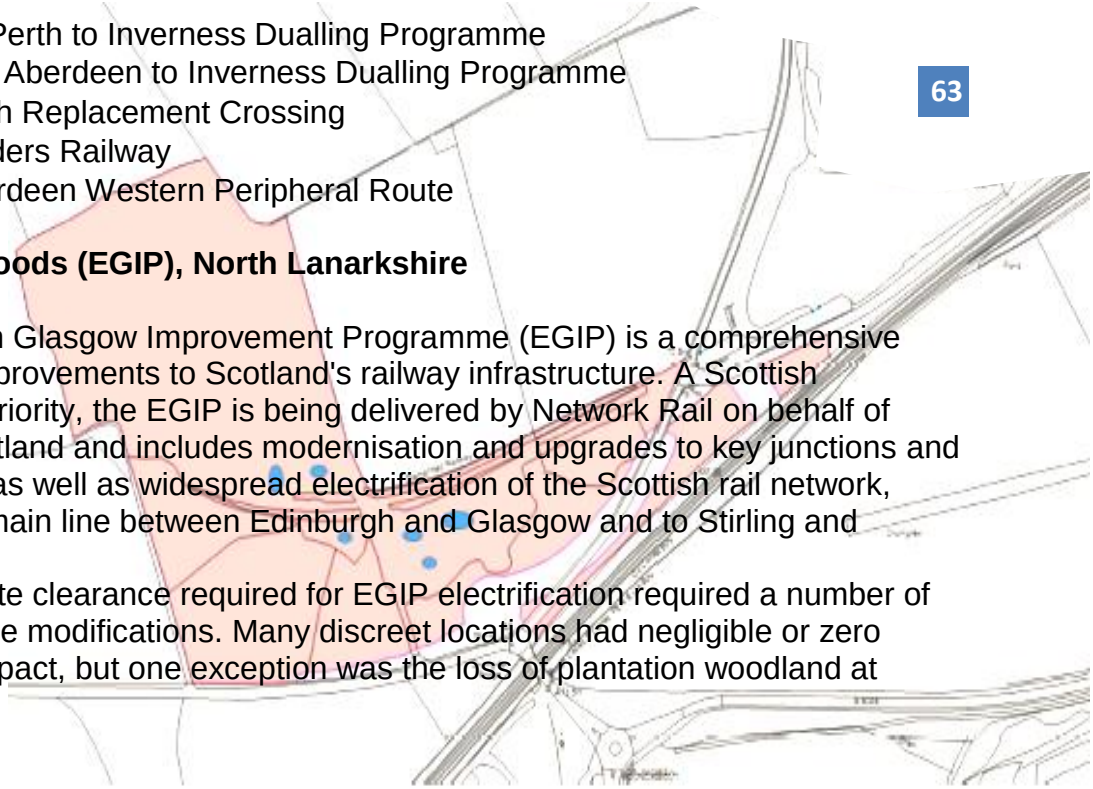
include suitable mitigation and/or compensation in relation to any latent adverse environmental impacts.

Where the project is relatively complex or of a significant size, the agency has developed a process of establishing a project-based environmental steering group (ESG) to support the consultation process and ensure all parties have the opportunity of contributing to the development. This process takes careful and committed management to make sure all the necessary organisations are included and involved, without over-burdening them with onerous schedules in addition to their own workloads.

For the most part an ESG will include statutory consultees such as Scottish Natural Heritage, Historic Environment Scotland, SEPA, Forestry Commission Scotland, National Park Authority (if relevant), Local Authorities, Visit Scotland etc. However, other non-statutory organisations can also be included, whether as a permanent member of the ESG or as a periodic contributory depending on need and the nature of the project. This group could include access forums, tourism organisations, local biodiversity groups, woodland trusts, etc. The ESG is established very early in the project development – for the A9 project, for example, the ESG was already underway two years before the first potential route alignments appeared. The process allows all parties to fully engage in and understand the project requirements and the specific challenges related to the site and surroundings which, in turn, provides the best opportunity of achieving a well-balanced, successful scheme that meets all its objectives whilst respecting the environment through which it passes.

