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A96 DUALLING
HARDMUIR TO FOCHABERS

A96 Dualling

Hardmuir to Fochabers scheme

DMRB Stage 2
Scheme Assessment Report

Volume 2 – Part 3
Environmental Assessment

December 2018

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A96 Dualling Hardmuir to Fochabers

DMRB Stage 2 Scheme Assessment Report
Volume 2
Part 3 – Environmental Assessment

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8. Introduction and Approach to Environmental Assessment

8.1 Introduction

8.1.1. This Part of the Stage 2 Scheme Assessment Report presents the findings of the environmental assessment of the shortlisted options and provides information to inform the multi-disciplinary comparison of the options. The assessment has been undertaken in accordance with the Design Manual for Roads and Bridges (DMRB), Volume 11, Environmental Assessment.

8.1.2. The assessment findings are presented in a series of environment topic chapters (Chapters 9 to 21) which are based on relevant trunk road environmental assessment guidance and best practice (see Section 8.3). The assessment is structured according to 12 key environment topics which are reported in two groups shown in Table 8.1 below. These groups reflect the environmental objective for the Scheme (see Volume 1, Chapter 1, Scheme Background).

Table 8.1: Environmental Assessment Topics and Groups

Topic	Group
Policies and Plans	Communities and People
Air Quality	
Noise and Vibration	
People and Communities	
Agriculture, Forestry and Sporting	
Materials	
Visual Effects	
Cultural Heritage	Natural and Cultural Heritage
Landscape	
Nature Conservation	
Geology, Soils, Contaminated Land and Groundwater	
Road Drainage and the Water Environment	

8.1.3. These topics and groups have been used throughout the early stages of the Scheme development to inform successive options assessments (see Volume 1, Chapter 3, Development of Route Options). The technical scope of the environmental assessment is set out further in Section 8.3 of this chapter (see Paragraphs 8.3.22 to 8.3.25).

8.2 Sources of Information

8.2.1. The following sources of information have been used in the environmental assessment:

- Design Manual for Roads and Bridges (DMRB) (Volume 11, Environmental Assessment);
- DMRB Interim Advice Note 125/15, Environmental Assessment Update;
- Moray Council (2015) The Moray Local Development Plan;
- Ordnance Survey mapping of the study area: OS Explorer 1:25,000 scale sheets 423 & 424;
- Transport Scotland (2016) A96 Dualling Programme, Strategic Environmental Principles, October 2016;
- Transport Scotland (2015) A96 Dualling Programme, Strategic Environmental Assessment, Tier 2 Environmental Report, May 2015;
- Transport Scotland (2015) A96 Dualling Programme, Strategic Environmental Assessment, Post Adoption Statement, February 2016; and
- Transport Scotland (2014) Fitting Landscapes, Securing More Sustainable Landscapes, March 2014.

8.2.2. Topic specific sources and references are included in each technical chapter (Chapters 9 to 20). A summary of key findings of the environmental assessment is presented in Volume 3, Chapter 25 (Assessment Summary).

8.3 Approach to Environmental Assessment

Environmental Design

8.3.1. Route option designs have been developed through the DMRB Stage 2 process to include avoidance wherever possible of key environmental constraints, private property and designated areas to reduce the potential for significant environmental effects from the construction and operation of the scheme. Figures 8.1, 8.2 and 8.3 (Volume 5) show the key designations and constraints along the route option corridors.

Mitigation

8.3.2. Where potentially significant environmental impacts are predicted, mitigation has been defined and recorded to avoid or reduce impacts where possible and the residual effects have been evaluated taking account of this assumed mitigation. The mitigation includes measures that are known to be effective, which follow good environmental practice and legislative standards, and can reasonably be assumed to be implemented and committed in scheme delivery. These measures also draw from higher level mitigation commitments made in key DMRB Stage 1 A96 Dualling Programme documents including the Strategic Environmental Assessment (SEA) and in Transport Scotland's Strategic Environmental Principles (see Section 8.2). Where more detailed mitigation has the potential to further reduce environmental effects, this has been recorded in the assessment and will be developed in greater detail during DMRB Stage 3.

8.3.3. Mitigation of potentially significant traffic related environmental effects as a result of scheme operation has not been developed or modelled at this stage. A quantitative assessment of the effects of traffic noise and emissions to air without mitigation has been undertaken (see Chapters 10, Air Quality and 11, Noise and Vibration) to inform the selection of the Preferred Option.

Options Assessed

8.3.4. Details of the options are set out in Volume 1, Chapters 5 to 7 (Engineering Assessments). The assessment has been undertaken for the options as described in Volume 1, Chapter 3 (Development of Route Options), Section 3.12. A study area for the assessment has been generally defined within a buffer area approximately 500m around each option (see Figures 8.1, 8.2 and 8.3 in Volume 5). Where specific assessment study areas have been used for each technical assessment these are described in the relevant chapter.

8.3.5. The assumed land take for the Scheme includes the road, structures, side roads, drainage ponds, earthworks and a strip of land adjacent to the edge of the earthworks to allow for maintenance access. This does not include land take for site compounds. The land boundary width of the road would vary according to ground topography and the lateral extent of required cuttings and embankments and drainage ponds where required.

Consultation

8.3.6. Environmental consultations have been undertaken to:

- Seek feedback and comments from consultees on environmental aspects of the Scheme to date;
- Obtain relevant baseline information to inform the assessments;
- Agree survey and assessment methods; and
- To understand views on the various options which have been assessed.

8.3.7. A range of statutory and other environmental consultees have been consulted during the DMRB Stage 2 process on environment specific issues (see Table 8.2 below). Regular engagement has been held with Scottish Natural Heritage (SNH), the Scottish Environment Protection Agency (SEPA) and Historic Environment Scotland (HES) through meetings and the forum provided by the A96 Programme Environmental Steering Group (ESG). Meetings have also been held with Moray Council (planning and other relevant services) and with other key stakeholders including Forestry Commission Scotland and a range of non-motorised user (NMU) groups.

8.3.8. All environmental consultees were contacted in writing at the preliminary stage of the Scheme in late 2016 to provide a background to the Scheme and its environmental assessment and invite initial feedback including any information of relevance. In summer 2017 further consultation letters were sent to consultees to seek views on the developing options.

8.3.9. This consultation process has allowed for understanding of the environmental sensitivities associated with the baseline in the Scheme study area and with aspects of the route options being assessed. A full list of all the organisations consulted about the environmental assessment is outlined in Table 8.2 below (statutory consultees are shown in the shaded cells). Further details of public consultations are set out in Volume 1, Chapter 3 (Development of Route Options).

Table 8.2: List of Environmental Consultees

Consultee Organisation	
Historic Environment Scotland (HES)	Moray Equestrian Access Group
Scottish Environment Protection Agency (SEPA)	Moray Estates Woodlands
Scottish Natural Heritage (SNH)	Moray Firth Cycling Club
Highland Council	Moray Riding for the Disabled Association
Moray Council	Moray Local Outdoor Access Forum
Aberdeenshire Council Archaeology Service (ACAS)	Moray Mountain Bike Club
Architecture & Design Scotland	Moray Ramblers
Architectural Heritage Society of Scotland	Moray Speyside Tourism
Association of British Riding Schools	Mountaineering Scotland
Badenoch & Strathspey Amphibian and Reptile Group	Mundole Equestrian
Bat Conservation Trust	National Access Forum
Botanical Society of Britain & Ireland	National Farmers Union (NFU) Scotland
British Geological Survey	National Trust for Scotland
British Horse Society	Newton Nursery (Forestry Commission owned)
British Trust for Ornithology Scotland	North East Raptor Study Group
Brodie Countryfare	North East Scotland Bat Group
Buglife Scotland	North East Scotland Biological Records Centre (NESBReC)
Burgie Equestrian Centre	North East Scotland Local Biodiversity Action Plan
Butterfly Conservation Scotland	North Scotland Grassland Society
Carbon Clever	Outfit Moray

Consultee Organisation	
Cycle Touring Club (Scotland)	Paths for all
Cycling Scotland	People Friendly Design
Elgin (and District) Angling Association	Ramblers Association
Elgin Cycling Club	Roy Dennis Wildlife Foundation
Findhorn District Salmon Fishery Board (DSFB)	Royal Society for the Protection of Birds (RSPB) North of Scotland
Findhorn, Nairn and Lossie Fisheries Trust[1]	Scotland Outdoor Access Network
Fochabers Hill Walking and Rambling Club	Scottish Accessible Transport Alliance
Fochabers Village Association	Scottish Badgers
Forestry Commission/ Forest Enterprise Scotland	Scottish Civic Trust
Forres Community Woodland Trust	Scottish Disability Equality Forum
Forres Cycling Club	Scottish Endurance Riding Club
Forres Footpath Trust	Scottish Environment LINK
Forres, Nairn & District Riding for the Disabled Association	Scottish Gamekeepers Association
Grampian Timber Forestry Consultancy	Scottish Government - Agricultural Officer
Highland Biological Recording Group	Scottish Orienteering Association
Highland Cycle Campaign	Scottish Rights of Way and Access Society (Scotways)
Highland Environmental Forum (previously Highland Biodiversity Partnership)	Scottish Squirrels
Highland Gliding Club	Scottish Water
Highland Raptor Study Group	Scottish Whale and Dolphin Trust
Highlands and Islands Transport Partnership (HITRANS)	Scottish Wildcat Action
Inverness Cycling Club	Scottish Wildlife Trust
James Hutton Institute	Spey Fishery Board
John Muir Trust	Sustrans

[1] Comments provided also represent those of the Findhorn District Salmon Fishery Board and the Lossie District Salmon Fishery Board

Consultee Organisation	
Living Streets Scotland	Tarmac Caledonian Ltd (Cloddach Quarry)
Lossie District Salmon Fishery Board	The Coal Authority
Ministry of Defence	The Dava Way Association
Marine Scotland	The Scottish Castle Association
Mobility and Access Committee for Scotland (MACS)	Trekking & Riding Association of Scotland
Moravian Orienteering	Visit Scotland
Moray Access Panel for the Disabled	Wildfowl and Wetland Trust
Moray Bird Club	Woodland Trust

Baselines and Surveys

8.3.10. The assessment of predicted environmental effects for each topic draws on baseline information collated from desk review, site visits and specific surveys and from relevant consultation feedback. The description of the relevant baseline in each chapter is primarily based on current conditions however individual assessments have taken account of the likely 2030 (forecast Scheme opening year) baseline where this could affect the assessment findings. The noise and air quality assessments also take account of projected design year (2045) traffic flows with and without the Scheme. The type of changes could include (but are not restricted to):

- Completion of development on sites in particular those identified in the Moray Local Development Plan (LDP) 2015[2]. These sites are primarily close to the edges of the principal settlements and could be progressed before the Scheme is developed;
- The delivery of forest planting and felling plans which could change the woodland cover;
- Natural succession in habitats over the period before (and after) 2030; and
- Changes in land boundaries and agricultural practices.

8.3.11. Further details of surveys which have been undertaken to inform the environmental assessments are presented in Chapters 9 to 20 and their accompanying appendices. An overview of key environmental designations is provided in Figures 8.1, 8.2 and 8.3 in Volume 5.

Overall Approach to Options Assessment

8.3.12. The approach to environmental assessment of the options has been adapted from current practice in Environmental Impact Assessment (EIA) including guidance in DMRB Volume

[2] Excluding sites identified as long-term opportunities as there is less certainty of their development before 2030 and key groups of these sites have been considered in relation to potential cumulative effects in each relevant chapter (see below under Scope of Assessment)

11 (Section 2). The assessments are not undertaken in the same level of detail as an EIA but the principles of impact assessment from EIA provide a robust basis for examination of the route options. EIA will be undertaken on the Preferred Option at DMRB Stage 3.

8.3.13. The DMRB Stage 2 environmental assessment approach is based on current methodologies from relevant Standards and Advice Notes in the DMRB (Volume 11, Section 2, Part 1, General Principles and Guidance of Environmental Impact Assessment, Part 2, Environmental Impact Assessment and Part 5, Assessment and Management of Environmental Effects) as well as on relevant current best practice in environmental assessment. It reflects the guidance provided in DMRB (Interim Advice Note 125/15, Environmental Assessment Update) in relation to focusing assessment on significant effects and on proportionate reporting. The approach has been tailored to reflect that DMRB Volume 11 advice has departed in recent years from the previous Stage 1, 2 & 3 focused approach[3] and for some technical topics the approach to assessment has been supplemented by other more recent guidance. The guidance followed for each assessment is set out in the assessment chapters of this Part (Chapters 9 to 20).

Impact Prediction and Evaluation of Effects

8.3.14. The assessment focuses on the effects from the permanent development and change in use of the land (e.g. land take, habitat loss) and existence of the development, and from the operational effect of traffic using the road. Whilst effects may come about as a result of scheme construction, their significance is related to the long-term change in the affected receptor and they are therefore considered to be from the permanent development of the Scheme. At DMRB Stage 2 there is relatively limited information available on the methods of scheme construction and these have generally not been considered within this assessment.

8.3.15. In this assessment environmental effects have been assessed with and without mitigation (see above) to provide a clear and auditable approach to consideration of effects and their significance for each option.

8.3.16. The EIA Regulations[4] require significant effects to be described but do not define significance. The definition of a significant effect which has been adopted is one which is considered in isolation or in combination with others, is material[5] to the environment and should be taken into account in decision-making.

8.3.17. The significance of an effect results from the interaction between the impact magnitude (which is related to the extent of the physical change, its spatial extent, duration and

[3] Volume 11 advice notes and standards prepared since 2008 focus on three levels of assessment; scoping, simple and detailed, rather than on guidance specific to Stage 1, 2 or 3. Professional judgement is used in determining the appropriate level of assessment taking account of the likelihood of significant effects and the detail needed to achieve a reasonable level of confidence for the assessment

[4] The Roads (Scotland) Act 1984 (Environmental Impact Assessment) Regulations 2017

[5] i.e. important or having an important effect and of sufficient importance to take into account in development decisions

frequency) and the value of the resource or the number and sensitivity of those people who might be affected. The process of assessing significance includes:

- Selecting criteria (for each discipline) from recognised sources (including legal standards, policy and best practice guidance and accepted practice) against which effects can be assessed (assessment criteria);
- Establishing significance thresholds drawing on the above sources, consultations, site survey information and professional judgement; and
- Comparing the predicted impacts with the significance thresholds and defining the nature of the residual effect taking account of the reversibility of the effect, its probability of occurring and confidence in prediction including any uncertainty.

8.3.18. The predicted impacts of the options (including their magnitude) have been considered including the potential for these to be significant. Where effects are considered unlikely to be significant they have not been assessed or reported further in detail[6] and the assessment has focused on the potentially significant effects of each option. This is considered to be a proportionate approach in line with good practice in EIA and allows the material differences between options to be identified more clearly.

8.3.19. Residual effects are reported taking account of mitigation. In this assessment, where relevant, effects are categorised into:

- None or negligible: no detectable change to the environment;
- Minor: a detectable but non-material change to the environment;
- Moderate: a material and important but non-fundamental change to the environment; and
- Major: a fundamental change to the environment and a principal consideration.

8.3.20. Effects categorised as moderate or major (adverse or beneficial) are considered to be significant. Assessments draw from quantitative and qualitative information and from professional judgement when considering a mix of beneficial and adverse effects for an option.

Scope of Assessment

8.3.21. The scope of the assessment is broad and all key technical guidance from DMRB has been considered with the assessment reported in a series of twelve topics (see Section 8.1). The elements which have been scoped out of the assessment are shown in Table 8.3 below.

Table 8.3: Technical Assessment Scope

Topic	Comment on Scope
People and Communities	The assessment scopes out consideration of Vehicle Travellers, including: • 'driver stress' – since the Scheme includes a dual carriageway that is predicted to reduce driver stress by the same amount for each route option;

[6] Where significant effects are not predicted sufficient information is presented to inform the assessment of options

Topic	Comment on Scope
	• 'views from the road' - since road designs are at an early stage and vertical levels and mitigation could change at later design stages; and • 'public transport' – since inter-urban bus connectivity would be accommodated on the existing A96. It is not considered that these issues would have material differences between the options assessed at DMRB Stage 2.
Policies and Plans	Due to the importance of planning issues for this Scheme, a specific Policies and Plans assessment has been undertaken and a chapter is included in the environmental assessment reporting (see Chapter 9 Policies and Plans), rather than including a planning section within each of the separate environmental chapters.

8.3.22. The potential for significant cumulative environmental effects to arise has been considered for the options with other future development proposals and from the interaction of different predicted environmental effects from the same option on key baseline receptors (in-combination effects).

8.3.23. The assessment of cumulative effects with other future developments has been considered in the relevant topic-specific assessments. The assessment has focused on potentially significant effects in combination with future developments identified from the proposed Moray Local Development Plan (LDP) 2020 which are of a substantial scale and longer term in nature[7]. These sites were identified in the 2018 consultation Main Issues Report and updated in September 2018[8] with housing and employment sites recommended by Moray Council to be included in the draft Moray Local Development Plan 2020. The potential for in-combination effects for each option is addressed in Chapter 21 (Summary of Cumulative Assessment).

8.3.24. There is some potential for cumulative effects of the A96 Dualling Hardmuir to Fochabers scheme with other parts of the A96 Dualling Programme between Inverness and Aberdeen. This is addressed in the A96 Dualling SEA reporting and at the DMRB Stage 2 level of assessment it is not considered there would be materially different cumulative effects for each of the options which have been assessed. The traffic modelling for the Scheme assumes that full dualling of the A96 between Inverness and Aberdeen is completed. This has informed some parts of the environmental assessment. Future land use change and its effects on traffic generation and demand has been accounted for in the air quality and noise and vibration assessments which draw from traffic model outputs.

[7] The emerging replacement LDP provides an indication of development beyond 2025
[8] Groupings around the principal settlements of the larger sites in the Report to Moray Council's Planning and Regulatory Services Committee (25.09.18) that are recommended to be included in the Proposed Moray Local Development Plan 2020 have been considered in this assessment for their potential for cumulative effects with the Scheme

8.3.25. The introduction of new EIA Regulations in Scotland in 2017[9] for the assessment of trunk roads may widen the scope of topics to be assessed in an EIA. In particular, it is anticipated that the Stage 3 EIA would incorporate a chapter addressing climate mitigation and adaptation. For the purposes of this DMRB Stage 2 assessment the topics assessed are considered to be comprehensive and representative of all key environmental impact types. The wider environmental implications of the options have been captured in the assessment of Materials (see Chapter 14) and will be further developed during DMRB Stage 3.

Assumptions and Limitations

8.3.26. The assessments have been completed drawing on baseline information collated in 2017 to 2018 including the results of habitat surveys and land use information including properties known to have planning consent.

8.3.27. There is inherent uncertainty in forecasting baseline (Do Minimum) conditions because of the proposed scheme opening year of 2030 but this is not considered to materially limit the options assessments. The Preferred Option will be developed in more detail at DMRB Stage 3 and the approach to the assessment recognises the scope for further design development.

8.3.28. Other limitations on a topic specific basis are reported where relevant in the technical chapters of this report.

8.4 Structure of Environmental Assessment Part

8.4.1. This Part of the DMRB Stage 2 Assessment Report is structured into a series of chapters which report the findings of the environmental assessment of each route option by topic. These are:

- Chapter 9: Policies and Plans;
- Chapter 10: Air Quality;
- Chapter 11: Noise and Vibration;
- Chapter 12: People and Communities;
- Chapter 13: Agriculture, Forestry and Sporting;
- Chapter 14: Materials;
- Chapter 15: Visual Effects;
- Chapter 16: Cultural Heritage;
- Chapter 17: Landscape;
- Chapter 18: Nature Conservation;
- Chapter 19: Geology, Soils, Contaminated Land and Groundwater; and
- Chapter 20: Road Drainage and the Water Environment.

[9] The Roads (Scotland) Act 1984 (Environmental Impact Assessment) Regulations 2017

8.4.2. A consistent approach to the structure of these chapters has been adopted for presentation of key information on approach, baseline, mitigation, predicted effects and a summary of findings.

8.4.3. A summary of the key overall findings of the environmental assessment of each option is presented in Volume 3, Chapter 25 (Assessment Summary) and a summary of the cumulative environmental assessment is set out in Chapter 21 (Summary of Cumulative Assessment).

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9. Policies and Plans

9.1 Introduction

9.1.1. This chapter presents the assessment of how the options perform against policies and plans.

9.1.2. The assessment has been undertaken with reference to the Design Manual for Roads and Bridges (DMRB), Volume 11, Section 3, Part 12, Impact of Road Schemes on Policies and Plans[10] which states that at DMRB Stage 2, projects should *"…undertake sufficient assessment to identify those national, regional, county and local policies which should be taken into account by the Design Organisation in developing and refining route options".*

9.1.3. In addition the assessment considers development designations in line with DMRB Volume 11, Section 3, Part 6 Land Use – Amendment No 1 which states that projects should *"…undertake sufficient assessment to identify areas of land which fall within local planning authority development designations and which need to be taken into account by the Design Organisation in developing and refining route options".*

9.1.4. This chapter is supported by Figures 9.1, 9.2 and 9.3 (Volume 5): Local Development Plan (LDP) Designated Sites and Planning Applications, and the following appendices (Volume 4b):

- Appendix A9.1: Local Development Plan Policy Baseline and Assessment;
- Appendix A9.2: Local Development Plan Designated Sites Baseline and Assessment;
- Appendix A9.3: Planning Applications Baseline and Assessment; and
- Appendix A9.4: Proposed Moray Local Development Plan 2020 Sites Assessment.

9.2 Policy Context

9.2.1. National policy in Scotland is set by the Scottish Government; its purpose is *"…to focus government and public services on creating a more successful country, with opportunities for all to flourish, through increasing sustainable economic growth".*[11] Scotland's Economic Strategy[12] and the Infrastructure Investment Plan[13] provide further details on how the Scottish Government aims to enable this purpose supported by a suite of national plans, policies and strategies.

[10] Note: since undertaking the assessment DMRB Part 12 has been withdrawn. DMRB is in the process of being updated. Part 12 has not as yet been replaced
[11] The Scottish Government website. Available at http://www.gov.scot/About/Performance/scotPerforms/purpose.
[12] The Scottish Government (2015) Scotland's Economic Strategy. APS Group Scotland. Available at http://www.gov.scot/Resource/0047/00472389.pdf
[13] The Scottish Government (2015) Infrastructure Investment Plan 2015. APS Group Scotland. Available at http://www.gov.scot/Resource/0049/00491180.pdf

9.2.2. The National Planning Framework[14] and Scottish Planning Policy[15] provide the policy and spatial detail of what is expected of the planning system and the outcomes that it must deliver in order to meet the Scottish Government's overall aim of sustainable development.

9.2.3. The Scottish Planning Policy is a statement of Scottish Government policy on how nationally important land use planning matters should be addressed across the country. It is non-statutory.

9.2.4. Scotland's Third National Planning Framework[14] (NPF3) sets out a commitment to better connect Scotland's cities and to providing a gateway to the rest of the world. It specifically includes the A96 dualling, "*We will complete dualling of the trunk roads between cities, with dualling of the A9 from Perth to Inverness complete by 2025 and dualling of the A96 from Inverness to Aberdeen by 2030"* (paragraph 5.20). NPF3 provides a statutory framework for Scotland's long term spatial development.

9.2.5. The planning system in Scotland[16] requires all local authorities to prepare local development plans that respond to the Government's national plans and policies, and most specifically NPF3.

9.2.6. The options fall primarily within the administrative area of Moray Council, with the most westerly 1.5km of the Hardmuir to Hillhead section located within the Highland Council area. At the regional and local level, planning policy in the area is set out in:

- Moray Council Moray Local Development Plan 2015[17] (MLDP);
- Highland Council Highland Wide Local Development Plan 2012[18] (HwLDP); and
- Highland Council Inner Moray Firth Local Development Plan 2015[19] (IMFLDP).

9.2.7. In the Highland Council area, the HwLDP contains the main planning policies relevant to this assessment; the IMFLDP contains settlement designations but none of these is directly affected by any of the options.

9.2.8. Both local authorities' local development plans, in line with NPF3, include the dualling of the A96 and have policies supporting the Scheme:

- the MLDP includes Policy T1 which states, "The Council will promote the improvement of road, rail, air and sea routes in Moray and priority will be given to: a) dualling the A96 Aberdeen to Inverness route with early delivery of bypasses for settlements prioritised...";

[14] The Scottish Government (2014) Ambition, Opportunity, Place, Scotland's Third National Planning Framework (NPF3) APS Group Scotland. Available at https://beta.gov.scot/publications/national-planning-framework-3/
[15]The Scottish Government (2014) Scottish Planning Policy. APS Group Scotland. Available at http://www.gov.scot/Resource/0045/00453827.pdf
[16] The Planning etc. (Scotland) Act 2006 (2007). The Stationery Office Limited. Available at http://www.legislation.gov.uk/asp/2006/17/pdfs/asp_20060017_en.pdf
[17] Moray Council (2015) Moray Local Development Plan 2015. Development Plans, Environmental Services. Moray Council. Available at http://www.moray.gov.uk/moray_standard/page_100458.html
[18] The Highland Council (2012) Highland-wide Local Development Plan 2012. Highland Council. Available at https://www.highland.gov.uk/info/178/local_and_statutory_development_plans/199/highland-wide_local_development_plan
[19] The Highland Council (2015) Inner Moray Firth Local Development Plan 2015. Highland Council. Available at https://www.highland.gov.uk/downloads/file/15008/adopted_inner_moray_firth_local_development_plan

- the HwLDP states that by 2030 the HwLDP will have "…resolved its infrastructure constraints … removing the barriers to growth which includes the A96 upgrade." (paragraph 8.2); and
- the IMFLDP states that significant investment in major infrastructure, including dualling of the A96, will support the delivery of development in the Inverness to Nairn Growth Area.

9.2.9. Supplementary Guidance has been adopted by both authorities providing additional detail to the policies contained within the local development plans; the Supplementary Guidance considered relevant to this assessment is Moray Council's Rural Groupings[20].

9.2.10. The MLDP and the HwLDP are in the process of being reviewed and updated. The revised local development plans will provide an updated vision and spatial strategy with planning policies to guide development over the next 20 years.

9.2.11. In December 2017 Moray Council published a Main Issues Report (MIR) for consultation, which included a number of proposed policy revisions and sites to be considered for designation in the emerging Moray Local Development Plan 2020. The preparation of the MIR was one of the first formal stages towards updating the current MLDP following a 'call for sites'[21] in 2017. The MIR housing and employment sites were subsequently reviewed and a revised set of sites recommended by Moray Council for inclusion in the Proposed Moray Local Development Plan 2020 were presented to the Council's Planning and Regulatory Services Committee on 25 September 2018. The Proposed Moray Local Development Plan 2020 is due to be considered by the Council in December 2018.

9.2.12. The review of the HwLDP commenced with a MIR being published by Highland Council and consulted on in 2016. Based on an initial review of the comments received, an interim position on the issues raised was agreed by the Council in August 2016; however the review is currently postponed until the implications of the Planning (Scotland) Bill[22] are more clearly understood. No sites were included in Highland Council's MIR for consideration.

9.2.13. This assessment focuses on Moray Council and Highland Council's adopted local development plans. An assessment of the development sites identified in the Proposed Moray Local Development Plan 2020 has been included for information only as the Proposed Plan currently has no material planning status. The consideration of the Proposed Moray Local Development Plan 2020 sites is set out in Appendix A9.4 (Volume 4b).

[20] Moray Council (2016) Rural Groupings Supplementary Guidance, Moray Local Development Plan. Development Plans, Environmental Services. Moray Council. Available at http://www.moray.gov.uk/downloads/file107404.pdf
[21] A process where the council seeks to identify sites that may be suitable for allocation for development in the next local development plan. Sites can be put forward by developers, landowners, communities and other interested parties for consideration
[22] A Bill for an Act of the Scottish Parliament - The Planning (Scotland) Bill was introduced into the Scottish Parliament on 4 December 2017 to make provision relating to how land is developed and used. The Bill is in the process of being reviewed

9.3 Approach to Assessment

9.3.1. This assessment of polices and plans considers:

- Local development plan policies;
- Local development plan designated sites for future development, and for safeguarding or protection including designations for:
    1. residential areas;
    2. business parks;
    3. employment/industrial areas;
    4. community facilities;
    5. tourism areas;
    6. flood alleviation areas;
    7. landscape enhancements;
    8. amenity areas; and
    9. environmental areas;
- Planning applications; and
- Moray Council's recommended sites for inclusion in the Proposed Moray Local Development Plan 2020[23].

Data Sources

9.3.2. The policies and plans baseline was established using:

- Data on local development plan designations provided by Moray Council in December 2016, and planning application data initially provided in February 2017, updated in September 2017 and September 2018;
- Data on local development plan designations and planning applications provided by Highland Council in December 2016, updated in September 2017 and June 2018;
- Data available on the Moray Council website[24] and the Highland Council website[25] including the respective Planning e-Portals which allow for planning application searches and updates;
- Aerial photography from March 2017 undertaken for the Scheme; and
- Information obtained from site visits undertaken in September 2017, February 2018 and June 2018.

Consultation

9.3.3. Consultations have been held with the Planning Department at Moray Council where the approach to this assessment was discussed. Moray Council provided information on the

[23] Sites recommended by Moray Council for inclusion in the Proposed Moray Local Development Plan 2020 have no formal planning status, the assessment is for information only, see Appendix A9.4
[24] Moray Council's Planning and Building Services website. Available at http://www.moray.gov.uk/moray_section/section_88557.html. [Accessed 14 September 2018]
[25] The Highland Council's Planning and Building Services website. Available at https://www.highland.gov.uk/info/161/planning_and_building_standards. [Accessed 14 September 2018]

current local development plan designations, the local development plan review process and the programme Moray Council are working to, as well as the response to their 'call for sites'. These consultations provided clarity on some policies and designations including the Countryside Around Town policy (Policy E10) and landscape designations. Highland Council was also consulted to obtain policies and planning data relevant to the assessment at the far western extent of the Scheme.

Assessment Methodology

9.3.4. The approach to the assessment of impacts on policies and plans is to consider whether the options are compliant with planning policies and to determine the likely magnitude of any predicted impact on potential future land uses. This assessment considers impacts on local development plan policies, local development plan site allocations and on planning applications.

9.3.5. As noted above in Paragraph 9.2.4, the A96 Dualling is a key national project supported by the Scottish Government and included in NPF3. The MLDP and HwLDP fully reflect the aims of NPF3 and Scottish Planning Policy and support the Scottish Government's overall objective of sustainable development. This assessment therefore focuses on the local development plans.

Local Development Plan Policy Assessment Criteria

9.3.6. The first stage of this assessment involved a review of the local development plan policies, which cover numerous land use and environmental aspects. Following the identification of the relevant policies, each route option was assessed against each of the policies.

9.3.7. The majority of the planning policies relate to environment and resource topics which are considered in detail in this DMRB Stage 2 assessment; cross references are provided to the relevant technical chapters which inform the assessment where applicable.

9.3.8. All local development plan policies were initially assessed to determine their relevance to the Scheme options; not all polices are relevant due to the geographical location of the options. For example, MLDP Policy E1 'Natura 2000 Sites and National Nature Conservation Sites' was deemed relevant as some options may have potential to affect Natura 2000 or national nature conservation sites directly or indirectly. Whereas, MLDP Policy R1 'Town Centre Development' was considered not relevant as it applies only to retail development and other uses, such as leisure or public buildings within a town centre and none of the options affects town centre areas.

9.3.9. In addition, some polices were considered relevant but only at a Scheme wide level as they are not geographically specific to any area and apply equally to all options, for example MLDP Policy PP2 on climate change.

9.3.10. For this assessment, 'scheme wide policies' are defined as those policies applicable to the A96 Hardmuir to Fochabers Scheme, and 'option specific policies' are defined as those policies specifically applicable to the Stage 2 route options by virtue of their geographical location.

9.3.11. The performance of each option has been assessed against the criteria in Table 9.1 below, which shows the impact categories and the assessment criteria definitions adopted; scheme wide policies are assessed separately using the same criteria.

9.3.12. The policy assessment was undertaken with input from other environmental disciplines. When considering each of the individual policies, professional judgement was used to form a view as to the overall performance of each option against each policy.

Table 9.1: Local Development Plan Policy Assessment Criteria

Performance against Policy	Definition
Complies	Option clearly complies with the policy or would facilitate the achievement of the policy.
Possible Conflict	Option would possibly conflict with the policy or would possibly hinder the achievement of the policy pending detailed environmental assessment, consideration of mitigation and further consultation. Full assessment against policy will be undertaken during DMRB Stage 3.
Conflict	Option clearly conflicts with the policy or would hinder the achievement of the policy.
Uncertain	Information is not yet available to consider performance against policy.
Not Relevant	Policy is not relevant to option.

Local Development Plan Designated Sites Criteria

9.3.13. The second stage of the assessment was to consider the impact of the Scheme on local development plan designations.

9.3.14. The impact of each option on local development plan designations was informed by an assessment of the approximate area of potential land-take from each designated site. The area of direct land-take was calculated as well as the percentage of that land-take compared to the overall area of the designation. Table 9.2 below sets out the impact categories and the assessment criteria definitions.

Table 9.2: Local Development Plan Designated Sites Assessment Criteria

Impact	Definition
Major	A fundamental reduction in the development capacity of the designated site (e.g. more than 50% of land-take).
Moderate	A material but non-fundamental reduction in the development capacity of the designated site (e.g. between 10% and 50% of land-take).
Minor	A minor reduction in the development capacity of the designated site (e.g. less than 10% of land-take).

9.3.15. A study area of 500m around the route options was used to identify local development plan designations that lie close to the options. The study area aligns with that used in the People and Communities assessment, see Chapter 12 (People and Communities). The designations within the study area that are not directly affected by a route option may be affected indirectly e.g. by traffic noise, air quality or visual impacts, key potential impacts have been considered in other parts of the environmental assessment where it has been possible to comment on effects on future land uses.

9.3.16. The criteria used to assess the local development plan designated sites was also used to assess the sites recommended to be included in the Proposed Moray Local Development Plan 2020 (see Section 9.2.11); the site assessment can be found in Appendix A9.4 (Volume 4b).

Planning Application Assessment Criteria

9.3.17. The third stage in this assessment considered the impacts of the options on planning applications. This has included current planning applications (which were awaiting a decision at the time of the assessment) and valid consented applications which were not built at the time of the assessment. The assessment was prepared based on publicly available planning application information up to 14 September 2018.

9.3.18. Planning application data provided by the Councils was initially sifted to exclude the following types of applications which were not considered to be relevant to this assessment:

- Applications more than 500m from an option;
- Applications submitted to, but not yet validated by, the local planning authority for consideration;
- Applications consented (full planning consent and planning consent in principle) more than three years ago except major applications, e.g. mineral applications;
- Applications now built or where construction or operation has started, as these developments now form part of the land use baseline;
- Consents that will have expired before 2030 (Scheme year of opening) and the land expected to be restored;
- Advertisement consents, Listed Building consents and Certificate of Lawful Development applications;
- Minor applications for building extensions or internal alterations;
- Applications for EIA screening or scoping opinions;
- Applications that have been withdrawn or refused and the appeal period expired; and
- Applications relating to other sections of the A96 Dualling Programme.

9.3.19. Where an application is associated with the build out of a designated site, the application has not been assessed if it aligns with that designation, to avoid duplication of assessment.

9.3.20. The method of assessment of the effects of options on relevant planning applications is similar to that presented for designated sites; Table 9.2 sets out the criteria used.

Mitigation, Assumptions and Limitations

9.3.21. The land-take impacts presented in this assessment are all considered to be adverse and permanent. Land-take calculations are approximate and have been derived using Geographic Information System (GIS). It is possible that areas calculated could change for any option as the design is further developed during DMRB Stage 3.

9.3.22. This assessment does not include construction impacts or any additional land-take, which may be required for any future mitigation such as compensatory planting. These would be identified and assessed during DMRB Stage 3.

9.3.23. This assessment has been undertaken based on information available at this stage. There is a likelihood that design development during DMRB Stage 3 will lessen or resolve some local development plan policy conflicts and possible conflicts. This assessment has focused on the clear policy compliance differences at this stage.

9.3.24. Minor boundary and tie-in adjustments to the option designs may be possible through design development and refinement at DMRB Stage 3 to minimise unnecessary land-take. Where a direct impact has been identified but it is considered that the impact can be avoided through design development, the details are reported in the assessment tables in Appendices A9.2 and A9.3 (Volume 4b) for completeness but not used to inform the assessment presented in this chapter.

9.3.25. This assessment does not consider indirect impacts on local development plan designations or planning applications; these will be considered during DMRB Stage 3.

9.4 Baseline

9.4.1. This section sets out the policies and plans which have been considered in this assessment.

Local Development Plan Policy

9.4.2. The MLDP sets out Moray Council's vision for Moray in which economic development is a key objective in line with the Scottish Government's core principles and objectives. Moray Council states that they consider that the economic and employment benefits of business and industrial growth should be a material consideration in any development proposal. The MLDP policies are strongly based on the Moray Economic Strategy[26] and aim to provide an adequate supply of housing land, respond positively to economic proposals, safeguard and enhance Moray's environmental qualities and promote low carbon sustainable development. Moray Council seeks to have good efficient transport links to the rest of the country.

9.4.3. The HwLDP sets out how Highland Council plans to meet the Scottish Government's aspirations for sustainable economic growth with a focus on supporting an increase in house building and providing a generous supply of land for future housing. The Highland

[26] The Moray Community Partnership (2012) The Moray Economic Strategy. Moray Council. Available at: http://www.moray.gov.uk/moray_standard/page_96870.html/ . [Accessed 20 August 2018]

Council vision for 2030 is to be one of Europe's leading regions with sustainable communities, balanced population growth and economic development, and a safeguarded environment providing a fairer and healthier Highlands. The Council aims by 2030 to have helped deliver, in partnership with Transport Scotland and other transport bodies, transport infrastructure improvements across the area in line with the Council's Local Transport Strategy and the Scottish Government's Strategic Transport Projects Review.

9.4.4. The MLDP and the HwLDP set out a number of policies grouped into categories. Table 9.3 below sets out the relevant policy categories in these plans and summarises the key aims of the policies within each category.

9.4.5. The full lists of MLDP and HwLDP policies are set out in Appendix A9.1, Tables 1.2 and 1.3 (Volume 4b). These tables list each policy by reference number and name, and indicate if it is relevant or not to this assessment and if so whether it applies at a scheme wide level or if it is geographically relevant to the options (see Paragraphs 9.3.6 to 9.3.12 above for definitions). The MLDP and HwLDP should be referred to for full details of the policy wording[17 & 18].

9.4.6. In total, four Moray Council policies were considered relevant at a Scheme wide level and 27 policies were relevant to the options. Two of Highland Council's policies were relevant at a scheme wide level and 19 policies were relevant to the options.

Table 9.3: Summary of Local Development Plan Policies

Policy Category	Local Development Plan Policy Summary
Moray Local Development Plan 2015	
Primary Policy	The primary polices reflect the priorities set out in Scottish Planning Policy and the overall objectives of Moray Council. These policies will be applied to all development proposals and used with the more detailed policies set out within the relevant sections of the MLDP to determine planning proposals. The primary policies aim to support the Scottish Government's aim in terms of sustainable economic growth (PP1), climate change (PP2) and placemaking (PP3).
Economic Development / Employment Land	The MLDP contains policies on economic development to ensure that there is a range and choice of sites and locations for development and investment in order to support economic growth. The policies also protect historical, traditional industries and control development in sensitive areas. The policies cover new employment land and business areas / uses (Policies ED1 – ED5), along with digital communications (Policy ED6) and tourism policies (ED8 and ED9).
Residential Development	These policies protect a range of sites which are effective or capable of meeting the housing supply target. The policies ensure placemaking is considered and help to reduce the impact of housing development on the environment. Housing policies (Policies H1 – H11) set out expectations relating to new housing land, existing housing, development and housing in the countryside, affordable and accessible housing as well as caravan and traveller sites.
Environmental Resources	These policies protect habitat, species and landscapes of international, national and local importance whilst also protecting greenspaces, water environments and trees. The environmental resources policies are split into the following four categories. Natural Environment (Policies E1 – E8) focuses on the protection of environmental features such as Natura 2000 sites, protected species, trees, open spaces, Areas of Great Landscape Value etc. Urban sprawl is controlled by Polices E9 Settlement Boundaries and E10 Countryside Around Towns. Built Environment (Policies BE1 – BE6) protects development affecting scheduled monuments, listed buildings, conservation areas and battlefields, gardens and designed landscapes. Environmental Protection covers waste (Policies EP1 – EP3), water resources and flood risk (Policies EP4 – EP7). Pollution is covered by Policy EP8, contaminated land (Policy EP9), foul drainage (Policy EP10), hazardous sites (Policy EP11), air quality (Policy EP12) and EP13 MOD safeguarding area.

Policy Category	Local Development Plan Policy Summary
	Environmental Resources addresses a number of development types including: renewable energy proposals (Policy ER1); development in woodlands (Policy ER2); safeguarding mineral reserves (ER3); minerals (Policy ER4); agriculture (Policy ER5); and soil resources (Policy ER6).
Transportation and Accessibility	Transport policies support: • The reduction of emissions from transport sources; • Sustainable transport and safeguarding non-motorised user routes; and • Enhancing accessibility. Policies T1 – T7 cover transport infrastructure improvements, access, roadside facilities, bus, road and harbour facilities, parking, traffic management and walking, cycling and equestrian networks.
Retail and Commercial Development	The retail policies help provide opportunities for retail development in the most appropriate locations whilst maintaining the vitality and viability of town centres. Town centre development is managed through Policy R1, out of town development by Policy R2 and neighbourhood and local shops is managed by Policy R3.
Implementation	Implementation policies summarise the key aspects of development proposals which will require to be observed through the planning application process and which advise on circumstances where potential impacts may require additional information to be provided. This includes developer requirements (Policy IMP1), development impact assessment (Policy IMP2), developer obligations (Policy IMP3) and development plan monitoring (Policy IMP4).
Highland Wide Local Development Plan 2012	
Spatial Strategy General Policies	The fundamental objective of the HwLDP is to direct the right sorts of development to the right places, thereby making better places. The general policies will be applied consistently across the Highland area. Policy 1 focuses on completing the uncontained city expansion areas, while Policy 2 covers Inverness and Policy 3 city centre development in general. Policies 4 - 27 cover specific town areas as well as the A96 corridor (phasing and infrastructure) between Inverness to Nairn (Policy 9).
Sustainable Highland Communities	Highland Council support development of existing communities and rural areas whilst maintaining a high-quality landscape. Policies support the provision of a range of housing opportunities to meet the housing demand.

Policy Category	Local Development Plan Policy Summary
	Sustainable design (Policy 28) is a key policy along with design quality and place-making (Policy 29), physical constraints (Policy 30) and developer contribution requirements which are set out in Policy 31. Policies 32 – 39 cover housing and settlements along with development in the countryside and traveller sites.
Delivering a Competitive, Sustainable, Adaptable Highland Economy	City centres and other town and village centres are considered important, having economic, social, and cultural roles and catering for a wide range of people and their needs. Policies are designed to encourage both economic opportunities as well as improvements to the public realm of meeting places and social spaces. Retail development is the focus of Policy 40; Policy 41 covers business and employment while Policy 42 covers previously used land. Tourism is covered by Policies 43 and 44, while Policies 45 and 46 address communications. The safeguarding of agricultural land and crofting are the focus of Policies 47 and 48, while Policies 49 – 55 cover coastal development, aquaculture, trees and development, woodland and minerals and soils. Travel and transport are covered in Policy 56.
Safeguarding our Environment	These policies aim to support and protect the outstanding natural, built and cultural heritage of international, national and local importance in the Highlands. Policies 57 - 66 cover the following aspects namely cultural heritage, protected species, landscape, geodiversity, water resources and flooding.
Sustainable Development and Climate Change	These policies support: • Renewable energy production contribution towards meeting ambitious targets set internationally, nationally and regionally; waste management national targets; and • Reducing pollution and maintaining a high-quality environment. Renewable energy and transmission development is covered by Policies 67 - 69, while waste management is covered by Policies 70 and 71. Pollution and air quality are the focus of Policies 72 – 73.
Healthier Highland	Policies which protect high quality, accessible, “fit for purpose” open spaces to enhance the Highland area as a place in which to live and work. Green networks, open spaces, playing fields, outdoor access and long distance routes are the focus of Policies 74 – 78.

Local Development Plan Designated Sites

9.4.7. The designated sites affected by the options are derived from the Moray Council's Settlement Statements as set out in the MLDP and from Supplementary Guidance: Rural Groupings[20]. As noted in Section 9.2.7, none of Highland Council's designations would be affected by any of the options. The Settlement Statements and Rural Groupings set out a series of maps with land designations for each settlement in Moray. Sites are designated for future development indicating the type of uses that would be acceptable, or if a current use is to be safeguarded or protected.

9.4.8. Table 9.4 below provides a summary of the types of designations within 500m of each route option listed by settlement or rural location. There is a focus of development around the towns of Forres, Elgin, Mosstodloch and Fochabers which include designations for housing, employment and environmental areas. There are a number of Transport Improvements (TSP) identified in Forres, Elgin, Mosstodloch and Fochabers as locations rather than designated areas of land.

9.4.9. The full list of designations within 500m of the options is set out in Appendix A9.2, Table 1.2 to Table 1.7 (Volume 4b). These include the MLDP site reference numbers, site descriptions and location details; these designations are shown in Figures 9.1, 9.2 and 9.3 (Volume 5).

Table 9.4: Summary of MLDP Designations within 500m of Options

Settlement / Rural Grouping	Summary of Types of Local Development Plan Designations
Brodie	Environment – Amenity
Broom of Moy	Environment – Amenity
Forres	Environment – Public Park and Gardens, Playspace, Green Corridors/ Natural/Semi Natural Greenspaces, Other Functional Greenspace
	Employment – Industrial, Business Park
	Flood Alleviation
	Housing - Residential
	LONG - Residential (i.e. long term housing designation)
	Opportunity
	Transport Improvement Sites
Mundole	Environment – Amenity
	Tourism
Alves	Environment – Sports Area, Green Corridors/Natural/Semi Natural Greenspaces, Other Functional Greenspace

Settlement / Rural Grouping	Summary of Types of Local Development Plan Designations
	LONG - Residential (i.e. long term housing designation)
Burgie	Environment - Amenity
Elgin	Environment - Amenity Greenspace, Playspace for Children, Green Corridors/Natural/Semi Natural Greenspaces, Other Functional Greenspace
	Employment – Industrial
	Business Park/Opportunity
	Housing – Residential
	LONG - Residential (i.e. long term housing designation)
	Transportation Improvements
Darklands (North)	Environment - Amenity
Miltonduff (North)	Environment – Amenity
Troves	Employment - Industrial
Lhanbryde	Environment - Private Gardens or Grounds, Amenity Greenspace, Playspace, Sports Areas, Green Corridors/Natural/Semi Natural Greenspaces, Other Functional Greenspace, Cemeteries
	Housing – Residential
Mosstodloch	Environment - Amenity, Sports Areas, Green Corridors/Natural/Semi Natural Greenspaces, Other Functional Greenspace
	Employment - Industrial
	Tourism
	Transportation Improvements
Fochabers	Environment - Amenity Greenspace, Sports Area, Green Corridors/Natural/Semi Natural Greenspaces, Other Functional Greenspace, Civic Space
	Housing - Residential
	LONG – Residential (i.e. long term housing designation)
	Opportunity
	Tourism
	Transportation Improvements

Planning Applications

9.4.10. Planning application information has been derived from the data provided by Highland Council and Moray Council, which were updated periodically over the assessment period and which have been sifted to exclude applications that are not relevant to this assessment (see Section 9.3).

9.4.11. Table 9.5 below provides a summary of the types of planning applications included in this assessment. This is based on the local authorities' application type category for those consents applied for or which have been approved. Most of the applications within 500m of the options are for 'Housing – local' developments i.e. small-scale housing developments and 'Business and Industry – local' i.e. small-scale business and industry applications. Applications that are aligned with a specific local development plan designation are not included in the list below to avoid duplication (see Section 9.3); this includes most of the larger housing and business and industry applications.

Table 9.5: Planning Application Types within 500m of Options

Summary of Planning Application Types	Location
Housing – local	Ardgye, Beechbrae, Cairnend, Elgin, Feddan, Fochabers, Forres, Hardmuir, Lhanbryde, Mosstodloch, Mosstowie, Newton, Quarrywood, Rafford, Sweethillock and Troves
Housing – major	Forres
Business and industry - local	Forres, Lhanbryde, Miltonduff, Rafford and Troves
Minerals	Forres
Other developments, consents and certificates (including agricultural)	Burgie, Elgin, Fochabers, Lhanbryde and Newmill

9.4.12. The planning applications considered within the study area are listed in Appendix A9.3, Tables 1.2 – 1.7 (Volume 4b). These tables set out the application numbers, the application types and status (e.g. permitted or pending determination), the application address and details of the proposed development. The locations of applications potentially affected by options are shown in Figures 9.1, 9.2 and 9.3 (Volume 5) with the totals shown in brackets.

9.5 Assessment

9.5.1. This section presents the findings of the policies and plans assessment for the options.

Local Development Plan Policy Assessment

Policies Relevant at a Scheme Wide Level

9.5.2. There are four policies in the MLDP and two policies in the HwLDP which have been identified as being relevant at a scheme wide level. Table 9.6 below sets out a summary of

each of these scheme wide policies with commentary on how the Scheme performs overall against them.

Policies Relevant to the Route Options

9.5.3. There are 27 policies in the MLDP and 19 policies in the HwLDP, which have been identified as being relevant to the options. These are all listed in Tables 1.2 and 1.3 in Appendix A9.1 (Volume 4b) and matrices of the options' policy compliance are set out in Tables 1.4 and 1.5 of Appendix A9.1 (Volume 4b).

9.5.4. A number of the policies are multi-faceted covering more than one environmental aspect, e.g. MLDP Policy EP8 on Pollution covers emissions to air, water and noise and light emissions, therefore assessment of performance against this policy requires consideration of the air quality, noise and vibration, landscape and visual and the water environment. In addition, some policies are definitively worded requiring details of mitigation and stakeholder agreement to be finalised, and more strategic considerations to be factored in, e.g. MDLP Policy BE1 on Scheduled Monuments and National Designations states that '*development proposals will be refused where they will adversely affect a Scheduled Monument unless the developer proves that any significant adverse effect on the qualities for which the site has been designated are clearly outweighed by social or economic benefits of national importance'*. Full consideration will involve a number of aspects, such as socio-economic benefits, which will be factored in during DMRB Stage 3.

9.5.5. Each option was assessed with reference to the criteria set out in Table 9.1 and the assumptions set out in Paragraph 9.3.23 above. The performance of the options is discussed below under the assessment categories and per section.

Table 9.6: Local Development Plan Policy Assessment – Scheme Wide

Policy Category and Name	Policy Description	Assessment / Comment
Moray Local Development Plan 2015		
Primary Policies **Policy PP2: Climate Change**	In order to contribute to reducing greenhouse gas emissions, development which meets a certain criterion should: • Be in sustainable locations; • Optimise accessibility to active travel options and public transport; • Utilise sustainable construction techniques and materials; • Where practical, install low and zero carbon generation technologies; • Prevent further development that would be at risk of flooding or coastal erosion; • Minimise disturbance to carbon rich soils and, in cases where it is agreed that trees can be felled, to incorporate compensatory tree planting; and • Be supported by a Sustainability Statement that sets out how the above objectives have been addressed within the development.	This policy mainly relates to the development of buildings; however, elements of it can be applied to the development of infrastructure projects. The Scheme has: • Developed options which make efficient use of land and infrastructure where practical; • Considered accessibility to active travel options and public transport; • Developed designs which do not materially affect flood levels; and • Minimised disturbance to carbon rich soils by avoiding areas of peat as far as possible. Transport Scotland has established sustainability objectives for the A96 Dualling Programme, which are being monitored for the Scheme. These include a requirement to address carbon reduction for the Scheme's future construction.
Transport and Accessibility Policy T1: Transport Infrastructure Improvements	T1 states, *"The Council will promote the improvement of road, rail, air and sea routes in Moray…Dualling the A96 Aberdeen to Inverness route with early delivery of bypasses for settlements prioritised…"*. Amongst other projects the A96 dualling forms one of the Council's priorities for improved transport infrastructure.	The Scheme complies with Moray Council's policy on intent to improve key road links. The Scheme is part of the Council's policy to improve transport infrastructure between Aberdeen and Inverness.
Implementation Policy IMP1: Developer Requirements	IMP1 states, "*New development will require to be sensitively sited, designed and serviced appropriate to the amenity of the surrounding area…"*.	The Scheme has been subject to an options assessment process to identify the Preferred Option. In accordance with the policy, this process has considered a number of aspects including: character of the surrounding area; the surrounding landscape; road, footpath, cycling and public transport routes;

Policy Category and Name	Policy Description	Assessment / Comment
		water and drainage; natural and built environmental resources including impacts on carbon rich soil; areas of flood risk; pollution risk; contaminated soil; and agricultural land. The Scheme will be subject to an Environmental Impact Assessment (EIA) at DMRB Stage 3.
Implementation Policy IMP2: Development Impact Assessment	IMP2 states, *"The Council will require applicants to provide impact assessments in association with planning applications in the following circumstances: a) an environmental assessment… b) a Transport Assessment…"*	As required by this policy, the Scheme will be accompanied by an EIA and a Transport Assessment at DMRB Stage 3.
Highland Wide Local Development Plan 2012		
Spatial Strategy - General Policies Policy 28: Sustainable Design	Policy 28 states, *"The Council will support developments which promote and enhance the social, economic and environmental wellbeing of the people of Highland..."* Proposed developments will be assessed on the extent to which they accord with the criteria as set out in the local development plan. Policy 28 goes on to state, *"Where environmental and/or socio-economic impacts of a proposed development are likely to be significant by virtue of nature, size or location, The Council will require the preparation by developers of appropriate impact assessments. Developments that will have significant adverse effects will only be supported if no reasonable alternatives exist, if there is demonstrable over-riding strategic benefit or if satisfactory overall mitigating measures are incorporated."*	The Scheme has been subject to a Strategic Environmental Assessment (SEA)[27] and an options assessment process to identify a Preferred Option. In accordance with the policy, this process includes consideration of: public transport, cycling and walking; brownfield sites; amenity; mineral deposits; agricultural land; routes for road and rail links; pollution and discharges; habitats; freshwater systems; species; landscape, cultural heritage, scenery; air quality; local character and historic and natural environment. The Scheme will be subject to an Environmental Impact Assessment (EIA) at DMRB Stage 3.

[27] Transport Scotland (2015) A96 Dualling, Strategic Environmental Assessment Tier 2 Environmental Report. Transport Scotland. Available at https://www.transport.gov.scot/media/39271/a96-tier-2-sea-environmental-report.pdf

Policy Category and Name	Policy Description	Assessment / Comment
Spatial Strategy - General Policies Policy 30: Physical Constraints	Policy 30 states, *"Developers must consider whether their proposals would be located within areas of constraints as set out in Physical Constraints: Supplementary Guidance."* *"Where a proposed development is affected by any of the constraints detailed within the guidance, developers must demonstrate compatibility with the constraint or outline appropriate mitigation measure to be provided."*	The Scheme is located in an area with a number of physical constraints which will affect its development e.g. watercourses, Ministry of Defence Installations, private water supplies, active quarries etc. Detailed studies have been, and will continue to be undertaken, to identify the extent to which the Scheme is compatible with such physical constraints or if it will have an impact on them and whether mitigation measures are required.

Policy Compliance

9.5.6. All of the options comply with the following MLDP and HwLDP[28] policies:

- MLDP Policy T4 Safeguarding Bus, Rail and Harbour Facilities;
- MLDP Policy T6 Traffic Management;
- HwLDP Policy 78 Long Distance Routes;
- MLDP Policy EP7 Control of Development in Flood Risk Areas;
- HwLDP Policy 64 Flood Risk;
- MLDP Policy BE3 Conservations Areas;
- HwLDP Policy 57 Natural, Built and Cultural Heritage; and
- HwLDP Policy 36 Development in the Wider Countryside.

9.5.7. Rail and harbour facilities are not adversely affected by the Scheme and the removal of strategic traffic from the existing A96 would improve journey times for local bus services, all options therefore comply with Policy T4. A Transport Assessment and an Environmental Impact Assessment will be undertaken for the Scheme which addresses the requirements of Policy T6. Hardmuir to Hillhead North and South Options also comply with HwLDP Policy 78 Long Distance Routes; see Chapter 12 (People and Communities) for further details.

9.5.8. Consultation on the approach to flood risk has been undertaken with Moray Council and SEPA and work to date has demonstrated that all options address flood risk with mitigation, where required at this stage, in accordance with MLDP Policy EP7 and HwLDP Policy 64 and associated guidance from DMRB and SEPA. The assessment presented in Chapter 20 (Road Drainage and the Water Environment) discusses flood risk in more detail.

9.5.9. None of the options would have a detrimental effect on any Conservation Area and therefore all comply with MLDP Policy BE3. The Hardmuir to Hillhead options also comply with HwLDP Policy 57 Natural Built and Cultural Heritage as the Scheme does not adversely affect any cultural heritage assets within the Highland area (see Chapter 16 Cultural Heritage).

9.5.10. HwLDP Policy 36 Development in the Wider Countryside has been adopted to encourage development in the countryside including infrastructure which will support the development of rural areas. The Hardmuir to Hillhead options comply with this policy, which does not apply to the other options.

9.5.11. The Hardmuir to Hillhead options lie in close proximity to designated waste sites within the MLDP, which are safeguarded by MDLP Policy EP3 Identifying and Safeguarding Key Waste Sites. The Hardmuir to Hillhead options are not predicted to have a detrimental impact on any waste sites and comply with MLDP Policy EP3. MLDP Policy EP3 is not relevant to the other options.

[28] HwLDP Policy compliance is only applicable to the Hardmuir to Hillhead options

Possible Policy Conflicts

9.5.12. Most options are considered to present a number of possible conflicts with local development plan policies. The definition of 'possible conflict', as set out in Table 9.1, acknowledges that full consideration of policy performance is not possible at this stage pending design refinement, detailed environmental assessment, and confirmation of mitigation measures.

9.5.13. All options are predicted to affect nature conservation interests and there are six relevant policies which the options possibly conflict with:

- MDLP Policy E1 Natura 2000 Designations;
- MDLP Policy E2 Local Nature Conservation Sites and Biodiversity;
- MDLP Policy E3 Protected Species;
- HwLDP Policy 58 Protected Species;
- HwLDP Policy 59 Other Protected Species; and
- HwLDP Policy 60 Other Important Habitat and Article 10 Features.

9.5.14. All options potentially affect protected habitats and/or protected species to some degree and possible mitigation measures have been identified at this stage (see Chapter 18 Nature Conservation); this will be further developed during DMRB Stage 3. The key areas of importance are internationally and nationally protected sites, for example the River Spey Special Area of Conservation (SAC) which is potentially affected by the Lhanbryde to East of Fochabers North and South Options. The MLDP and HwLDP policies protecting ecological assets are strongly worded requiring the development of detailed mitigation, agreement from Scottish Natural Heritage (SNH), full compliance with legislation and the securing of appropriate protected species licences. The Scheme will be developed to ensure compliance with all relevant ecological legislative requirements.

9.5.15. All options have an impact on trees and woodland which are protected by four policies:

- MDLP Policy E4 Trees and Development;
- MDLP Policy ER2 Development in Woodlands;
- HwLDP Policy 51 Trees and Development; and
- HwLDP Policy 52 Principle of Development in Woodland.

9.5.16. Whilst it is anticipated that mitigation planting would compensate for the loss of woodland and trees, there is a possibility that the options would conflict with these policies; details will be developed during DMRB Stage 3. Predicted effects on woodlands are addressed primarily in Chapter 13 (Agricultural, Forestry, Equestrian and Sporting) and Chapter 18 (Nature Conservation).

9.5.17. All options are predicted to have potential impacts on a number of sensitive watercourses and waterbodies that traverse the area and there will be a requirement for surface water drainage from the Scheme during operation. The water environment is protected by four policies which the options possibly conflict with:

- MDLP Policy EP5 Surface Water Drainage: Sustainable Urban Drainage Systems (SUDS);
- MDLP Policy EP6 Waterbodies;
- HwLDP Policy 63 Water Environment; and
- HwLDP Policy 66 Surface Water Drainage.

9.5.18. Route option designs include a number of sustainable drainage options such as retention ponds; the drainage design will be refined during DMRB Stage 3. Chapter 20 (Road Drainage and the Water Environment) discusses effects on water quality and flood risk in more detail.

9.5.19. All options possibly conflict with two policies which address impacts on the wider landscape including consideration of Areas of Great Landscape Value (AGLVs), which lie to the south of Forres (River Findhorn AGLV) and south of Fochabers (Speyside AGLV):

- MLDP Policy E7 Areas of Great Landscape Value and impacts upon the wider landscape; and
- HwLDP Policy 61 Landscape.

9.5.20. The landscape assessment (see Chapter 17) has identified landscape character areas across the wider landscape and has assessed the potential impacts on these areas. The overall effects at DMRB Stage 3 will depend on the detailed design of the Scheme including its vertical and horizontal alignment and design of key structures.

9.5.21. All options potentially affect the setting of scheduled monuments or listed buildings and, therefore, possibly conflict with one or both of the following policies:

- MLDP Policy BE1 Scheduled Monuments and National Designations; and
- MLDP Policy BE2 Listed Buildings.

9.5.22. The options have been designed to date to avoid direct impacts on such nationally important sites but effects may still occur on the setting of these sites and structures. Mitigation will be further developed through DMRB Stage 3 and consultation with Historic Environment Scotland (HES) will continue to inform designs. Chapter 16 (Cultural Heritage) sets out further information on predicted effects of the options on these assets.

9.5.23. Hardmuir to Hillhead North Option and Lhanbryde to East of Fochabers North Option possibly conflict with MLDP Policy BE5 Battlefields, Gardens and Designed Landscapes which lie in close proximity to Darnaway Castle and Brodie Castle (Hardmuir to Hillhead North Option) and Gordon Castle (Lhanbryde to East of Fochabers North Option) Garden and Designed Landscapes (GDL) designations and they may affect their setting. See Chapter 16 (Cultural Heritage) for further details.

9.5.24. All options would have some impact on open spaces, public access, travel, walking, cycling and equestrian routes etc. and possibly conflict with the following policies:

- MDLP Policy E5 Open Spaces;
- MDLP Policy T2 Provision of Access;

- MDLP Policy T7 Safeguarding and Promotion of Walking, Cycling and Equestrian Networks;
- HwLDP Policy 56 Travel; and
- HwLDP Policy 77 Public Access.

9.5.25. Impacts predicted for the options range from direct impacts such as severance and land-take to indirect impacts on the amenity of community assets. The design of mitigation such as NMU crossings and the re-direction of NMU routes will be developed during DMRB Stage 3 (see Chapter 12, People and Communities, for further details).

9.5.26. Four policies address pollution including noise, air quality and emissions to the water environment and land with an overarching requirement to protect the environment:

- MDLP Policy EP12 Air Quality;
- MDLP Policy EP8 Pollution;
- HwLDP Policy 72 Pollution; and
- HwLDP Policy 73 Air quality.

9.5.27. All options possibly conflict with these policies, detailed impact assessment and mitigation refinement is ongoing for these topics and final impacts on the environment will depend on the Preferred Option design and finalised outputs from the traffic modelling. Further information on these topics can be found in the following chapters: Chapter 10 (Air Quality); Chapter 11 (Noise and Vibration), Chapter 19 (Geology, Soils, Contaminated Land and Groundwater) and Chapter 20 (Road Drainage and the Water Environment).

9.5.28. The Hardmuir to Hillhead South Option and both the options of Hillhead to Lhanbryde section lie within close proximity to designated mineral sites safeguarded by MLDP Policy ER3 Safeguarding Mineral Reserves; they possibly conflict with this policy.

Policy Conflicts

9.5.29. All options have been assessed as conflicting with Moray Council's Settlement Boundary Policy E9. Whilst this policy is not fully applicable to an infrastructure project, it has been considered in this assessment as all options breach the settlement boundaries of a number of towns including Forres, Elgin, Fochabers, Lhanbryde, and Mosstodloch. The policy is focused on controlling urban sprawl beyond the settlement boundaries and in breaching the settlement boundaries the Scheme introduces new development into areas where it is tightly controlled.

9.5.30. The options in the Hardmuir to Hillhead and Hillhead to Lhanbryde sections have been assessed as conflicting with Moray Council's Policy E10 Countryside Around Towns. This policy is aimed at controlling inappropriate development and urban expansion. Whilst the options in the Hardmuir to Hillhead and Hillhead to Lhanbryde sections are considered to conflict with this policy, the A96 Dualling is a priority project for Moray Council, covered by MLDP Policy T1 (discussed in Table 9.6), which is intended to serve Forres and Elgin. It is, therefore, considered that this policy conflict would be a likely acceptable departure by Moray Council.

9.5.31. All options have been assessed as conflicting with Moray Council's Agriculture Policy ER5, and the western end of the options in the Hardmuir to Hillhead section also conflict with the Highland Council Policy 47 on Safeguarding Inbye / Apportioned Croftland. This conflict is unavoidable due to the Scheme's need to take land currently in agricultural use, see Chapter 13 (Agricultural, Forestry, Equestrian and Sporting) for further details.

9.5.32. Hardmuir to Hillhead South Option conflicts with MLDP Policy BE5 Battlefields, Gardens and Designed Landscapes (GDL) as it directly affects the Darnaway Castle GDL designation and may affect the setting of the Brodie Castle GDL designation.

Uncertain

9.5.33. There are two MDLP and two HwLDP policies for which compliance is uncertain for all options due to the absence of sufficiently detailed data; these are MLDP Policies EP9 Contaminated Land and ER6 Soil Resources and HwLDP Policies 42 Previously Used Land and 55 Peat and Soils. These will be assessed in further detail during DMRB Stage 3. Although it should be noted that the Scheme would comply with relevant legislation for contaminated land and it is expected that at DMRB Stage 3 all options would comply with MLDP Policies EP9 and HwLDP Policy 42. Details of the options assessment for these topics are presented in Chapter 14 (Materials) and Chapter 19 (Geology, Soils, Contaminated Land and Groundwater).

Policy Assessment Summary

9.5.34. Table 9.7 below sets out an overall summary of the number of policies each option complies with, possibly conflicts or conflicts with, along with those which are either not relevant or are uncertain. The following paragraphs draw out the key differences between the options.

Hardmuir to Hillhead

9.5.35. The options in the Highland Council area are the same for the North and South Options in terms of performance against policies.

9.5.36. Where the options fall within Moray Council area, the key difference is that the South Option conflicts with Policy BE5 Battlefields, Gardens and Designed Landscape due to its direct impact on Darnaway Castle GDL designation and its possible impact on the setting of Brodie Castle GDL designation, while the North Option may only possibly conflict with this policy. The South Option potentially conflicts with Policy ER3 Safeguarding Mineral Reserves which is not relevant to the North Option. However, as the majority of policies are a possible conflict it is not predicted that there is an overall clear difference in the policy performance between the options.

Hillhead to Lhanbryde

9.5.37. There is no difference in the predicted policy performance between the North and South Options for this section.

Lhanbryde to East of Fochabers

9.5.38. There is one difference in the predicted performance against the policies between the North and South Options for this section. The North Option is predicted to possibly conflict with BE5 Battlefields, Gardens and Designed Landscapes due to a loss of land from within the Gordon Castle GDL designation, while this designation is not relevant to the South Option. However, as the majority of policies are a possible conflict it is not predicted that there is a difference in the policy performance between the options.

Table 9.7: Summary of Local Development Plan Policy Assessment

Option	Complies	Possible Conflict	Uncertain	Conflicts	Not Relevant
Hardmuir to Hillhead					
Highland Council					
North Option	4	12	2	1	0
South Option	4	12	2	1	0
Moray Council					
North Option	5	16	2	3	1
South Option	5	16	2	4	0
Hillhead to Lhanbryde					
North Option	5	16	2	3	1
South Option	5	16	2	3	1
Lhanbryde to East of Fochabers					
North Option	4	16	2	2	3
South Option	4	15	2	2	4

Local Development Plan Designated Sites Assessment

9.5.39. The assessment of the impacts of the options on local development plan designated sites focuses on the Moray Council MLDP; there are no relevant designated sites in close proximity to the options located in the Highland Council area.

9.5.40. The details of the impact assessment are set out in Tables 1.8 to 1.13 in Appendix A9.2 (Volume 4b). These tables indicate which impacts have the potential to be designed out and which do not contribute the options assessment and are not discussed further in this chapter.

9.5.41. There are four Transport Improvements (TSP) identified in Forres and Elgin that would be directly affected by the options:

- Forres:
    10. TSP11 - A96 bus layby to serve BP1 and BP2 designations;
    11. TSP12 - A96 bus layby to serve BP1 and BP2 designations;
    12. TSP30 - Internal connection between I7/I8 industrial designations; and
- Elgin:
    13. TSP2 - A96/Morriston Road junction. BP/OPP needs to be considered in Transport Assessment.

9.5.42. As these TSPs are not areas of land, a magnitude of impact using the criteria set out in this chapter cannot be applied. Also given the nature of the TSPs they are applicable to the build out of designated sites and they can be redesigned or relocated or may no longer be required following development of the Scheme. For this reason, the impacts on these TSPs are noted in Tables 1.8-1.11 in Appendix A9.2 (Volume 4b) but are not discussed below.

Hardmuir to Hillhead

9.5.43. The North Option is predicted to have a moderate adverse impact on two designated sites, while the South Option would have a moderate adverse impact on one designated site. The North Option would take approximately 4ha (approximately 20-25%) of site BP2, the Forres Enterprise Park Extension and 4ha (approximately 35-40%) of land from site I8 Springfield East (industrial) which is a key employment designation to the North of Forres. This option would cut through the eastern extent of site BP2 and cut through site I8 and take land from its northern half; see Figure 9.1b (Volume 5). The South Option would take less than 0.1ha (approximately 20-25%) of a designated Amenity site in Mundole from its south-western edge, see Figure 9.1c (Volume 5).

9.5.44. The North Option is also predicted to have a minor impact on two further sites, impacting on approximately 3ha (approximately 5-10%) of land from BP1 Forres Enterprise Park where the Scheme cuts into the corner of the designation, and less than 0.1ha (less than 5%) of land from industrial site I7 Springfield West in Forres. See Figure 9.1b (Volume 5).

9.5.45. The South Option is predicted to also have a minor impact on the FA1 Mosset Burn site, which is designated as a flood alleviation area south of Forres. A land-take of approximately 1ha (less than 5%) from this designation is predicted; see Figure 9.1d (Volume 5). Further details on impacts on flood risk in the Hardmuir to Hillhead South Option area are set out in Chapter 20 (Road Drainage and the Water Environment).

Hillhead to Lhanbryde

9.5.46. The North Option is predicted to have a moderate impact on one designated site; it takes approximately 16ha (approximately 10-15%) of land from the long lead residential designation LONG1 in Elgin. The North Option cuts through this site in a north/south direction. See Figure 9.2b and 9.2c (Volume 5).

9.5.47. The North Option is also predicted to have minor impacts on two designated sites. It is predicted to take less than 0.1ha (less than 5%) of land from residential designation R11

Findrassie/Myreside to the north of Elgin and less than 0.1ha (less than 5%) of industrial site I8 Newfield in Elgin. See Figure 9.2b and 9.2c (Volume 5).

9.5.48. The South Option is predicted to have a moderate adverse impact on two designated sites. It is predicted to affect the Riverview site in Elgin, which is designated as a Business Park/Opportunity site, taking around 1ha (approximately 25-30%) of the site, see Figure 9.2e (Volume 5). The South Option would affect site R1 in Lhanbryde, a designated residential site west of St Andrew's Road, which would lose less than 1ha (approximately 10-15%) from the western extent of the site, see Figure 9.2f (Volume 5).

9.5.49. A further minor impact is predicted from the South Option; site ENV6, a designated green corridor in Elgin, which would lose less than 0.5ha (less than 5%) of land, see Figure 9.2e (Volume 5).

Lhanbryde to East of Fochabers

9.5.50. The North Option is predicted to have two moderate adverse impacts on designations. It would affect designation ENV3 amenity greenspace in Fochabers (a number of areas make up this designation) where the Scheme clips various sites and would take around 4ha in total (approximately 30-35%) of land from the designation. It would also affect designation ENV6 green corridor in Fochabers which is predicted to lose less than 1ha (approximately 20-25%) from the designation. See Figure 9.3b (Volume 5).

9.5.51. The North Option would have a minor impact on two sites in Fochabers, the R3 residential site East of Duncan Avenue which would lose less than 1ha (approximately 5-10%) of land from its eastern edge, and environmental designation ENV5 sports area which would lose less than 1ha (approximately 5-10%) from the northern part of the site. See Figure 9.3b (Volume 5)

Overall

9.5.52. For all options the impacts on designated sites are limited, the key moderate land-take impacts are on designated sites to the north and east of Forres, to the north and west of Elgin and in Lhanbryde. The assessment findings are summarised in Table 9.8 below.

Table 9.8: Summary of Local Development Plan Designated Site Assessment

Option	Major Impact	Moderate Impact	Minor Impact
Hardmuir to Hillhead			
North Option	0	2	2
South Option	0	1	1
Hillhead to Lhanbryde			
North Option	0	1	2
South Option	0	2	1

Option	Major Impact	Moderate Impact	Minor Impact
Lhanbryde to East of Fochabers			
North Option	0	2	2
South Option	0	0	0

Planning Applications Assessment

9.5.53. The assessment of the impacts on planning applications focuses on applications made to Moray Council; there are no relevant planning applications in the Highland area.

9.5.54. Areas of impact may change as a result of design development and some minor impacts have the potential to be designed out during DMRB Stage 3. The details of the impact assessment are set out in Tables 1.8 to 1.13 in Appendix A9.3 (Volume 4b); these tables indicate which impacts have potential to be designed out and have not been considered further in the assessment presented in this chapter. The findings are summarised in Table 9.9 below.

Hardmuir to Hillhead

9.5.55. The North Option is predicted to have a moderate adverse impact on one planning application, 18/00811/APP (pending determination), which is an application for planning permission for the development of a 4.7 hectare site to the North of the existing distillery to deliver new cask warehouses, new access, formation of a pond and associated landscaping at Benromach Distillery, Waterford Road (see Figure 9.1b, Volume 5). The site would be severed by the North Option with approximately 40-45% of the application site predicted to be affected as a result of the Scheme.

9.5.56. The South Option does not affect any planning application sites.

Hillhead to Lhanbryde

9.5.57. The North Option is predicted to have a major impact on three planning applications. Application 17/00574/PPP (application permitted) is for planning permission in principle for the construction of a new dwelling at Beechbrae near Elgin (see Figures 9.2a and 9.2b, Volume 5) where the majority (around 90-95%) of the site would be affected. Two further applications are affected: 18/00555/APP (application permitted) and 18/01134/APP (pending determination), both these applications are for the erection of dwellinghouses and garages at Newton near Elgin where the majority of the sites (around 80-85% of each site) would be affected (see Figure 9.2b, Volume 5).

9.5.58. The North Option is also predicted to have a moderate impact on a planning application for the erection of a dwellinghouse within the grounds of Newton House, planning application 16/01132/APP (application permitted), (see Figure 9.2b, Volume 5), with approximately 10-15% of the application site predicted to be affected as a result of the route option. The North Option would have a further minor impact on planning application 18/00361/APP

(pending determination) for the conversion of steadings to a number of dwellinghouses at Ardgye Steading, Alves (see Figure 9.2a and 9.2b, Volume 5), with approximately 5% of the application site being directly affected and the access route being severed.

9.5.59. The South Option is predicted to have a moderate impact on planning application 15/00451/APP (application permitted) for a dwellinghouse at Easter Cloves near Mosstowie (see Figure 9.2d, Volume 5), where approximately 15-20% of the application site would be directly affected from the proposed access route.

Lhanbryde to East of Fochabers

9.5.60. Both options are predicted to have a major impact on planning application 18/00392/APP (application permitted) for two general purpose farm buildings at Wester Marchfield near Lhanbryde (see Figures 9.3a and 9.3c, Volume 5). Both options are predicted to result in land-take of approximately 80-85% of the application site.

9.5.61. Overall the predicted impacts on planning applications for the options are limited, the key major land-take impacts are for the Hillhead to Lhanbryde North Option which is predicted to affect three planning applications. A major impact is predicted on one planning application site in both the Lhanbryde to East of Fochabers North and South Options. The assessment findings are summarised in Table 9.9 below.

Table 9.9: Summary of Planning Application Assessment

Option	Major Impact	Moderate Impact	Minor Impact
Hardmuir to Hillhead			
North Option	0	1 (pending determination)	0
South Option	0	0	0
Hillhead to Lhanbryde			
North Option	3 (1 pending determination)	1	1 (pending determination)
South Option	0	1	0
Lhanbryde to East of Fochabers			
North Option	1	0	0
South Option	1	0	0

9.6 Cumulative Effects

9.6.1. A review of future local development plan housing and employment development sites recommended by Moray Council for inclusion in the Proposed Moray Local Development

Plan 2020 identified the potential for further[29] impacts to occur from the options. Appendix A9.4 (Volume 4b) sets out an assessment of these sites. A number of the sites are the same or similar to the current MLDP designations (these would continue to be identified for development), some sites have had their designation type changed and some sites are new. The sites recommended for the Proposed MLDP have no planning status as yet and are still subject to change.

Hardmuir to Hillhead

9.6.2. The North Option would have a major impact on site FR14/FR15 Waterford Road in Forres (8ha, 50-60% lost) which is a site recommended for industrial designation. Moderate impacts are predicted on two other sites in Forres: I5/FR17 Benromach Distillery (3ha, 20-30% lost) and BP2/FR21 Forres Enterprise Park / Tarras (4ha, 20-30% lost), which are potential industrial and business park designations respectively. A minor impact would also be predicted on site BP1 Forres Enterprise Park (2ha, 5-10% lost) which is recommended for business park use.

9.6.3. The South Option would not be predicted to affect any recommended sites.

Hillhead to Lhanbryde

9.6.4. The North Option would have a major impact on recommended site EL9 (E) Lossiemouth Road North in Elgin (5ha, 70% lost), a proposed mixed-use site. It is predicted that here would be moderate impact on three other recommended sites in Elgin for residential use, site EL9 (W) Lossiemouth Road North (4ha, 20-30% lost), long lead housing site LONG1 North East (6ha, 10-20% lost) and site LONG1/EL10 North East (4ha, 10-20% lost). There would also be minor impacts predicted on four other sites recommended for designation in Elgin: I8 Newfield (<1ha, <1% lost) an industrial site; R11 Findrassie (<0.1ha, <1% lost) a residential site; R14 Lesmurdie Fields (<1ha, 1% lost) a residential site; and I7/EL14E Barmuckity Business Park (<1ha, 1% lost).

9.6.5. The South Option would have moderate impacts on two sites recommended for designation in Elgin, site EL13/EL46 Burnside of Birnie (9ha, 20% lost) and EL20/BP/OPP Riverview (1ha, 20-30% lost). EL13/EL46 is a potential industrial designation and EL20/BP/OPP is a potential mixed-use designation. A minor impact is predicted in Elgin on site EL40 South of Burnside of Birnie (1ha, 5-10% lost) a potential industrial designation. The South Option would have a moderate impact on site R1 West of St Andrew's Road in Lhanbryde (1ha, 10-20% lost) a potential residential designation, and a minor impact on I1 Troves Industrial Estate (<1ha, 5% lost) a potential industrial designation.

Lhanbryde to East of Fochabers

9.6.6. The North Option would have a predicted minor impact on three sites recommended for designation: site R3 East of Duncan Avenue (<1ha, 5-10% lost) a potential residential site

[29] These are not strictly cumulative effects but have been dealt with in this section for consistency with other chapters. The consideration of potential future designations provides a sensitivity check on the findings of the assessment of impacts on LDP designated sites presented in Section 9.5

in Fochabers; site FC2/OPP3 Lennox Crescent (<1ha, 1% lost) a potential community facility in Fochabers; and site MS2/I3 land south of A96 bypass (1ha, 5-10% lost) a potential mixed use site in Mosstodloch.

9.6.7. The South Option would not be predicted to affect any recommended sites.

9.7 Summary of Effects

9.7.1. This section sets out a summary of the key findings of the options assessment based on the predicted policies and plans impacts. The summaries are presented in Tables 9.10 to 9.12 below.