Recent projects for which Transport Scotland have set up Environmental Steering Groups include:

- A9 Perth to Inverness Dualling Programme
- A96 Aberdeen to Inverness Dualling Programme
- Forth Replacement Crossing
- Borders Railway
- Aberdeen Western Peripheral Route



Drumgrew Woods (EGIP), North Lanarkshire

The Edinburgh Glasgow Improvement Programme (EGIP) is a comprehensive package of improvements to Scotland's railway infrastructure. A Scottish Government priority, the EGIP is being delivered by Network Rail on behalf of Transport Scotland and includes modernisation and upgrades to key junctions and infrastructure as well as widespread electrification of the Scottish rail network, including the main line between Edinburgh and Glasgow and to Stirling and Dunblane.
Part of the route clearance required for EGIP electrification required a number of road and bridge modifications. Many discreet locations had negligible or zero biodiversity impact, but one exception was the loss of plantation woodland at Drumgrew.

A replanting regime was proposed by the project at this location and was considered by the local authority. However, during the consultation, East Dunbartonshire Council identified that there was a greater benefit in semi-improving the diversity of the high value, species rich neutral and marshy grasslands at the site.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The agreed final improvements consisted of removal of Japanese Knotweed and creation of several scrapes to enhance habitat for invertebrates, amphibians and breeding birds.

5

Knowledge – To ensure that the best new and existing knowledge on biodiversity is available to all policy makers and practitioners


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Academy9

The Academy9 programme was introduced in the previous Biodiversity Report but still worthy of inclusion here as it has gathered pace over the past few years. Academy9 is an exciting new education initiative linked specifically to the A9 Dualling programme. It hopes to encourage pupils of schools within the Perth to Inverness corridor to learn about the many facets of the project and possibly consider engineering related careers.

All the activities that the programme delivers within the schools aim to cover the 3 E's (Environment : Equity : Economics - the three pillars of Sustainability), with the important addition of Health and Safety. To date, ecology has featured heavily in covering the environmental elements. Each year there are three core events arranged for each section of the route – this equates to an annual engagement with close to 800 young people, their teachers and some parents annually. The format each year follows the following general approach:

- A Gateway Event – a large starter event for all Primary 5 children in each section coming together to take part in one big event.

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The ecology task is essentially children reading a description of an animal/plant and them then selecting a play card with the animal/plant that matches the description.

- A Roadshow Event – a classroom based series of sessions for Primary 6/7 children where professionals working with Transport Scotland visit a class and deliver a learning session. The ecology task of this is called “Nature Detective” and the engineering task also considers constraints and making a route selection choice so subtly introduces most environmental factors.

- An Apprenticeship Academy – an Easter school event across 3-4 days for Secondary pupils, in years 2 and 3. Across the event there are mini-challenges which introduce the following environmental topics:

    - Ecology – match images of species with indicators of species and environmental designation level
    - Water/ Contamination – measure pH of 4 water ‘samples’ and establish the contamination source based on this info and a map
    - Peat – match up the depth of a peat core diagram with historical events
    - Noise – number noise sources from loudest to quietist
    - Community and Access – connect places within a maze
    - Cultural Heritage – dig for ‘archaeological artefacts’ (Lego pieces) within a sand box

In support of the main events programme Transport Scotland have also created a page within the Education Scotland’s website that is used in all schools (by teachers and students alike) to access additional information as an on-going learning resource: https://blogs.glowscotland.org.uk/glowblogs/academy9/

Under the resources tab on the website there is an environmental section with a selection of outputs and a resource directory to provide access to some of the tasks noted above:
https://blogs.glowscotland.org.uk/glowblogs/academy9/files/2016/06/Website-Directory.pdf

A9 Wider Stakeholder Consultations

As well as the focus on the Academy9 initiative, Transport Scotland have also been widely engaged with other stakeholder groups as the A9 Dualling Programme develops. There has been a robust schedule of public exhibitions and drop-ins for all the developing schemes to ensure those living and working along and around the A9 route have the opportunity to review, comment on and shape the emerging designs, including


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plans for route alignment and junction layout, as well as issues relating to the environment and the provision for nature conservation.