Table 9.10: Summary of Predicted Environmental Effects: Hardmuir to Hillhead

Criteria	Predicted Impacts for North Option	Predicted Impacts for South Option
Local Development Plan Policies	Moray Council: • Complies 5 • Possible Conflict 16 • Conflict 3 • Uncertain 2 • Not Relevant 1 Highland Council: • Complies 4 • Possible Conflict 12 • Conflict 1 • Uncertain 2 • Not Relevant 0	Moray Council: • Complies 5 • Possible Conflict 16 • Conflict 4 • Uncertain 2 • Not Relevant 0 Highland Council: • Complies 4 • Possible Conflict 12 • Conflict 1 • Uncertain 2 • Not Relevant 0
Local Development Plan Designated Sites	• **Moderate Impact 2** • Minor Impact 2	• **Moderate Impact 1** • Minor Impact 1
Planning Applications	• **Moderate Impact 1** (pending determination)	• No Impacts

Summary

9.7.2. The North Option is predicted to conflict with four local development plan policies (across the two local authority areas) and possibly conflict with a further 28. It is predicted that the North Option would have a moderate adverse impact on two local development plan designated sites (BP2 the Enterprise Park extension site and I8 industrial site at Springfield East, both in Forres) with minor adverse impacts predicted to a further two sites. It is predicted that the North Option would result in one moderate impact to a planning application to expand / develop a distillery site in Forres (this application is pending determination).

9.7.3. The South Option is predicted to conflict with five local development plan policies and possibly conflict with a further 28 policies. It is predicted that there would be a moderate adverse impact on one local development plan designated site (Amenity land at Mundole) and a minor impact to one local development plan designated site (flood alleviation). It is not predicted that the South Option would result in any impacts to planning application sites.

9.7.4. The options are predicted to have similar impacts on local development plan policies. The North Option has greater impacts on local development plan designated sites and a moderate impact predicted on a planning application site. Overall, the South Option is predicted to have slightly less impacts on policies and plans.

Table 9.11: Summary of Predicted Environmental Effects: Hillhead to Lhanbryde

Criteria	Predicted Impacts for North Option	Predicted Impacts for South Option
Local Development Plan Policies	• Complies 5 • Possible Conflict 16 • Conflict 3 • Uncertain 2 • Not Relevant 1	• Complies 5 • Possible Conflict 16 • Conflict 3 • Uncertain 2 • Not Relevant 1
Local Development Plan Designated Sites	• **Moderate Impact 1** • Minor Impact 2	• **Moderate Impact 2** • Minor Impact 1
Planning Applications	• **Major Impact 3** (1 pending determination) • **Moderate Impact 1** • Minor Impact 1 (pending determination)	• **Moderate Impact 1**

Summary

9.7.5. The North Option is predicted to conflict with a total of three local development plan policies and possibly conflict with a further 16. This option would result in a moderate impact on a local development plan designated site (LONG1 residential site to the north of Elgin) and minor impacts on two other local development plan designated sites. It is predicted that a major adverse impact would occur to three planning application sites: for a new dwelling at Beechbrae and for two new dwellings at Newton (one of the Newton applications is pending determination). The North Option is predicted to have a moderate impact on a planning application for a new dwelling in the grounds of Newton House, Newton and a minor impact on an application for a conversion to dwellinghouses (pending determination).

9.7.6. The South Option is predicted to conflict with three local development plan policies and possibly conflict with a further 16 policies. It is predicted that there would be a moderate adverse impact on two local development plan designated sites (BP/OPP business park opportunity site at Riverview, Elgin and residential site R1 west of St Andrew's Road, Lhanbryde), and a minor impact on one local development plan designated site. It is

predicted that the option would have a moderate impact on a planning application for a new dwelling at Easter Cloves, Mosstowie.

9.7.7. The options are predicted to have similar impacts on local development plan policies. The North Option would have more impacts on planning applications, and the South Option would result in more moderate impacts on local development plan designated sites. Overall, on balance, there is not predicted to be any material difference in impacts on policies and plans between these options.

Table 9.12: Summary of Predicted Environmental Effects: Lhanbryde to East of Fochabers

Criteria	Predicted Impacts for North Option	Predicted Impacts for South Option
Local Development Plan Policies	• Complies 4 • Possible Conflict 16 • Conflict 2 • Uncertain 2 • Not Relevant 3	• Complies 4 • Possible Conflict 15 • Conflict 2 • Uncertain 2 • Not Relevant 3
Local Development Plan Designated Sites	• **Moderate Impact 2** • Minor Impact 2	• No Impacts •
Planning Applications	• **Major Impact 1**	• **Major Impact 1**

Summary

9.7.8. The North Option is predicted to conflict with two local development plan policies and to possibly conflict with a further 16. It is predicted that the option would result in moderate adverse impacts on two local development plan designated sites (for amenity greenspace and green corridors in Fochabers), and minor adverse impacts are predicted to a further two sites. A major adverse impact is predicted on one planning application site (for general purpose farm buildings at Wester Marchfield).

9.7.9. The South Option is predicted to conflict with two local development plan policies and possibly conflict with a further 15 policies. It is predicted that no local development plan designated sites would be affected by the South Option; however a major adverse impact is predicted to one planning application site (for general purpose farm buildings at Wester Marchfield).

9.7.10. The options are predicted to have similar impacts on local development plan policies and planning applications. The North Option would have more impacts on local development plan designated sites. Overall, the South Option is predicted to have slightly less impact on policies and plans.

9.8 Scope of the DMRB Stage 3 Assessment

9.8.1. The DMRB Stage 3 policies and plans assessment will consider in more detail the performance of the Preferred Option, which will be subject to further design development, against the relevant local development plan policies.

9.8.2. Further design development will enable the predicted direct land-take impacts on local development plan designations and planning application sites to be assessed in detail. The DMRB Stage 3 assessment will also consider sites within any Moray Council Proposed Plan valid at the time of the assessment. Appendix A9.4 (Volume 4b) sets out details of Moray Council's currently anticipated timescales for progressing the replacement MLDP.

9.8.3. The DMRB Stage 3 assessment will consider indirect effects on local development plan designations and planning application sites that lie close to, but which are not directly affected by, the Preferred Option. This will be undertaken with reference to the detailed topic assessments for key environmental assessments.

10. Air Quality

10.1 Introduction and Scope

10.1.1. This chapter presents an assessment of the predicted air quality effects of the shortlisted options. Potential changes in air quality at sensitive receptors as a result of changes in traffic flows for the options are considered with respect to relevant policy and legislation, and in the context of existing air quality in the study area.

10.1.2. The construction phase of the Scheme has the potential to result in temporary air quality impacts from the emission of dust, which can cause nuisance in the form of dust soiling and elevated concentrations of fine particulates. Dust effects are not predicted to vary significantly between options and have therefore been scoped out of this options assessment. It is not anticipated that there would be material differences in the number of properties potentially affected by dust between the options.

10.1.3. The operational phase of the Scheme has the potential to affect air quality due to:

- Changes in the vehicular emissions and pollutant concentrations resulting from changes in the flow, speed and composition of traffic on the road network; and
- Changes in road layout and alignment, leading to changes in the distance between vehicular emission sources and receptors.

10.1.4. The predicted effects have been considered following the guidance contained in the Design Manual for Roads and Bridges (DMRB), Volume 11, Section 3, Part 1 HA207/07 Air Quality (referred to as DMRB HA207/07) and relevant Interim Advice Notes (IANs):

- IAN 170/12 Updated air quality advice on the assessment of future NO_x and NO_2 projections for users of DMRB (Volume 11, Section 3, Part 1 HA207/07 Air Quality) (referred to as IAN 170/12);
- IAN 174/13 Updated advice for evaluating significant local air quality effects for users of DMRB (Volume 11, Section 3, Part 1 Air Quality) (referred to as IAN 174/13); and
- IAN 175/13 Updated air quality advice on risk assessment related to compliance with the EU Directive on ambient air quality and on the production of Scheme Air Quality Action Plans for users of DMRB (Volume 11, Section 3, Part 1 Air Quality) (referred to as IAN 174/13).

10.1.5. IAN 170/12 states that a judgement should be made to which set of NOx and NO_2 projections should be used within an assessment (Department for Environment, Food and Rural Affairs (Defra) technical guidance, Long Term Trends (LTT) or the interim LTTE6). In the case of this assessment the projections from Defra's technical guidance have been used on the basis that the Opening Year (2030) is sufficiently far into the future that there is unlikely to be a gap between current projected vehicle emission reductions and projections on the annual rate of improvements in ambient air quality as published in Defra's current LAQM toolkit. The emissions used in the assessment are based on the latest version of the Emissions Factor Toolkit (EFT) which has updated emissions for EURO 6/VI vehicles, which are predicted to make up the majority of the fleet in 2030.

10.1.6. IAN 185/15 'Updated traffic, air quality and noise advice on the assessment of link speeds and generation of vehicle data into 'speed-bands' for users of DMRB (Volume 11, Section 3, Part 1 Air Quality and Volume 11, Section 3. Part 7 Noise') has not been adopted by Transport Scotland, unless the Scheme passes through an Air Quality Management Area (AQMA). IAN 185/15 is therefore not relevant to this assessment and has not been considered further.

10.1.7. The air quality topic encompasses two sub-topics:

- Local air quality, which is concerned principally with emissions of pollutants that are of concern to human health, vegetation and ecosystems, at a local level; and
- Regional effects, which are concerned with total emissions of pollutants that can disperse over longer distances, affecting human health, vegetation and ecosystems.

10.1.8. This chapter is supported with the following appendices in Volume 4b:

- Appendix A10.1: Air Quality Assessment Methodology;
- Appendix A10.2: Air Quality Model Verification;
- Appendix A10.3: Monitoring Data Adjustment; and
- Appendix A10.4: Predicted Effects Supporting Assessment.

10.1.9. Supporting figures set out the affected road networks for the local air quality assessment (Figures 10.1, 10.2 and 10.3, Volume 5) and the location of air quality monitoring sites (Figures 10.4, 10.5 and 10.6, Volume 5).

10.2 Approach to Assessment

Introduction

10.2.1. This section sets out the approach to air quality assessment for the options. Reference is made to key sources of information and consultation, and the methodology for the assessment is presented.

Sources of Information

10.2.2. The following sources of information have been used for this assessment:

- Department for Environment, Food and Rural Affairs (2016). Local Air Quality Management Technical Guidance (TG16);
- DMRB HA207/07;
- IAN 174/13;
- IAN 170/12; and
- IAN 175/13.

Consultation

10.2.3. The Environmental Health Officer (EHO) at Moray Council noted that:

- The approach to the air quality assessment is in accordance with their requirements; and
- Verification of modelled air quality concentrations should be undertaken using the most recent local authority and Scheme monitoring results.

Assessment Methodology

10.2.4. Operational air quality effects have been considered in accordance with the guidance listed above. A detailed methodology for assessing operational air quality impacts is presented in Appendix A10.1 (Volume 4b). In summary the following has been undertaken:

- A simple level operational local and regional air quality assessment has been undertaken using Highways England's DMRB Screening Method in accordance with DMRB HA207/07. This approach is considered appropriate and proportionate for this stage of assessment to determine the differences between options and because there are no exceedances monitored in the existing baseline; there have been no exceedances predicted in earlier assessment stages and pollutant concentrations remain low;
- Background concentrations of Nitrogen Dioxide (NO_2), Nitrogen Oxides (NO_x) and Particulate Matter (PM_{10}) have been obtained from Air Quality in Scotland[30]. Baseline data have also been obtained from local authority monitoring data and a specific monitoring survey undertaken for the project;
- Local concentrations of NO_2, NO_x and PM_{10} from road emission sources have been predicted at human and ecological receptors in the Opening Year (2030) Do Minimum and Do Something scenarios of the options, added to the background concentrations and compared to relevant air quality objectives and limit values, and to determine the changes to the options would have on local air quality. Assessment of $PM_{2.5}$ is not required as part of DMRB and also it has not been considered further as it is a constituent part of PM_{10} and the predicted PM_{10} concentrations remain below the relevant $PM_{2.5}$ objective and any precited changes would be smaller than those predicted for PM_{10};
- The significance of changes in local air quality has been determined following advice in IAN 174/13, in accordance with this guidance air quality effects are judged based on the effects at human health and ecological receptors considering the predicted concentrations and the magnitude of change. For effects to be considered significant there is first a requirement for the air quality objectives to be exceeded in either the Do Minimum or Do Something years. In the event that there are exceedances at affected receptors significance is determined based on a series questions which identify the change in air quality, the number of people affected and the length of time that the change would occur for;
- Regional emissions of NOx, PM_{10} and Carbon Dioxide (CO_2) have been calculated for the Opening Year (2030) and Future Year (2045) Do Minimum and Do Something scenarios of the options and the results for each option compared. The total mass emissions and the changes in mass emissions are presented. There is no recognised formal approach for determining the significance of changes in regional emissions given the national scale and therefore results are presented to compare options only; and

[30] Air Quality in Scotland background maps available at: http://www.scottishairquality.co.uk/data/mapping?view=data [Accessed 9 July 2018]

- A compliance risk assessment has been undertaken in accordance with IAN 175/13 to determine the potential for the options to be non-compliant with the EU Directive on ambient air quality and clean air for Europe ((2008/50/EC). The assessment uses information from Defra's Pollution Climate Mapping (PCM) model. The PCM links included in the study area and the predicted concentrations in the Opening Year are presented in the baseline section (see Section 10.3). The outcomes of the assessment are presented in Appendix A10.1 (Volume 4b).

10.2.5. To assist in the determination of significance of effects on local air quality, a number of worst case receptors for human health and areas with ecological designations have been selected. These have been chosen as they are considered to represent locations that would experience the highest pollutant concentrations in either the Do Minimum or Do Something scenario (i.e. they are located in close proximity to existing or future roads) or receptors that are predicted to experience the greatest change in pollutant concentrations (i.e. they are located on roads which will experience large changes in traffic flows or are located in areas where there are no nearby roads but an option would pass nearby). Appendix A10.1 (Volume 4b) provides further details of the receptors selected for the assessment.

Study Area

Local Assessment

10.2.6. The local air quality assessment involves estimating the change in pollutant concentrations at sensitive receptors resulting from the operation of the Scheme. The study area for the local air quality assessment covers the chosen human health receptors and designated sites within 200m of all roads that are expected to be affected by the Scheme. The Affected Road Networks (ARNs) determined for the local air quality assessment are presented in Figures 10.1, 10.2 and 10.3 (Volume 5).

10.2.7. In DMRB HA207/07, affected roads are defined where:

- The road alignment will change by 5m or more; or
- Daily traffic flows will change by 1,000 Annual Average Daily Traffic (AADT) flow or more; or
- Heavy Duty Vehicle (HDV) flows will change by 200 AADT or more; or
- Daily average speed will change by 10kph or more; or
- Peak hour speed will change by 20kph or more.

10.2.8. The majority of the affected links identified for each of the three assessment sections meet the criteria of having a change of 1,000 AADT or more. The ARN assessed for each option has been limited to focus on the worst affected links and therefore the worst affected receptors which are located within the extents of the three sections of the assessment.

10.2.9. The links in the local ARN for each option include the existing and proposed A96 and the additional links in the following options:

- Hardmuir to Hillhead South Option: A940 between Nairn Road and Grant Drive;

- Hillhead to Lhanbryde North Option: Morriston Road, the A941, Lesmurdie Road, Calcots Road, B9103, Linkwood Road and Reiket Lane;
- Hillhead to Lhanbryde South Option: Morriston Road, the A941, Calcots Road, Linkwood Road, Reiket Lane, North Street and Harrison Terrace;
- Lhanbryde to East of Fochabers North Option: A98 and B9104; and
- Lhanbryde to East of Fochabers South Option: A98.

Regional Assessment

10.2.10. The regional air quality assessment assesses the change in overall emissions resulting from the Scheme. This is required as emissions not only affect local air quality, but also have an effect on a regional, national and international scale. The regional assessment accounts for changes in emissions associated with the options across the whole Corridor Road Assignment Model (CRAM) corridor which extends from Inverness to Aberdeen. Only a small element of the regional emissions estimate is attributable to each of the three Hardmuir to Fochabers sections being considered. Therefore, it is the differences between North and South Option Do Something results that are relevant in comparing the options.

10.2.11. The criteria stated in DMRB HA207/07, Section 3.20, which were used to determine the regional affected road network are:

- A change of more than 10% in AADT;
- A change of more than 10% to the number of HDVs; or
- A change in daily average speed of more than 20 kph.

10.2.12. Roads that met the above criteria and were included in the Corridor Road Assignment Model (CRAM) which extends from Inverness to Aberdeen were incorporated in the assessments.

10.2.13. Similar to the local assessment, the majority of the affected road links meet the AADT criteria.

10.2.14. The regional ARN is similar for all shortlisted options and includes the majority of the A and B roads between Inverness and Aberdeen, including within the intermediate towns between these cities.

Assumptions and Limitations

10.2.15. Air quality predictions are based on the most reasonable, robust and representative methodologies in accordance with best practice guidance. However, there is an inherent level of uncertainty associated with the Screening Model predictions, including the items which are listed below and further explained in Paragraphs 10.2.16 and 10.2.17:

- Uncertainties with traffic forecasts;
- Uncertainties with vehicle emission predictions;
- Uncertainties with background air quality data; and
- Simplifications made within Screening Model calculations or post processing of the data that represent chemical reactions.

10.2.16. In order to best manage these uncertainties, the air quality Screening Model used to inform the assessment has been evaluated using air quality measurements to verify outputs. The Screening Model verification process has been undertaken in line with Defra guidance[31]. This is undertaken by comparing modelled and monitored pollutant concentrations and, if necessary, adjusting the Screening Model output to account for systematic bias. However, it should be noted that modelled results following verification can still contain an element of residual uncertainty, which in IAN 174/13 is referred to a Measure of Uncertainty (MoU).

10.2.17. Following the verification process for the Scheme an overall Root Mean Square Error value of less than 10% of the mean annual air quality objective is achieved, which is considered robust according to Defra guidance. On this basis, the modelled results are considered appropriate to allow a robust professional judgement of significance for each option to be determined. The model verification is presented in Appendix A10.2 (Volume 4b).

10.3 Baseline Environment

Introduction

10.3.1. Baseline air quality data have been obtained from the local authorities within the study area (Moray Council and Highland Council), Air Quality in Scotland[32], and from Defra. The baseline conditions which have been established in this section are relevant to all options considered.

Local Authority Review and Assessment

10.3.2. Moray Council and Highland Council undertook their most recent air quality review and assessments in 2017 which indicated that pollutant concentrations within the study area of all shortlisted options continue to be below the air quality objectives. No AQMAs have been considered or designated within Moray. Highland Council has one AQMA designated for exceedances of the annual mean NO_2 air quality objective (AQO), located within Inverness, approximately 30km west of the closest option and the closest ARN (see Section 10.2). On this basis, the Scheme is not predicted to have an effect on the Inverness AQMA and further consideration of this area has been scoped out of this assessment.

Local Authority Monitoring

10.3.3. There are no automatic monitoring stations located within the study area.

10.3.4. Moray Council undertakes diffusion tube monitoring at 19 sites within their local authority area which monitor annual mean NO_2 concentrations. There is no monitoring data available for the other pollutants considered within this assessment. Highland Council does not operate any monitoring within the options study areas. Table 10.1 below presents the most

[31] Defra (2016) Part IV of the Environment Act 1995, Environment (Northern Ireland) Order 2002 Part III: Local Air Quality Management Technical Guidance (TG16), available online at http://laqm.defra.gov.uk/documents/LAQM-TG16-April-16-v1.pdf
[32] Air Quality in Scotland background maps available at: http://www.scottishairquality.co.uk/data/mapping?view=data [Accessed 9 July 2018]

recent monitored results at sites located within the option study areas. Monitored concentrations at all Moray Council diffusion tube locations are well below[33] the annual mean NO_2 objective (of 40µg/m^3) in 2015, 2016 and 2017. Figures 10.4, 10.5 and 10.6 (Volume 5) present the location of these monitoring sites.

Table 10.1: Diffusion Tube Monitoring Data

Scheme Section	Site ID	Site Classification	National Grid Reference		Annual Mean NO_2 Concentration µg/m^3		
			X	Y	2015	2016	2017[(a)]
Hardmuir to Hillhead Section	Forres	Urban Background	303726	858931	13.0	13.9	12.7
Hillhead to Lhanbryde Section	Elgin 1	Kerbside	321105	862669	22.3	22.9	20.7
	Elgin 2	Kerbside	322348	862745	19.8	23.3	23.0
	Elgin 3	Roadside	322302	862727	12.8	12.5	11.0
	Elgin 4	Urban Background	322249	862630	7.9	10.6	9.6
	Elgin 5	Kerbside	322233	861869	15.6	17.9	15.7
	Elgin 6	Kerbside	322029	862832	15.8	17.5	15.7
	Elgin 7	Roadside	321615	862307	8.2	10.0	9.9
	Elgin 8	Roadside	322492	863309	14.1	14.3	13.5
	Elgin 9	Kerbside	321775	861115	6.7	7.9	6.9
	Elgin 10	Kerbside	320641	862291	13.3	15.1	13.0
Lhanbryde to East of Fochabers Section	Fochabers 1	Kerbside	334634	858726	10.1	11.6	9.9
	Fochabers 2	Kerbside	334423	858663	4.9	4.9	4.4
Outside of study areas	Keith 1	Roadside	343323	850458	25.3	28.2	24.8
	Keith 2	Kerbside	343329	850415	21.3	25.7	21.3
	Lossie 1	Kerbside	322463	870293	5.2	5.9	5.1
	Lossie 2	Urban Background	323515	870931	5.6	5.9	5.1
	Rothes 1	Kerbside	327756	849658	17.1	16.8	14.6
	Rothes 2	Kerbside	327740	849239	17.5	19.6	17.4

Source: Moray Council
Note: (a) Data capture was 83-100%. Bias adjustment factor of 0.78 applied.

[33] "well below" is defined as a value less than 75% of the AQO

Scheme Specific Monitoring

10.3.5. A three month air quality monitoring survey was undertaken to supplement the local authority monitoring data undertaken by Moray Council. Monitoring was carried out and reported at 15 locations along roads near the options as well as at the Inverness Automatic Urban and Rural Network (AURN) Defra monitoring site to enable bias adjustment of the Scheme monitoring tubes, as described in Appendix A10.3 (Volume 4b). The results from the monitoring were bias adjusted and annualised in accordance with Defra LAQM(TG(16))[34], as described in Appendix A10.3 (Volume 4b).

10.3.6. This monitoring survey identified that NO_2 concentrations within the vicinity of the shortlisted options are well below the annual mean NO_2 air quality objective of 40 µg/m^3. The highest monitored annual mean NO_2 concentration, 15.5µg/m^3, was recorded at Site 6 on the existing A96 at the River Spey Bridge.

10.3.7. The results from this monitoring survey are presented in Table 10.2 below. The locations of these monitoring sites are presented in Figures 10.4, 10.5 and 10.6 (Volume 5).

Table 10.2: Scheme Specific Monitoring Data

Scheme Section	Site ID	Site Classification	National Grid Reference		Bias adjusted and annualised Annual Mean NO_2 Concentration µg/m^3 2017
			X	Y	
Hardmuir to Hillhead Section	Site 1	Roadside	301536	858169	10.3
	Site 2A	Roadside	305352	859625	6.7
	Site 2B	Roadside	305505	859667	8.3
	Site 12	Roadside	302792	857419	7.9
	Site 14	Roadside	303023	858881	2.9
Hillhead to Lhanbryde Section	Site 4	Roadside	313466	862213	9.4
	Site 5	Roadside	325096	861727	8.1
	Site 9	Roadside	322531	860027	6.1
	Site 10	Roadside	321815	864511	10.4
Lhanbryde to East of Fochabers Section	Site 6	Roadside	333990	859528	15.5
	Site 7	Roadside	332403	859048	5.2
	Site 8	Roadside	335146	858423	5.2

[34] Department for Environment, Food and Rural Affairs (2016). Local Air Quality Management Technical Guidance (TG16)

Scheme Section	Site ID	Site Classification	National Grid Reference		Bias adjusted and annualised Annual Mean NO_2 Concentration µg/m^3 2017
			X	Y	
Outside study areas	Site 11	Roadside	319478	859169	1.9
	Site 13	Roadside	306219	861542	7.4
	Site 15	Roadside	265711	845664	20.0

Note: Annualisation factor = 0.83 bias adjustment factor = 0.8

Background Pollutants

10.3.8. Background pollutant concentrations are spatially and temporally variable throughout the UK. Annual mean background concentrations of NOx, NO_2 and PM_{10} were obtained from Air Quality in Scotland. The background maps provide yearly forecasts based on a grid at a resolution of 1km^2 across Scotland. Appendix A10.1 (Volume 4b) provides background concentrations for each grid square within the assessment. Tables 10.3 and 10.4 below present the minimum, maximum and average concentrations used within the assessment.

Table 10.3: Scotland Background Pollutant Map Data for the Local Assessment 2017

2017								
Maximum Concentration (µg/m^3)			Minimum Concentration (µg/m^3)			Average Concentration (µg/m^3)		
NOx	NO_2	PM_{10}	NOx	NO_2	PM_{10}	NOx	NO_2	PM_{10}
16.9	11.4	10.0	3.3	2.5	6.4	7.0	5.0	7.8

Table 10.4: Scotland Background Pollutant Map Data for the Local Assessment 2030

2030								
Maximum Concentration (µg/m^3)			Minimum Concentration (µg/m^3)			Average Concentration (µg/m^3)		
NOx	NO_2	PM_{10}	NOx	NO_2	PM_{10}	NOx	NO_2	PM_{10}
11.4	8.0	9.8	2.2	1.7	6.2	4.3	3.1	7.6

PCM Links

10.3.9. There are 60 PCM links in total that overlap the ARN networks generated for the options, all located within Elgin. The highest predicted annual mean concentrations on these PCM links is on the existing A96 and is predicted to be 16µg/m^3 in the opening year of 2030, which is well below the annual mean limit value of 40µg/m^3 for NO_2. Additional information on the compliance risk assessment is provided in Appendix A10.1 (Volume 4b).

Summary

10.3.10. Scheme specific monitoring data indicate that annual mean NO_2 concentrations are well below the annual NO_2 AQO in all three Scheme section study areas. There are no designated AQMAs within the study area. The available monitoring data indicate that air quality at receptors currently meet the relevant NO_2 AQOs.

10.4 Potential Impacts

10.4.1. This section presents the potential impacts of the shortlisted options on air quality. The magnitude of predicted potential impacts has been considered at each modelled receptor in combination with the likely resultant pollutant concentrations taking into consideration the existing baseline to determine the potential for significant effects. The potential impacts include:

- Beneficial impacts at local human and ecological receptors located within 200m of roads where traffic is predicted to decrease;
- Adverse impacts at local human and ecological receptors located within 200m of new roads and existing roads where traffic is predicted to increase; and
- Beneficial or adverse impacts on regional emissions as a result of overall changes predicted in traffic emissions across the region.

10.4.2. The potential risk of options causing a significant effect at local human and ecological receptors is low because existing pollutant concentrations in the study area are low (see Section 10.3).

10.5 Mitigation

10.5.1. The findings of this air quality assessment indicate that significant adverse effects on local air quality from the options would not be predicted. No operational air quality specific mitigation measures have therefore been designed into the options at this stage. The requirement for mitigation would be reviewed again during DMRB Stage 3 and confirmed based on the outcome of the air quality assessment at that stage.

10.6 Predicted Environmental Effects

10.6.1. This section presents the key predicted environmental effects of the options on air quality. The predicted effects are presented in Tables 10.5 to 10.10 below. These tables capture the key findings of the assessment and provide a summary of the overall significance. A more detailed description of the results and full tables showing changes in pollutant concentrations at individual receptors are set out in Appendix A10.4 (Volume 4b).

Hardmuir to Hillhead - Local Air Quality Effects

10.6.2. The predicted local air quality effects of the North Option and South Option are presented in Table 10.5 and Table 10.6 respectively.

Hillhead to Lhanbryde - Local Air Quality Effects

10.6.3. The predicted local air quality effects of the North Option and South Option in this section are presented in Table 10.7 and Table 10.8 respectively.

Lhanbryde to East of Fochabers - Local Air Quality Effects

10.6.4. The predicted effects of the North Option and South Option on local air quality in this section are presented in Table 10.9 and Table 10.10 respectively.

All Options – Regional Emissions

10.6.5. Total mass emissions from the regional impact assessment are presented in Appendix A10.4 (Volume 4b). Table 10.11 and 10.12 present the percentage change between the Do Minimum and Do Something for each of the options and demonstrates that all changes are of a similar magnitude.

Table 10.5: Predicted Local Air Quality Effects: Hardmuir to Hillhead - North Option

Sub-topic	Predicted Effects	Significance of Predicted Effects
Local Air Quality – Human Health	• Predicted concentrations for sensitive receptors indicate that the highest predicted NO_2 concentration with the option is 5.4µg/m^3 at R22 on the A940 and the highest PM_{10} concentration with the option is 9.1µg/m^3 at R7 adjacent to the existing A96, which are both well below the relevant AQOs • The highest increase in NO_2 is predicted to be 1.3µg/m^3 at R12, located approximately 60m from the option and the greatest decrease is predicted as -3.0µg/m^3 at R3 adjacent to the existing A96 • The highest increase in PM_{10} is predicted to be 0.4µg/m^3 at R12 and the greatest decrease is predicted as -1.1µg/m^3 at R3	• Existing and predicted NO_2 and PM_{10} concentrations at receptors are well below the existing AQOs • In accordance with the advice stated in IAN 174/13, effects are not considered to be significant • Air quality at sensitive receptors is predicted to result in benefits at some locations and adverse impacts at others, however because existing concentrations are low and predicted concentrations at all receptors are well below the AQOs, considering the advice stated in IAN 174/13, no significant residual local air quality effects are predicted
Air Quality – Ecological Designations	• No ecological transects identified within 200m of the option	• No significant residual effects for ecological receptors are predicted

Table 10.6: Predicted Local Air Quality Effects: Hardmuir to Hillhead - South Option

Sub-topic	Predicted Effects	Significance of Predicted Effects
Local Air Quality – Human Health	• Predicted concentrations for sensitive receptors indicate that the highest predicted NO_2 concentration with the option is 4.9µg/m^3 at R22 on the A940 and the highest PM_{10} concentration with the option is predicted to be 9.1µg/m^3 at R8 adjacent to the existing A96, which are both well below the relevant AQOs • The highest increase in NO_2 is predicted as 1.2µg/m^3 at R16, located approximately 50m from the option and the greatest decrease is -3.0µg/m^3 at R3 adjacent to the existing A96 • The highest increase in PM_{10} is predicted to be 0.4µg/m^3 at R16 and the greatest decrease is -1.1µg/m^3 at R3	• Existing and predicted NO_2 and PM_{10} concentrations at receptors are well below the existing AQOs • In accordance with the advice stated in IAN 174/13, effects are not considered to be significant • Air quality at sensitive receptors is predicted to result in benefits at some locations and adverse impacts at others, however because existing concentrations are low and predicted concentrations at all receptors are well below the AQOs, considering the advice stated in IAN 174/13 no significant residual local air quality effects are predicted
Air Quality – Ecological Designations	• A specific ecological transect has been assessed for the ecological designations at Lower Findhorn Woods Site of Special Scientific Interest (SSSI) and Special Area of Conservation (SAC) and Darnaway and Lethen Forest Special Protection Area (SPA). • The closest assessment location to the option is predicted to experience an “imperceptible” worsening in NOx concentrations	• Existing and predicted NOx concentrations at ecological designations within the vicinity of the option are well below the AQO for the protection of vegetation and therefore in accordance with advice stated in IAN 174/13, effects are not significant • IAN 174/13 states that where an assessment indicates a potentially significant effect on a designated site due to predicted NOx concentrations above the AQO for the protection of vegetation, then changes in nutrient nitrogen deposition should be calculated as supporting information to further assist in the evaluation of significance. NOx concentrations are assessed to be below the AQO, therefore no further consideration of nitrogen deposition is required. No significant residual effects for ecological receptors are predicted.

Table 10.7: Predicted Local Air Quality Effects: Hillhead to Lhanbryde - North Option

Sub-topic	Predicted Effects	Significance of Predicted Effects
Local Air Quality – Human Health	• Predicted concentrations for sensitive receptors indicate that the highest predicted NO_2 concentration with the option is 14.7µg/m^3 at R20 adjacent to the existing A96 in central Elgin and the highest PM_{10} concentration with the option is predicted to be 11.3µg/m^3 at R17 adjacent to the existing A96 in east Elgin, which are both well below the relevant AQOs • The highest increase in NO_2 is predicted to be 1.6µg/m^3 at R12 located approximately 50m from the option at Hillhead and the greatest decrease is predicted as -4.1µg/m^3 at R6 adjacent to the existing A96 in Alves • The highest increase in PM_{10} is predicted to be 0.5µg/m^3 at R12 and the greatest decrease is predicted as -1.2µg/m^3 at R11 which is adjacent to the existing A96 west of Lhanbryde	• Existing and predicted NO_2 and PM_{10} concentrations at receptors for the North Option are well below the existing AQO • In accordance with the advice stated in IAN 174/13, effects are not considered to be significant • Air quality at sensitive receptors is predicted to result in benefits at some locations and adverse impacts at others, however because existing concentrations are low and predicted concentrations at all receptors are well below the AQOs, considering the advice stated in IAN 174/13 no significant residual local air quality effects are predicted
Air Quality – Ecological Designations	• Three specific ecological transects have been assessed for the Quarry Woods SSSI ecological designation. The closest assessment location to the North Option is predicted to experience a “Medium” improvement in NOx concentrations	• Existing and predicted NOx concentrations at ecological designations within the vicinity of the option are well below the AQO for the protection of vegetation and therefore in accordance with advice stated in IAN 174/13, effects are not significant • IAN 174/13 states that where an assessment indicates a potentially significant effect on a designated site due to predicted NOx concentrations above the AQO for the protection of vegetation, then changes in nutrient nitrogen deposition should be calculated as supporting information to further assist in the evaluation of significance. NOx concentrations are assessed to be below the AQO, therefore no further consideration of nitrogen deposition is required. No significant residual air quality effects are predicted

Table 10.8: Predicted Local Air Quality Effects: Hillhead to Lhanbryde - South Option

Sub-topic	Predicted Effects	Significance of Predicted Effects
Local Air Quality – Human Health	• The highest predicted NO_2 concentration with the option is predicted to be 14.4µg/m^3 at R20 adjacent to the existing A96 in central Elgin and the highest PM_{10} concentration with the option is predicted to be 11.2µg/m^3 at R17 adjacent to the existing A96 in east Elgin, which are both well below the relevant AQOs • The highest increase in NO_2 is predicted to be 1.5µg/m^3 at R27 located approximately 60m from the option at Lochinver. The greatest decrease is predicted to be -4.0µg/m^3 at R6 adjacent to the existing A96 in Alves • The highest increase in PM_{10} is predicted to be 0.5µg/m^3 at R27 and the greatest decrease is predicted as -1.2µg/m^3 at R6	• Existing and predicted NO_2 and PM_{10} concentrations at receptors for the South Option are well below the existing AQO • In accordance with the advice stated in IAN 174/13, effects are not considered to be significant • Air quality at sensitive receptors is predicted to result in benefits at some locations and adverse impacts at others, however because existing concentrations are low and predicted concentrations at all receptors are well below the AQOs, considering the advice stated in IAN 174/13 no significant residual local air quality effects are predicted
Air Quality – Ecological Designations	• Three specific ecological transect has been assessed for the Quarry Woods SSSI ecological designation. The closest assessment location to the South Option is predicted to experience a “large” improvement in NOx concentrations	• Existing and predicted NOx concentrations at ecological designations within the vicinity of the option are well below the AQO for the protection of vegetation and therefore in accordance the advice stated in IAN 174/13, effects are not significant • IAN 174/13 states that where an assessment indicates a potentially significant effect on a designated site due to predicted NOx concentrations above the AQO for the protection of vegetation, then changes in nutrient nitrogen deposition should be calculated as supporting information to further assist in the evaluation of significance. NOx concentrations are assessed to be below the AQO, therefore no further consideration of nitrogen deposition is required. No significant residual effects for ecological receptors are predicted.

Table 10.9: Predicted Local Air Quality Effects: Lhanbryde to East of Fochabers - North Option

Sub-topic	Predicted Effects	Significance of Predicted Effects
Local Air Quality – Human Health	• Predicted concentrations for sensitive receptors indicates that the highest predicted NO_2 concentration with the option is 7.3µg/m^3 at R14 adjacent to the option (at Inchberry Road) and the highest PM_{10} concentration with the option is 8.6µg/m^3 at R14, which are both well below the relevant AQOs • The highest increase in NO_2 is predicted to be 2.1µg/m^3 at R10 located approximately 40m from the option (at Pittensair) and the greatest decrease is predicted to be -3.1µg/m^3 at R4 located adjacent to the existing A96 at Craigawan in Mosstodloch • The highest increase in PM_{10} is predicted to be 0.6µg/m^3 at R10 and the greatest decrease is predicted as -1.0µg/m^3 at R1 which is adjacent to the existing A96 east of Lhanbryde	• Existing and predicted NO_2 and PM_{10} concentrations at receptors for the North Option are well below the existing AQO • In accordance with the advice stated in IAN 174/13, effects are not considered to be significant • Air quality at sensitive receptors is predicted to result in benefits at some locations and adverse impacts at others, however because existing concentrations are low and predicted concentrations at all receptors are well below the AQOs, considering the advice stated in IAN 174/13, no significant residual local air quality effects are predicted
Air Quality – Ecological Designations	• Six specific ecological transects have been assessed for the Loch Oire SSSI and River Spey SSSI and SAC • The closest assessment location at Loch Oire to the North Option is predicted to experience a “large” improvement in NOx concentrations and the closest assessment location at River Spey is predicted to experience a “large” worsening in NOx concentrations	• Existing and predicted NOx concentrations at ecological designations within the vicinity of the option are well below the AQO for the protection of vegetation and therefore in accordance with advice stated in IAN 174/13, effects are not significant • IAN 174/13 states that where an assessment indicates a potentially significant effect on a designated site due to predicted NOx concentrations above the AQO for the protection of vegetation, then changes in nutrient nitrogen deposition should be calculated as supporting information to further assist in the evaluation of significance. NOx concentrations are assessed to be below the AQO, therefore no further consideration of nitrogen deposition is required. No significant residual effects for ecological receptors are predicted.

Table 10.10: Predicted Local Air Quality Effects: Lhanbryde to East of Fochabers - South Option

Sub-topic	Predicted Effects	Significance of Predicted Effects
Local Air Quality – Human Health	• Predicted concentrations for sensitive receptors indicate that the highest predicted NO_2 concentration is predicted to be 6.8µg/m^3 at R4 adjacent to the existing A96 west of Fochabers and the highest PM_{10} concentration with the option is predicted to be 8.4µg/m^3 at R4 at Craigawan, which are both well below the relevant AQOs • The highest increase in NO_2 is predicted to be 2.2µg/m^3 at R10 (Pittensair) approximately 40m from the option and the greatest decrease is predicted to be -2.9µg/m^3 at R4 • The highest increase in PM_{10} is predicted to be 0.7µg/m^3 at R10 and the greatest decrease is predicted as -1.0µg/m^3 at R1 which is adjacent to the existing A96 east of Lhanbryde	• Existing and predicted NO_2 and PM_{10} concentrations at receptors for the South Option are well below the existing AQO • In accordance with the advice stated in IAN 174/13, effects are not considered to be significant • Air quality at sensitive receptors is predicted to result in benefits at some locations and adverse impacts at others, however because existing concentrations are low and predicted concentrations at all receptors are well below the AQOs, considering the advice stated in IAN 174/13, no significant residual local air quality effects are predicted
Air Quality – Ecological Designations	• Six specific ecological transects have been assessed for the Loch Oire SSSI and River Spey SSSI and SAC. • The closest assessment location at Loch Oire to the option is predicted to experience a “large” improvement in NOx concentrations and the closest assessment location at River Spey is predicted to experience a “large” worsening in NOx concentrations	• Existing and predicted NOx concentrations at ecological designations within the vicinity of the option are well below the AQO for protection of vegetation and therefore in accordance with advice stated in IAN 174/13, effects are not significant • IAN 174/13 states that where an assessment indicates a potentially significant effect on a designated site due to predicted NOx concentrations above the AQO for the protection of vegetation, then changes in nutrient nitrogen deposition should be calculated as supporting information to further assist in the evaluation of significance. NOx concentrations are assessed to be below the AQO, therefore no further consideration of nitrogen deposition is required • No significant residual effects for ecological receptors are predicted

Table 10.11: Regional Effects - Percentage Change 2030

Pollutant	2030 %ge Change between Do Minimum and Do Something					
	Hardmuir to Hillhead		Hillhead to Lhanbryde		Lhanbryde to East of Fochabers	
	North Option	South Option	North Option	South Option	North Option	South Option
NOx	22.7	22.8	23.9	22.0	23.5	24.6
PM_{10}	16.5	16.7	17.2	16.7	17.0	17.2
CO_2	21.2	34.3	22.3	21.2	21.9	22.9

Table 10.12: Regional Effects - Percentage Change 2045

Pollutant	2045 %ge Change between Do Minimum and Do Something					
	Hardmuir to Hillhead		Hillhead to Lhanbryde		Lhanbryde to East of Fochabers	
	North Option	South Option	North Option	South Option	North Option	South Option
NOx	23.6	23.8	24.6	24.3	24.3	24.8
PM_{10}	16.8	17.2	17.8	17.2	17.4	17.6
CO_2	20.2	20.4	21.3	20.7	20.9	30.7

Cumulative Effects

10.6.6. The traffic data used to inform the air quality assessment are derived from a transport model covering the A96 Dualling Programme between Inverness and Aberdeen. The projected Opening Year of the Scheme (2030) in both the Do Minimum and the Do Something scenarios has taken account of future changes in land use and development areas, projected population change and economic growth. The Do Something assumes full dualling of the A96 throughout the Inverness to Aberdeen corridor. As these projections have already been taken into account in the prediction of the future traffic flows, which have informed the environmental assessment and this air quality assessment, further cumulative effects on air quality are not considered.

10.6.7. Predicted air quality effects, set out in the tables in Section 10.6, indicate that no residual significant effects are predicted on air quality and as such, no significant cumulative effects from any of the options are predicted.

10.7 Summary of Effects

10.7.1. This section sets out a summary of the key findings of the options assessment based on the predicted significant residual effects. The summaries are presented in Tables 10.13 to 10.15 below with a commentary provided under each table.

Table 10.13: Summary of Predicted Environmental Effects: Hardmuir to Hillhead

Predicted Residual Effects for North Option	Predicted Residual Effects for South Option
• Existing and predicted NO_2 and PM_{10} concentrations at local sensitive human receptors are low and well below the AQOs for the protection of human health • The greatest increase at human receptors in both NO_2 and PM_{10} concentrations is predicted at receptor location R12 (Hillhead) which is within 50m of the option • Existing and predicted NOx concentrations are well below the AQO for the protection of vegetation and no significant effects for ecological receptors are predicted • The predicted residual effect for local air quality is not significant	• Existing and predicted NO_2 and PM_{10} concentrations at local sensitive human receptors are low and well below the AQOs for the protection of human health • The greatest increase at human receptors in both NO_2 and PM_{10} concentrations is predicted at receptor location R16 for the South Option (Woodside Cottage) which is within 60m of the option • Existing and predicted NOx concentrations are well below the AQO for the protection of vegetation at the Lower Findhorn Woods SSSI and Darnaway and Lethen Forest SPA and no significant effects are predicted • The predicted residual effect for air quality is not significant

Summary

10.7.2. All concentrations of pollutants in the local air quality assessment are predicted to be well below the AQOs for the protection of human health and vegetation, and there are no predicted significant effects for either option. There are some non-significant predicted changes in local air quality at the sensitive receptors included in the assessment.

10.7.3. Receptors located along the existing A96 are generally predicted to experience improvements in local air quality as traffic flows would decrease as traffic moves onto the new road. Receptors located within 200m of the options are predicted to experience a deterioration in air quality as the option would introduce additional emissions from traffic.

10.7.4. The regional assessment predicted increases of NOx, PM_{10} and CO_2 of similar magnitude for the North and South Options.

10.7.5. Overall there are no significant air quality effects predicted for either option.

Table 10.14: Summary of Predicted Environmental Effects: Hillhead to Lhanbryde

Predicted Residual Effects for North Option	Predicted Residual Effects for South Option
• Existing and predicted NO_2 and PM_{10} concentrations at local sensitive human receptors are low and well below the AQOs for the protection of human health • The greatest increase at human receptors in NO_2 and PM_{10} concentrations is predicted at receptor location R12 (Easter Coxton) which is within 50m of the option • Existing and predicted NOx concentrations are well below the AQO for the protection of vegetation at Quarry Woods SSSI and no significant effects are predicted • The predicted residual effect for air quality is not significant	• Existing and predicted NO_2 and PM_{10} concentrations at local sensitive human receptors are low and well below the AQOs for the protection of human health • The greatest increase at human receptors in NO_2 and PM_{10} concentrations is predicted at receptor location R27 for the South Option (Lochinver) which is within 60m of the option • Existing and predicted NOx concentrations are well below the AQO for the protection of vegetation at Quarry Woods SSSI and no significant effects are predicted • The predicted residual effect for air quality is not significant

Summary

10.7.6. All concentrations of pollutants in the local air quality assessment are predicted to be well below the AQOs for the protection of human health and vegetation, and there are no significant effects for either option. There are some non-significant predicted changes in local air quality at the sensitive receptors included in the assessment.

10.7.7. Receptors located along the existing A96 are generally predicted to experience improvements in local air quality as traffic flows would decrease as traffic moves onto the new road. Receptors located within 200m of options are predicted to experience a deterioration in air quality as the option would introduce additional emissions from traffic.

10.7.8. The regional assessment predicted increases of NOx, PM_{10} and CO_2 of similar magnitude for the North and South Options.

10.7.9. Overall there are no significant air quality effects predicted for either option.

Table 10.15: Summary of Predicted Environmental Effects: Lhanbryde to East of Fochabers

Predicted Residual Effects for North Option	Predicted Residual Effects for South Option
• Existing and predicted NO_2 and PM_{10} concentrations at local sensitive human receptors are low and well below the AQOs for the protection of human health • The greatest increase at human receptors in both NO_2 and PM_{10} concentrations is predicted at receptor location R10 (Pittensair) which is within 40m of the option • Existing and predicted NOx concentrations are well below the AQO for the protection of vegetation at Loch Oire SSSI and the River Spey SAC and SSSI and no significant effects are predicted • The predicted residual effect for air quality is not significant	• Existing and predicted NO_2 and PM_{10} concentrations at local sensitive human receptors are low and well below the AQOs for the protection of human health • The greatest increase at human receptors in both NO_2 and PM_{10} concentrations is predicted at receptor location R10 (Pittensair) which is within 40m of the option • Existing and predicted NOx concentrations are well below the AQO for the protection of vegetation at Loch Oire SSSI and the River Spey SAC and SSSI and no significant effects are predicted • The predicted residual effect for air quality is not significant

Summary

10.7.10. All concentrations of pollutants in the local air quality assessment are predicted to be well below the AQOs for the protection of human health and vegetation, and there are no significant effects for either option. There are some predicted non-significant changes in local air quality at the sensitive receptors included in the assessment.

10.7.11. Receptors located along the A96 are generally predicted to experience improvements in local air quality as traffic flows would decrease as traffic moves onto the new road. Receptors located within 200m of the options are predicted to experience a deterioration in air quality as the option would introduce additional emissions from traffic.

10.7.12. The regional assessment predicted increases of NOx, PM_{10} and CO_2 of similar magnitude for the North and South Options.

10.7.13. Overall there are no significant air quality effects predicted for either option.

10.8 Scope of the DMRB Stage 3 Assessment

10.8.1. In accordance with DMRB HA207/07, a qualitative assessment of potential dust effects during construction will be undertaken for the Preferred Option following further design development, a review of likely dust raising activities, and identification of sensitive receptors within 200 metres of these activities.

10.8.2. Relevant mitigation measures to minimise the air quality impact of construction activities will be set out in the EIA Report and included within commitments for any Construction Environmental Management Plan (CEMP).

10.8.3. The operational air quality impacts of predicted traffic flows for the Preferred Option would be determined through air dispersion modelling and assessment to provide a more detailed assessment of the local air quality effects at human and ecological receptors.

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11. Noise and Vibration

11.1 Introduction and Scope

11.1.1. This chapter presents the Design Manual for Roads and Bridges (DMRB) Stage 2 assessment of the noise and vibration impacts of each of the options for the A96 Dualling Hardmuir to Fochabers Scheme (the Scheme).

11.1.2. The assessment considers the results of predictions of road traffic noise and vibration impacts arising from the route options.

11.2 Approach to Assessment

Introduction

11.2.1. The assessment has been undertaken in accordance with the DMRB (Volume 11, Section 3, Part 7 HD 213/11 Noise and Vibration) (referred to as 'DMRB HD 213/11'), supplemented with the Technical Advice Note[35] that supports the Scottish Government's Planning Advice Note (PAN) 1/2011[36], which provides an approach to determining the significance of noise effects.

Sources of Information

11.2.2. The following sources of information have been used to inform this assessment:

- Ordnance Survey (OS) landline tiles;
- OS address base data;
- Outputs from the Aecom CRAM traffic model version 1.3; and
- Scheme drawings.

Consultation

11.2.3. The Environmental Health Department of Moray Council were consulted and included the following main items:

- Approach to assessment – DMRB HD 213/11, PAN 1/2011 and the supporting Technical Advice Note provide the basis of the assessment approach and methodology;
- Construction phase noise and vibration – this will be considered at DMRB Stage 3 when sufficient detail is available to undertake a meaningful assessment of the potential impacts;
- Baseline noise climate – besides road and rail traffic noise in the existing A96 and the Aberdeen - Inverness Railway Line corridors, aircraft noise associated RAF Lossiemouth is also a particular feature;

[35] Scottish Government (2011) Technical Advice Note – Assessment of Noise
[36] Scottish Government (2011) Planning Advice Note 1/2011 Planning and Noise

- Receptors[37] which the consultees considered as particularly sensitive were:
  - Brodie Castle, Forres;
  - Riverview Caravan Park, Forres;
  - Cooper Park, Elgin; and
  - Gordon Castle, Fochabers.

Assessment Methodology

11.2.4. DMRB HD 213/11 describes the methodology for the assessment of traffic noise and vibration impacts associated with trunk road projects. The scope of the assessment of noise and vibration impacts of the options has followed the methods described within DMRB HD 213/11 at the 'Detailed' level of assessment. This is on the basis that there are dwellings within 1km of the Scheme associated with options that are expected to be subject to changes in road traffic noise greater than the threshold values for permanent impacts. The threshold values are a change in magnitude of:

- Daytime road traffic noise:
  - 1 dB $L_{A10,18h}$ in the short term (i.e. on scheme opening); or
  - 3 dB $L_{A10,18h}$ in the long term (typically 15 years after scheme opening).
- Night-time road traffic noise:
  - 3 dB $L_{night,outside}$ in the long term where the receptor noise level exceeds 55 dB $L_{night,outside}$ in any scenario.

11.2.5. A change in road traffic noise of 1 dB $L_{A10,18h}$ in the short term (e.g. when a project is opened) is the smallest that is considered perceptible. In the long term (typically 15 years after project opening), a 3 dB $L_{A10,18h}$ change is considered perceptible.

11.2.6. Short-term impacts are those arising in the Scheme opening year (OY) with 'Do Something' (DS) 2030 versus 'Do Minimum' (DM) (2030).

11.2.7. Long-term impacts are those arising in the Scheme design year (DY) with Do Something 2045 or Do Minimum 2045 versus Do Minimum 2030.

11.2.8. DMRB HD 213/11 requires the application of the procedures described within the technical memorandum 'Calculation of Road Traffic Noise' (CRTN)[38] for the prediction of operational noise impacts. The predicted noise levels are based on forecast typical weekday traffic parameters (the Annual Average Weekday Traffic (AAWT)) within the 18-hour period between 06:00 and 24:00. A three-dimensional acoustic model has been developed within DataKustik CadnaA software[39], which implements the procedures of CRTN. Night-time noise levels ($L_{night,outside}$) are calculated using Method 3 described in the Transport Research

[37] Particularly sensitive receptors are those which have been identified through consultation with Moray Council Environmental Health Department as being particularly sensitive and for which detailed calculations of noise changes have been undertaken in describing the Predicted Effects of shortlisted options. A more comprehensive schedule of representative sensitive receptors will be included in the noise assessment at DMRB Stage 3 for the Preferred Option.
[38] Department of Transport and Welsh Office (1988) Calculation of Road Traffic Noise
[39] DataKustik GmbH (2018) CadnaA version 4.6.155

Laboratory report 'Converting the UK traffic noise index $L_{A10,18h}$ to EU noise indices for noise mapping'[40]. The impervious surfaces correction has been applied to be representative of conventional hot-rolled asphalt surfacing.

11.2.9. In accordance with DMRB HD 213/11, night-time noise impacts are considered only in the long-term and only at dwellings exposed to road traffic noise of 55 dB $L_{night,outside}$ (free field) or greater in any scenario.

11.2.10. Traffic-induced airborne vibration nuisance is assessed under the Do Minimum and Do Something scenarios in the long-term only.

11.2.11. The study area for the assessment of road traffic noise impacts in accordance with DMRB HD 213/11 is defined as a buffer 1km from the carriageway edge between the start and end of the proposed route options and the existing routes that are to be bypassed or improved between the start and end points. The assessment reports the changes in road traffic noise within a calculation area which is defined as a buffer 600m from the new or bypassed roads and all affected routes within the study area. Affected routes are those where the calculated changes in road traffic noise attributable to the link are equal to or exceed the threshold values described in paragraph 11.2.4 above.

11.2.12. The traffic modelling data used as the basis of the Do Something options assessment includes the implementation of the entire A96 Dualling Programme. This results in higher traffic flows on the new A96 than if the Hardmuir to Fochabers dualling only was considered and therefore the corresponding road traffic noise impacts are considered to be a worst case and representative of cumulative impacts from the A96 Dualling Programme. Furthermore, affected routes are identified that are significantly beyond the 1km study area buffer of the Hardmuir and Fochabers section. The majority of these would fall within the study areas of the assessments of the other sections of the A96 Dualling Programme. Consequently, affected routes beyond the 1km study area buffer of the Hardmuir to Fochabers section have not been considered. Changes within the study areas of other sections of the A96 Dualling Programme will be considered within the assessments of those schemes. Receptors adjacent to affected links in areas outside the study area but adjacent to the Hardmuir to Fochabers section will be considered within DMRB Stage 3.

11.2.13. The study area for the assessment of changes in nuisance levels due to traffic-induced airborne vibration is restricted to dwellings within 40m of the carriageway edge of road links within the calculation area, and where there is a calculated Do Minimum noise level exceeding 58 dB $L_{A10,18h}$ in the design year.

11.2.14. The DMRB HD 213/11 methodology assesses impacts on two categories of receptors: 'dwellings' and 'other noise sensitive receptors'. It classifies the magnitude of short and long-term changes in road traffic noise but does not assign significance based on receptor value/sensitivity and magnitude of impact.

[40] Transport Research Laboratory (2002) 'Converting the UK Traffic Noise Index $L_{A10,18h}$ to EU Noise Indices for Noise Mapping' Project report PR/SE/451/02

11.2.15. The Technical Advice Note which supports PAN 1/2011 considers significance of effects in terms of magnitude of impacts and sensitivity of receptor. This has been used to identify significant adverse or beneficial effects based on the prediction of impacts due to changes in road traffic noise in accordance with DMRB HD 213/11.

11.2.16. The sensitivity of receptors is described in the Technical Advice Note as follows:

- High – receptors that are particularly sensitive to noise such as residential dwellings, schools during the daytime, hospitals and places of worship;
- Medium – receptors with moderate sensitivity to noise such as offices, cafes and restaurants; and
- Low – receptors that would have minimal disturbance due to noise such as factories and working environments with high noise levels and night clubs.

11.2.17. In order to apply the significance matrix to the categories of noise-sensitive receptors considered by DMRB HD 213/11, 'dwellings' are considered to have high sensitivity and 'other noise sensitive receptors' are considered to have medium sensitivity on a precautionary basis. DMRB HD 213/11 does not define 'other noise sensitive receptors' therefore this has been applied to non-residential buildings, locations or settings used for occupational or amenity purposes. The receptors which were identified by the consultees as being particularly sensitive are considered to have high sensitivity.

11.2.18. The classification of the magnitude of changes in road traffic noise impacts presented in DMRB HD 213/11 is summarised in Table 11.1 below.

Table 11.1: Magnitude of Road Traffic Noise Impacts

Magnitude of impact	Noise change $L_{A10,18h}$ dB	
(Beneficial or adverse)	Short term	Long term
No change	0	0
Negligible	0.1 – 0.9	0.1 – 2.9
Minor	1.0 – 2.9	3.0 – 4.9
Moderate	3.0 – 4.9	5.0 – 9.9
Major	5.0 +	10.0 +

11.2.19. Table 11.2 below presents a matrix to determine significance of effects to be consistent with the Technical Advice Note.

Table 11.2: Significance of Effects Matrix

	Magnitude of impact				
Sensitivity	**Major**	**Moderate**	**Minor**	**Negligible**	**No change**
High	Large / Very Large	Moderate / Large	Slight / Moderate	Slight	Neutral

	Magnitude of impact				
Sensitivity	**Major**	**Moderate**	**Minor**	**Negligible**	**No change**
Medium	Moderate / Large	Moderate	Slight	Neutral / Slight	Neutral
Low	Slight / Moderate	Slight	Neutral / Slight	Neutral / Slight	Neutral

11.2.20. The Technical Advice Note sets out the consideration of significance within the decision-making process as follows:

- Very Large – key factor and may be associated with impacts where mitigation is not practical or would be ineffective;
- Large – important factor in the decision-making process and may be associated with impacts that can be mitigated to have moderate or slight significance;
- Moderate – important but not key in the decision-making process;
- Slight – unlikely to be important in the decision-making process; and
- Neutral – no effect and not a determining factor.

11.2.21. On this basis, significant effects are identified as those assessed as Very Large or Large significance. For example, in the case of dwellings, this would correspond with Moderate or Major impacts.

Assumptions and Limitations

11.2.22. Baseline noise surveys have not been carried out at this stage and will be conducted at DMRB Stage 3 (see Section 11.8).

11.2.23. It is not possible to provide a meaningful assessment of construction noise and vibration associated with the options at this stage. It has been assumed that working methods would be broadly similar for all options therefore the magnitude of impact would be governed primarily due to the proximity of the receptors to the route option.

11.2.24. Permanent ground-borne vibration impacts due to road traffic are generally associated with the interaction of the wheels and road surface. Section A5.26 of DMRB HD 213/11 states "*Significant groundborne vibrations may be generated by irregularities in the road surface. Such vibrations are unlikely to be important when considering disturbance from new roads and an assessment will only be necessary in exceptional circumstances*." Therefore, this has not been considered within this assessment.

11.3 Baseline Environment

Study Area Context

11.3.1. Baseline noise surveys have not been undertaken at this stage and will be carried out to inform the DMRB Stage 3 assessment. However, a description of the baseline within the

DMRB study area has been developed based on a desk study of mapping, consultation with Moray Council (see Section 11.2) and a qualitative assessment of observations on noise sources in the study area.

11.3.2. A review of consented planning applications and settlement designations within the Moray Council Local Development Plan 2015 has been undertaken to identify areas of future development anticipated to be present in the opening year (see Section 8.3 of Chapter 8, Introduction and Approach to Environmental Assessment) within the calculation areas where noise-sensitive receptors are expected to be introduced. A high-level review has been included within the assessment of each option to consider whether the inclusion of future development may affect the assessment outcome.

11.3.3. The following sections describe the distribution of sensitive receptors within the calculation areas and the main sources of noise which influence the noise climate that are specific to the three route sections. Sources which are common to the study areas of all options include:

- Trains on the Aberdeen - Inverness Railway Line;
- Agricultural equipment and activities; and
- Non-anthropogenic sources such as wind in trees and foliage, birdsong, cattle and watercourses.

Candidate Noise Management Areas

11.3.4. The European Parliament and Council Directive for Assessment and Management of Environmental Noise 2002/49/EC[41] (also known as the Environmental Noise Directive (END)) requires Member States to determine the noise exposure of the population through noise mapping and to establish Action Plans based on the mapping results. The requirements were transposed into the Environmental Noise (Scotland) Regulations 2006[42]. The production of noise mapping was undertaken by the Scottish Government as the competent authority.

11.3.5. Round 1 mapping applied criteria to produce strategic noise maps which identified areas affected by the highest road, rail and airport and industrial noise sources. Round 2 mapping informed the development of the Transportation Noise Action Plan[43]. Two Candidate Noise Management Areas from this Plan have been identified within the study area for the Scheme:

- A96 High Street at Hill Street in Elgin between the junctions with the B9010 and A941; and
- A940 Market Street in Forres at the southern end of Market Street.

11.3.6. The predicted changes in road traffic noise affecting these areas due to options are presented in Section 11.6.

[41] European Commission (2002) Council Directive 2002/49/EC The Assessment and Management of Environmental Noise
[42] Scottish Government (2006) The Environmental Noise (Scotland) Regulations 2006
[43] Transport Scotland (2014) Transportation Noise Action Plan

Hardmuir to Hillhead Baseline

11.3.7. Figures 11.1a and 11.1b (Volume 5) present the DMRB study and calculation areas for the North and South Options.

11.3.8. The calculation areas for the options include:

- North Option: 5,256 dwellings and 428 other noise sensitive receptors; and
- South Option: 4,962 dwellings and 445 other noise sensitive receptors.

11.3.9. The calculation areas for both options include the majority of Forres which comprises dwellings and industrial/commercial properties mainly on the north and east side. The calculation areas of both options also include scattered dwellings within rural areas. The South Option includes a concentration of dwellings at the Riverview Caravan Park in Mundole, south west of Forres.

11.3.10. The main areas of future development (see Figure 9.1, Volume 5) include the residential allocations of:

- Lochyhill on the north-east side of Forres which lies partly within the calculation areas of the North and South route options; and
- Dallas Dhu and Knockomie South to the south of Forres which lie partly within the calculation area of the South Option.

11.3.11. The main sources of environmental noise within the DMRB study area are:

- Road traffic including particularly on the A96, A940, B9010 and B9011 roads;
- Industrial developments on the north side of Forres; and
- Aircraft movements associated with RAF Lossiemouth.

11.3.12. The particularly sensitive receptor of Brodie Castle, Forres, lies within the calculation areas of both options, and Riverview Caravan Park, Forres, lies within the calculation area of the South Option. These are considered to be high sensitivity receptors (see Section 11.2).

11.3.13. The Candidate Noise Management Area on Market Street, Forres, falls within the calculation areas for both the North and South Options.

Hillhead to Lhanbryde Baseline

11.3.14. Figures 11.2a and 11.2b (Volume 5) present the DMRB study and calculation areas for the North and South Options.

11.3.15. The calculation areas for the options include:

- North Option: 11,996 dwellings and 1,385 other noise sensitive receptors; and
- South Option: 11,461 dwellings and 1,350 other noise sensitive receptors.

11.3.16. The calculation areas for both options include the majority of Elgin which comprises extensive residential areas on all sides of the town and industrial/commercial properties mainly south of the centre and on the east side. The majority of Lhanbryde also lies within

the calculation areas of both options. The calculation areas of both options also include scattered dwellings within rural areas.

11.3.17. The main areas of future development (see Figure 9.2, Volume 5) include the residential allocations of the:

- Findrassie / Myreside site and Lesmurdie Fields site on the north-east side of Elgin which lie partly within the calculation area of the North Option;
- Glassgreen and Thornhill sites in the Springfield area on the south side of Elgin which lie within the calculation area of the South Option; and
- West of St Andrew's Road site at Lhanbryde which lies within the calculation areas of both route options.

11.3.18. The main sources of environmental noise within the DMRB study area are:

- Road traffic on the existing A96, B9010, B9012, B9013, B9103 and A941 roads;
- Industrial developments on the south-east side of Elgin; and
- Aircraft associated with RAF Lossiemouth.

11.3.19. The Candidate Noise Management Area on the existing A96 at High Street in Elgin falls within the calculation areas for both options.

11.3.20. Cooper Park, Elgin, was identified as a particularly sensitive receptor in consultation with Moray Council and lies partly within the calculation area of both options. It is assessed as a high sensitivity receptor.

Lhanbryde to East of Fochabers Baseline

11.3.21. Figures 11.3a and 11.3b (Volume 5) present the DMRB study and calculation areas for the North and South Options.

11.3.22. The calculation areas for the options include:

- North Option: 2,420 dwellings and 171 other noise sensitive receptors; and
- South Option: 2,511 dwellings and 173 other noise sensitive receptors.

11.3.23. The calculation areas for both route options include Lhanbryde, Mosstodloch and Fochabers which comprises dwellings and industrial/commercial properties. The calculation areas of both options also include scattered dwellings within rural areas.

11.3.24. The main areas of future development (see Figure 9.3, Volume 5) include the residential allocations of the:

- West of St Andrew's Road site at Lhanbryde which lies within the calculation areas of both options;
- East of Duncan Avenue site at Fochabers which lies within the calculation areas of both options; and
- Ordiequish Road and Ordiequish Road West sites which lie partly within the calculation areas of both options.

11.3.25. The main sources of environmental noise within the DMRB study area are road traffic on the existing A96, A98, B9015, B9103 and B9104 roads.

11.3.26. Gordon Castle at Fochabers was identified as a particularly sensitive receptor in consultation with Moray Council and is assessed as a high sensitivity receptor. The estate lies partly within the calculation areas of both options.

11.4 Potential Impacts

11.4.1. This section presents the potential traffic noise and vibration impacts of the options. The magnitude of predicted impacts has been considered in combination with the sensitivity of the baseline to determine the potential for significant effects. The predicted impacts are presented in Table 11.3 below.

Table 11.3: Potential Operational Noise and Vibration Impacts

Potential Impact	Adverse / Beneficial	Magnitude	Potentially Significant?	Relevant Options
Dwellings and other sensitive receptors exposed to decreases and increases in road traffic noise arising from the Scheme and the affected road network	Beneficial / Adverse	Negligible to Major	✓	All
Changes in road traffic noise affecting particularly sensitive receptors	Beneficial / Adverse	Negligible to Major	✓	All
Changes in road traffic noise within Candidate Noise Management Areas	Beneficial / Adverse	Not applicable[44]	–	Hardmuir to Hillhead both options and Hillhead to Lhanbryde both options
Changes in road traffic noise arising from the Scheme and the affected road network affecting dwellings and other sensitive receptors associated with future development	Beneficial / Adverse	Not applicable[45]	–	All
Dwellings exposed to changes in level of nuisance due to traffic-	Beneficial / Adverse	Not applicable[46]	–	All

[44] There are no specified criteria for assessing changes in noise levels within a Candidate Noise Management Area
[45] A qualitative assessment is made to consider whether the inclusion of receptors of the identified future developments could materially affect the assessment outcome
[46] HD 213/11 requires that the percentage changes in people bothered very much or quite a lot by traffic-induced airborne vibration are reported and does not assign magnitude of impact

Potential Impact	Adverse / Beneficial	Magnitude	Potentially Significant?	Relevant Options
induced airborne vibration arising from the Scheme and the affected road network				

11.4.2. For each option, the assessment of potential noise and vibration impacts considers:

- Short and long-term changes in road traffic noise at existing dwellings and other noise sensitive receptors;
- Long-term changes in traffic-induced airborne vibration nuisance;
- Short and long-term changes in road traffic noise at particularly sensitive receptors including Candidate Noise Management Areas where applicable; and
- A high-level review of potential road traffic noise affecting future development and whether the inclusion of associated sensitive receptors could affect the assessment outcome.

11.5 Mitigation

11.5.1. No specific mitigation has been incorporated in the assessment of options. The feasibility or effectiveness of measures such as noise barriers or low noise road surfacing applied to the carriageway, and the resulting benefits have not been established at this stage.

11.5.2. Newly laid low noise road surfacing has been shown to generate lower tyre/road noise relative to conventional new hot rolled asphalt by up to 3.5 dB[47]. The benefit of noise barriers is controlled by its height, providing it is adequately long, and dependent on its proximity to the sources and receivers.

11.5.3. Where the route option is within a cutting, the attributable screening attenuation has been accounted for within the acoustic model consistent with the effects of topographical screening.

11.5.4. These measures will be developed at DMRB Stage 3 for the Preferred Option. In the assessment (see Section 11.6) the benefits of mitigation have been considered qualitatively in the reporting of the assessment for relevant options.

11.6 Predicted Environmental Effects

11.6.1. This section presents the findings of the assessment of noise and vibration effects of the shortlisted options.

[47] Transport Research Laboratory (2004) The Performance of Quieter Surfaces Over Time – Published Project Report PPR485

Hardmuir to Hillhead

11.6.2. Figures 11.4a and 11.4b (Volume 5) present the predicted changes in road traffic noise in the form of noise contour maps in the opening year (2030 Do Something compared to 2030 Do Minimum) for the North and South Options respectively. These show:

- The North Option is predicted to result in Major and Moderate adverse changes in opening year road traffic noise around the part of the option north of Forres. Moderate beneficial changes are predicted in the area alongside the existing A96 through Forres. Moderate adverse changes are predicted in the area south of Forres where there is a relatively high density of receptors; and
- The South Option is predicted to result in Major and Moderate adverse changes in the part of the option south of Forres. Major and Moderate beneficial changes are predicted in the area alongside the existing A96 through Forres.

Short and Long-Term Changes in Road Traffic Noise at Existing Dwellings and Other Noise Sensitive Receptors

11.6.3. Table 11.4 below presents the 2030 Do Something short-term changes in predicted daytime road traffic noise for the two options at dwellings and other noise-sensitive receptors.

Table 11.4: Short-term Changes in Daytime Road Traffic Noise for the Do 2030 Something Scenario – Hardmuir to Hillhead

DSOY v DMOY			Dwellings		Other receptors	
Change in noise level dB		Magnitude of impact	North Option	South Option	North Option	South Option
Increase in noise level, $L_{A10,18h}$	0.1 to 0.9	Negligible	407	572	119	111
	1.0 to 2.9	Minor	1,337	269	71	6
	3.0 to 4.9	**Moderate**	**2,235**	**76**	**61**	**7**
	5.0 +	**Major**	**719**	**188**	**80**	**22**
No change	0	No change	167	150	51	69
Decrease in noise level, $L_{A10,18h}$	0.1 to 0.9	Negligible	96	781	9	45
	1.0 to 2.9	Minor	142	1,536	13	69
	3.0 to 4.9	**Moderate**	**78**	**1,270**	**19**	**107**
	5.0 +	**Major**	**75**	**120**	**5**	**9**

11.6.4. This shows that the South Option is predicted to result in Moderate and Major short-term increases in daytime road traffic noise at many fewer dwellings than the North Option. The South Option is also predicted to result in Moderate and Major decreases at a much greater number of dwellings than the North Option. A similar trend is predicted for traffic noise impacts at other sensitive receptors. These findings do not take account of any potential future mitigation for the North Option. For example, the use of low noise road surfacing

and/or acoustic barriers along key sections of the new road would have the potential to reduce a large proportion of the significant adverse noise impacts so that they would not be assessed as significant.

11.6.5. The alignment of the North Option is elevated which allows road traffic noise to propagate more widely, and it lies closer to populated areas of Forres than the South Option, which is more remote. The introduction of the North Option results in increases at a relatively high number of receptors, many of which are also elevated, whereas there are fewer receptors within the calculation area of the South Option although it results in relatively large increases in noise levels in the remote areas. Furthermore, sections of the South Option lie in cutting which serves to limit the spread to road traffic noise.

11.6.6. Table 11.5 below compares the predicted 2045 Do Something long-term changes in daytime road traffic noise for the two options at dwellings and other noise sensitive receptors.

Table 11.5: Long-term Changes in Daytime Road Traffic Noise for the Do Something 2045 Scenario – Hardmuir to Hillhead

DSDY v DMOY			Dwellings		Other receptors	
Change in noise level dB		Magnitude of impact	North Option	South Option	North Option	South Option
Increase in noise level, $L_{A10,18h}$	0.1 to 2.9	Negligible	1,276	1,459	176	148
	3.0 to 4.9	Minor	2,017	152	59	9
	5.0 to 9.9	**Moderate**	**1,481**	**100**	**76**	**13**
	10.0 +	**Major**	**28**	**110**	**24**	**9**
No change	0	No change	145	149	56	65
Decrease in noise level, $L_{A10,18h}$	0.1 to 2.9	Negligible	206	2,147	22	108
	3.0 to 4.9	Minor	70	733	12	86
	5.0 to 9.9	**Moderate**	**28**	**110**	**3**	**7**
	10.0 +	**Major**	**5**	**2**	**0**	**0**

11.6.7. This shows that the North Option is predicted to result in Moderate long-term increases at a much greater number of dwellings than the South Option. However, the South Option is predicted to have a greater number of Major long-term traffic noise increases than the North Option. This is because the alignment of the South Option affects many properties that are within an area with relatively few other sources of road traffic noise. Consequently, the South Option results in a higher number of Major adverse impacts. However, the South Option is also predicted to result in a greater number of dwellings with Moderate decreases with only a few receptors with Major decreases for both route options.

11.6.8. In the case of the North Option, a large proportion of receptors fall within the Minor and Moderate adverse categories. Mitigation by the application of a low noise road surfacing might be effective in moving a large number of these receptors into the Minor and Negligible adverse categories. However, in the case of the South Option, as the changes at the receptors in remote areas are so large, many receptors would remain in the Major adverse category despite the benefit of low noise road surfacing.

11.6.9. Table 11.6 below presents the predicted long-term changes in night-time road traffic noise for the two route options at dwellings under the 2045 Do Something and Do Minimum scenarios.

Table 11.6: Long-term Changes in Night-time Road Traffic Noise for the 2045 Do Something and Do Minimum Scenarios – Hardmuir to Hillhead

Night-time impacts (dwellings only)			DSDY v DMOY		DMDY v DMOY	
Change in noise level dB		Magnitude of impact	North Option	South Option	North Option	South Option
Increase in noise level, $L_{night,outside}$	0.1 to 2.9	Negligible	169	148	207	206
	3.0 to 4.9	Minor	4	1	0	0
	5.0 to 9.9	**Moderate**	**1**	**0**	**0**	**0**
	10.0 +	**Major**	**1**	**1**	**0**	**0**
No change	0	No change	0	0	1	1
Decrease in noise level, $L_{night,outside}$	0.1 to 2.9	Negligible	16	4	6	6
	3.0 to 4.9	Minor	3	14	0	0
	5.0 to 9.9	**Moderate**	**3**	**0**	**0**	**0**
	10.0 +	**Major**	**0**	**0**	**0**	**0**

11.6.10. This shows that the implementation of both options results in a decrease in the predicted number of dwellings affected by night-time road traffic noise. The differences between the options includes only a small number of dwellings.

11.6.11. Table 11.7 below presents the 2045 Do Minimum long-term changes in daytime road traffic noise predicted for the two route options at dwellings and other noise sensitive receptors. This represents long-term growth in road traffic noise that would arise without the implementation of the A96 Dualling Programme.

Table 11.7: Long-term Changes in Daytime Road Traffic Noise for the 2045 Do Minimum Scenario – Hardmuir to Hillhead

DMDY v DMOY			Dwellings		Other receptors	
Change in noise level dB		Magnitude of impact	North Option	South Option	North Option	South Option
Increase in noise level, $L_{A10,18h}$	0.1 to 2.9	Negligible	5,086	4,828	374	379
	3.0 to 4.9	Minor	0	0	0	0
	5.0 to 9.9	**Moderate**	**0**	**0**	**0**	**0**
	10.0 +	**Major**	**0**	**0**	**0**	**0**
No change	0	No change	145	109	51	63
Decrease in noise level, $L_{A10,18h}$	0.1 to 2.9	Negligible	25	25	3	3
	3.0 to 4.9	Minor	0	0	0	0
	5.0 to 9.9	**Moderate**	**0**	**0**	**0**	**0**
	10.0 +	**Major**	**0**	**0**	**0**	**0**

11.6.12. This shows that the long-term changes in road traffic noise under the Do Minimum scenario within the calculation areas of both route options would not be significant.

Changes in Road Traffic Noise at Particularly Sensitive Receptors

11.6.13. The predicted changes in daytime road traffic noise levels for the options at particularly sensitive receptors and the Candidate Noise Management Area in the Forres area are presented in Table 11.8 below.

Table 11.8: Predicted Changes in Road Traffic Noise $L_{A10,18h}$ dB at Particularly Sensitive Receptors – Hardmuir to Hillhead

Receptor	Route option	2030 Short-term	2045 Long-term	
		DSOY v DMOY	DSDY v DMOY	DMDY v DMOY
Brodie Castle, Forres	North	+0.3	+1.1	+0.9
	South	+1.4	+2.2	+0.9
Riverview Caravan Park	South only	+19.3	+20.2	+0.9
12, Rowan Road				
95, Beech Avenue		+22.5	+23.4	+0.9
Candidate Noise Management Area at Forres	North	+1.6	+3.0	+0.4
	South	+0.2	+1.7	+0.4

11.6.14. This shows that:

- Brodie Castle – the options would result in either Negligible or Minor adverse impacts in both the short and long-term and are therefore not predicted to be significant;
- Riverview Caravan Park – this falls within the calculation area of the South Option and not the North Option. Major adverse increases in road traffic noise are predicted to affect the south side of the caravan park; and
- Candidate Noise Management Area at Forres – both options would result in either Negligible or Minor adverse impacts in both the short and long-term and are therefore not predicted to be significant.

Road Traffic Noise Impacts at Future Developments

11.6.15. The potential impact of the options has been reviewed with reference to the proximity of the alignments to key residential allocations identified in the Moray Council Local Development Plan 2015 (see Section 11.3).

11.6.16. Developments south-west of Forres adjacent to the A940 Grantown Road (Dallas Dhu and Knockomie South) and east of Forres (Lochyhill) would introduce receptors into the calculation areas of both options. The noise change contours for both options indicate Minor and Moderate increases in the area of Dallas Dhu and Knockomie South. In the area of Lochyhill, both options are predicted to result in reductions around the existing A96 which borders the site to the north. However, the South Option would take A96 traffic further away from the site such that the spatial extents of predicted reductions within the site would be expected to be greater than in the case of the North Option. It is predicted that the South Option would have less adverse traffic noise impact overall on future residential development.

Changes in Traffic-Induced Airborne Vibration Nuisance

11.6.17. Table 11.9 below presents the long-term changes in traffic-induced airborne vibration nuisance predicted for the route options.

Table 11.9: Changes in Traffic-induced Airborne Vibration Nuisance – Hardmuir to Hillhead

Long-term 2045 daytime impacts (dwellings only)		DMDY v DMOY		DSDY v DMOY	
Change in nuisance level dB		North Option	South Option	North Option	South Option
Increase in nuisance level	< 10%	358	280	4	43
	10 < 20%	0	0	43	61
	20 < 30%	0	0	202	3
	30 < 40%	0	0	0	0
	>40%	0	0	0	0

Long-term 2045 daytime impacts (dwellings only)		DMDY v DMOY		DSDY v DMOY	
Change in nuisance level dB		North Option	South Option	North Option	South Option
No change	0	0	0	0	30
Decrease in nuisance level	< 10%	4	4	4	114
	10 < 20%	0	0	0	20
	20 < 30%	0	0	0	6
	30 < 40%	0	0	0	0
	>40%	0	0	0	0

11.6.18. This shows that under the Do Minimum scenario (i.e. in the absence of any option) small and mainly adverse changes in nuisance is predicted for both route options.

11.6.19. Under the Do Something scenario, the changes in nuisance level are predicted to be mainly adverse in the case of the North Option and greater in magnitude than the South Option, whereas there are more beneficial changes (decreases in nuisance) predicted for the South Option.

Hillhead to Lhanbryde

11.6.20. Figures 11.5a and 11.5b (Volume 5) present the predicted changes in road traffic noise in the opening year for the North and South Options respectively. These show:

- The North Option is predicted to result in Major and Moderate adverse changes in opening year road traffic noise around the parts of the option north of Elgin and south of Alves. Major and Moderate beneficial changes are predicted in the area alongside the existing A96 through Elgin and a section west of Alves; and
- The South Option is predicted to result in Major and Moderate adverse changes in the part of the option south of Elgin. Major and Moderate beneficial changes are predicted in the area alongside the existing A96 through Elgin and the section south of Newton.

Short and Long-Term Changes in Road Traffic Noise at Existing Dwellings and Other Noise Sensitive Receptors

11.6.21. Table 11.10 below compares the 2030 Do Something short-term changes in daytime road traffic noise for the two options at dwellings and other noise sensitive receptors.