In support of the consultation process and to ensure stakeholders have all the information needed to allow them to engage meaningfully with the project teams Transport Scotland has developed an on-line guidance document: https://www.transport.gov.scot/media/35685/ts-a9-dualling-engaging-communities-2016.pdf

As well as the liaison with the usual consultees – both statutory and non-statutory, Transport Scotland have also made efforts to ensure smaller, less mainstream organisations and charities have the opportunity to engage with the Dualling Process. Transport Scotland is keen to ensure this Corporate Social Responsibility (CSR) is built-in to all our projects with the aim of delivering economic, social and environmental benefits to local stakeholders. It is a two-way process, involving scheme-related knowledge transfer to these groups whilst learning useful local information in return that may have a bearing on the development of the projects.

In this way, consultants have made presentations at events such as the AGM of the St Vincent Therapy Gardens - a local charity that focuses on mental health and using gardening to provide therapy - this was specifically about 'fitting the road' and the importance of landscape and ecology. This relationship has been extended over the past three years to incorporate such things as buying tools for the charity and providing assistance to build fruit frames and raise greater awareness of landscape and ecology issues.


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Other examples of this wider consultation process include one of the project archaeologists speaking at this year's Kingussie heritage festival and the inclusion of pop-up displays at the Blair Horse Trials and Scone Game Fair.


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M8 Water voles

During the course of the planning and delivery of the M8, M73, M74 road improvement scheme the contractor discovered a large population of water vole (*Arvicola amphibious*) along several sections of the M8 motorway verge adjacent to or in areas where works were planned to occur.

This had previously been reported by one of the Transport Scotland operating companies, Scotland TranServ, who had found similar populations living in this odd location but a little further west along the motorway.

Water vole habitat is protected under the Wildlife and Countryside Act 1981 (as amended). The species has experienced a severe decline in their national population size and distribution in recent decades due primarily to habitat loss and fragmentation, but also predation by American mink. However, this project and the earlier work by the operating company, has shown that water vole are more adaptable than previously thought, and this may lead to more opportunities to provide feasible habitat in the future. Areas of Grassland including the verges and embankments next to the M8 corridor near to Easterhouse are now known to be home to some of the highest density of Water vole habitat in the UK. It is thought that the Voles were associated with the Monklands Canal which was built over to make way for the motorway during the 1970's.


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To protect water vole during the M8, M73, M74 project extensive survey and trapping works were performed to assess current habitat conditions, trap any affected animals and facilitate re-introduction into the affected areas once works had been completed. During construction activities, the Water Vole were carefully removed under license from the disturbed areas and housed in a cabin nearby, where they were carefully weighed, sexed, and housed until the area was ready for re-release. This was achieved by installing soft release pens complete with a store of food. Once the voles had eaten the food they simply wandered away into the renewed habitat.

There were so many water vole trapped through this exercise that not all could be returned to the re-aligned road verges. The remaining 31 voles were contributed to a large-scale reintroduction project at the Kielder Water and Forest National Park in Northumberland (locally known as the 'Saving Ratty Project'.

http://www.visitkielder.com/news/2017/06/the-largest-ever-reintroduction-of-endangered-water-voles-in-the-uk-is-underway

The project greatly improved the knowledge of practitioners involved in water vole conservation, particularly SNH & Direct Ecology staff, about the status and management of fossorial water voles.

Network Rail – Learning at Work

Working in the lineside environment brings with it many challenges and need for Risk Management. The railway corridor is an ideal natural refuge of many species because it is by and large isolated from general human interference. One of these challenges includes carrying out required track maintenance works in close proximity to European Protected Species (EPS) such as otter, Great Crested Newts and bats as well as other protected animals regularly found at the side of railways, like badger.