Table 11.10: Comparison of 2030 Short-term Changes in Daytime Road Traffic Noise Under the Do Something Scenario – Hillhead to Lhanbryde

DSOY v DMOY			Dwellings		Other receptors	
Change in noise level dB		Magnitude of impact	North Option	South Option	North Option	South Option
Increase in noise level, $L_{A10,18h}$	0.1 to 0.9	Negligible	2,890	2,061	135	133
	1.0 to 2.9	Minor	1,489	845	41	26
	3.0 to 4.9	**Moderate**	**543**	**290**	**13**	**19**
	5.0 +	**Major**	**390**	**206**	**23**	**22**
No change	0	No change	871	693	272	189
Decrease in noise level, $L_{A10,18h}$	0.1 to 0.9	Negligible	3,702	3,562	255	234
	1.0 to 2.9	Minor	1,416	2,926	447	497
	3.0 to 4.9	**Moderate**	**593**	**746**	**191**	**220**
	5.0 +	**Major**	**102**	**132**	**8**	**10**

11.6.22. The South Option is predicted to result in fewer dwellings with adverse impacts at all magnitudes of impacts. The South Option is also predicted to result in a greater number of dwellings and other sensitive receptors with beneficial impacts at all magnitudes except those assessed as Negligible beneficial although the number of receptors is similar for both route options.

11.6.23. Table 11.11 below compares the 2045 Do Something long-term changes in daytime road traffic noise for the two options at dwellings and other noise sensitive receptors.

Table 11.11: Comparison of 2045 Long-term Changes in Daytime Road Traffic Noise Under the Do Something Scenario – Hillhead to Lhanbryde

DSDY v DMOY			Dwellings		Other receptors	
Change in noise level dB		Magnitude of impact	North Option	South Option	North Option	South Option
Increase in noise level, $L_{A10,18h}$	0.1 to 2.9	Negligible	5,607	3,593	305	210
	3.0 to 4.9	Minor	748	517	28	34
	5.0 to 9.9	**Moderate**	**382**	**168**	**13**	**18**
	10.0 +	**Major**	**127**	**80**	**11**	**5**
No change	0	No change	899	845	252	208

DSDY v DMOY			Dwellings		Other receptors	
Change in noise level dB		Magnitude of impact	North Option	South Option	North Option	South Option
Decrease in noise level, $L_{A10,18h}$	0.1 to 2.9	Negligible	3,730	5,602	681	744
	3.0 to 4.9	Minor	408	569	87	122
	5.0 to 9.9	**Moderate**	**95**	**87**	**8**	**9**
	10.0 +	**Major**	**0**	**0**	**0**	**0**

11.6.24. In the design year the South Option is predicted to result in fewer dwellings with adverse impacts at all magnitudes. The South Option is predicted to result in a greater number of dwellings with beneficial impacts at all magnitudes except Moderate beneficial although the number of receptors in this band are similar for both options.

11.6.25. Table 11.12 below compares the 2045 long-term changes in night-time road traffic noise for the two options at dwellings under the Do Something and Do Minimum scenarios.

Table 11.12: Comparison of 2045 Long-term Changes in Night-time Road Traffic Noise Under the Do Something and Do Minimum Scenarios – Hillhead to Lhanbryde

Night-time impacts (dwellings only)			DSDY v DMOY		DMDY v DMOY	
Change in noise level dB		Magnitude of impact	North Option	South Option	North Option	South Option
Increase in noise level, $L_{night,outside}$	0.1 to 2.9	Negligible	389	349	899	861
	3.0 to 4.9	Minor	1	0	45	46
	5.0 to 9.9	**Moderate**	**1**	**1**	**7**	**6**
	10.0 +	**Major**	**0**	**3**	**0**	**0**
No change	0	No change	62	29	29	25
Decrease in noise level, $L_{night,outside}$	0.1 to 2.9	Negligible	236	276	4	3
	3.0 to 4.9	Minor	142	137	0	0
	5.0 to 9.9	**Moderate**	**1**	**1**	**0**	**0**
	10.0 +	**Major**	**0**	**0**	**0**	**0**

11.6.26. This shows that similar numbers of dwellings are affected by predicted long-term night-time impacts under both options. Only the South Option is predicted to result in any Major adverse impacts although this applies to relatively few dwellings.

11.6.27. Comparison of Do Something and Do Minimum results shows that the implementation of either option would result in fewer adverse impacts and greater beneficial impacts than in the case where the Scheme is not implemented. At a small number of dwellings, the implementation of the South Option is predicted to result in Major adverse impacts which would not arise in the case that the options are not implemented.

11.6.28. Table 11.13 below compares the Do Minimum 2045 long-term changes in daytime road traffic noise for the two options at dwellings and other noise sensitive receptors. This represents long-term growth in road traffic noise that would arise without the implementation of the Scheme.

Table 11.13: Comparison of 2045 Long-term Changes in Daytime Road Traffic Noise Under the Do Minimum Scenario – Hillhead to Lhanbryde

DMDY v DMOY			Dwellings		Other receptors	
Change in noise level dB		Magnitude of impact	North Option	South Option	North Option	South Option
Increase in noise level, $L_{A10,18h}$	0.1 to 2.9	Negligible	11,254	10,717	1,133	1,149
	3.0 to 4.9	Minor	50	50	5	5
	5.0 to 9.9	**Moderate**	**16**	**16**	**1**	**1**
	10.0 +	**Major**	**0**	**0**	**0**	**0**
No change	0	No change	555	617	234	186
Decrease in noise level, $L_{A10,18h}$	0.1 to 2.9	Negligible	121	61	12	9
	3.0 to 4.9	Minor	0	0	0	0
	5.0 to 9.9	**Moderate**	**0**	**0**	**0**	**0**
	10.0 +	**Major**	**0**	**0**	**0**	**0**

11.6.29. The noise impacts of long-term changes in road traffic under the Do Minimum scenario are mainly predicted to result in Negligible increases within the calculation areas of both route options.

Changes in Road Traffic Noise at Particularly Sensitive Receptors

11.6.30. Table 11.14 below compares the predicted changes in daytime road traffic noise levels under the route options at the particularly sensitive receptor of Cooper Park and the Candidate Noise Management Area, both located in Elgin.

Table 11.14: Predicted Changes in Road Traffic Noise $L_{A10,18h}$ dB at Particularly Sensitive Receptors – Hillhead to Lhanbryde

Receptor	Route option	2030 Short-term	2045 Long-term	
		DSOY v DMOY	DSDY v DMOY	DMDY v DMOY
Cooper Park, Elgin	North	-0.6	-0.4	+0.3
	South	-0.3	-0.2	+0.3
Candidate Noise Management Area at Elgin	North	-3.7	-3.4	+1.4
	South	-4.2	-3.8	+1.4

11.6.31. This shows that:

- Cooper Park, Elgin – both options are predicted to have a Negligible beneficial impact on Cooper Park in the short and long term. In the Do Minimum, the predicted impact is Negligible adverse in the long term; and
- Candidate Noise Management Area at Elgin – both options are predicted to result in a beneficial impact in the short term and the long term. Without the Scheme the predicted impact is Negligible adverse in the long term with both options.

Road Traffic Noise Impacts at Future Developments

11.6.32. The potential impact of the route options has been reviewed with reference to the proximity of the alignments to key residential allocations identified in the Moray Council Local Development Plan 2015 (see Section 11.3).

11.6.33. Both options include the West of St Andrew's Road site at Lhanbryde within the calculation areas. The extent of the Findrassie/Myreside site within the calculation area of the North Option is larger in area than the combined area of the Glassgreen and Thornhill sites (Elgin South) that fall within the South Option calculation area. Furthermore, the Findrassie/Myreside site would be directly affected by noise from road traffic using the North Option whereas the part of the calculation area affecting Glassgreen and Thornhill is associated with the A941 as part of the affected road network. It is concluded that the South Option would be predicted to have less adverse traffic noise impact on future residential development since there would be fewer anticipated noise sensitive receptors within the calculation area.

Changes in Traffic-Induced Airborne Vibration Nuisance

11.6.34. Table 11.15 below presents the 2045 long-term changes in traffic-induced airborne vibration nuisance due to the options.

Table 11.15: Changes in Traffic-induced Airborne Vibration Nuisance – Hillhead to Lhanbryde

2045 Long-term daytime impacts (dwellings only)		DMDY v DMOY		DSDY v DMOY	
Change in nuisance level dB		North Option	South Option	North Option	South Option
Increase in nuisance level	< 10%	769	840	64	16
	10 < 20%	47	47	24	23
	20 < 30%	0	0	29	95
	30 < 40%	0	0	2	1
	>40%	0	0	0	8
No change	0	3	6	45	7
Decrease in nuisance level	< 10%	8	6	539	534
	10 < 20%	0	0	47	130
	20 < 30%	0	0	0	0
	30 < 40%	0	0	0	0
	>40%	0	0	0	0

11.6.35. In the Do Minimum scenario, small and mainly adverse changes in nuisance are predicted for both options. In the Do Something scenario, the North Option is predicted to result in fewer dwellings with larger increases in nuisance. However, the South Option is predicted to result in a greater number of dwellings with larger decreases in nuisance level.

Lhanbryde to East of Fochabers

11.6.36. Figures 11.6a and 11.6b (Volume 5) present the predicted changes in road traffic noise in the opening year for the North and South Options respectively. These show:

- The North Option is predicted to result in Major and Moderate adverse changes in opening year road traffic noise around Wester Bauds and Easter Bauds. Major and Moderate beneficial changes are predicted in the area alongside the existing A96 between Lhanbryde and Mosstodloch; and
- The South Option is predicted to result in Major and Moderate adverse changes in the part of the option south of Mosstodloch and Fochabers. Major and Moderate beneficial changes are predicted in the area alongside the existing A96 between Lhanbryde and Fochabers.

Short and Long-Term Changes in Road Traffic Noise at Existing Dwellings and Other Noise Sensitive Receptors

11.6.37. The predicted Do Something 2030 short-term (opening year) changes in daytime road traffic noise for the two options at dwellings and other noise sensitive receptors are presented in Table 11.16 below.

Table 11.16: Comparison of 2030 Short-term Changes in Daytime Road Traffic Noise Under the Do Something Scenario – Lhanbryde to East of Fochabers

DSOY v DMOY			Dwellings		Other Receptors	
Change in noise level dB		Magnitude of impact	North Option	South Option	North Option	South Option
Increase in noise level, $L_{A10,18h}$	0.1 to 0.9	Negligible	228	271	10	14
	1.0 to 2.9	Minor	744	537	41	25
	3.0 to 4.9	**Moderate**	**644**	**318**	**58**	**11**
	5.0 +	**Major**	**54**	**92**	**6**	**8**
No change	0	No change	61	117	30	32
Decrease in noise level, $L_{A10,18h}$	0.1 to 0.9	Negligible	133	150	9	9
	1.0 to 2.9	Minor	412	270	2	10
	3.0 to 4.9	**Moderate**	**101**	**276**	**9**	**18**
	5.0 +	**Major**	**43**	**480**	**6**	**46**

11.6.38. The South Option is predicted to result in fewer dwellings and other sensitive receptors with Minor and Moderate adverse impacts. However, a greater number of receptors are predicted to have Major adverse impacts for the South Option. This is because the alignment of the South Option is more remote from the existing A96 where it passes through Lhanbryde and Fochabers but is closer to scattered dwellings in areas where Do Minimum levels of road traffic noise are low.

11.6.39. The South Option is predicted to result in a greater overall number of receptors with Moderate and Major beneficial impacts.

11.6.40. Table 11.17 below compares the 2045 Do Something long-term changes in daytime road traffic noise for the two route options at dwellings and other noise sensitive receptors.

Table 11.17: Comparison of 2045 Long-term Changes in Daytime Road Traffic Noise Under the Do Something Scenario – Lhanbryde to East of Fochabers

DSDY v DMOY			Dwellings		Other Receptors	
Change in noise level dB		Magnitude of impact	North Option	South Option	North Option	South Option
Increase in noise level, $L_{A10,18h}$	0.1 to 2.9	Negligible	634	645	32	31
	3.0 to 4.9	Minor	989	524	78	23
	5.0 to 9.9	**Moderate**	**99**	**120**	**8**	**5**
	10.0 +	**Major**	**8**	**26**	**1**	**3**
No change	0	No change	88	125	31	32
Decrease in noise level, $L_{A10,18h}$	0.1 to 2.9	Negligible	496	355	10	21
	3.0 to 4.9	Minor	68	253	5	15
	5.0 to 9.9	**Moderate**	**37**	**422**	**6**	**28**
	10.0 +	**Major**	**1**	**41**	**0**	**15**

11.6.41. The North Option is predicted to result in slightly fewer receptors with Major adverse impacts in the long-term. However, the South Option is predicted to result in a larger number of receptors with beneficial impacts.

11.6.42. Table 11.18 below compares the 2045 long-term changes in night-time road traffic noise for the two options at dwellings under the Do Something and Do Minimum scenarios.

Table 11.18: Comparison of 2045 Long-term Changes in Night-time Road Traffic Noise Under the Do Something and Do Minimum Scenarios – Lhanbryde to East of Fochabers

Night-time impacts (dwellings only)			DSDY v DMOY		DMDY v DMOY	
Change in noise level dB		Magnitude of impact	North Option	South Option	North Option	South Option
Increase in noise level, $L_{night,outside}$	0.1 to 2.9	Negligible	3	3	24	23
	3.0 to 4.9	Minor	8	1	46	47
	5.0 to 9.9	**Moderate**	**0**	**0**	**6**	**6**
	10.0 +	**Major**	**3**	**0**	**0**	**0**
No change	0	No change	0	0	0	0
Decrease in noise	0.1 to 2.9	Negligible	0	0	3	3
	3.0 to 4.9	Minor	4	4	0	0

Night-time impacts (dwellings only)			DSDY v DMOY		DMDY v DMOY	
Change in noise level dB		Magnitude of impact	North Option	South Option	North Option	South Option
level, $L_{night,outside}$	5.0 to 9.9	**Moderate**	**0**	**2**	**0**	**0**
	10.0 +	**Major**	**0**	**0**	**0**	**0**

11.6.43. This shows that similar numbers of dwellings are affected by long-term night-time impacts under both route options although only the North Option is predicted to result in a Major adverse impact at relatively few dwellings. Very few receptors are affected in either case.

11.6.44. Comparison of Do Something and Do Minimum results shows that the implementation of either option would result in fewer adverse impacts and greater beneficial impacts than in the case where the Scheme was not implemented. At a small number of dwellings, the implementation of either option is predicted to result in Major adverse and beneficial impacts which would not arise in the case that the options are not implemented.

11.6.45. Table 11.19 below compares the 2045 Do Minimum long-term changes in daytime road traffic noise for the two options at dwellings and other noise sensitive receptors. This represents long-term growth in road traffic noise that would arise without the implementation of the Scheme.

Table 11.19: Comparison of 2045 Long-term Changes in Daytime Road Traffic Noise Under the Do Minimum Scenario – Lhanbryde to East of Fochabers

DMDY v DMOY			Dwellings		Other Receptors	
Change in noise level dB		Magnitude of impact	North Option	South Option	North Option	South Option
Increase in noise level, $L_{A10,18h}$	0.1 to 2.9	Negligible	2,195	2,237	104	106
	3.0 to 4.9	Minor	50	50	5	5
	5.0 to 9.9	**Moderate**	**16**	**16**	**1**	**1**
	10.0 +	**Major**	**0**	**0**	**0**	**0**
No change	0	No change	85	131	36	39
Decrease in noise level, $L_{A10,18h}$	0.1 to 2.9	Negligible	74	77	25	22
	3.0 to 4.9	Minor	0	0	0	0
	5.0 to 9.9	**Moderate**	**0**	**0**	**0**	**0**
	10.0 +	**Major**	**0**	**0**	**0**	**0**

11.6.46. The noise impacts of long-term changes in road traffic noise under the Do Minimum scenario are mainly predicted to result in Negligible increases within the calculation areas of both options.

Changes in Road Traffic Noise at Particularly Sensitive Receptors

11.6.47. Table 11.20 below compares the predicted changes in daytime road traffic noise levels under the route options at the particularly sensitive receptor of Gordon Castle at Fochabers.

Table 11.20: Predicted Changes in Road Traffic Noise $L_{A10,18h}$ dB at Particularly Sensitive Receptors – Lhanbryde to East of Fochabers

Receptor	Route option	2030 Short-term	2045 Long-term	
		DSOY v DMOY	DSDY v DMOY	DMDY v DMOY
Gordon Castle, Fochabers	North	+2.3	+3.4	+0.9
	South	-6.6	-6.1	+0.9

11.6.48. At Gordon Castle there would be Minor adverse short-term impacts if the North Option was implemented whereas there would be a Major beneficial impact if the South Option was implemented. In the long term, the North Option is predicted to result in a Minor adverse impact and the South Option would result in a Moderate beneficial impact at this receptor. In the case of both route options, if these were not implemented the predicted impact is Negligible adverse.

Road Traffic Noise Impacts at Future Developments

11.6.49. The potential impact of the options is reviewed with reference to the proximity of the alignments to key residential allocations identified in the Moray Council Local Development Plan 2015 (see Section 11.3).

11.6.50. Reductions in road traffic noise in the area of West of St Andrew's Road development at Lhanbryde are shown in the noise contour plots to be similar for both options.

11.6.51. The changes in road traffic noise due to the North Option in the area of the East of Duncan Avenue development at Fochabers show Negligible increases whereas with the South Option, noise levels are shown to reduce. Conversely, parts of the Ordiequish Road and Ordiequish Road West developments would only be included in the assessment of the South Option where increases are predicted.

11.6.52. Therefore, on balance, future developments would tend to make the assessment of both options slightly more adverse and would not affect the overall assessment of the options.

Changes in Traffic-Induced Airborne Vibration Nuisance

11.6.53. Table 11.21 below presents the 2045 long-term changes in traffic-induced airborne vibration nuisance due to the options.

Table 11.21: Changes in Traffic-induced Airborne Vibration Nuisance – Lhanbryde to East of Fochabers

2045 Long-term daytime impacts (dwellings only)		DMDY v DMOY		DSDY v DMOY	
Change in nuisance level dB		North Option	South Option	North Option	South Option
Increase in nuisance level	< 10%	79	78	1	1
	10 < 20%	47	47	27	28
	20 < 30%	0	0	17	28
	30 < 40%	0	0	73	4
	>40%	0	0	0	0
No change	0	13	14	1	1
Decrease in nuisance level	< 10%	54	14	65	59
	10 < 20%	0	0	8	15
	20 < 30%	0	0	1	1
	30 < 40%	0	0	0	0
	>40%	0	0	0	0

11.6.54. This shows that under the Do Minimum scenario small and mainly adverse changes in nuisance are predicted for both options. There are fewer dwellings within 40m of the road links of the calculation area for the South Option.

11.6.55. Under the Do Something scenario, the changes in nuisance level are mainly adverse in the case of the North Option and greater in magnitude than the South Option, whereas there are more beneficial changes in the case of the South Option.

11.7 Summary of Effects

11.7.1. Tables 11.22, 11.23 and 11.24 below summarise the results of the assessment of effects of the route options associated with each section.

11.7.2. The significance of effects has been assessed using the matrix at Table 11.2 where there is a methodology that can be applied to assess magnitude of impact and assign the sensitivity of receptors, and where it is possible to apply the methodology. Where it is not possible to assess the significance of effects due to a type of impact, this has been included for information.

Table 11.22: Summary of Predicted Environmental Effects: Hardmuir to Hillhead

Sub-topic/ criteria		Predicted Residual Effects for North Option	Predicted Residual Effects for South Option
Opening year changes in road traffic noise affecting dwellings	**Moderate Adverse**	**2,235**	**76**
	Major Adverse	**719**	**188**
	Moderate Beneficial	**78**	**1,270**
	Major Beneficial	**75**	**120**
Comment on changes in road traffic noise affecting particularly sensitive receptors		• Brodie Castle – Slight adverse effects in the opening and design years – Not significant	• Brodie Castle – Slight / Moderate to Slight adverse effects in the opening and design years – Not significant • Riverview Caravan Park at Forres**: Large / Very Large adverse** effects in the opening and design years – Significant adverse
Comment on changes in road traffic noise affecting the Candidate Noise Management Area at Forres		• Adverse impact: +1.6 dB opening year and +3.0 dB in the design year	• Adverse impact: +0.2 dB in the opening year and +1.7 dB in the design year
Comment on changes in road traffic noise affecting future development		• Potential beneficial impacts on parts of the Lochyhill residential designation	• Potential beneficial impacts in the area of the Lochyhill residential designation
Comment on changes in nuisance level (DSDY vs DMOY) due to traffic-induced vibration		• 249 dwellings with adverse changes in nuisance level • 4 dwellings with beneficial changes	• 107 dwellings with adverse changes in nuisance level • 140 dwellings with beneficial changes

Summary

11.7.3. For the North Option in the 2030 opening year, there would be significant adverse noise effects at approximately 2,950 residential properties of which approximately 720 would be Major. Approximately 150 residential properties would be predicted to have significant beneficial traffic noise impacts of which approximately 75 would be Major effects.

11.7.4. For the South Option in the 2030 opening year, there would be significant adverse noise effects at approximately 260 residential properties of which approximately 190 would be major. Approximately 1,390 residential properties would be predicted to have significant beneficial traffic noise impacts of which approximately 120 would be Major effects.

11.7.5. There is potential for future mitigation for both options. This could include the use of low noise road surfacing and noise barriers, bunds, landscaping or retained cuttings. These would be expected to reduce the predicted number of significant adverse noise effects.

11.7.6. Overall the South Option is predicted to have less effect due to traffic noise and vibration.

Table 11.23: Summary of Predicted Environmental Effects: Hillhead to Lhanbryde

Sub-topic/ criteria		Predicted Residual Effects for North Option	Predicted Residual Effects for South Option
Opening year changes in road traffic noise affecting dwellings	**Moderate Adverse**	**543**	**290**
	Major Adverse	**390**	**206**
	Moderate Beneficial	**593**	**746**
	Major Beneficial	**102**	**132**
Comment on changes in road traffic noise affecting particularly sensitive receptors		• Cooper Park, Elgin – Slight beneficial effects in the opening and design years – Not significant	• Cooper Park, Elgin – Slight beneficial effects in the opening and design years – Not significant
Comment on changes in road traffic noise affecting the Candidate Noise Management Area at Forres		• Beneficial impacts: -3.7 dB in the opening and -3.4 dB in the design year	• Beneficial impacts: -4.2 dB in the opening year and -3.8 dB in the design year
Comment on changes in road traffic noise affecting future development		• Potential adverse impacts on Findrassie/Myreside designation due to the route option (direct)	• Potential adverse impacts on the Glassgreen and Thornhill designations due to affected road network (indirect)
Comment on changes in nuisance level (DSDY vs DMOY) due to traffic-induced vibration		• 119 dwellings with adverse changes in nuisance level • 586 dwellings with beneficial changes	• 143 dwellings with adverse changes in nuisance level • 664 dwellings with beneficial changes

Summary

11.7.7. For the North Option in the 2030 opening year, there would be significant adverse noise effects predicted at approximately 930 residential properties of which approximately 390 would be Major. Approximately 700 residential properties would be predicted to have significant beneficial traffic noise impacts of which approximately 100 would be Major effects.

11.7.8. For the South Option in the 2030 opening year, there would be significant adverse noise effects at approximately 500 residential properties of which approximately 210 would be Major. Approximately 880 residential properties would be predicted to have significant beneficial traffic noise impacts of which approximately 130 would be Major effects.

11.7.9. There is potential for future mitigation for both options. This could include the use of low noise road surfacing and noise barriers, bunds, landscaping or retained cuttings. These would be expected to reduce the predicted number of significant adverse noise effects for both options.

11.7.10. Overall the South Option is predicted to have slightly less effect due to traffic noise and vibration.

Table 11.23: Summary of Predicted Environmental Effects: Lhanbryde to East of Fochabers

Sub-topic/ criteria		Predicted Residual Effects for North Option	Predicted Residual Effects for South Option
Opening year changes in road traffic noise affecting dwellings	**Moderate Adverse**	**644**	**318**
	Major Adverse	**54**	**92**
	Moderate Beneficial	**101**	**276**
	Major Beneficial	**43**	**480**
Comment on changes in road traffic noise affecting particularly sensitive receptors		• Gordon Castle, Fochabers – Slight / Moderate adverse effects in the opening and design years – Not significant	• Gordon Castle, Fochabers – **Large / Very Large to Moderate / Large beneficial** effects in the opening and design years – Significant beneficial
Comment on changes in road traffic noise affecting future development		• Potential adverse impacts on the East of Duncan Avenue designation	• Potential adverse impacts on the Ordiequish Road and Ordiequish Road West designations and beneficial impacts on the East of Duncan Avenue designation
Comment on changes in nuisance level (DSDY vs DMOY) due to traffic-induced vibration		• 118 dwellings with adverse changes in nuisance levels • 74 dwellings with beneficial changes	• 61 dwellings with adverse changes in nuisance levels • 75 dwellings with beneficial changes

Summary

11.7.11. For the North Option, which is located in a predominantly rural location on the southern edge of Mosstodloch and northern edge of Fochabers, there would be significant adverse noise effects at approximately 700 residential properties of which approximately 50 would be Major. Approximately 140 residential properties would be predicted to have significant beneficial traffic noise impacts of which approximately 40 would be Major effects in the 2030 opening year.

11.7.12. For the South Option in the 2030 opening year, there would be significant adverse noise effects at approximately 410 residential properties of which approximately 90 would be Major. Approximately 760 residential properties would be predicted to have significant beneficial traffic noise impacts of which approximately 480 would be Major effects.

11.7.13. There is potential for future mitigation for both options. This could include the use of low noise road surfacing and noise barriers, bunds, landscaping or retained cuttings. These would be expected to reduce the predicted number of significant adverse noise effects for both options.

11.7.14. Overall the South Option is predicted to have less effect on traffic noise and vibration.

11.8 Scope of DMRB Stage 3 Assessment

11.8.1. The noise and vibration impacts of the Preferred Option will be assessed in accordance with DMRB HD 213/11 'Noise and Vibration' at the Detailed level of assessment.

11.8.2. Noise and vibration impacts predicted to arise during the construction of the Scheme will also be assessed. The assessment will consider the impacts attributable to construction activities, construction traffic and changes in road traffic noise due to any temporary diversions of public roads. The methodology described in BS 5228[48,49] provides appropriate methodologies for the prediction and assessment of noise and vibration during construction. Relevant mitigation measures to control the noise and vibration impacts during the construction phase would be set out in the Environmental Impact Assessment Report and included within commitments for any Construction Environmental Management Plan. An indication of the properties expected to be entitled to mitigation under the Noise Insulation Regulations shall be identified.

11.8.3. Baseline noise measurements shall be undertaken to:

- Validate the model for the calculation of road traffic noise; and
- Quantify background noise levels affecting receptors where it is judged to be not adequately described by the calculation of road traffic noise. For example, this would include areas where the noise climate affecting sensitive receptors is dominated by sources of environmental noise other than road traffic noise either with or without the preferred scheme.

11.8.4. Moray Council and Highland Council will be consulted on the:

- Selection of locations for the baseline noise measurement survey; and
- Approach and methodologies for the assessment including the application of the relevant standards, guidance, national and local policies current at that time.

[48] British Standards Institution (2014) British Standard 5228 'Code of practice for noise and vibration control on construction and open sites – Part 1: Noise' 2009+A1:2014
[49] British Standards Institution (2014) British Standard 5228 'Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration' 2009+A1:2014

11.8.5. The assessment will present the findings of the noise impact assessment for the Preferred Option on a comprehensive schedule of noise sensitive receptors building on those identified in this assessment.

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12. People and Communities

12.1 Introduction and Scope

12.1.1. This chapter presents the Design Manual for Roads and Bridges (DMRB) Stage 2 assessment of the predicted effects on People and Communities. The assessment has been undertaken in accordance with DMRB (Interim Advice Note 125/15, Environmental Assessment Update) which recommends that the following parts of the DMRB Guidance are combined into a single assessment on 'People and Communities':

- DMRB (Volume 11, Section 3, Part 6, Land Use), which comprises assessments of private property, loss of land used by the community, effects on development land, effects on agricultural land and waterway restoration projects.
- DMRB (Volume 11, Section 3, Part 8, Pedestrians, Cyclists and Community Effects), which comprises assessments of changes in journey length, changes in amenity, community severance, new severance and relief from existing severance.
- DMRB (Volume 11, Section 3, Part 9, Vehicle Travellers), which comprises assessments of views from the road and driver stress.

12.1.2. The assessment of impacts of the shortlisted options on development land (including planning application sites) is presented in Chapter 9 (Policies and Plans), and the assessment of impacts on agriculture, forestry and sporting Interests is set out in Chapter 13 (Agriculture, Forestry and Sporting Interests), both included in this report. Effects on Vehicle Travellers have been scoped out from this options assessment as it is predicted that these issues will not have material differences between options.

12.1.3. A review of the Waterway Restoration Priorities by the Inland Waterways Amenity Advisory Council (IWAAC)[50] and the subsequent report[51] showed that there are no relevant waterway restoration projects in the study area. Therefore, this is not considered any further in this assessment.

12.1.4. This assessment therefore covers effects on:

- Non-Motorised Users (NMU) - walkers, cyclists and equestrians;
- Private Properties;
- Community Land, Facilities and Outdoor Access Areas; and
- Community Severance.

12.1.5. This chapter is supported by Figures 12.1, 12.2 and 12.3 (Volume 5) and the following appendices (Volume 4b):

- Appendix A12.1: People and Communities Assessment Methodology;
- Appendix A12.2: NMU Assessment Tables; and

[50] Inland Waterways Amenity Advisory Council (1998) *Waterway Restoration Priorities* http://issuu.com/waterwaysassoc/docs/1998_restoration_report?mode=window&viewMode=doublePage
[51] Inland Waterways Amenity Advisory Council (2006) *Inland waterway restoration & development projects in England, Wales & Scotland. Third Review Report* http://issuu.com/waterwaysassoc/docs/2006_restoration_report?mode=window&viewMode=doublePage

- Appendix A12.3: Community Land, Facilities and Outdoor Access Assessment Tables.

12.2 Approach to Assessment

Introduction

12.2.1. The assessment follows the guidance outlined in Section 12.1 above as well as guidance produced by Scottish Natural Heritage (SNH) and Historic Environment Scotland (HES)[52].

12.2.2. At this stage in the design and assessment process, the likely nature, location and scale of the construction activities (e.g. location of construction compounds) is not known. The predicted effects reported in this chapter therefore focus on the permanent effects of the options.

Sources of Information

12.2.3. Baseline conditions were collated from information gathered during site visits which were undertaken during 2017 (June, September and November) and in March 2018 and through a review of:

- Aerial photographs.
- Ordnance Survey (OS) mapping.
- The Highland-wide Local Development Plan (HwLDP)[53].
- Moray Council Local Development Plan (MLDP)[54].
- Moray Council Open Space Strategy[55].
- Highland Greenspace Audit[56].
- Moray Council Core Path Plan[57].

Consultation

12.2.4. Consultation to inform the understanding of baseline conditions was undertaken with a number of organisations as set out Table 8.2 (Chapter 8, Introduction and Approach to Environmental Assessment). Consultation consisted of an initial information request on the location of, and any other information on, NMU routes and community land/facilities within the study area and a record of consultations has been made. In some cases, consultation responses were followed up with meetings to gain more information.

12.2.5. Topics highlighted during discussions with the Scottish Rights of Way and Access Society (Scotways), Moray Council and Forestry Commission Scotland are set out below:

- Cyclist safety is a key issue along the existing A96;

[52] Environmental Impact Assessment Handbook, Guidance for competent authorities, consultation bodies, and others involved in the Environmental Impact Assessment process in Scotland. Scottish Natural Heritage and Historic Environment Scotland, 5th Edition, April 2018
[53] The Highland Council (2012) Highland-wide Local Development Plan
[54] Moray Council (2015) Moray Local Development Plan
[55] Moray Council (2018) Open Space Strategy
[56] The Highland Council (2010) Highland Greenspace Audit 2010
[57] Moray Council (2011) Moray Council Core Paths Plan

- The importance of maintaining NMU route connectivity to the north and south of the existing A96;
- Any implementation of grade separated crossings should accommodate all NMUs with an emphasis on equestrian use;
- Equestrian use in the study area is extensive and increasing, with increasing levels of endurance riding to the west of Forres;
- Balnacoul Wood is considered to be a popular community woodland which was planted with its use as a recreational facility in mind;
- The Moray Monster Trails (MMT) are a key asset to Forestry Commission Scotland and are the only trails of their type in the Grampian area; and
- The Rothes to Lossiemouth Aspirational Core Path was highlighted as a key active travel route which is not yet adopted.

12.2.6. Further discussions with Forestry Commission Scotland highlighted the following additional topics:

- There is the potential for woodland areas to become landlocked due to the severance of access routes;
- Birkenhill Wood to the south of Elgin is heavily used for recreation; and
- Retaining access to forestry areas, woodland clearance and impacts to woodland recreational areas are important.

12.2.7. Topics highlighted during discussions with HITRANS and Sustrans:

- There would be a preference for cycling facilities along the existing (de-trunked) A96 with NMU links provided to bus-stops and lay-bys along the trunk road network;
- Reductions in traffic often lead to an increase in speed along the road so cyclists using the de-trunked A96 in the future might experience different safety concerns to those currently experienced; and
- Consideration of the potential impact to National Cycle Network Route 1 (NCN1) and to ensure that appropriate links to communities are maintained with appropriate surfacing along the connections.

12.2.8. Discussions with Moray Local Outdoor Access Forum highlighted:

- A preference for a bypass to the south of Elgin as it was considered to be less disruptive to NMUs and local amenity, compared to a northern bypass; and
- The need for a safe, grade-separated and multi-use NMU path between Moray's principal settlements along the existing A96 corridor.

12.2.9. The information obtained from consultation has been used to:

- Help understand the existing environmental site conditions within the study area (as shown on Figure 12.1, Volume 5);
- Help to establish key environmental issues and identify potential impacts to be considered in the assessments;
- Inform the scope of the assessments and reporting; and
- Inform the design and the development of mitigation.

NMU Assessment

Assessment Methodology

12.2.10. The NMU assessment identifies the key routes used by NMUs and assesses the effects of the shortlisted options on the users of these routes regardless of the purpose of the journey (e.g. commuting, recreation etc.). For further information on the assessment methodology for the NMU assessment see Appendix A12.1 (Volume 4b).

12.2.11. Linear facilities such as Core Paths, the National Cycle Network (NCN) and Public Rights of Way (PRoW) are considered in the assessment of the path network (refer to Figure 12.1, Volume 5 and Section 12.3 for further information). Further consideration of access to community land, facilities and area based facilities[58] is included within the Community Land and Facilities assessment (see Section 12.6).

Impact Assessment

12.2.12. The assessment of effects of the options on NMUs focuses on:

- Changes in journey lengths and times as a result of direct impacts to and/or the diversion of NMU routes; and
- Changes in the amenity value of journeys. Amenity is defined as the relative pleasantness of a journey. It is concerned with changes in the degree and duration of people's exposure to traffic and the impact of the road itself. The assessment of amenity takes account of the visual effects assessment (see Chapter 15, Visual Effects) but is also reliant on a range of other factors (as set out above) to determine the overall impact. Amenity of NMU routes is considered for all routes irrespective of journey destination (i.e. amenity does not only consider journeys to/from community land/facilities).

12.2.13. Potential impacts to users of NMU routes are set out later in this chapter in Table 12.4.

12.2.14. The assessment considers all paths as being of equal importance regardless of user type, or levels of usage. It is also assumed that paths should be retained and/or improved, where practical. All NMUs are considered to be of high sensitivity.

12.2.15. Impact magnitudes have been developed using professional judgement drawing on the experience of applying the guidance on assessments of other trunk road schemes.

12.2.16. A change in journey length will occur where disruption to a path is predicted to result in a diversion, or where an NMUs ability to use a path in its current form is affected. The assessment of effects to users of NMU routes has included an analysis of traffic flows to determine changes to the number of vehicles using the road network (both local and trunk), and whether this would deter or encourage NMUs to use routes.

[58] As detailed in the Environmental Impact Assessment Handbook: Guidance for competent authorities, consultation bodies and others involved in the Environmental Impact Assessment process in Scotland, Version 5 (Scottish Natural Heritage and Historic Environment Scotland, April 2018)

12.2.17. The assessment of amenity relates in particular to NMUs' exposure to traffic and associated noise, air quality, perceived safety by the user and visual effects. The assessment takes account of the visual effects assessment (Chapter 15, Visual Effects) but does not 'double count' impacts as it is also reliant on a range of other factors (as set out above) to determine the overall amenity impact. The assessment of changes in the amenity of journeys has been based on professional judgement taking account of information on predicted changes in traffic flows on roads in proximity to, or crossed by, NMU routes. It also takes account of the extent to which new road infrastructure affects the pleasantness of routes currently unaffected e.g. from new crossings.

12.2.18. The criteria used in the assessment of impacts on NMUs is set out in Appendix A12.1 (Volume 4b).

Private Property Assessment

Assessment Methodology

12.2.19. The assessment of effects to private property (residential, commercial, industrial and other properties at risk of demolition or land-take) includes the identification of the type and number of properties which might need to be demolished[59], or where land-take from the curtilage of the property is required, and any change in access to / from affected properties as a result of changes to the road network[60]. Section 12.3 outlines the baseline for the Private Properties assessment.

Impact Assessment

12.2.20. The assessment of the effects on residential, commercial and industrial property assesses any direct impacts predicted from the demolition of private property, changes to access or land-take as a consequence of the options.

12.2.21. The assessment of effects also considers where access to a residential, commercial or industrial property is to be stopped-up and whether alternative access is provided leading to a change in journey length. The sensitivity of private properties has been categorised using a three-point scale: High (residential, commercial or industrial properties), Medium (the curtilage of residential or commercial properties) and Low (derelict or unoccupied buildings).

12.2.22. The magnitude criteria for assessing impacts on private properties has been categorised using a four-point scale: Major, Moderate, Minor and Negligible. The impact on private properties has been categorised as significant (Major or Moderate) or not significant (Minor or Negligible).

[59] The route options will require two unoccupied structures to be demolished on the Hillhead to Lhanbryde North Option (refer to Figure 12.2) – a shed adjacent to the Kinloss Burn and a derelict structure to the west of Ardgye. It is not predicted that the demolition of either structure will result in significant adverse effects (refer to Tables 1.2 – 1.4, Appendix 12.1, and Table 12.6 - Predicted Environmental Effects - Hardmuir to Hillhead (South Option) below

[60] Agricultural businesses are considered and assessed in Chapter 13 – Agriculture, Forestry and Sporting Interests

12.2.23. For the purposes of this assessment private properties have been allocated to one category based on their primary land use. For example:

- Where agricultural land and associated infrastructure is affected (such as pig feeders etc.) this is considered within Chapter 13 (Agriculture, Forestry and Sporting Interests Assessment) rather than the assessment of private property.
- Where a nursery or school is potentially impacted this has been assessed under the Community Facilities assessment.

12.2.24. The assessment of land-take effects on private property has been informed by the baseline sensitivity and impact magnitude criteria in Appendix A12.1 (Volume 4b).

Community Land, Facilities and Outdoor Access Areas Assessment

Assessment Methodology

12.2.25. The assessment of effects on community land, facilities and outdoor access areas considers direct impacts to, amenity of, and the change in accessibility of the public from facilities, services and outdoor areas they use (e.g. schools, churches, health care services and shops which act as a focal point within a community rather than specific commercial premises/retail centres), as well as considering the location, status and importance of any land used by the public which could be lost. Consideration has also been given to accessibility of, and impacts to, area based outdoor access facilities such as rivers, lochs and woodland areas (Section 12.3 sets out the community land, facilities and outdoor access area baseline).

12.2.26. 'New' severance in the context of the community land, facilities and outdoor access area assessment is defined as the severance of users from facilities resulting from the physical barrier effect of the new road proposals and any associated amenity or perceived effects and from changes to journeys which are required in order to cross or make detours around the new infrastructure. The assessment has considered impacts to access, amenity and land-take to determine the significance of effect as detailed in Appendix A12.1 (Volume 4b).

Impact Assessment

12.2.27. The assessment considers how the options affect access to and the amenity of community facilities/land and outdoor access areas (i.e. relief from, or the creation of severance to community land and facilities) as well as assessing any lake-take from these areas.

12.2.28. The assessment of changes to access to outdoor areas for NMUs focusses on any changes to journeys undertaken for purposes including recreation and education from one place to another. A qualitative description has been completed taking account of changes in journey length and the amenity of journeys.

12.2.29. Journey distances for NMUs and vehicle travellers have been determined based on the guidance for average journey speeds in DMRB (Volume 11, Section 3, Part 8, Pedestrians, Cyclists, Equestrians and Community Effects). An average journey speed of 3kph is

referenced for vulnerable groups, 5kph for pedestrians and 20kph for cyclists. For motorised vehicle travellers, an average journey speed of 60kph has been assumed.

12.2.30. The sensitivity of community land and facilities has been categorised using a three-point scale: High (community land, facilities and outdoor access areas as detailed in Table 1.5, Appendix A12.1, Volume 4b), Medium (the curtilage of areas of community land/facilities) and Low (derelict or disused land). The magnitude criteria for assessing the impact to community land and facilities has been categorised using a four-point scale: Major, Moderate, Minor and Negligible. The impact to community land and facilities has been categorised as significant (Major or Moderate) or not significant (Minor or Negligible).

12.2.31. The criteria detailed in Tables 1.1 to 1.6 in Appendix A12.1 (Volume 4b) have been developed to inform the evaluation of significance of effects on access to community facilities.

Community Severance Assessment

Assessment Methodology

12.2.32. The assessment of community severance considers the degree of severance experienced by local communities (such as Forres, Elgin, Fochabers etc.) as a result of the permanent development of, and traffic using, the shortlisted options (Section 12.3 outlines the local communities in the study area subject to assessment). For further information on the assessment methodology for the Community Severance assessment refer to Appendix A12.1 (Volume 4b).

Impact Assessment

12.2.33. The assessment considers how the options affect community connectivity and considers the connectivity within and between local communities.

12.2.34. 'New' severance is the severance of communities resulting from the physical barrier effect of the new road proposals and any associated amenity or perceived effects and from changes to journeys between communities. 'Existing' severance is defined as the severance of communities from their local facilities, by the presence of the existing road network (and traffic using it).

12.2.35. In assessing new community severance consideration has been given to known routes used by vulnerable groups. All communities have been assessed as being 'high' value receptors.

12.2.36. The impact to community severance has been categorised as significant (Major or Moderate) or not significant (Minor or Negligible). In assessing relief from existing severance consideration has been given to the reduction in traffic flows within the settlements in the vicinity of the options. Relief from existing severance has been assessed using a three-point scale of Major beneficial, Moderate beneficial and Minor beneficial.

Assumptions and Limitations

12.2.37. Private accesses and accommodation works have not been detailed at this stage. Any assumptions that have been made to inform the assessment process are based on experience of other trunk road schemes. Final accesses and accommodation works would be developed during DMRB Stage 3.

12.2.38. No detailed consultation has been undertaken with business owners at this stage. The assessment of agricultural and forestry businesses is considered in Chapter 13 (Agriculture, Forestry and Sporting Interests).

12.2.39. Calculations on land-take are approximate at this stage. Land-take calculations will be considered in more detail at DMRB Stage 3.

12.2.40. Access to outdoor area-based facilities via the NMU routes identified in the study area only considers those areas in the immediate vicinity of the study area (as defined in Section 12.3).

12.2.41. A review of planning consents relating to active quarrying sites has been undertaken to determine the status of the quarries in the future baseline (i.e. 2030 Opening Year baseline). Of the known, active quarrying sites within the study area none is expected to be operational in 2030 (based upon a review of conditions associated with the planning consents and information set out in Chapter 19 (Geology, Soils, Contaminated Land and Groundwater). These have therefore not been considered further within the People and Communities assessment.

12.2.42. The effects of the options on public utilities have been considered in Part 2: Engineering Assessment. No further assessment of potential impacts to utility equipment is in this chapter.

12.3 Baseline Environment

Study Area

12.3.1. A study area of 500m has been defined from the outermost edge of the options for the assessment as shown in Figure 12.1, 12.2 and 12.3 (Volume 5). The assessment of effects goes beyond this study area in some instances to allow for:

- Consideration of the effects on users of paths to access outdoor areas where these are predicted to result in the severance of communities from community facilities outwith the 500m study area; and
- Consideration of any alterations to accessing schools where school catchment areas overlap the options.

12.3.2. For the assessment of direct effects to private properties, the study area is confined to where land-take, demolition or changes in access would be required.

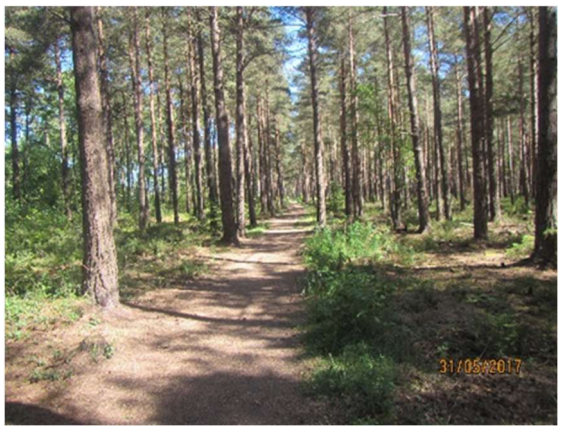
Study Area Context

12.3.3. The main communities within the study area include Forres, Elgin, Lhanbryde, Mosstodloch and Fochabers which are located on or close to the existing A96. Other smaller settlements include, but are not limited to, Brodie, Mundole, Red Craig, Broom of Moy, Cassieford, Alves, Rafford, Miltonduff and Mosstowie.

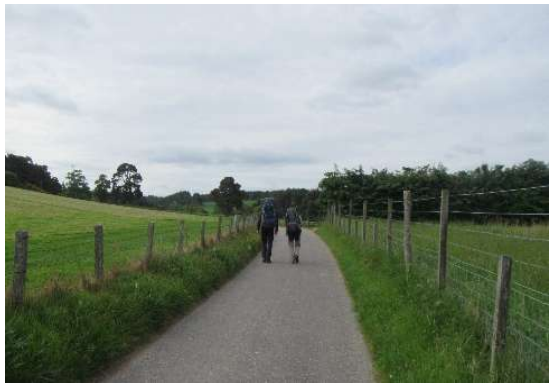
12.3.4. The baseline NMU network in the study area and its interaction with the options are shown on Figure 12.1, 12.2 and 12.3 (Volume 5) and comprises:

- PRoWs;
- Core Paths and Aspirational Core Paths;
- Scotland's Great Trails;
- NCN1;
- Forestry Commission Recreational Routes;
- Moray Cycle Routes; and
- Existing Local NMU Routes.

12.3.5. Photographs 12.1 to 12.4 show typical NMU routes located within the study area.



Photographs 12.1 & 12.2: NMU routes within Birkenhill Wood and Balnacoul Wood (north)



Photographs 12.3 & 12.4 NCN1 at Brodie Castle and users of the Speyside Way

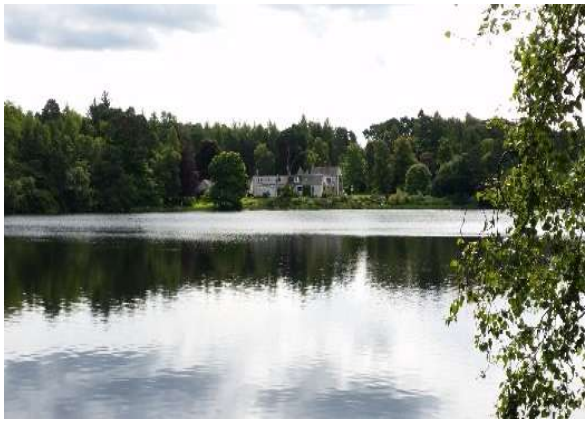
12.3.6. Site visits were undertaken in June, September and November 2017 and March 2018 to map and assess the NMU routes that were likely to be impacted.

12.3.7. The most dense areas of residential properties are located within those settlements referenced above, although the study area is characterised by extensive development of individual and small groups of residential properties in the rural areas, including farmhouses and associated steadings. Commercial and industrial property is located along the length of the options, with the main concentrations including retail and business areas in Forres, Elgin, Mosstodloch and Fochabers. Scattered commercial and industrial properties include but are not limited to Benromach Distillery, Dallas Dhu Distillery, Forres Enterprise Park, Glenburgie Distillery and Newton Nursery.

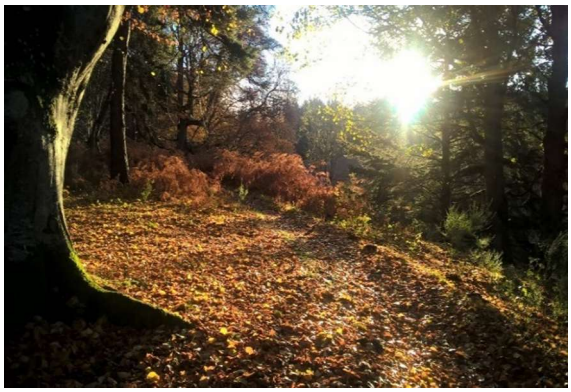
12.3.8. The majority of community facilities are located within the communities of Forres, Elgin, Lhanbryde, Mosstodloch and Fochabers, however facilities including places of worship and cemeteries are also found outwith the main settlements, for example, in Alves, Spynie and Dipple.

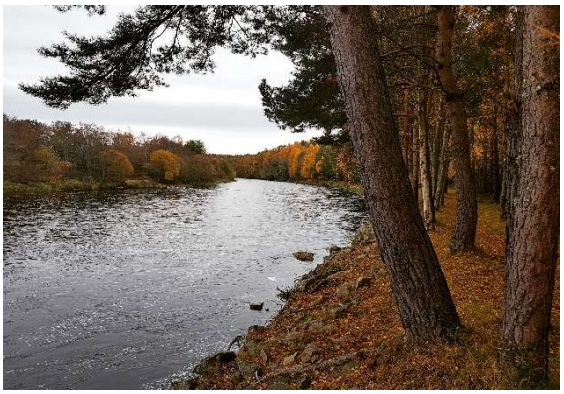
12.3.9. Highland Council's Audit of Greenspace and Moray Council's Open Space Strategy shows that there are a number of areas where land is identified as open space within the study area including the River Findhorn Green Corridor (M/FR/OS/058), amenity land at the Forres Enterprise Park (M/FR/OS/051) and the Former Railway at Lesmurdie (M/EL/OS/074). There are no National Parks, Regional Parks or Country Parks within the study area surrounding the options. The baseline for outdoor areas includes areas of local open space (including woodlands), green space, waterbodies (including lochs and rivers) and promoted activity sites. See Figure 12.1, 12.2 and 12.3 (Volume 5).

12.3.10. Photographs 12.5 to 12.8 show typical community land / outdoor access areas located within the study area.

Photographs 12.5 & 12.6: Raffpark Wood (Brodie) and Loch na Bo





Photographs 12.7 & 12.8: Leitch's Wood (Fochabers) and the River Findhorn

Hardmuir to Hillhead

12.3.11. Table 12.1 below summarises the baseline of NMU routes, private properties, community land and facilities and communities within the study area surrounding the two options between Hardmuir and Hillhead (refer to Figure 12.1, Volume 5).

Table 12.1: Summary of Hardmuir to Hillhead Baseline

Receptor Type	North Option	South Option
NMUs (High sensitivity receptors)		
Public Rights of Way	3 routes dispersed throughout the study area	3 routes dispersed throughout the study area
Core Paths	20 routes dispersed throughout the study area	6 routes dispersed throughout the study area
Aspirational Core Paths	10 routes dispersed throughout the study area	2 routes: one along the A96 and the other at Brodie
Scotland's Great Trails	Moray Coast Trail Located between Forres and Findhorn in the study area	Moray Coast Trail Located between Forres and Findhorn in the study area
National Cycle Network	NCN1 Located between Brodie and Forres in the study area	NCN1 Located between Brodie and Forres in the study area
Forestry Commission Recreational Routes	N/A	N/A
Moray Cycle Routes	N/A	Forres Foray: Looping path from Forres to the south
Existing Local NMU Routes	52 routes dispersed throughout the study area	72 routes dispersed throughout the study area

Receptor Type	North Option	South Option
Private Properties (High sensitivity receptors with the exception of the curtilage of properties, or any derelict / disused properties)		
Private Properties[61]	Approximately 1,100	Approximately 300
Community Land, Facilities and Outdoor Access Areas (High sensitivity receptors with the exception of the curtilage of community facilities, or any derelict / disused facilities)		
Woodland used by the community	Wester Hardmuir/Hardmuir Wood, Raffpark Wood, Darnaway Forest, Brodie Castle Wood and River Findhorn Green Corridor	Wester Hardmuir/Hardmuir Wood, Raffpark Wood, Brodie Castle Wood, Darnaway Forest, Limekilns Wood, Cothall Wood, Fairyhills Wood, Keymoss/Office Wood, Muiry Wood
Schools	Five school catchment areas: Dyke Primary School, Anderson's Primary School, Kinloss Primary School, Alves Primary School and Forres Academy	Seven school catchment areas: Dyke Primary School, Pilmuir Primary School, Logie Primary School, Applegrove Primary School, Anderson's Primary School, Alves Primary School and Forres Academy
Other Community Land/ Facilities including outdoor area-based facilities	**Waterbodies** – River Findhorn **Open Space** - Sueno's Park, Forres Enterprise Park Amenity Land, Forres East Amenity Land **Other** – Walled Garden at Grange Hall	**Places of Worship** – Rafford Parish Church **Cemeteries** - Rafford **Waterbodies** - River Findhorn, and Loch of Blairs **Open Space** - Forres Enterprise Park Amenity Land **Other** - Rafford War Memorial, Cathay Nursing Home and the Walled Garden at Grange Hall
Community Severance (High sensitivity receptors)		
Key Communities	Forres, Brodie, Broom of Moy	Forres, Brodie, Mundole, Rafford

Hillhead to Lhanbryde

12.3.12. Table 12.2 below summarises the baseline of NMU routes, private properties, community land and facilities and communities within the study area surrounding the two options between Hillhead and Lhanbryde (refer to Figure 12.2, Volume 5).

[61] Calculated using OS AddressPoint Data within 500m of each option

Table 12.2: Summary of Hillhead to Lhanbryde Baseline

Receptor Type	North Option	South Option
NMUs (High sensitivity receptors)		
Public Rights of Way	3 routes dispersed throughout the study area	2 routes in Lhanbryde
Core Paths	16 routes dispersed throughout the study area	21 routes dispersed throughout the study area
Aspirational Core Paths	10 routes dispersed throughout the study area	13 routes dispersed throughout the study area
Scotland's Great Trails	N/A	N/A
National Cycle Network	NCN1 Located between Brodie and Forres in the study area	N/A
Forestry Commission Recreational Routes	2 routes in Quarrelwood	N/A
Moray Cycle Routes	The Elgin Experience: Looping path around Elgin	The Elgin Experience: Looping path around Elgin
Existing Local NMU Routes	60 routes dispersed throughout the study area	61 routes dispersed throughout the study area
Private Property (High sensitivity receptors with the exception of the curtilage of properties, or any derelict / disused properties)		
Private Properties	Approximately 1,300	Approximately 1,000
Community Land, Facilities and Outdoor Access Areas (High sensitivity receptors with the exception of the curtilage of community facilities, or any derelict / disused facilities)		
Woodland used by the community	Alves Wood, Carden Hill Wood, Knock of Alves, Quarrelwood, Findrassie Wood, Spynie Wood, Kirkhill Wood and Lochnabo Wood	Alves Wood, Carden Hill Wood, Knock of Alves, Aldroughty Wood, Quarrelwood, Woodland at Miltonduff, Mayne Wood, Wood of Level, Birkenhill Wood and Lochnabo Wood
Schools	Eight School catchment areas: St Andrews School, Lhanbryde Primary School, Bishopmill Primary School, Seafield Primary School, Alves Primary School, Forres Academy, Elgin Academy and Milne's High School	12 Schools have catchment areas which intersect the study area: Alves Primary School, Mosstowie Primary School, Greenwards Primary School, Linkwood Primary School, Lhanbryde Primary School, West End Primary School, Bishopmill Primary School, New Elgin Primary School, Forres Academy, Elgin Academy, Elgin

Receptor Type	North Option	South Option
		High School and Milne's High School.
Other Community Land/ Facilities including outdoor area-based facilities	**Places of Worship** - Alves Church, Spynie Church, St Andrews Church **Cemeteries** - New Alves, Mausoleum at York Tower, Kirkhill and Lhanbryde) **Waterbodies** – River Lossie **Open Space** - Former Railway at Lesmurdie **Other** – Alves Community Village Hall, Alves War Memorial, Lay-by at Carden Hill, Spynie Church Hall	**Places of Worship** - Alves Church **Cemeteries** – Lhanbryde **Waterbodies** – River Lossie **Open Space** - Cloddach Quarry Restoration Area **Other** - Alves Community Village Hall, Alves War Memorial, Coarse Fishing Area at Hardhillock, River Lossie, Moray Beekeepers Apiary
Community Severance (High sensitivity receptors)		
Key Communities	Forres, Alves, Elgin, Lhanbryde	Forres, Alves, Elgin, Lhanbryde

Lhanbryde to East of Fochabers

12.3.13. Table 12.3 below summarises the baseline of NMU routes, private properties, community land and facilities and communities within the study area surrounding the two options between Lhanbryde and East of Fochabers (see Figure 12.3, Volume 5).

Table 12.3: Summary of Lhanbryde to East of Fochabers Baseline

Receptor Type	North Option	South Option
NMUs (High sensitivity receptors)		
Public Rights of Way	4 routes dispersed throughout the study area	3 routes dispersed throughout the study area
Core Paths	44 routes dispersed throughout the study area	25 routes dispersed throughout the study area
Aspirational Core Paths	6 routes dispersed throughout the study area	3 routes dispersed throughout the study area
Scotland's Great Trails	The Speyside Way: linking Spey Bay to Grantown-on-Spey	The Speyside Way: linking Spey Bay to Grantown-on-Spey
National Cycle Network	N/A	N/A
Forestry Commission Recreational Routes (including Moray Monster Trails)	14 routes located in Slorach's Wood and Whiteash Hill Wood	11 routes located in Slorach's Wood and Whiteash Hill Wood

Receptor Type	North Option	South Option
Moray Cycle Routes	Scenic Speyside: Looping path from Fochabers to Orton	Scenic Speyside: Looping path from Fochabers to Orton
Existing Local NMU Routes	68 routes dispersed throughout the study area	66 routes dispersed throughout the study area
Private Property (High sensitivity receptors with the exception of the curtilage of properties, or any derelict / disused properties)		
Private Properties	Approximately 1,524	Approximately 800
Community Land, Facilities and Outdoor Access Areas (High sensitivity receptors with the exception of the curtilage of community facilities, or any derelict / disused facilities)		
Woodland used by the community	Lochnabo Wood, Threapland Wood, Castlehill Wood, Trochelhill Wood, Balnacoul Wood, Slorach's Wood, Leitch's Wood, River Spey Recreational Woodland	Lochnabo Wood, Threapland Wood, Castlehill Wood, Trochelhill Wood, Balnacoul Wood, Slorach's Wood, Leitch's Wood, Woodland to the East of the River Spey
Schools	Three School catchment areas: Lhanbryde Primary School, Milne's Primary School and Mosstodloch Primary School.	Four School catchment areas: Lhanbryde Primary School, Milne's High School, Milne's Primary School and Mosstodloch Primary School
Other Community Land/Facilities including outdoor area-based facilities	**Cemeteries** – Lhanbryde Old Cemetery **Waterbodies** – Loch Oire, Loch na Bo, River Spey **Sports Facilities** – Lhanbryde Playing field, Lhanbryde Playing Area, Sports Pavilion and Playing Field, Fochabers Cricket Ground and Club, Fochabers Bowling Club, Fochabers Tennis Courts **Places of Worship** – St Mary's Church, Gordon Chapel **Other** - Mosstodloch War Memorial, Fochabers Scout Hall, Fochabers The Public Institute, Bellie Parish Church Hall, Fochabers Medical Centre, Fochabers Police Station, Fochabers Fire Station, Wilson Memorial Fountain, Fochabers War Memorial, Walled Garden at Gordon Castle	**Cemeteries** – Lhanbryde and Dipple **Waterbodies** – Loch Oire, Loch na Bo, River Spey **Sports Facilities** – Lhanbryde and Fochabers playing fields
Community Severance (High sensitivity receptors)		
Key Communities	Lhanbryde, Mosstodloch and Fochabers	Lhanbryde and Fochabers

12.4 Potential Impacts

12.4.1. This section presents the potential impacts predicted for the options. The magnitude of predicted impacts has been considered in combination with the sensitivity of the affected receptor to determine the potential for significant effects. The predicted impacts are presented in Table 12.4 below. Impacts shown in the tables which are not predicted to be potentially significant have not been assessed or reported further in this chapter.

12.4.2. Potential impacts are described without mitigation, and therefore represent a worst-case scenario. Mitigation measures are considered in Section 12.5 (Assumed Mitigation). Further mitigation to reduce impacts and effects will be developed for the Preferred Option during the DMRB Stage 3 assessment.

Table 12.4: Potential Impacts on People & Communities Receptors

Potential Impact (taking account of sensitivity of receptor)	Adverse/ Beneficial	Magnitude	Potentially Significant?	Relevant Options
NMU Assessment				
• Direct impacts to NMU routes leading to a diversion for users of less than 250m	Adverse	Negligible to Minor	✓ - High value receptors × - all other receptors	ALL
• Direct impacts to NMU routes leading to a diversion for users of more than 250m	Adverse	Moderate to Major	✓	ALL
• A barely noticeable change to the amenity or perceived safety of an NMU route	Adverse	Negligible to Minor	✓ - High value receptors × - all other receptors	ALL
• Noticeable or considerable change to the amenity or perceived safety of a route (including safety resulting from changes in traffic flows) which significantly alters the experience of the user, or deters existing users from using the route	Adverse	Moderate to Major	✓	ALL
• A minor improvement to the amenity or perceived safety of routes, or reductions in traffic flows of less than 30%	Beneficial	Negligible to Minor	✓ - High value receptors × - all other receptors	ALL
• Noticeable or considerable improvements to the amenity of a route or perceived safety; or • Provision of a new grade separated crossing leading to an enhancement of the NMU network; or • Reductions in traffic flows to below 8,000 Average Annual Daily Traffic (AADT) or by more than 30% resulting in perceived less intimidating conditions for users	Beneficial	Moderate to Major	✓	ALL

Potential Impact (taking account of sensitivity of receptor)	Adverse/ Beneficial	Magnitude	Potentially Significant?	Relevant Options
Private Properties Assessment				
• Demolition of a private property, loss of more than 10% of the landholding (including property curtilage), or a major severance of a landholding	Adverse	Moderate to Major	✓	ALL
• Alterations to the access to a private property resulting in an increase in vehicle distance travelled for access of over 1,000m	Adverse	Moderate to Major	✓	ALL
• Partial severance or a loss of less than 10% of a landholding	Adverse	Negligible to Minor	✓	ALL
• Alterations to the access to a private property resulting in an increase in vehicle distance travelled for access of less than 1,000m	Adverse	Negligible to Minor	✓ - High value receptors × - all other receptors	ALL
Community Land, Facilities and Outdoor Access Area Assessment				
• Total loss of a community area or facility, loss of more than 25% of the area/facility, or a major separation of an area of community land	Adverse	Moderate to Major	✓	ALL
• Partial separation or a loss of community land/facility of less than 25%	Adverse	Negligible to Minor	✓ - High value receptors × - all other receptors	ALL
• Change to the amenity of community land/facilities which significantly alters the experience of the user • Journey distance to community land/facilities would be increased by >0.15km for pedestrians (vulnerable groups), >0.25km pedestrians (non-vulnerable groups), >1km for cyclists and/or >3km for vehicles	Adverse	Moderate to Major	✓	ALL
• Current journey pattern to/from community land/facilities is maintained but there may be some hindrance to movement including the requirement to use of a new underpass/overbridge	Adverse	Negligible to Minor	✓ - High value receptors × - all other receptors	ALL

Potential Impact (taking account of sensitivity of receptor)	Adverse/ Beneficial	Magnitude	Potentially Significant?	Relevant Options
• Journey distance to community land/facilities would be increased by <0.15km for pedestrians (vulnerable groups), <0.25km pedestrians (non-vulnerable groups), <1km for cyclists and/or <3km for vehicles				
Community Severance Assessment				
• Journey distance between/within communities would be increased by >0.15km for pedestrians (vulnerable groups), >0.25km pedestrians (non-vulnerable groups), >1km for cyclists and/or >3km for vehicles	Adverse	Moderate to Major	✓	ALL
• Current journey pattern within a community is maintained but there may be some hindrance to movement for communities including the requirement to use of a new underpass/overbridge • Journey distance would be increased by <0.15km for pedestrians (vulnerable groups), <0.25km pedestrians (non-vulnerable groups), <1km for cyclists and/or <3km for vehicles	Adverse	Negligible to Minor	✓ - High value receptors	ALL
• Traffic levels are reduced by >30% in urban areas or where the existing road substantially bisects a village or small town, or by >75% in rural areas	Beneficial	Moderate to Major	✓	ALL
• Traffic levels are reduced by <30% in urban areas or where the existing road substantially bisects a village or small town, or by <75% in rural areas	Beneficial	Negligible to Minor	✓ - High value receptors	ALL

12.5 Mitigation

12.5.1. The approach to mitigation design which has been adopted throughout the design process has been to avoid impacts in the first instance and then minimise remaining impacts where possible in line with PAN 1/2017: Environmental Impact Assessment[62], the A96 Post Adoption Statement[63] and the A96 Dualling Strategic Environmental Principles[64].

12.5.2. The options have not been developed at this stage to consider specific provisions for NMUs. The design has however incorporated alternative access routes where the option would sever an existing access and where no reasonable local alternative exists.

12.5.3. Further detailed mitigation measures for the Preferred Option will be developed during DMRB Stage 3.

12.5.4. The following mitigation measures have been assumed in this assessment:

- PC1 - Where NMU routes are directly impacted, diversions or re-routing of existing paths will be implemented to maintain the connectivity of the path network. To inform the assessment the most likely path diversions have been assumed in some locations where a clear connection could be made without the requirement for significant additional land-take;
- PC2 - Surfacing of any new paths to be provided will consider the existing type of user and the design will be developed taking account of need;
- PC3 - Where vehicle access to private properties and community facilities is permanently impacted, reinstatement or an alternative access will be provided; and
- PC4 - Where land-take is required from private properties or community land/facilities consideration will be given to amending earthwork slopes to reduce/remove the land-take requirements where possible.

12.5.5. Where no specific mitigation has been developed at this stage this is identified in Tables 12.5 – 12.10 with a 'N/A' entry in the table column for assumed mitigation. Further design work will be undertaken during DMRB Stage 3 to develop specific mitigation measures.

12.6 Predicted Environmental Effects

12.6.1. This section presents the key predicted environmental effects of the options. Predicted effects have been assessed prior to mitigation and the residual effects then evaluated following assumed mitigation (see Section 12.5). Where significant residual effects are presented in Tables 12.5 to 12.10 below the text is set out in bold.

- The predicted effects for the Hardmuir to Hillhead North and South Options are summarised in Tables 12.5 and Table 12.6 respectively.
- The predicted effects for the Hillhead to Lhanbryde North and South Options are summarised in Tables 12.7 and Table 12.8 respectively.

[62] Scottish Government (2013) Planning Advice Note 1/2013: Environmental Impact Assessment (Rev. 1.0 (2017))
[63] Transport Scotland (2016) A96 dualling Programme, Strategic Environmental Assessment Post Adoption Statement
[64] Transport Scotland (2016) A96 Dualling Programme, Strategic Environmental Principles

- The predicted effects for the Lhanbryde to East of Fochabers North and South Options are summarised in Tables 12.9 and Table 12.10 respectively.

12.6.2. These tables capture the key findings of the assessment and more detailed supporting assessments are set out in Appendix A12.2 and Appendix A12.3 (Volume 4b).

12.6.3. The assessment tables should be read in conjunction with Figures 12.1, 12.2 and 12.3 (Volume 5) which show the following:

- NMU routes;
- Private properties directly affected and those whose access is significantly affected; and
- Significantly affected areas of community land and community facilities.

Hardmuir to Hillhead

Table 12.5 Predicted Environmental Effects - Hardmuir to Hillhead (North Option)

Sub-topic	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects (and Significance)
NMU Assessment	Users of five NMU routes (High sensitivity) predicted to experience a significant reduction in amenity, and changes to journey length: • ELR343 - route following local road to the east of Hardmuir Wood is stopped up (over 500m increase in journey length) • ELR344 - route following local road (C10E) to Feddan is stopped up (over 500m increase in journey length) • ELR271 - route connecting Darnaway Forest to Brodie Castle via Tearie Farm is stopped up (over 500m increase in journey length) • ACP1 route following the U67E road which connects between the existing A96 and the B9011 to the east of Forres is stopped up (over 500m increase in journey length) • ELR432 - route following local road (C27E) to the south of Forres Enterprise Park is stopped up (over 500m increase in journey length) Significant effects to amenity of journeys and/or perceived safety of users on nine NMU routes (High sensitivity) from predicted changes in traffic flows: • ELR187, from Dalvey Smithy Cottages to Wester Moy Cottages along local road passes under the option • CP-FR09-00, which passes under the option immediately north of the Aberdeen - Inverness Railway crossing of the river • ELR28, route along the River Findhorn is in close proximity to the option	Moderate to Major adverse	PC1, PC2	**Moderate to Major adverse** residual effects on NMUs due to reduction in amenity of routes and increased journey lengths. NMU routes near Wester Hardmuir/Hardmuir Wood and paths following local roads by Forres Enterprise Park would require significant diversions with the amenity of the routes significantly affected resulting in a likely reorganisation of habits by current users

Sub-topic	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects (and Significance)
	• ELR477 - route through Forres Flood Defence scheme is in close proximity to the option • PRoW GM47, Broom of Moy to Greshop Industrial Estate which passes under the option • The Moray Coast Trail which is realigned alongside the option and will also pass under the mainline to the west of the Benromach Distillery • ELR534, route following local road crossing the Aberdeen - Inverness Railway Line is in close proximity to the option • CP-FR15-02, path adjacent to the B9011 would pass under the option • ELR539, route in the woodland at Forres Enterprise Park is in close proximity to the option Beneficial effects to users of 12 NMU routes (High sensitivity) which follow or cross the existing A96. The amenity of the routes would be improved through significant reductions in traffic volumes: • Users of CP-FR10-01, CP-FR11-00, CP-FR10-02, ELR500, ELR498, CP-FR28-02, CP-FR30-00, ACP43, ACP44, ELR533, CP-FR14-00 and ACP22 and are predicted to experience an improvement to the amenity of journeys on the paths as a result of traffic flow reductions	Moderate Beneficial	N/A	**Moderate beneficial** residual effect through significant reductions in traffic volumes and associated amenity benefits
Private Properties Assessment	**Land-take** • The south-eastern corner of the paddock area to the south of Greeshop House is predicted to be directly affected by the required earthwork slopes and the realigned NMU route ELR477 (Medium sensitivity)	Minor adverse	PC4	Minor adverse as a result of minor land-take from the curtilage of the affected properties

Sub-topic	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects (and Significance)
	• The northern corner of the curtilage of the derelict farm building at Cassieford Farm is predicted to be directly affected by option (Low sensitivity)			
	Access to Private Properties Changes to some private accesses and alterations to the local road network are predicted to have significant changes in journey length to access 10 private properties (one at Toll Brae, one at Feddan View, five at Hillhead (including Chuillin) and three at Leys) (High sensitivity)	Minor to Moderate adverse	PC3	Minor to **Moderate adverse residual effects** predicted to journey lengths to 10 properties
Community Land, Facilities and Outdoor Access Areas Assessment	**Land-take, Access and Amenity** • Predicted significant effects resulting from land-take and associated effects to the amenity of, or the access to the River Findhorn Green Corridor and Forres Enterprise Park Amenity Land (High sensitivity) • Predicted significant adverse effect to users of the River Findhorn and with negative effects to the amenity of visits as a result of the proximity of the outdoor access areas to the option (High sensitivity) • The remaining community land/facilities within the study area (including the Walled Garden at Grange Hall) are not predicted to be significantly affected. It is not predicted that significant effects would occur to any school catchments (High sensitivity) • Predicted beneficial effects to users of Sueno's Park from reduction in traffic flows on the existing A96 immediately north of the park (High sensitivity)	Minor to Moderate adverse Moderate beneficial	N/A	Minor to **Moderate adverse** effects predicted to the River Findhorn Green Corridor and Forres Enterprise Park Amenity Land. **Moderate beneficial** residual effects predicted for users of Sueno's Park
Community Severance Assessment	**Relief from Existing Severance** Reduced traffic flows on the existing A96 in Brodie and Forres predicted to lead to improvements in amenity of some parts of these settlements	Moderate to Major beneficial	N/A	**Moderate to Major beneficial** residual effect for some parts of the community and NMU users in Brodie

Sub-topic	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects (and Significance)
	generally and for NMU journeys within them particularly across the A96 to access recreational facilities, residential areas and some commercial premises including for vulnerable groups (High sensitivity)			and Forres through predicted reductions in traffic flows
	New Severance No significant new severance predicted from the option with access to services and community facilities within the settlements being retained (High sensitivity)	Negligible to Minor adverse	N/A	Negligible to Minor adverse

Table 12.6: Predicted Environmental Effects - Hardmuir to Hillhead (South Option)

Sub-topic	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects (and Significance)
NMU Assessment	Users of the following 11 NMU routes (High sensitivity) would experience a significant reduction in amenity on, and direct effects to (including the severance of) the routes: • ELR271 - Darnaway Forest to Brodie Castle via Tearie Farm is stopped up (over 500m journey length increase) • ELR343 - local road to the east of Hardmuir Wood is stopped up (over 500m journey length increase) • ELR344 - local road to Feddan is stopped up (over 500m journey length increase) • ELR431 - route following local road along the north-western edge of Darnaway Forest is stopped up (over 500m journey length increase) • ELR627 - path in the north of Darnaway Forest connecting to the existing A96 to the east of Woodside Cottage is stopped up (over 500m journey length increase) • ELR319 – woodland track in Limekilns Wood is stopped up (over 500m journey length increase) • ELR427 - woodland path running north-south within the eastern section of Limekilns Wood is in proximity to the option • ELR626 - woodland track running north-east to south-west in the western section of Fairyhills Wood is stopped up (over 500m journey length increase) • ELR23 - along the local road through Fairyhills Wood is stopped up (250 – 500m journey length increase) • ELR456 - muddy woodland path in Office Wood to the south of Dallas Dhu distillery, leading to Blairs Home Farm and a circular	Moderate to Major adverse	PC1, PC2	**Moderate to Major adverse.** Residual effect on NMUs due to reduction in amenity of routes and increased journey lengths on them. NMU routes in Fairyhills Wood and at Wester Hardmuir/Hardmuir Wood would be significantly affected requiring significant diversions and having the amenity of the routes significantly affected resulting in a likely reorganisation of habits by current users who are likely to utilise alternative routes in the wider area

Sub-topic	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects (and Significance)
	path to Garden's Cottages is stopped up (over 500m journey length increase) • ELR432 - route following existing local road (B9010) from Rafford to the existing A96 route crosses the mainline by overbridge Significant effects to amenity of journeys and/or the perceived safety of users on 12 NMU routes (High sensitivity) as a result of changes in traffic flows: • ELR18 - route connecting Darnaway Forest to the existing A96 via Newton of Dalvey crosses the option by overbridge • ELR368 - well defined paths in the field adjacent to Mundole are in close proximity to the option • ELR553 - path along the western bank of the River Findhorn is in close proximity to the option • ELR428 - route connecting Limekilns Wood to Mundole is stopped up and redirected through the Forres South junction (up to 250m increase in journey length) • ELR21 - route around Loch of Blairs is severed and rerouted through the Forres South junction • ELR474 - path in Fairyhills Wood to the west of the Quarry is in close proximity to the option • ELR624 - woodland path in the south-western section of Fairyhills Wood is located in close proximity to the Forres South junction • Dava Way – long distance route which crosses the option to the south of Forres via an overbridge • ELR32 - path connecting Redhill to Marcassie is in close proximity to the option			

Sub-topic	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects (and Significance)
	• ELR197 - route following local road to the north of Rafford which crosses the mainline by overbridge connecting the B9010 to local road U95E • ELR279 - circular path in Council Wood to the east of Muiry Wood is in close proximity to the option • ELR280 - woodland path in Muiry Wood to the east of Cathay Care Home is in close proximity to the option Beneficial effects are predicted to users of NMU routes (High sensitivity) following the existing A96 through significant reductions in traffic volumes resulting in beneficial impacts to the amenity and potential safety of users: • Users of ELR341 and ACP22 are predicted to experience an improvement to the amenity of the paths as a result of traffic flow reductions	Moderate Beneficial	N/A	**Moderate beneficial** residual effect through significant reductions in traffic volumes and associated amenity benefits
Residential, Commercial and Industrial Properties Assessment	**Land-take** The eastern extent of Riverview Caravan Park would be directly affected by embankments associated with the option (Medium sensitivity)	Minor adverse	PC4	Following mitigation, the residual effect is predicted to be negligible
	Access to Private Properties Changes to some private accesses and alterations to the local road network, are predicted to have significant changes in journey length to access three private properties (one at Toll Brae, one at Feddan View and one at Woodside Cottage) (High sensitivity)	Minor to Moderate adverse	PC3	Minor to **Moderate adverse** residual effects predicted to journey lengths to three private properties

Sub-topic	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects (and Significance)
Community Land, Facilities and Outdoor Access Areas Assessment	**Land-take, New Severance and Amenity** • Predicted significant effects resulting from land-take and associated effects to the amenity of, or the access to Limekilns Wood, Fairyhills Wood and Office Wood (High sensitivity) • Predicted significant adverse effect to users of Muiry Wood, the River Findhorn and Loch of Blairs with negative effects to the amenity of visits as a result of the proximity of the outdoor access areas to the route option (High sensitivity) • The remaining community land/facilities within the study area (including the Cathay Care Home) are not predicted to be significantly affected. It is not predicted that significant effects would occur to any school catchments (High sensitivity)	Minor to Major adverse	N/A	Minor to **Major adverse** effects predicted to Fairyhills Wood, Office Wood, Muiry Wood, Limekilns Wood, River Findhorn and Loch of Blairs.
Community Severance Assessment	**Relief from Existing Severance** Reduced traffic flows on the existing A96 in Brodie and Forres predicted to lead to improvements in amenity of some parts of the settlements generally and for NMU journeys within them particularly across the A96 to access recreational facilities, residential areas and some commercial premises including for vulnerable groups (High sensitivity)	Moderate to Major beneficial	N/A	**Moderate to Major beneficial** residual effect for some parts of the community and NMUs in Brodie and Forres through predicted reductions in traffic flows
	New Severance No significant new severance predicted from the option with access to services and community facilities within the settlements being retained (High sensitivity)	Negligible to Minor adverse	N/A	Negligible to Minor adverse

Hillhead to Lhanbryde

Table 12.7: Predicted Environmental Effects – Hillhead to Lhanbryde (North Option)

Sub-topic	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects (and Significance)
NMU Assessment	Users of the following four NMU routes (High sensitivity) would experience a significant reduction in amenity on, and direct effects to (including the severance of) the routes: • ELR38 - path in Carden Hill Wood is severed (over 500m journey length increase) • ELR58 - circular route in Spynie Wood is severed (250m – 500m journey length increase) • ELR66 - route following local road (U123E) to the south of existing A96 at Barmuckity is severed (over 500m journey length increase) • ELR572 - path along local road (C1E) to the south of Lhanbryde is severed (250m – 500m journey length increase) Significant effects to amenity of journeys and/or the perceived safety of users on 19 NMU routes (High sensitivity) as a result of changes in traffic flows: • ELR565 - route following the local road (U101E) to the east of Alves Wood passing by Alves Church would cross the option by overbridge • ELR459 - route follows local road (C4E) to the south of Alves Wood would be in close proximity to the option • ELR566 - route following the local road (C4E) connecting Alves to Viewhill via Cloves would cross the option by underpass • ELR266 - route connecting the properties at Carsehill to the existing A96 would cross the option by overbridge	Moderate to Major adverse	PC1, PC2	**Moderate to Major adverse** residual effect on NMUs due to reduction in amenity of routes and increased journey lengths on them. NMU routes in Carden Hill Wood would be significantly affected requiring significant diversions and having the amenity of the routes significantly affected resulting in a likely reorganisation of habits by current users who would utilise alternative routes in the wider area. Mitigation on path ELR38 and ELR58 is predicted to reduce the impact on journey lengths to less than 250m, however a residual significant impact to amenity remains on path ELR38(resulting in total residual effects to users of two NMU routes and amenity impacts to 20 routes)