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To ensure full account is taken of the potential impact engineering works may have on the wildlife associated with Scotland's rail corridors, Network Rail employ Ecologists to oversee the planning and delivery of their works. These resources can be shared across the business units and can be accessed directly to provide key specialist advice as required within all functions of the industry.

In addition to the engagement of qualified professionals, Network Rail make use of volunteer workers, both from within and outwith the organisation, to assist with various projects, all overseen by qualified personnel. This work is often associated with opportunities to assist Charities, Not-for-Profit Organisations and other Voluntary NGO's, providing a valuable workforce to help projects that are often struggling for resources. It is also a great way to engage with a wider community and ensure knowledge-transfer in relation to the environment and its protection.

This year Network Rail partnered with the Supply Chain Sustainability School (SCSS) – an organisation that improves collaboration between clients, contractors and first tier suppliers to work with supply chains to jointly build sustainability skills. This partnering has led to SCSS sustainability e-learning modules being added to the Network Rail Oracle site so that staff can freely access a range of environment and social performance topics ranging from Biodiversity to Waste Management and Sustainable Resourcing to Social Value. www.supplychainschool.co.uk

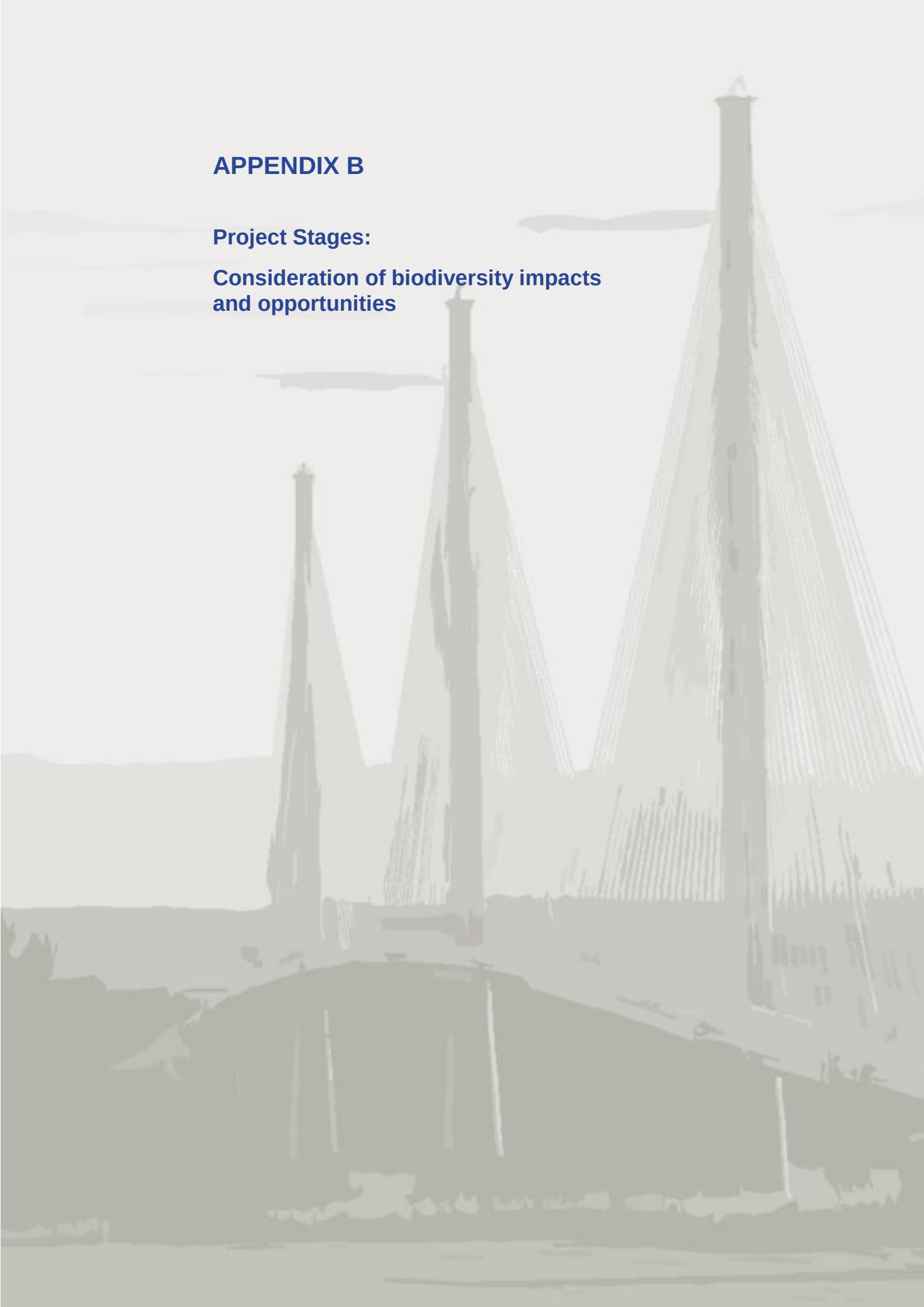
A83 Rest and be Thankful – mitigation planting (monitoring)

The A83 trunk road west of Tarbet passes through Glen Croe, a steep-sided valley with tall, largely open hillsides above. Beinn Luibhean sits immediately above the A83 as it travels up to the Rest and be Thankful car park and viewing area. There have been a number of relatively major landslides generated on this hill over the years and this has led to road closures with the related inconvenience to rad users, including a long diversion route. Following a robust study of the situation a series works have been proposed including the construction of catch-fences, the repair/ of culverts and the upgrading of the Old Military Road to act as a temporary diversion if required. Another, long term measure proposed is the establishment of a large area of native deciduous woodland to help bind the soil to the bedrock and so, hopefully, reduce the likelihood of further landslides occurring.

The proposal has been discussed with all the relevant stakeholders including SNH and the Loch Lomond and Trossachs National Park. Both organisations are very supportive of the plans as the developing woodland will not only help by stabilising the slope but will integrate with Forest Enterprise Scotland's felling and replanting plans and add significantly to the native deciduous woodland resource in the glen. This in turn will provide important connectivity throughout the area and deliver valuable habitat for local native species.

This is an ambitious project and the first time in the UK that such an undertaking has been contemplated for landslide mitigation on this scale. It will obviously take time for such planting to get established and reach the size and root maturity required to have a mitigating effect and during this time Transport Scotland has made arrangements for a robust monitoring programme to be undertaken.

This will measure the stability of the slope before and during the plant establishment to assess the effect as the woodland reaches full establishment in 25 years. The monitoring will assess geotechnical aspects of the slope as well as the growth and impact of the plants. This will not only help the delivery of this particular project but will provide valuable data that can be used for other similar sites in Scotland and further afield.



APPENDIX B

Project Stages:

Consideration of biodiversity impacts and opportunities

APPENDIX B

Consideration of biodiversity impacts and opportunities takes place at all stages of our development work as well as the decisions taken daily on the management of the national transport networks. Transport Scotland's internal procedures ensure this occurs at the following times:

During appraisal

All interventions proposed for Scotland's transport networks require robust assessment and appraisal at the outset to determine whether the proposals could have significant effects on the environment. Decision-makers need to be able to understand any such effects and any potential alternative approaches that could minimise or avoid them.

In this context, the assessment and appraisal process can cover statutory Environmental Impact Assessment (EIA), non-statutory environmental impact assessment, and Assessment of Implications on European Sites. At a wider level, there may also be a requirement for Strategic Environmental Assessment (SEA) and Transport Appraisal which are then linked to project based environmental impact assessments. These processes are valid whether the proposals concerned are related to new schemes or management and maintenance interventions. In terms of conservation and enhancement of biodiversity, the appraisal process allows the assessment team the opportunity to consider whether the proposal will have a likely impact on the diversity and character of the local environment, including its wildlife communities and assemblages (flora and fauna) and to arrive at a balanced report.