Sub-topic	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects (and Significance)
	• ELR300 - route which follows the B9012 would cross the proposed option by overbridge • ELR463 - route follows local road (C24E) at Findrassie Lodge crossing the option by overbridge • ELR61 - route following local road (U39E) to Spynie Cemetery is severed (less than 250m journey length increase) • CP-EG03-01 - route following the A941 crosses the mainline by overbridge • ELR59 – gated, grassy forestry track connecting the A941 to Spynie Wood would be in close proximity to the option • ELR63 - route following local road (C21E) from Elgin to Muir of Linksfield would cross the option via an underpass • ELR72 - path from Kirkhill to Pitgaveny Wood would be in close proximity to the option • ELR71 – path from Pitgaveny Road to Caysbriggs would cross the option by overbridge • ELR600 – route following local road from the River Lossie to Bridge of Calcots would cross the option by underpass • ELR321 - route which follows the dismantled railway to the north of Elgin would cross the proposed option by overbridge • ELR291 - route along the eastern edge of the woodland at Kirkhill would be in close proximity to the option • ELR68 – route following the western bank of the River Lossie would cross the option by underpass • ELR87 – route following local road to Moss of Meft would cross the option by underpass			

Sub-topic	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects (and Significance)
	• ELR550 - route which connects the Elgin Flood Defence Scheme to the existing A96 would be in close proximity to the option • ELR93 - route to the south of Lhanbryde connecting to the Bogton standing stones would cross the option by overbridge and run alongside the option for a section of its length Beneficial effects to users of two NMU routes (High sensitivity) following the existing A96 through significant reductions in traffic volumes associated with the beneficial effects to the amenity and potential safety of users: • Users of ACP2 and ACP4 are predicted to experience an improvement to the amenity of the paths as a result of traffic flow reductions	Moderate Beneficial	N/A	**Moderate beneficial** residual effect through significant reductions in traffic volumes and associated amenity benefits
Residential, Commercial and Industrial Properties Assessment	**Land-take** • There would be a total loss of the shed structure adjacent to Kinloss Burn at Burgie which lies between the mainline and associated side road. This structure is overgrown and unoccupied (Low sensitivity) • There would be a total loss of the derelict structure (possible former private water supply now confirmed by the landowner as disused) within the field to the west of Ardgye House which lies under the option (Low sensitivity)	Minor adverse	N/A	The residual effect is assessed as Minor adverse on the basis that the structures requiring demolition are unoccupied/unused
Residential, Commercial and Industrial Properties Assessment	**Access to Private Properties** Changes to some private accesses and alterations to the local road network, are predicted to have significant effects to journey length to access 21 private properties (12 at Burgie Lodge, two at Pinewood Cottage, three at Rosebrae and Dykeside and four at Greens of Coxton) (High sensitivity)	Minor to Moderate adverse	PC3	Minor to **Moderate adverse** residual effects predicted to journey lengths to 21 private properties

Sub-topic	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects (and Significance)
Community Land, Facilities and Outdoor Access Areas Assessment	**Land-take, Access and Amenity** • It is predicted that there would be a total loss of the A96 lay-by and picnic area at Carden Hill due to the location of Elgin West junction (High sensitivity) • Predicted significant effects resulting from land-take and associated effects to the amenity of, or the access to Carden Hill Wood, Spynie Wood, Kirkhill Wood and the former railway at Lesmurdie (High sensitivity) • Predicted adverse amenity effects to visitors of Spynie Church resulting from the proximity of the option (High sensitivity) • The remaining community land/facilities within the study area (including Spynie Church Hall and Nursery, and St Andrew's Church and Kirkhill Cemetery) are not predicted to be significantly affected. It is not predicted that significant effects would occur to any school catchments (High sensitivity) • Predicted beneficial amenity and access effects to users (including vulnerable groups) accessing Alves Primary School and Alves War Memorial from reduction in traffic flows on the existing A96 (High sensitivity)	Minor to Major adverse Moderate beneficial	N/A	Minor to **Major adverse** effects are predicted to occur to the lay-by and picnic area at Carden Hill, the former railway at Lesmurdie, Kirkhill Wood, Woodland at Carden Hill, the Spynie Wood and Spynie Church However, it is predicted that there are **Moderate beneficial** effects to Alves Primary School and Alves War Memorial
Community Severance Assessment	**Relief from Existing Severance** Reduced traffic flows on the existing A96 in Alves and Lhanbryde predicted to lead to improvements in amenity of some parts of the settlement generally and for NMU journeys within them particularly across the A96 to access facilities such as Alves Primary School, residential areas and some commercial premises (High sensitivity)	Moderate to Major beneficial	N/A	**Moderate to Major beneficial** residual effect for some parts of the community and NMUs in Alves and Lhanbryde through predicted reductions in traffic flows

Sub-topic	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects (and Significance)
	New Severance No significant new severance predicted from the option with access to services and community facilities within the settlements being retained (High sensitivity)	Negligible to Minor adverse	N/A	Negligible to Minor adverse

Table 12.8: Predicted Environmental Effects – Hillhead to Lhanbryde (South Option)

Sub-topic	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects (and Significance)
NMU Assessment	It is predicted that users of the following eight NMU routes (High sensitivity) would experience a significant reduction in amenity on, and direct effects to (including the severance of) the routes: • ELR590 - route to the north-west of Alves Wood is stopped up (over 500m journey length increase) • ELR591 - route to the north-east of Alves Wood is stopped up (over 500m journey length increase) • ELR551 - route from Burnside Farm to the coarse fishing area at Hardhillock is stopped up (over 500m journey length increase) • ELR441 - route follows local road (C4E) at Lochinver is stopped up (250m-500m journey length increase) • CP-EG07-04 - route in Birkenhill Wood accessing the informal car park is stopped up (over 500m journey length increase) • CP-EG07-05 - looping path in Birkenhill Wood is stopped up (over 500m journey length increase) • ELR263 - path in the southern section of Birkenhill Wood is stopped up (over 500m journey length increase) • ELR572 - route following local road (C1E) to the south of Lhanbryde is stopped up (250m-500m journey length increase) Significant effects to amenity of journeys and/or the perceived safety of users on 14 NMU routes (High sensitivity) as a result of changes in traffic flows: • ELR35 - route to the west of Alves Wood would cross the option by overbridge	Moderate to Major adverse	PC1, PC2	**Moderate to Major adverse** residual effect on NMUs due to reduction in amenity of routes and increased journey lengths on them. NMU routes in Alves Wood and at Birkenhill Wood would be significantly affected resulting in a likely reorganisation of habits by current users who are likely to utilise alternative routes in the wider area. Mitigation on path CO-EG07-05 is predicted to reduce the impact on journey lengths to less than 250m, however a residual significant impact to amenity remains (resulting in total residual effects to users of seven NMU routes and amenity impacts to 15 routes)

Sub-topic	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects (and Significance)
	• ELR473 - route to the north of Alves Wood is stopped up leaving users no longer able to follow the route • ELR565 - route following the local road (U101E) to the east of Alves Wood passing by Alves Church would cross the option by overbridge • ELR566 – route which follows the local road network (C4E) between Alves and Viewhill would cross the option by overbridge • ELR266 - route connecting the properties at Carsehill to the existing A96 at Alves is in close proximity to the option • ELR629 - route around Elgin Caravan Park is in close proximity to the option • ELR219 - route follows local road (C3E) which passes Miltonduff and would cross the option by overbridge • ELR82 - route along the Black Burn at Miltonduff would cross the option by underpass • ELR464 - route following local road (B9010) at Pittendreich would cross the option by underpass • ELR439 - route along local track at Nether Birnie would cross the option by underpass • ELR236 - looping path at Duffus Hillock is in close proximity to the option • ELR465 - route following the A941 south of Elgin would cross the option by underpass • CP-EG07-03 - looping path in Birkenhill Wood would be in close proximity to the mainline • ELR93 - route to the south of Lhanbryde connecting to the standing stones would cross the option by overbridge			

Sub-topic	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects (and Significance)
	Beneficial effects to users of three NMU routes (High sensitivity) following the existing A96 through significant reductions in traffic volumes associated with the beneficial effects to the amenity and potential safety of users: • Users of ACP22, ACP4, and ELR570 are predicted to experience an improvement to the amenity of the paths as a result of traffic flow reductions	Moderate Beneficial	N/A	**Moderate beneficial** residual effect through significant reductions in traffic volumes and associated amenity benefits
Residential, Commercial and Industrial Properties Assessment	**Land-take** • There would be a total loss of the shed structure adjacent to Kinloss Burn at Burgie which lies between the option and associated side road. This structure is overgrown and unoccupied (Low sensitivity) • There would be a total loss of the structure of a building associated with the Clay Pigeon Shoot at Hardhillock Farm which lies beneath the option. The property is utilised by the farm for the clay pigeon shooting business but is unoccupied (Low sensitivity)	Minor adverse	N/A	The residual effect is assessed as Minor adverse on the basis that the demolition of the structures is not predicted to result in significant environmental effects
	Access to Private Properties Changes to some private accesses and alterations to the local road network, are predicted to have significant changes in journey length to access 45 private properties (12 at Burgie Lodge, one at Easter Wards, 17 at Viewhill, Whitefield Croft and Lochinver Croft, four at Lochinver, three at Inverlochty and eight at Glenesk/Greenfield) (High sensitivity)	Minor to Moderate adverse	PC3	Minor to **Moderate adverse** residual effects predicted to journey lengths to access 45 private properties
Community Land, Facilities and Outdoor	Land-take, Access and Amenity • Predicted significant effects resulting from land-take and associated effects to the amenity of, or the access to Alves Wood, Cloddach Quarry Restoration Area and Birkenhill Wood (High sensitivity)	Minor to Major adverse	N/A	Minor to **Major adverse** effects predicted to Cloddach Quarry Restoration Area, Moray Beekeepers Apiary,

Sub-topic	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects (and Significance)
Access Areas Assessment	• Visitors to Alves Church, users of the River Lossie (including anglers), users of the coarse fishing area at Hardhillock Farm and Moray Beekeepers Apiary (located at the Cloddach Quarry Restoration Area) are predicted to experience significant adverse effects to their amenity (High sensitivity) • The remaining community land/facilities within the study area (including Alves Community Hall, Carden Hill Wood, Knock of Alves and Aldroughty Wood) are not predicted to be significantly affected. It is not predicted that significant effects would occur to any school catchments, however some minor adverse effects are predicted as a result of the changes to the local road network in the vicinity of the Elgin West junction (High sensitivity) • Predicted beneficial effects to users (including vulnerable groups) accessing Alves Primary School and Alves War Memorial from reduction in traffic flows on the existing A96 (High sensitivity)	Moderate beneficial		Coarse Fishing Area, Birkenhill Wood, Alves Wood and Alves Church. **Moderate beneficial** effects predicted for Alves Primary School and Alves War Memorial
Community Severance Assessment	**Relief from Existing Severance** Reduced traffic flows on the existing A96 in Elgin, Alves and Lhanbryde leading to improvements in amenity of some parts of the settlements generally and for NMU journeys within them particularly across the A96 to access facilities such as Alves Primary School, residential areas and some commercial premises (High sensitivity)	Moderate to Major beneficial	N/A	**Moderate to Major beneficial** residual effect for some parts of the community and NMUs in Elgin, Alves and Lhanbryde through predicted reductions in traffic flows
	New Severance No significant new severance predicted from the option with access to services and community facilities within the settlements being retained (High sensitivity)	Negligible to Minor adverse	N/A	Negligible to Minor adverse

Lhanbryde to East of Fochabers

Table 12.9: Predicted Environmental Effects – Lhanbryde to East of Fochabers (North Option)

Sub-topic	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects (and Significance)
NMU Assessment	It is predicted that users of the following 10 NMU routes (High sensitivity) would experience a significant reduction in amenity on, and direct effects to (including the severance of) the routes: • ELR592 - path along the western edge of Balnacoul Wood is stopped up (over 500m journey length increase) • ELR116 and ELR117 - wide woodland paths running approximately north-south through Balnacoul Wood are stopped up (over 500m journey length increase) • ELR265 - route following local road (U11E) to the east of Balnacoul Wood is stopped up (250m - 500m journey length increase) • ELR158 - path in Leitch's Wood parallel to the A96 is stopped up (over 500m journey length increase) • ELR186 - path in Slorach's Wood connecting to the existing A96 is stopped up (over 500m journey length increase) • ELR455 and ELR584 - woodland paths in the western section of Leitch's Wood is stopped up (over 500m journey length increase) • FC11 - path to Peep's View viewpoint in Leitch's Wood is stopped up (over 500m journey length increase) • FC37 - The Fochabers Ring Moray Mountain Bike Trail which forms a circular mountain bike trail in in Leitch's Wood is stopped up (over 500m journey length increase)	Moderate to Major adverse	PC1, PC2	**Moderate to Major adverse** residual effect on NMUs due to reduction in amenity of routes and increased journey lengths on them. NMU routes in Leitch's Wood and Balnacoul Wood would be significantly affected requiring extensive diversions and having the amenity of the routes significantly affected resulting in a likely reorganisation of habits by current users who are likely to utilise alternative routes in the wider area.

Sub-topic	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects (and Significance)
	Significant effects to amenity of journeys and/or the perceived safety of users on 15 NMU routes (High sensitivity) as a result of changes in traffic flows: • ELR94 - route connecting the existing A96 to Lochnabo Wood would cross the option via an overbridge • CP-EG52-02, connecting Lhanbryde cemetery to Loch na Bo would cross the option via an overbridge • ELR597 – overgrown path to the east of Loch Oire which routes south to the Aberdeen - Inverness Railway Line before turning north back through the woodland would cross the option by underpass • ELR329 - looping path in Threapland Wood is located in close proximity to the option • ELR114 and ELR145 - wide woodland path running approximately east-west through Balnacoul Wood would be diverted along a side road (users of ELR114 would also experience up to 250m journey length increase) • ELR615 - short connecting woodland path in Balnacoul Wood is stopped up (up to 250m journey length increase) • ELR467 - route following the B9015 south from Mosstodloch to Inchberry would be diverted (up to 250m journey length increase) • CP-FB08-01, path adjacent to the existing A96 which provides a pedestrian crossing of the River Spey would be located in close proximity to the option • CP-FB08-02 - path adjacent to the B9014 would be diverted along a side road (up to 250m journey length increase) • CP-SW02-06 - route along the eastern bank of the River Spey would cross the option via an underpass			

Sub-topic	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects (and Significance)
	• CP-FB14-01 – path from Fochabers to Gordon Castle Farm which passes under the A96 is predicted to be affected by the option running on embankment in close proximity to users • CP-FB16-01 - path adjacent to the B9104 and A98 would be diverted along a side road (up to 250m journey length increase) • ELR392 and ELR446 – short woodland paths connecting Forestry Commission routes in Leitch's Wood would be in close proximity to the option Beneficial effects to users of three NMU routes (High sensitivity) following the existing A96 through significant reductions in traffic volumes associated with the beneficial effects to the amenity and potential safety of users: • Users of ERL570, ELR578 and CP-FB13-00 are predicted to experience an improvement to the amenity of the paths as a result of traffic flow reductions	Moderate Beneficial	N/A	**Moderate beneficial** residual effect through significant reductions in traffic volumes and associated amenity benefits
Residential, Commercial and Industrial Properties Assessment	**Land-take** • A small loss of land to the north of the Elgin Kart Raceway Go-Kart Track. Predicted that any loss of land would be minor and would not require any demolition of structures associated with the track (Medium sensitivity) • A small loss of land associated with the south-western curtilage of Pittensair House derelict steadings (Low sensitivity)	Minor adverse	PC4	The residual effect is assessed as Minor adverse
	Access to Private Properties It is predicted that no private properties within the study area would have their access significantly affected (High sensitivity)	Negligible	PC3	Negligible

Sub-topic	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects (and Significance)
Community Land, Facilities and Outdoor Access Areas Assessment	**Land-take, Access and Amenity** • Predicted significant effects resulting from land-take and associated effects to the amenity of, or the access to Threapland Wood, the recreational woodland adjacent to the River Spey at Fochabers and Leitch's Wood (High sensitivity) • Visitors to Loch na Bo and Lochnabo Wood and Balnacoul Wood are predicted to experience significant adverse effects to their amenity. Access to Slorach's Wood would be restricted for mountain bikers who cross from the trails in Leitch's Wood to Slorach's Wood resulting in a significant effect to accessibility (High sensitivity) • The remaining community land/facilities within the study area (including the River Spey) are not predicted to be significantly affected. It is not predicted that significant effects would occur to any school catchments (High sensitivity)	Minor to Major adverse	N/A	Minor to **Major adverse** effects are predicted to occur to Leitch's Wood and Moderate adverse effects are predicted to occur to Lochnabo Wood, Loch na Bo, Threapland Wood, Balnacoul Wood and the recreational woodland Adjacent to the River Spey at Fochabers
Community Severance Assessment	**Relief from Existing Severance** Reduced traffic flows on the existing A96 in Lhanbryde and Mosstodloch predicted to lead to improvements in amenity of some parts of the settlements generally and for NMU journeys within them particularly across the A96 to access recreational facilities and areas such as Balnacoul Wood, residential areas and some commercial premises (High sensitivity)	Moderate to Major beneficial	N/A	Moderate to **Major beneficial** residual effect for some parts of the community and NMUs in Lhanbryde and Mosstodloch through predicted reductions in traffic flows
	New Severance No new severance predicted from the option with access to services and community facilities within the settlements being retained (High sensitivity)	Negligible to Minor adverse	N/A	Negligible to Minor adverse

Table 12.10: Predicted Environmental Effects – Lhanbryde to East of Fochabers (South Option)

Sub-topic	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects (and Significance)
NMU Assessment	It is predicted that users of the following nine NMU routes (High sensitivity) would experience a significant reduction in amenity on, and direct effects to (including the severance of) the routes: • ELR592 - wide woodland path around the western edge of Balnacoul Wood is severed (over 500m journey length increase) • ELR98 - wide woodland path running approximately east-west through the southern section of Balnacoul Wood is severed (over 500m journey length increase) • CP-FB17-01 - Route connecting Castle Hill to Slorach's Wood is severed (over 500m journey length increase) • PRoW GM9 - woodland track running the length Slorach's Wood and Ordiequish Wood, north-south from the lane leading to Castlehill Farm in Fochabers is severed (over 500m journey length increase) • ELR168, ELR186 and ELR576 - woodland paths in Slorach's Wood running parallel to Burn of Fochabers is severed (over 500m journey length increase) • FC95 - route connecting Fochabers to Slorach's Wood is severed (over 500m journey length increase) • FC32 - circular mountain bike trail at the north end of Slorach's Wood (The Soup Dragon Moray Monster Trail) is severed (over 500m journey length increase) Significant effects to amenity of journeys and/or the perceived safety of users on 11 NMU routes (High sensitivity) as a result of changes in traffic flows: • CP-EG52-02, connecting Lhanbryde Cemetery to Loch na Bo Wood would cross the option via an overbridge	Moderate to Major adverse	PC1, PC2	**Moderate to Major adverse** residual effect on NMUs due to reduction in amenity of routes and increased journey lengths on them. NMU routes in Slorach's Wood and Balnacoul Wood would be significantly affected requiring significant diversions and having the amenity of the routes significantly affected resulting in a likely reorganisation of habits by current users who are likely to utilise alternative routes in the wider area

Sub-topic	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects (and Significance)
	• ELR94 - route connecting the existing A96 to Lochnabo Wood would cross the option via an overbridge • ELR597 - looping path to the east of Loch Oire would cross the route option via an underpass • ELR329 - looping path in Threapland Wood is located in close proximity to the option • ELR440 - road (U22E), connecting to B9015 at its western extent would be in close proximity to the option • ELR192 - path following the western bank of the River Spey would cross the option via an underpass • CP-FB21-06 and CP-FB21-08 - route following the eastern bank of the River Spey would be in close proximity to the option • ELR316 - short, connecting woodland path in the north of Slorach's Wood would be in close proximity to the option • FC33 and FC92 - mountain bike trail within in the eastern section of Slorach's Wood would be in close proximity to the option			
	Beneficial effects to users of three NMU routes (High sensitivity) following the existing A96 through significant reductions in traffic volumes associated with the beneficial effects to the amenity and potential safety of users: • Users of ELR570, ELR578 and ELR466 are predicted to experience an improvement to the amenity of the paths as a result of traffic flow reductions	Moderate beneficial	N/A	**Moderate beneficial** residual effect through significant reductions in traffic volumes and associated amenity benefits

Sub-topic	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects (and Significance)
Residential, Commercial and Industrial Properties Assessment	**Land-take** • A minor loss of land to the north of the Elgin Kart Raceway Go-Kart Track is predicted, which would not require any demolition of structures associated with the track (Medium sensitivity) • A minor loss of land associated with the south-western curtilage of Pittensair House derelict steadings (Low sensitivity)	Minor adverse	PC4	The residual impact is assessed as Minor adverse
	Access to Private Properties Predicted that no private properties within the study area would have their access significantly affected (High sensitivity)	Negligible	PC3	Negligible
Community Land, Facilities and Outdoor Access Areas Assessment	**Land-take, Access and Amenity** • Visitors to Threapland Wood and Slorach's Wood are predicted to experience significant adverse effects to their amenity as well as minor woodland land-take. • Visitors to Loch na Bo, Lochnabo Wood, Dipple Cemetery and the River Spey (including anglers) are predicted to experience significant adverse effects in the immediate vicinity of the River Spey crossing (High sensitivity) • The remaining community land/facilities within the study area (including the Trochelhill Wood, Balnacoul Wood and Loch Oire) are not predicted to be significantly affected. It is not predicted that significant effects would occur to any school catchments (High sensitivity)	Minor to Major adverse	PC1	Minor to **Major adverse** effects predicted to Slorach's Wood and Threapland Wood as a result of woodland loss, amenity and access. **Moderate adverse** effects to the River Spey, Loch na Bo, Lochnabo Wood and Dipple Cemetery
Community Severance Assessment	**Relief from Existing Severance** Reduced traffic flows on the existing A96 in Lhanbryde and Mosstodloch predicted to lead to improvements in amenity of some parts of the	Moderate to Major beneficial	N/A	**Moderate to Major beneficial** residual effect

Sub-topic	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects (and Significance)
	settlements generally and for NMU journeys within them particularly across the A96 to access recreational facilities, residential areas and some commercial premises (High sensitivity)			for some parts of the community and NMUs in Lhanbryde and Mosstodloch through predicted reductions in traffic flows
	New Severance No significant new severance predicted from the option with access to services and community facilities within the settlements being retained (High sensitivity)	Negligible to Minor adverse	N/A	Negligible to Minor adverse

Cumulative Effects

12.6.4. A review of the proposed future development areas outlined in the draft Moray Local Development Plan 2020 has identified the potential for cumulative effects to occur on People and Communities with the Hillhead to Lhanbryde options.

12.6.5. Significant cumulative effects are predicted to Spynie Wood as a result of the Hillhead to Lhanbryde North Option in combination with the effects of long term mixed-use development sites in this area. Cumulative effects are predicted as a result of the proximity of the new infrastructure to the wooded area at Spynie and the NMU routes it supports resulting in significant changes to the amenity of these facilities which are currently a well-used area by the local community for recreational purposes.

12.6.6. Significant cumulative effects are predicted to the amenity of journeys on the NMU routes to the south of Birkenhill Wood (Core Paths - CP-EG07-03, CP-EG07-04, and CP-EG07-05) as well as the amenity of Birkenhill Wood and the Wood of Level resulting from their location on the boundary of the mixed-use development sites to the south of Elgin and the Hillhead to Lhanbryde South Option.

12.6.7. It is not predicted that there would be any significant cumulative effects on other NMU routes, community land and facilities, private properties or communities along the route of any of the other options from the information available at this stage.

12.6.8. The potentially significant cumulative effects identified are not considered to alter the overall findings of the assessment for the Hillhead to Lhanbryde options set out in Section 12.7.

12.7 Summary of Effects

12.7.1. This section sets out a summary of the key findings of the options assessment based on the predicted significant residual effects. The summaries are presented in Tables 12.11 to 12.13 below and should be reviewed with reference to Figures 12.1, 12.2 and 12.3 (Volume 5).

Table 12.11: Summary of Predicted Environmental Effects: Hardmuir to Hillhead

Sub-topic/ criteria	Predicted Residual Effects for North Option	Predicted Residual Effects for South Option
NMU Assessment	• It is predicted that NMUs would experience significant adverse effects on a total of 14 routes. Users of five of these routes are predicted to experience significant effects to journey length and amenity. Significant adverse effects are predicted to the amenity of NMU journeys on the remaining nine routes • Significant beneficial effects predicted for NMUs using 12 routes as a result of traffic flow decreases	• It is predicted that NMUs would experience significant adverse effects on a total of 23 routes. Users of 11 of these routes are predicted to experience significant effects to journey length and amenity. Significant adverse effects are predicted to the amenity of NMU journeys on the remaining 12 routes • Significant beneficial effects predicted for NMUs using two routes as a result of traffic flow decreases
Private Properties Assessment	• No significant land-take is required from private properties • Significant increases in distance are predicted to access 10 private properties at Toll Brae, Feddan View, Hillhead and Leys	• No significant land-take is required from private properties • Significant increases in distance are predicted to access three private properties at Toll Brae, Feddan View and Woodside Cottage
Community Land, Facilities and Outdoor Access Areas Assessment	• Significant loss of land used by the community with significant adverse land-take, amenity and access effects to users of the River Findhorn Green Corridor and the Forres Enterprise Park • Significant amenity effects are also predicted to the River Findhorn resulting in some users potentially being dissuaded from accessing these areas • Significant beneficial amenity effects are predicted to users of Sueno's Park which is situated adjacent to the existing A96 at Forres	• Significant severance and loss of land used by the community with significant adverse land-take, amenity and access effects to users of Limekilns Wood, Fairyhills Wood and Office Wood • Significant amenity effects are also predicted to the River Findhorn, Muiry Wood and the Loch of Blairs resulting in some members of the community potentially being dissuaded from accessing these areas
Community Severance Assessment	• Some people in Brodie and Forres, including vulnerable groups, are predicted to experience significant beneficial effects through reduced traffic flows on the existing A96 leading to improvements in amenity of some parts of the settlement and for journeys within it and particularly across the A96 to access employment land, residential areas and Forres Railway Station	• Some people in Brodie and Forres, including vulnerable groups, are predicted to experience significant beneficial effects through reduced traffic flows on the existing A96 leading to improvements in amenity of some parts of the settlement and for journeys within it and particularly across the A96 to access employment land, residential areas and Forres Railway Station

Summary – Hardmuir to Hillhead

12.7.2. The North Option is predicted to result in significant adverse effects to users of 14 NMU routes with five of these routes predicted to be adversely affected through increases in journey lengths and a reduction in the amenity for users. It is not predicted that any significant effects to private properties will occur, however access to 10 private properties would be significantly affected resulting in journeys to these properties increasing. Effects on community land, facilities and outdoor access areas are spread across the option with a loss of land from the River Findhorn Green Corridor and the amenity land at the Forres Enterprise Park predicted.

12.7.3. The South Option is predicted to result in significant adverse effects to users of 23 NMU routes with 11 of these routes predicted to be adversely affected through increases in journey lengths and a reduction in the amenity for users. No significant effects to private properties are predicted, however access to three private properties would be significantly affected resulting in journeys to these properties increasing. Effects on community land, facilities and outdoor access areas are spread across the route option with a significant loss of woodland used by the community at Limekilns Wood, Fairyhills Wood and Office Wood to the south of Forres.

12.7.4. Both options are predicted to result in beneficial effects to residents of Brodie and Forres through reduced traffic flows on the existing A96 leading to improvements in amenity of some parts of the settlements.

12.7.5. The North Option results in fewer significant effects to users of NMU routes and significantly more benefits as a result of traffic decreases. Both options are predicted to have similar effects from changes in access to private properties, although the North Option affects more property accesses. The South Option results in large areas of land-take from areas such as Limekilns Wood and Fairyhills Wood whilst the North Option affects fewer areas of woodland and provides significant beneficial amenity effects to users of Sueno's Park. Both options are predicted to have similar beneficial effects in terms of reducing community severance.

12.7.6. Overall the North Option is predicted to have less impact on people and communities.

Table 12.12: Summary of Predicted Environmental Effects: Hillhead to Lhanbryde

Sub-topic/ criteria	Predicted Residual Effects for North Option	Predicted Residual Effects for South Option
NMU Assessment	• It is predicted that NMUs would experience significant adverse effects on a total of 23 routes. Users of four of these routes are predicted to experience significant effects to journey length and amenity. Significant adverse effects are predicted to the amenity of NMU journeys on the remaining 19 routes • Significant beneficial effects predicted for NMUs using two routes as a result of traffic flow decreases	• It is predicted that NMUs would experience significant adverse effects on a total of 22 routes. Users of eight of these routes are predicted to experience significant effects to journey length and amenity. Significant adverse effects are predicted to the amenity of NMU journeys on the remaining 14 routes • Significant beneficial effects predicted for NMUs using three routes as a result of traffic flow decreases
Private Properties Assessment	• Significant increases in distance are predicted to access 21 private properties at Burgie Lodge, Pinewood Cottages, Rosebrae and Dykeside and Greens of Coxton	• Significant increases in distance are predicted to access 45 private properties at Burgie Lodge, Easter Wards, Viewhill/Whitefield Croft and Lochinver Croft, Lochinver, Inverlochty and Glenesk/Greenfield
Community Land, Facilities and Outdoor Access Areas Assessment	• Significant loss of land used by the community with significant adverse land-take, amenity and access effects to users of the lay-by at Carden Hill • Significant amenity effects and/or journey length increases are also predicted to Spynie Wood, Kirkhill Wood, Carden Hill Wood, the Former Railway at Lesmurdie and Spynie Church resulting in members of the community potentially being dissuaded from accessing these areas • Beneficial effects to the amenity of Alves Primary School and Alves War Memorial from reduced traffic on the existing A96	• Significant loss of land used by the community with significant adverse land-take, amenity and access effects to users of Alves Wood, Cloddach Quarry Restoration Area and Birkenhill Wood • Significant amenity effects and journey length increases are predicted to Alves Church, the River Lossie, the coarse fishing area at Hardhillock and Moray Beekeepers Apiary resulting in some users potentially being dissuaded from accessing these areas • Beneficial effects to the amenity of Alves Primary School and Alves War Memorial from reduced traffic on the existing A96
Community Severance Assessment	• Some people in Alves and Lhanbryde, including vulnerable groups, are predicted to experience significant beneficial effects through reduced traffic flows on the existing A96 leading to improvements in amenity of some parts of the settlements	• Some people in Alves and Lhanbryde, including vulnerable groups, are predicted to experience significant beneficial effects through reduced traffic flows on the existing A96 leading to improvements in amenity of some parts of the settlements
Cumulative Effects	• Predicted cumulative effects to recreational users of Spynie Wood and associated NMU routes	• Predicted cumulative effects to recreational users of Birkenhill Wood and the Wood of Level and associated NMU routes

Summary - Hillhead to Lhanbryde

12.7.7. The North Option is predicted to result in significant adverse effects to users of 23 NMU routes with four of these routes predicted to be adversely affected through increases in journey lengths and a reduction in the amenity for users. It is not predicted that any significant effects to private properties would occur, however access to 21 private properties would be significantly affected resulting in journeys to these properties increasing. Effects on community land, facilities and outdoor access areas are spread across the option with a loss of the lay-by and picnic area at Carden Hill, and further significant effects predicted for users of Spynie Wood, Kirkhill Wood, Carden Hill Wood, the former railway at Lesmurdie and Spynie Church.

12.7.8. The South Option is predicted to result in significant adverse effects to users of 22 NMU routes with eight of these routes predicted to be adversely affected through increases in journey lengths and a reduction in the amenity for users. No significant effects to private properties are predicted, however access to 45 private properties would be significantly affected resulting in journeys to these properties increasing. Effects on community land, facilities and outdoor access areas are spread across the option with a loss of land community land / outdoor access areas at Alves Wood, Cloddach Quarry Restoration Area and Birkenhill Wood with significant amenity effects also predicted at a further four areas.

12.7.9. Both options are predicted to result in beneficial effects to residents of Alves and Lhanbryde through reduced traffic flows on the existing A96 leading to improvements in amenity of some parts of the settlements.

12.7.10. Both options result in similar effects to users of NMU routes. The South Option results in a greater number of significant effects to accesses at private properties. The North Option results in less significant effects to areas of community land whilst the South Option results in large areas of land-take from areas such as Birkenhill Wood and amenity impacts to the Moray Beekeepers Apiary. Both options are predicted to have similar beneficial effects in terms of reducing community severance.

12.7.11. Overall the North Option is predicted to have slightly less impact on people and communities.

Table 12.13: Summary of Predicted Environmental Effects: Lhanbryde to East of Fochabers

Sub-topic/ criteria	Predicted Residual Effects for North Option	Predicted Residual Effects South Option
NMU Assessment	• It is predicted that NMUs would experience significant adverse effects on a total of 25 routes. Users of 10 of these routes are predicted to experience significant effects to journey length and amenity. Significant adverse effects are predicted to the amenity of NMU journeys on the remaining 15 routes • Significant beneficial effects predicted for NMUs using three routes as a result of traffic flow decreases	• It is predicted that NMUs would experience significant adverse effects on a total of 20 routes. Users of nine of these routes are predicted to experience significant effects to journey length and amenity. Significant adverse effects are predicted to the amenity of NMU journeys on the remaining 11 routes • Significant beneficial effects predicted for NMUs using three routes as a result of traffic flow decreases
Private Properties Assessment	• No significant land-take is required from private properties, and no significant increases in distance are predicted to access private properties	• No significant land-take is required from private properties, and no significant increases in distance are predicted to access private properties
Community Land, Facilities and Outdoor Access Areas Assessment	• Significant loss of land used by the community with significant adverse land-take, amenity and access effects to users of Threapland Wood, recreational land adjacent to the River Spey at Fochabers and Leitch's Wood. Significant restrictions on access are also predicted for NMUs accessing Slorach's Wood with the existing NMU linkage between Leitch's Wood and Slorach's Wood being severed • Significant amenity effects and/or journey length increases are also predicted to Loch na Bo, Lochnabo Wood and Balnacoul Wood resulting in some members of the community potentially being dissuaded from accessing these areas	• Significant loss of land used by the community with significant adverse land-take, amenity and access effects to users of Threapland Wood and Slorach's Wood • Significant amenity effects and journey length increases are also predicted to Loch na Bo, Lochnabo Wood, Dipple Cemetery and the River Spey (in the immediate vicinity of the River Spey Crossing) resulting in some members of the community potentially being dissuaded from accessing these areas
Community Severance Assessment	• Some people in Lhanbryde and Mosstodloch, including vulnerable groups, are predicted to experience significant beneficial effects through reduced traffic flows on the existing A96 leading to improvements in amenity of some parts of the settlement and for journeys within it and particularly across the A96 to access employment land and residential areas	• Some people in Lhanbryde and Mosstodloch, including vulnerable groups, are predicted to experience significant beneficial effects through reduced traffic flows on the existing A96 leading to improvements in amenity of some parts of the settlement and for journeys within it and particularly across the A96 to access employment land and residential areas

Summary - Lhanbryde to East of Fochabers

12.7.12. The North Option is predicted to result in significant adverse effects to users of 25 NMU routes with 10 of these routes predicted to be adversely affected through increases in journey lengths and a reduction in the amenity for users. It is not predicted that any significant effects to private properties (or their access) would occur. Direct effects to community land, facilities and outdoor access areas are predicted to occur at Threapland Wood, Balnacoul Wood and Leitch's Wood, with further significant amenity effects predicted at Loch na Bo and Lochnabo Wood.

12.7.13. The South Option is predicted to result in significant adverse effects to users of 20 NMU routes with nine of these routes predicted to be adversely affected through increases in journey lengths and a reduction in the amenity for users. It is not predicted that any significant effects to private properties (or their access) would occur. Direct effects to community land, facilities and outdoor access areas are predicted to occur at Threapland Wood and Slorach's Wood, with further significant amenity effects predicted at Loch na Bo, Lochnabo Wood, Dipple Cemetery and to users of the River Spey.

12.7.14. Both options result in similar effects to users of NMU routes, and both options have similar effects on private property accesses. Both options also result in significant effects on amenity and journey length for those following NMU routes at outdoor areas such as Loch na Bo Wood and Threapland Wood and Slorach's Wood. However, in addition, the North Option results in a severance of access for NMUs between Slorach's Wood and Leitch's wood. The options result in a similar beneficial effect through relieving severance at Lhanbryde and Mosstodloch.

12.7.15. Overall the South Option is predicted to have slightly less impact on people and communities.

12.8 Scope of the Stage 3 Assessment

12.8.1. The DMRB Stage 3 assessment for People and Communities will be undertaken in accordance with the DMRB and following guidance on Environmental Impact Assessment (EIA) by SNH and HES[65]. This would include more detailed assessment of the Preferred Option for the following:

- NMU Assessment:
  - Confirm the information gathered from relevant statutory bodies and local authorities including types of users through desk-based assessment, site visits and survey information;
  - Review the DMRB Stage 2 Assessment of the amenity value of paths utilising information available from the Scheme traffic model and the relevant assessments (e.g. air quality, noise and vibration and landscape and visual);
  - Update and define the assessment of changes in journey length and amenity, taking into account embedded mitigation; and
  - Propose appropriate mitigation measures based on refined assessments.
- Vehicle Travellers:
  - Assess the impacts on driver stress, using traffic data for the Preferred Option; and
  - Review the DMRB Stage 3 landscape and visual assessments to inform the assessment of view from the road.
- Private Properties:
  - Further consideration of any properties at risk of demolition or land-take and associated consideration of effect on the future viability of businesses; and
  - Update and refine the assessment of changes in journey lengths to access private properties.
- Community Land, Facilities and Outdoor Access Areas:
  - Confirm the information gathered from relevant statutory bodies, local authorities and the general public to identify community land, facilities and outdoor area-based facilities including any areas of importance for informal use; and
  - Update and refine the level of impact significance for changes in accessibility, journey length and amenity, taking into account embedded mitigation.
- Community Severance:
  - Using updated traffic data for the Preferred Option assess relief from existing severance and the potential for new severance within affected communities.
  - Further consultation will be undertaken with landowners, business owners and other key consultees to discuss the impact of the Preferred Option and to incorporate appropriate mitigation into the Scheme design.

[65] Environmental Impact Assessment Handbook, Guidance for competent authorities, consultation bodies, and others involved in the Environmental Impact Assessment process in Scotland. Scottish Natural Heritage and Historic Environment Scotland, 5th Edition, April 2018

13. Agriculture, Forestry and Sporting Interests

13.1 Introduction and Scope

13.1.1 This chapter presents the Design Manual for Roads and Bridges (DMRB) Stage 2 assessment of the predicted effects of each of the shortlisted options on agriculture, forestry and sporting interests. For the purpose of this assessment, agriculture, forestry and sporting interests include:

- Land used for the purpose of agricultural production including horticulture;
- Land used for forestry including commercial farm woodland; and
- Land used for sporting interests including land in equestrian use, commercial shooting and fishing enterprises.

13.1.2 The assessment identifies potential impacts on the land-take, severance and fragmentation of land, and associated access arrangements within the farm and forestry land holdings affected by each option. The predicted effects of these impacts on each enterprise have then been evaluated taking account of the option designs and mitigation assumed at this stage.

13.1.3 Land in non-commercial use and used for non-commercial sporting interests has been excluded from this assessment. Other commercial and non-commercial sporting and recreational interests are addressed in Chapter 12 (People and Communities).

13.1.4 This chapter is supported by Figures 13.1, 13.2 and 13.3 (Volume 5) and the following appendices (Volume 4b):

- Appendix A13.1: Assessment Methodology; and
- Appendix A13.2: Land-take Calculations.

13.2 Approach to Assessment

Introduction

13.2.1 This assessment has been carried out in accordance with the guidance in the DMRB (Volume 11, Section 3, Part 6, Land Use) which recommends that the scope of the agricultural assessment at DMRB Stage 2 covers:

- The amount and value of agricultural land affected by each of the options; and
- The likely effects of the options on individual farm units taking account of their size, type of husbandry and access arrangements.

13.2.2 Only those impacts which arise as a result of permanent change (e.g. land-take, severance of land and loss of infrastructure) have been considered in this assessment. At this stage of the design and assessment process, the nature, location and scale of construction activities has not been established and it is not possible to assess the impact of these on agriculture, forestry, equestrian or sporting facilities.

13.2.3 The evaluation of effects of the options on agricultural, forestry, equestrian and sporting land use takes into account the loss of land and its suitability for agriculture and forestry, as well as the loss of key infrastructure and access to land and buildings following mitigation.