During design

The results of the assessment and appraisal process will directly influence the scope and content of the project design stage. Transport Scotland promotes the ethos that consideration of biodiversity should be built into the early planning and development of all works proposed for relevant transport networks, irrespective of the nature of the works.

In this way, an understanding of biodiversity and the potential application of appropriate measures is a key component, whether the works are primarily developed for nature conservation/enhancement or even if they are considered unrelated to environmental management – such as carriageway resurfacing etc. In this way, implications on wildlife and natural habitats, whether direct or indirect, can be explored at a stage where it should be relatively straightforward to make any necessary allowances to the emerging design. This includes avoidance and mitigation of any negative impacts as well as consideration of opportunities for biodiversity enhancement.

Transport Scotland has long championed the use of native species of local provenance for all new works within the Scottish trunk road network. This has since become a common policy in other delivery authorities and is now enshrined in legislation through the Wildlife and Natural Habitats (Scotland) Act 2011 which reinforced the provisions of the Wildlife and Countryside Act 1981 in this respect.

During procurement

Our procurement process takes account of biodiversity through clear statements of instructions to our supply chain. For example, with respect to road maintenance works, the Fourth Generation term maintenance contracts provide instructions to our Operating Companies within Schedule 7 Part 4 Landscape Development. Extracts from this contract are shown below:

'When developing the Landscape Development Plan, the Operating Company shall take account of Transport Scotland's commitment to the protection and enhancement of biodiversity through all relevant legislation and documents including (i) the Trunk Roads Biodiversity Action Plan, and (ii) the Scottish Government's biodiversity strategy Scotland's Biodiversity – It's in your hands. The Landscape Development Plan shall include (i) recommendations in accordance with the landscape strategy; (ii) recommendations resulting from the annual landscape management report, and (iii) recommendations resulting from the Operating Company's landscape opportunities inspections referred to in this Part. The annual landscape management report shall record details of the Operations undertaken in support of enhancing biodiversity and nature conservation, including works associated with creating, repairing or improving any wildlife mitigation measures within the Unit.'

A number of appendices on landscaping and ecology in the 4G contract provide specific instructions for specific elements, with extracts such as:

- The Operating Company shall give at least 48 hours' notice to the Overseeing Organisation of the intention to commence any of the Operations at…Special Areas of Conservation including candidate sites…or Sites of Interest for Nature Conservation.
  The Operating Company shall also ensure that the appropriate advisory body (for example Scottish Natural Heritage, Scottish Environmental Protection Agency and Historic Scotland) shall also be advised of the intended Operations prior to the Operations commencing on Site

- The Operating Company's programme of weed control shall ensure there shall be a significant reduction in the occurrences and extent of these species each successive year for the duration of this Contract wherever they occur. Within wildflower areas or areas of nature conservation value the Operating Company shall eliminate any injurious weeds that cannot be effectively controlled by chemical means without causing damage to other vegetation by hand pulling

- The Operating Company shall carry out rabbit, hare and deer control in all areas of new planting or seeding undertaken under this Contract.
  Areas of brambles and herbage that interfere with the control of rabbit or deer shall be cut

- The Operating Company shall maintain all the grass and wildflower grass areas within the Unit in accordance with the Landscape Inventory categories.

No grass cutting shall be carried out within 250 mm of unprotected trees and shrubs

- Wildflower seeding shall be undertaken typically in early Spring or early Autumn and following best horticultural practice appropriate to the species involved

Our major road schemes also take account of biodiversity. For example, extracts from the A737 Dalry Bypass Employer Requirements from May 2016 state that:

'Notwithstanding any other provision of the Contract the Chartered Landscape Architect shall inspect the Site monthly throughout the Period of Establishment Maintenance and report accordingly. Not more than two weeks after each visit the Contractor's Chartered Landscape Architect shall make written recommendations to the Contractor regarding deficiencies and opportunities for improving the landscape maintenance and exploiting environmental opportunities that become apparent during the Period of Establishment Maintenance to enhance biodiversity and reduce pesticide application.

A copy of the Chartered Landscape Architect's written recommendations shall be provided simultaneously to the Engineer. The Contractor's Chartered Landscape Architect shall confirm, without limitation, the requirements for plant replacement, establishment of woodland, shrub and hedgerow planting and all seeded grassland and wildflower areas and remedial Works associated with the landscape Design. The recommendations of the Contractor's Chartered Landscape Architect shall be carried out by the Contractor.'

An annual biodiversity fund of £40,000 is embedded within the ScotRail Franchise. In May 2016, ScotRail launched, in partnership with Keep Scotland Beautiful, the Biodiversity Fund scheme.

Individuals or groups already involved in the ScotRail 'Adopt a Station' scheme were invited to apply for funding for projects that aimed to increase biodiversity in stations and the local area. The fund is managed by Keep Scotland Beautiful, with schemes addressing the following areas:

- Biodiversity planting (such as wildflower meadow or woodland)
- Provision of physical aides such as bird boxes
- Information and communication
- Planting of native species in accessible areas for the enjoyment of the public and/or ScotRail employees
- Educational events
- Protecting and enhancing existing native flora and fauna

During construction

It is fundamental to the success of all schemes that implementation of biodiversity actions are carefully monitored by appropriately qualified individuals to ensure that the aims and objectives embedded in the design are realised. This includes the delivery of all committed mitigation. At the same time, and despite the most carefully prepared design documentation, it is in the nature of projects involving excavations and other ground works that unexpected issues can often arise. Such issues can present significant problems for the Design Teams to overcome and it can sometimes be challenging to find appropriate solutions to protect against increased environmental impact.

However, the discovery of unexpected issues and overcoming practical problems during implementation can also be used as an opportunity to maximise scheme benefits through the development of alternative solutions, whether in relation to landscape integration and/or enhancement of the natural heritage. Contractual and regulatory obligations will still be required to be satisfied but the potential for the delivery of alternative, creative solutions is encouraged.

Safeguarding the natural resource, delivery of the agreed proposals and the exploitation of onsite opportunities requires regular monitoring of implementation by suitably qualified and experienced staff, and Transport Scotland ensures that this is clearly detailed in the relevant contract documentation (whether as part of the Management and Maintenance Term Contracts or for new scheme requirements). This is helped by ensuring a clear understanding of the project objectives across the other project professionals involved and supported by good communication.

During maintenance

A common issue with the development of schemes within the public realm, however well delivered initially, is the commitment to a long term maintenance regime. All major scheme interventions will ordinarily include a 5-year project maintenance period post completion. This is a contract requirement and covers the defects liability on built elements and the establishment period for any new planting and seeding works. The requirement allows for the employment of suitably qualified individuals to undertake regular inspections of the works throughout each year of the maintenance period to check that the scheme is performing as required. This also provides a chance for an assessment of how the site is developing in general and in relation to the local characteristics of the adjacent landscape. This, in turn, gives rise to the possible introduction of small amendments to the maintenance regime if there is an opportunity to improve biodiversity integration – for example, the minor adjustment of a wildlife fence alignment following evidence of conflict with migrating mammals or changes to a mowing regime to encourage a more diverse sward development.

As well as the maintenance period associated with major new interventions, Transport Scotland has a remit to manage the existing rail and trunk road networks. Scotland has a total of 3,405 kilometres of trunk road and 2,776 kilometres of rail track. Assuming a typical average maintained ‘soft’ landscape corridor and supporting infrastructure, this combined network brings the order of 90-120 square kilometres of land area under management. In terms of the trunk road network this management is delivered via Operating Companies; contractors working under a term contract arrangement (as shown in the ‘procurement’ sub-section above).

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APPENDIX C

Acknowledgements and List of Illustrations

APPENDIX C

Acknowledgements

Transport Scotland would like to thank all its staff and supply chain who are involved in delivering projects and maintaining the nation's strategic transport networks.
It is through collective understanding and collaborative working that the greatest differences can be made for the benefit of Scotland's natural environment.

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