Sources of Information

13.2.4 The following sources of information have been used for this assessment:

- The Scottish Government Land Parcel Identification System (LPIS) data (2018);
- Soil Survey of Scotland Staff (1984-87). Land Capability for Agriculture maps of Scotland at a scale of 1:50 000. Macaulay Institute for Soil Research, Aberdeen;
- The National Forestry Inventory (NFI) data (November 2017);
- Aerial photographs; and
- Information provided by land owners/occupiers.

13.2.5 Site visits were undertaken in 2017 and 2018 to verify the agriculture and forestry land use and land management practices that were determined from desk-based studies.

Consultation

13.2.6 Consultation with the National Farmers Union of Scotland (NFUS) noted that:

- Prime arable land is a very important commodity and of limited amount in Scotland and has great importance to Scotland's rural economy and food production;
- Where possible routes should go through poorer land, rough land, scrub land and woodland;
- Where it is not possible to avoid prime arable land, the area taken should be kept to a minimum;
- Any route causing the division of land holdings/farms must address fully any access issues the farmer may have with the land cut off from the farm by possible use of underbridges / overbridges, or any other method that minimises disruption to the farming business and livestock and machinery movements; and
- Care must be taken to avoid leaving blocks of land, land locked, with no rights of access.

13.2.7 Consultation with Forest Enterprise Scotland (FES)[66] identified that:

- There should be no net loss of woodland and areas of high value woodland should be avoided;
- Bisecting woodland can render woodlands difficult to harvest; and
- Newton Nursery is the only public-sector nursery within Scotland delivering trees to FES.

[66] Including comments from the Forestry Commission's Newton Nursery near Elgin

Assessment Methodology

13.2.8 The assessment has been based on the guidance for a DMRB Stage 2 agricultural assessment and has considered the following land uses within the study area for each option:

- Agricultural land – land used for the practice of arable cultivation or rearing stock to produce food and other products;
- Equestrian land – land used as livery yards or riding stables, but excluding land used for equestrian recreation (such as non-motorised user routes for hacking and horse-trekking);
- Forestry land – land used for the growing of trees to produce wood and wood products for commercial purposes; and
- Land for sporting interests – land used for activities, such as shooting and angling activities (predominantly game fishing).

13.2.9 The assessment is based on the number of affected holdings, the magnitude of the impact on the affected holdings, the area of total land-loss and the proportion of prime agricultural land loss.

13.2.10 The assessment focuses on a prediction of effects on land holdings, which are identifiable and discrete operational units within which an enterprise is carried out. This includes farms and their associated land, commercial forestry plantations or equestrian businesses. Land holdings may include land which is owned or operated by the farm and forms part of the enterprise but is not necessarily located immediately adjacent to the farm or its immediate land interests (e.g. some enterprises rent out fields which can be some distance from the farm holding).

13.2.11 The identification of land holdings affected by the Scheme is based upon two key data sources: local knowledge of landownership and occupation (which has been verified by individual landowners/occupiers where feasible); and land registered with the Scottish Government in the LPIS.

13.2.12 The study area has been defined as land and land holdings that would be subject to direct land-take, severance or changes in access as a result of the permanent development of a route option.

13.2.13 The assessment of impacts to land holdings has comprised the following tasks:

- The sensitivity of agriculture, equestrian and sporting interests has been categorised for each individual land holding using a three-point scale: High, Medium and Low (as set out in Table 1.1, Appendix A13.1, Volume 4b), and guided by professional judgement following the desk-based review of information and the site visits undertaken. Sensitivity has been determined by a combination of farm size, the presence of prime agricultural land and the presence of sporting activities. The average farm size has been determined by calculating the mean farm size of all holdings impacted by the options, excluding the two largest land holdings, to avoid skewing the

sample[67]. Each farm holding has been given a unique reference number, e.g. MMS Farm ID1 which has been used to define/classify and differentiate the farm holdings as shown on Figures 13.1, 13.2 and 13.3 (Volume 5);

- The area of land occupied by the option within each farm holding (in hectares, ha) and the approximate percentage of the affected land holding has been calculated;
- An assessment to determine the likely effect of the options on the viability of the individual land holdings has been undertaken using the following assessment criteria as set out in Table 1.2 (Appendix A13.1, Volume 4b): land-take including prime land; severance of land; fragmentation of land holdings; disruption to / loss of access; and disruption to / loss of sporting interests[68]; and
- Where preliminary flood modelling has indicated there may be localised and temporary increases in the extent/new areas of flood risk, or a flood compensatory storage area has been identified to mitigate flood risk associated with the options, this has been included in the assessment of predicted effects where relevant.

13.2.14 In addition to the assessment of impacts to individual land holdings the assessment has considered the overall loss of prime agricultural land within the study area for each option. The assessment of the quality of agricultural land within the footprint of the options has taken account of the Macaulay Land Capability for Agriculture (LCA) classification (see Section 13.3 – Baseline Environment for further information on land classifications). Land within LCA Class 1[69], Class 2 and Class 3.1 is considered to be 'prime agricultural land' and is, therefore, considered to be of high agricultural value.

13.2.15 The criteria for assessing the potential magnitude of impact has been categorised using a four-point scale: Major; Moderate; Minor; and Negligible (as set out in Table 1.2, Appendix A13.1, Volume 4b). Impacts are adverse unless stated otherwise.

13.2.16 The significance of effect is a function of the sensitivity of the land holding and the magnitude of the potential impact. The evaluation of effect significance has been informed by the criteria outlined in Table 1.3 (Appendix A13.1, Volume 4b) and professional judgement from the agricultural assessment team used in each case taking account of current knowledge of each land holding. Predicted residual effects following mitigation are defined in terms of significance (Negligible, Minor, Moderate, Major) with effects of Moderate and above considered to be 'significant'. Mitigation measures have been considered to avoid, reduce or offset any predicted significant effects (see Section 13.4).

Assumptions and Limitations

13.2.17 Baseline information and the sensitivity of land holdings have been determined using the data available at the time of the assessment. To inform the assessment, general observational fieldwork was undertaken in the study area to determine the nature of farm enterprises. Specific farm visits were not undertaken at this stage but will be undertaken as part of DMRB Stage 3 (refer to Section 13.8).

[67] The average farm size is 180ha and the medium farm size has been determined by +/- 50ha of the average, thereby providing three size categories, small <130ha, medium 130-230ha and large >230ha
[68] It should be noted that where a commercial sporting activity has been identified as being affected, its location and any land loss associated with it will have been included in either the agriculture, forestry or equestrian holdings
[69] A review of the LCA data has identified that no Class 1 land is present within the study area

13.2.18 The estimation of land-take from each land holding is approximate and is based on the footprint of the options rounded up to the nearest 0.5ha. The estimation of land-take does not include any additional land required for construction or any additional land-take required for landscape planting or other possible mitigation measures.

13.2.19 Within the study area there are several large estates which own or manage farms potentially affected by the options. The assessment of effects on land holdings has taken account of the wider land areas available to the relevant estate as these enterprises are considered to have greater flexibility to accommodate changes in land availability due to their scale. In these cases, the assessment has considered the impact of the options with reference to those farms under the ownership of the estate in the area of land immediately adjoining the options[70].

13.3 Baseline Environment

Land Use

13.3.1 There is a high proportion of land of high agricultural value within the study area, with significant differences in its distribution between the options. Within Morayshire overall some 15% of farmland is farm woodland, which is predominantly non-commercial open woodland[71]. Within the study area (refer to paragraph 13.3.5), agriculture, farm woodlands, farm diversification and forestry are the predominant land use, with approximately 90% of land in agriculture and 10% in forestry, with mixed agriculture being the predominant land use[72].

13.3.2 The majority of the forestry land identified in the study area (excluding farm woodlands) is owned and managed by Forestry Commission Scotland (FCS) or by private estates and is managed for commercial forestry operations.

13.3.3 There is a mixed farming structure within the study area with some large estates, and a range of owner-occupied farms and tenanted farms. There is also a prevalence of farm holdings with a mixed tenure, with an owner-occupied core, but with tenanted land, annual lets, winter grazing and contract-farmed land in addition. Many farm holdings are therefore fragmented, comprising multiple parcels of land and making up a relatively complex distribution of land ownership and management.

13.3.4 In terms of agricultural production, the study area has a very mixed farming area comprising of arable cropping (winter-sown cereals, spring barley for malting and oil seed rape), field scale vegetables (potatoes and carrots), seed potatoes, cattle (suckler cows and feeding cattle), breeding ewes and lambs, pig and poultry production and some dairy. Free range egg and pork production is evident and the conversion to organic status is also noted on some holdings.

[70] Land holdings associated with estates in other areas of the country or remote from the land holding being assessed have not been included
[71] The Land Based Sector in NE Scotland (A study for the NE Scotland Agriculture Advisory Group, March 2016)
[72] The Land Based Sector in NE Scotland (A study for the NE Scotland Agriculture Advisory Group, March 2016)

Study Area Context

13.3.5 The study area is considered to comprise those holdings which intersect the footprint of the options. The assessment of impacts goes beyond this study area in some instances to allow for:

- Consideration of the impact of the loss of land to holdings that have land outside of the study area, that forms part of the holding; and
- Cconsideration of the impact on access to adjoining land, where a holding has land outside of the study area.

13.3.6 The total land-take, area of prime agricultural land[73], land-take from forestry[74] and the number of agricultural, forestry and equestrian holdings that are located within the corridor for each option are shown in Tables 13.1 to 13.3[75].

13.3.7 For the Hardmuir to Hillhead section, Table 13.1 indicates that a slightly larger overall land-take is associated with the South Option due to its longer length. The North Option passes through generally flatter land associated with the coastal plain, much of which is prime agricultural land associated with the alluvial soils in this area. The land south of Forres is more extensively wooded than to the north of the town and includes the woodland areas south-west of Forres, which are managed for timber and conservation by the Altyre Estate.

Table 13.1: Land Use Baseline – Hardmuir to Hillhead Options

Category	Quantity within Study Area	
	North Option	South Option
Total land-take from agriculture, including equestrian land use (ha)	121.0	166.5
Area of land-take of prime agricultural land (ha)	92.5	58.5
Area of land-take of prime agricultural land as a percentage of total agricultural land-take (%)	76.5	35.5
Total land-take from forestry (ha)	5.5	50.0
Total number of agricultural, forestry and equestrian holdings	13	13

13.3.8 The baseline information for the Hillhead to Lhanbryde section set out in Table 13.2 below indicates that the North Option has a higher overall land-take and passes through significantly larger areas of prime agricultural land. The North Option passes through the flatter land associated with the Laich o'Moray to the North of Elgin, whilst the South Option generally crosses areas of prime agricultural land in the western area to the east of Alves

[73] Figures quoted in Tables 13.1 to 13.3 are taken from GIS calculation using Land Capability for Agriculture data which does not take account of current land uses
[74] Figures quoted in Tables 13.1 to 13.3 are taken from the National Forestry Inventory (NFI)
[75] All areas (in hectares) quoted in the tables are rounded up to the nearest 0.5ha

Wood and at the River Lossie, south of Elgin. The South Option also crosses woodland areas including Alves Wood and Birkenhill Wood.

Table 13.2: Land Use Baseline – Hillhead to Lhanbryde Options

Category	Quantity within Study Area	
	North Option	South Option
Total land-take from agriculture, including equestrian land use (ha)	227.5	193.5
Area of land-take of prime agricultural land (ha)	129.0	41.0
Area of land-take of prime agricultural land as a percentage of total agricultural land-take (%)	57.0	21.5
Total land-take from forestry (ha)	21.5	38.5
Total number of agricultural, forestry and equestrian holdings	27	28

13.3.9 Table 13.3 below indicates that agricultural land take is similar for both options in the Lhanbryde to East of Fochabers section. Both options cross the wooded areas of Threapland and Balnacoul Woods. The North Option passes through part of a large area of commercial woodland at Whiteash Hill Wood, and the South Option crosses a similar area of woodland at Slorach's Wood to the south of Fochabers. Prime agricultural land is not extensive in the area of these options.

Table 13.3: Land Use Baseline – Lhanbryde to East of Fochabers Options

Category	Quantity within Study Area	
	North Option	South Option
Total land-take from agriculture, including equestrian land use (ha)	108.0	108.5
Area of land-take of prime agricultural land (ha)	3.5	6.5
Area of land-take of prime agricultural land as a percentage of total agricultural land-take (%)	3.5	6.5
Total land-take from forestry (ha)	54.0	49.5
Total number of agricultural, forestry and equestrian holdings	10	10

13.4 Potential Impacts

13.4.1 This section presents the potential impacts of the options. The magnitude of predicted impacts on land holdings (the receptors) affected by each route option has been considered in combination with the sensitivity of the receptor to determine the potential for significant effects. Where there are two alternatives provided in Table 1.3 (Appendix A13.1, Volume 4b), e.g. Minor/Moderate, a single significance rating has been chosen based on professional judgement. For the purposes of this assessment, potential effects predicted to be Moderate or Major were considered to be significant.

13.4.2 The predicted impacts are presented in Tables 13.4 to 13.9 below. Land holdings with impacts shown in the tables which are not predicted to be potentially significant have not been assessed or reported any further in this chapter. The Farm IDs in Tables 13.4 to 13.9 correspond to those shown on Figures 13.1, 13.2 and 13.3 (Volume 5) and have been ordered from west to east along each option.

Table 13.4: Predicted Impacts on Land Holdings – Hardmuir to Hillhead (North Option)

Potential Impact (taking account of sensitivity of receptor)	Sensitivity	Magnitude	Potentially Significant?
MMS Farm ID106 – predicted agricultural land-take of 2.5% from multiple fields, predominantly LCA Class 3.2.	High	Minor	x
MMS Farm ID40 – predicted agricultural land-take of 0.5% from multiple fields, consisting of LCA Class 3.2.	High	Minor	x
MMS Farm ID44 – Large scale dairy farm with predicted agricultural land-take of 15% and a potentially significant loss of prime agricultural land affecting multiple fields, predominantly LCA Class 3.1.	High	Major	✓
MMS Farm ID77 – predicted agricultural land-take of 1%, however a potentially significant area of land-loss (15ha) impacting multiple fields comprising LCA Classes 2 and 3.1.	Medium	Moderate	✓
MMS Farm ID29 – predicted agricultural land-take of 5%, however a potentially significant area of agricultural land-loss (27ha) impacting multiple fields of LCA Classes 2 and 3.2.	Medium	Moderate	✓
MMS Farm ID5 – predicted agricultural land-take of 6.5%, including impacting one field of LCA Class 2.	High	Moderate	✓
MMS Farm ID21 – predicted agricultural land-take of 10% and a potentially significant loss of land, impacting multiple fields of LCA Class 2.	High	Major	✓

Potential Impact (taking account of sensitivity of receptor)	Sensitivity	Magnitude	Potentially Significant?
MMS Farm ID2 – predicted agricultural land-take of 10% and a potentially significant loss of land, impacting multiple fields of LCA Class 2.	High	Major	✓
MMS Farm ID75 – predicted agricultural land-take of 1.5%, impacting multiple fields of LCA Class 2.	High	Minor	x
MMS Farm ID93 – predicted agricultural land-take of 34% and a potentially significant loss of land, including impacting one field of LCA Class 2.	High	Major	✓
MMS Farm ID24 – predicted agricultural land-take of 6%, impacting multiple fields of predominantly LCA Class 3.2.	Medium	Moderate	✓
MMS Farm ID18 – predicted agricultural land-take of 7.5%, impacting multiple fields of predominantly LCA Class 2.	High	Moderate	✓
MMS Farm ID87 – predicted agricultural land-take of 2%, affecting more than one field. Predominantly LCA Class 3.2[76].	Medium	Minor	x
13 holdings affected for route option overall			

Table 13.5: Predicted Impacts on Land Holdings – Hardmuir to Hillhead (South Option)

Potential Impact (taking account of sensitivity of receptor)	Sensitivity	Magnitude	Potentially Significant?
MMS Farm ID106 – predicted agricultural land-take of 2.5% from multiple fields, predominantly LCA Class 3.2.	High	Minor	x
MMS Farm ID40 – predicted agricultural land-take of 0.5% from multiple fields, consisting of LCA Class 3.2.	High	Minor	x
MMS Farm ID44 – Large scale dairy farm with predicted agricultural land-take of 15% and a potentially significant loss of prime agricultural land affecting multiple fields, predominantly LCA Class 3.1.	High	Major	✓
MMS Farm ID77 – predicted land-take of 1%, however a potentially significant area of land-take	Medium	Moderate	✓

[76] MMS Farm ID87 is screened out of further assessment in the Hardmuir to Hillhead section but is assessed in the Hillhead to Lhanbryde section (refer to Tables 13.7 and 13.8) which considers land-take from the farm boundary as whole

Potential Impact (taking account of sensitivity of receptor)	Sensitivity	Magnitude	Potentially Significant?
(18ha) impacting multiple fields comprising LCA Classes 2 and 3.1.			
MMS Farm ID29 – predicted agricultural land-take of 2% impacting woodland and arable, impacting multiple fields. Land of medium quality (LCA classes 3.2 and 4.1) impacted.	Low	Minor	x
MMS Farm ID79 – predicted agricultural land-take of 10.5%, impacting multiple fields of woodland and arable (Class 3.1) use.	High	Major	✓
MMS Farm ID3 – predicted predominantly forestry land-take, with some agricultural land (LCA Class 4.2) equating to 6.5% of the holding.	Low	Moderate	✓
MMS Farm ID89 – predicted agricultural land-take of 10%, impacting multiple fields of predominantly LCA Class 3.2.	Medium	Moderate	✓
MMS Farm ID68 – predicted agricultural land-take of 14.5%, impacting multiple fields of varying land quality with some LCA Class 3.1 impacted.	High	Major	✓
MMS Farm ID41 – predicted agricultural land-take of 8%, impacting multiple fields. Land of medium quality (LCA classes 3.2 and 4.2) impacted	High	Moderate	✓
MMS Farm ID24 – predicted agricultural land-take of 1% including impacting one field of LCA Class 4.2.	Medium	Minor	x
MMS Farm ID18 – predicted agricultural land-take of 13%, impacting multiple fields of varying land quality with some LCA Class 2 impacted.	High	Major	✓
MMS Farm ID87 – predicted agricultural land-take of 2%, affecting more than one field. Predominantly LCA Class 3.2[77].	Medium	Minor	x
13 holdings affected for route option overall			

[77] MMS Farm ID87 is screened out of further assessment in the Hardmuir to Hillhead section but is assessed in the Hillhead to Lhanbryde section (refer to Tables 13.6 and 13.7) which considers land-take from the farm boundary as whole

Table 13.6: Predicted Impacts on Land Holdings – Hillhead to Lhanbryde (North Option)

Potential Impact (taking account of sensitivity of receptor)	Sensitivity	Magnitude	Potentially Significant?
MMS Farm ID87 – estimated agricultural land-take of 5%[78], impacting multiple fields of predominantly LCA Class 3.2.	Medium	Moderate	✓
MMS Farm ID12 – predicted agricultural land-take 2%, impacting multiple fields. Predominantly LCA Class 3.2.	Low	Minor	x
MMS Farm ID78 - predicted agricultural land-take of 2.5%, affecting multiple fields which are predominantly LCA Class 3.2.	Low	Minor	x
MMS Farm ID56 - predicted agricultural land-take of 7%, impacting multiple fields of predominantly LCA Class 3.1.	High	Moderate	✓
MMS Farm ID76 - predicted agricultural land-take of 4%, however a potentially significant land-loss (11ha) impacting multiple fields of predominantly LCA Class 3.1.	High	Moderate	✓
MMS Farm ID98 – predicted agricultural land-take of 7.5%, impacting multiple fields of LCA Class 3.1.	High	Moderate	✓
MMS Farm ID22 – predicted agricultural land-take 1.5% including impacting one field of predominantly LCA Class 3.2 with some LCA Class 2 also impacted.	Medium	Minor	x
MMS Farm ID77 - predicted agricultural land-take of 1.5%, however a potentially significant area of land-loss (24ha) impacting multiple fields of predominantly LCA Class 3.1.	Medium	Moderate	✓
MMS Farm ID55 – predicted equestrian land-take of 15.5% from multiple fields. However, as the equestrian use of the land is not related to the core operation of the business its potential loss is considered not to be significant. Land holding comprised of LCA Classes 2 and 3.1.	High	Minor	x
MMS Farm ID112– predicted land-take of 9.5% of the nursery, affecting multiple fields of predominantly LCA Class 3.1.	High	Major	✓
MMS Farm ID45 – predicted agricultural land-take of 2.5%. However, a potentially significant area loss of agricultural land (19ha), predominantly impacting	Medium	Moderate	✓

[78] Includes land-take from the Hardmuir to Hillhead section of 5.5ha

Potential Impact (taking account of sensitivity of receptor)	Sensitivity	Magnitude	Potentially Significant?
multiple fields of prime agricultural land (LCA Classes 2 and 3.1).			
MMS Farm ID94 – predicted agricultural land-take of 12%, impacting multiple fields of predominantly LCA Class 3.1.	High	Major	✓
MMS Farm ID72 -– predicted agricultural land-take of 0.5% impacting on one field (LCA Class 3.2).	Medium	Negligible	x
MMS Farm ID108 – predicted agricultural land-take of 5%, impacting the perimeter of more than one field. Land of LCA Class 3.1 is affected.	High	Moderate	✓
MMS Farm ID105 - predicted agricultural land-take of 2.5%, impacting the perimeter of one field which is of LCA Class 2.	High	Minor	x
MMS Farm ID65 -– predicted agricultural land-take of 11.5%, impacting multiple fields of LCA Classes 2 and 3.1.	High	Major	✓
MMS Farm ID64 – predicted agricultural land-take of 7%, impacting multiple fields of LCA Class 3.2.	High	Moderate	✓
MMS Farm ID85 – predicted agricultural land-take of 3.5% impacting multiple fields and some woodland. Predominantly LCA Class 3.2 with some Class 2 and Class 3.1 impacted in the north-west.	Medium	Minor	x
MMS Farm ID1 – predicted agricultural land-take of 5%, impacting multiple fields with potential severance, predominantly impacting LCA Class 3.2.	High	Moderate	✓
MMS Farm ID61 – predicted agricultural land-take of 11%, affecting multiple fields of varying land quality with predominantly prime agricultural land (LCA classes 2 and 3.1) impacted.	High	Major	✓
MMS Farm ID58 - predicted agricultural land-take of 2% impacting multiple fields of land of LCA Class 3.2.	Low	Minor	x
MMS Farm ID91 – predicted agricultural land-take of 10.5%, impacting multiple fields of predominantly LCA Class 3.2, with some Class 2 and 3.1 affected adjacent to the River Lossie.	High	Major	✓
MMS Farm ID69 - predicted agricultural land-take of 5%, impacting multiple fields of predominantly LCA Class 3.2.	High	Minor	x

Potential Impact (taking account of sensitivity of receptor)	Sensitivity	Magnitude	Potentially Significant?
MMS Farm ID35 – predicted agricultural land-take of 13.5%, impacting multiple fields of medium land quality (LCA Classes 3.2, 4.1 and 4.2)	High	Major	✓
MMS Farm ID90 – predicted agricultural land-take of 0.5% from one field comprising LCA Class 3.2.	High	Minor	x
MMS Farm ID33 – predicted agricultural land-take of 1% impacting multiple fields and a small area of woodland comprising LCA Class 3.2.	Medium	Minor	x
MMS Farm ID86 – predicted agricultural land-take of 1.5% including impacting more than one field of LCA Class 3.2.	High	Minor	x
27 holdings affected for route option			

Table 13.7: Predicted Impacts on Land Holdings – Hillhead to Lhanbryde (South Option)

Potential Impact (taking account of sensitivity of receptor)	Sensitivity	Magnitude	Potentially Significant?
MMS Farm ID87 - predicted agricultural land-take of 4.5[79]% impacting multiple fields of LCA Class 3.2.	Medium	Moderate	✓
MMS Farm ID12 - predicted agricultural land-take of 1%, impacting multiple fields which is predominantly LCA Class 3.2.	Low	Negligible	x
MMS Farm ID50 - predicted agricultural land-take of 6%, impacting multiple fields of predominantly LCA Class 3.2.	High	Moderate	✓
MMS Farm ID78 - predicted agricultural land-take of 0.5% (LCA Class 4.1).	Low	Negligible	x
MMS Farm ID77 predicted predominantly forestry land-take of 1% with some impacts to multiple fields of prime agricultural land (LCA 3.1) to the east of Alves Wood.	Medium	Minor	x
MMS Farm ID98 - predicted agricultural land-take of 1% including impacting more than one field (of LCA Class 3.1) on northern boundary of holding.	High	Minor	x
MMS Farm ID22 - predicted agricultural and-take of 3%, impacting multiple fields of LCA Class 3.1 and 4.2.	Medium	Minor	x

[79] Includes land-take from the Hardmuir to Hillhead section of 5.5ha

Potential Impact (taking account of sensitivity of receptor)	Sensitivity	Magnitude	Potentially Significant?
MMS Farm ID39 - predicted agricultural land-take of 7.5%, impacting multiple fields predominantly LCA Class 3.2 with some Class 3.1 in the north-west of the land holding. Potential adverse impact on a clay pigeon shoot and coarse fishing.	Medium	Major	✓
MMS Farm ID15 - predicted agricultural land-take of 21.5% including impacting more than one field of LCA Class 3.2.	High	Major	✓
MMS Farm ID45 - predicted agricultural land-take of 3.5%, impacting multiple fields and some forestry. Predominantly LCA Class 3.2 and 5.3, with some Class 3.1 present in north-west of land holding.	Medium	Moderate	✓
MMS Farm ID31 - predicted agricultural land-take of 1.5% including impacting more than one field of LCA Class 3.2.	Low	Minor	x
MMS Farm ID13 - predicted agricultural land-take of 6.5%, impacting multiple fields and LCA Classes 3.1, 3.2 and 6.2.	High	Moderate	✓
MMS Farm ID38 - predicted agricultural land-take of 4.5%, impacting one field of LCA Class 3.2.	High	Moderate	✓
MMS Farm ID107 - predicted agricultural land-take of 8%, with land-loss impacting multiple fields which are predominantly LCA Classes 2 and 3.1.	Medium	Moderate	✓
MMS Farm ID72 - predicted agricultural land-take of 3%, impacting multiple fields of medium land quality including LCA Classes 3.2 and 4.1.	Medium	Minor	x
MMS Farm ID110 - predicted forestry land-take of 1.5%, only impacting the northern edge of the wood.	High	Minor	x
MMS Farm ID16 - predicted agricultural land-take of 19.5%, impacting multiple fields of LCA Class 3.2.	High	Major	✓
MMS Farm ID17 - predicted agricultural land-take of 6%, impacting the perimeter of one field of LCA Class 3.2.	High	Moderate	✓
MMS Farm ID9 - predicted forestry land-take of 10%, resulting in fragmentation of the woodland.	High	Major	✓
MMS Farm ID58 - predicted agricultural land-take of 2.5%, impacting multiple fields of moderate land quality including LCA Classes 3.2 and 4.1.	Low	Minor	x
MMS Farm ID54 - predicted agricultural land-take of 0.5%, impacting the perimeter of one field of LCA Class 3.2.	High	Minor	x

Potential Impact (taking account of sensitivity of receptor)	Sensitivity	Magnitude	Potentially Significant?
MMS Farm ID103 - predicted agricultural land-take of 7.5%, impacting multiple fields and a small area of woodland of medium land quality including LCA Classes 3.2 and 4.1.	High	Moderate	✓
MMS Farm ID42 - predicted agricultural land-take of 2% including impacting more than one field comprising LCA Classes 3.2 and 4.1.	Medium	Minor	x
MMS Farm ID69 - predicted agricultural land-take of 8%, impacting multiple fields (of LCA Class 4.1) and a small area of woodland.	High	Moderate	✓
MMS Farm ID35 - predicted agricultural land-take of 21.5%, impacting multiple fields which are of LCA Classes 4.1 and 3.2.	High	Major	✓
MMS Farm ID90 – predicted agricultural land-take of 1.5% impacting one field of LCA Class 3.2.	High	Minor	x
MMS Farm ID33 – predicted agricultural land-take of 2%, impacting multiple fields which are of LCA Class 3.2.	Medium	Minor	x
MMS Farm ID86 – predicted agricultural land-take of 4%, impacting several fields of LCA Class 3.2.	High	Moderate	✓
28 holdings affected for route option			

Table 13.8: Predicted Impacts on Land Holdings – Lhanbryde to East of Fochabers (North Option)

Potential Impact (taking account of sensitivity of receptor)	Sensitivity	Magnitude	Potentially Significant?
MMS Farm ID86 - predicted agricultural land-take 10%, impacting multiple fields of LCA Class 3.2.	High	Major	✓
MMS Farm ID63 - predicted forestry land-take of 2%, causing some fragmentation of the forestry.	Medium	Minor	x
MMS Farm ID99 – predicted agricultural and forestry land-take of 13% impacting multiple fields of medium land quality including LCA Classes 5.2, 4.2 and 3.2.	High	Major	✓
MMS Farm ID59 - predicted agricultural land-take of 3%, impacting multiple fields of LCA Class 3.2.	Medium	Minor	x
MMS Farm ID33 - predicted agricultural land-take of 8%, impacting multiple fields of LCA Classes 3.2 and 4.1.	Medium	Moderate	✓

Potential Impact (taking account of sensitivity of receptor)	Sensitivity	Magnitude	Potentially Significant?
MMS Farm ID46 - predicted forestry land-take of 0.5%, causing division within the two forestry plantations impacted.	Low	Minor	x
MMS Farm ID67 - predicted agricultural land-take of 22%, impacting multiple fields of LCA Class 3.2 with potentially significant land-loss.	High	Major	✓
MMS Farm ID31 - predicted agricultural land-take of 1%, impacting the perimeter of more than one field predominantly of LCA Classes 3.2 and 4.2.	Low	Negligible	x
MMS Farm ID101 - predicted agricultural land-take of 3%, impacting the perimeter of more than one field of LCA Class 3.1.	Medium	Moderate	✓
MMS Farm ID49 - predicted agricultural land-take of 10%, impacting the perimeter of more than one field with approximately half of the land affected being LCA Class 3.1.	High	Major	✓
10 holdings affected for route option			

Table 13.9: Predicted Impacts on Land Holdings – Lhanbryde to East of Fochabers (South Option)

Potential Impact (taking account of sensitivity of receptor)	Sensitivity	Magnitude	Potentially Significant?
MMS Farm ID86 - predicted agricultural land-take 10%, impacting multiple fields of LCA Class 3.2.	High	Major	✓
MMS Farm ID63 - predicted forestry land-take of 2%, causing some fragmentation of the forestry.	Medium	Minor	x
MMS Farm ID99 – predicted agricultural and forestry land-take of 13% impacting multiple fields of medium land quality including LCA Classes 5.2, 4.2 and 3.2.	High	Major	✓
MMS Farm ID59 - predicted agricultural land-take of 3%, impacting multiple fields of LCA Class 3.2.	Medium	Minor	x
MMS Farm ID33 - predicted agricultural land-take of 14%, impacting multiple fields of moderate agricultural capability (LCA Classes 3.2 and 4.1).	Medium	Major	✓
MMS Farm ID46 - predicted forestry land-take of 0.5% resulting in division within the forestry plantation at Slorach's Wood.	Low	Minor	x

Potential Impact (taking account of sensitivity of receptor)	Sensitivity	Magnitude	Potentially Significant?
MMS Farm ID73 - predicted agricultural land-take of 2% including impacting more than one field of agricultural land of LCA Class 3.2.	High	Minor	x
MMS Farm ID31 - predicted agricultural land-take of 3%, impacting multiple fields comprising land within LCA Classes 2 and 3.2.	Low	Minor	x
MMS Farm ID67 - predicted agricultural land-take of 4%, including impacting more than one field of moderate land capability (LCA Classes 3.2 and 4.1). and causing division of the holding.	High	Moderate	✓
MMS Farm ID19 - predicted agricultural land-take of 5%, impacting one field of LCA Class 3.2.	High	Moderate	✓
10 holdings affected for route option			

13.5 Mitigation

13.5.1 The options have been developed, wherever possible, to:

- Avoid the severance of land within a holding. However, where severance does occur, the design has sought to ensure that suitable alternative vehicular access to minimise any land severance is provided; and
- Avoid the loss of any infrastructure, i.e. farm, forestry and equestrian buildings and yards, including livestock housing and handling facilities, feed and fodder storage, manure and slurry storage, crop and produce storage and the storage of equipment and machinery, stabling, all-weather arenas and associated buildings and facilities.

13.5.2 The following possible mitigation measures have been assumed in the assessment:

- AG1 - Where vehicular access to holdings is permanently impacted, reinstatement or an alternative and suitable access will be provided.
- AG2 - Alternative access, where provided, will be suitable for use by agricultural and forestry vehicles and equipment, given any height, width and weight restrictions.

13.5.3 Mitigation measures AG1 and AG2 are embedded in the design of the route options (i.e. pre-mitigation stage) and have been included in the assessment of all farm holdings as set out in Section 13.6. As a result, the significance of potential and residual effects (pre and post mitigation) are predicted to be the same.

13.6 Predicted Environmental Effects

13.6.1 This section presents information on the assessment of the key predicted significant effects of the options on agriculture, forestry and sporting interests. Any impacts determined to be not significant from Tables 13.4 to 13.9 have not been carried forward.

13.6.2 The predicted effects of the option on each affected land holding are presented in Tables 13.10 to 13.15 below. These tables capture the key findings of the assessment of effects on land holdings and present the overall agricultural land takes estimated for each option.

Hardmuir to Hillhead

Table 13.10: Predicted Effects on Land Holdings - North Option

Predicted Effects	Significance of Predicted Effects	Predicted Residual Effects (and Significance)
MMS Farm ID44 – predicted loss of 21.5ha (c. 15% of holding) of the agricultural land farmed by the business. The land affected is predominantly LCA Class 3.1 and is used for grazing and conservation of forage for the dairy herd. The option would affect multiple fields causing division of fields and fragmentation of the holding resulting from both the mainline and realigned side road connecting to the existing A96 which would also facilitate access to the northern section of the farm.	Major adverse	**Major adverse** residual effect as a result of a significant prime agricultural land-loss, division of fields and fragmentation of the holding requiring an alteration to access.
MMS Farm ID77 – predicted loss of 15.5ha (c.1% of the holding) of predominantly agricultural land farmed by the business. Multiple fields of prime agricultural land (LCA Classes 2 and 3.1) are affected including the area for the Forres West junction. Access to the northern section of the holding is affected with journeys within the farm requiring a diversion through the junction to access the fields which would be fragmented from the wider holding.	Moderate adverse	**Moderate adverse** residual effect as a result of significant loss of prime agricultural land and fragmentation of the holding.
MMS Farm ID29 - predicted loss of 27.5ha (c.5% of the holding) of the agricultural land farmed by the business. Affecting multiple fields (predominantly arable and of LCA Classes 2 and 3.2) causing the division of fields and fragmentation of the holding. Some areas of the holding between the option and the existing A96 may be unsuitable to farm resulting in further loss of land.	Moderate adverse	**Moderate adverse** residual effect as a result of a significant land-loss (including some prime agricultural land), division of fields and fragmentation of the holding.
MMS Farm ID5 - predicted loss of 4ha (c. 6.5% of the holding of the agricultural land farmed by the business). Affects one arable field which is identified as LCA Class 2 dissecting it in two causing fragmentation of the holding.	Moderate adverse	**Moderate adverse** residual effect as a result of a significant land-loss, division of a field and fragmentation of the holding.
MMS Farm ID21 - predicted loss of 7ha (c.10% of the holding) of prime agricultural land (LCA Class 2) used for nursery tree production. Affecting multiple fields causing the loss of one field and the sub-division of a further two fields, likely to render the remaining field areas unsuitable for use. A small area of land may be subject to increased risk of flooding, which is likely to be infrequent and of short duration.	Major adverse	**Major adverse** residual effect as a result of a significant loss of prime agricultural land from multiple fields as well as an overall fragmentation of the holding.

Predicted Effects	Significance of Predicted Effects	Predicted Residual Effects (and Significance)
MMS Farm ID2 – predicted loss of 7ha (c.10% of the holding) of the predominantly arable land farmed by the business. Affecting multiple fields of LCA Class 2 land causing the division of four fields and fragmentation of the holding. Access to the southern section of the farm would be affected with the diversion of Inverene Road.	Major adverse	**Major adverse** residual effect as a result of a significant loss of prime agricultural land, division of fields and fragmentation of the holding.
MMS Farm ID93 - predicted loss of 3.5ha (c. 34% of the holding) of the arable land farmed by the business which is LCA Class 2. Affecting multiple fields and resulting in the division of fields and fragmentation of the holding with an area of the holding severed to the north-east of the option.	Major adverse	**Major adverse** residual effect as a result of a significant loss of prime agricultural land and fragmentation of the holding.
MMS Farm ID24 - predicted loss of 12ha (c.6% of the holding) of the agricultural land farmed by the business. Affecting multiple fields, predominantly arable land of LCA Class 3.2, of which two fields are predicted to be sub-divided causing fragmentation of the holding. Access to the holding is predicted to be maintained via the local road network.	Moderate adverse	**Moderate adverse** residual effect as a result of a significant land-loss, division of fields and fragmentation of the holding.
MMS Farm ID18 - predicted loss of 13.5ha (c.7.5% of the holding) of the arable land farmed by the business. Affecting multiple fields which are predominantly LCA Class 2 causing field division and fragmentation of the holding. It is predicted that some areas of the farm between the option and the existing A96 may not remain viable to farm.	Moderate adverse	**Moderate adverse** residual effect as a result of a significant loss of prime agricultural land and fragmentation of the holding.
A total of nine holdings are predicted to be significantly affected by the option. **Permanent loss for route option of agricultural land 121 ha of which 92.5 ha (76.5%) is of high agricultural value.** **Permanent loss of 5.5ha of identified on the NFI.**		

Table 13.11: Predicted Effects on Land Holdings - South Option

Predicted Effects	Significance of Predicted Effects	Predicted Residual Effects (and Significance)
MMS Farm ID44 – predicted loss of 21.5ha (c.15% of the holding) of the agricultural land farmed by the business. The land affected is predominantly LCA Class 3.1 and is used for grazing and conservation of forage for the dairy herd. The option will affect multiple fields causing division of fields and fragmentation of the holding resulting from both the mainline and realigned side road connecting to the existing A96 which would also facilitate access to the northern section of the farm.	Major adverse	**Major adverse** residual effect as a result of a significant prime agricultural land-loss, division of fields and fragmentation of the holding requiring an alteration to access.
MMS Farm ID77 – predicted loss of 18.5ha (c.1% of the holding) of primarily agricultural land farmed by the business. Multiple fields of prime agricultural land (LCA Classes 2 and 3.1) would be affected including the area affected by the Forres West junction. Access to the northern section of the holding is affected with journeys within the farm requiring a diversion through the junction to access the fields which would be fragmented from the wider holding.	Moderate adverse	**Moderate adverse** residual effect as a result of significant loss of prime agricultural land and fragmentation of the holding.
MMS Farm ID79 - predicted loss of 9.5ha (c.10.5% of the holding) of the land farmed by the business which is predominantly LCA Class 3.1, with some land in forestry and equestrian use (including as an equestrian eventing centre). The option divides more than one field (access is retained to all fields via an underpass from the Riverview Caravan Park – which is the current access point) and an area of woodland. A relatively small area of land may also be subject to increased risk of flooding (infrequent and of short duration) and accommodate a flood compensation storage area, although it would remain available for its current use.	Major adverse	**Major adverse** residual effect as a result of a significant prime agricultural land-loss, division of fields and fragmentation of the holding (access is however retained to fragmented areas).
MMS Farm ID3 - predicted loss of 42.5ha (c.6.5% of the holding) of the commercial forestry land managed by the estate. Principally affects woodland at Limekilns and Fairyhills Wood (including the area immediately adjacent to the A940, the siting of the Forres South junction) and more than one arable field to the south of Forres causing division of the woodland and arable land. Access would be maintained within the land holding, however alterations to the local road network are predicted to lengthen the distance travelled to the north-western area of the holding.	Moderate adverse	**Moderate adverse** residual effect as a result of a significant loss of forest land, division of arable fields and commercial woodland areas leading to fragmentation of the holding.
MMS Farm ID89 - predicted loss of 15ha (c.10% of the holding) of the arable land farmed by the business. Affecting multiple fields (which are predominantly LCA Class 3.2) resulting in field division and fragmentation of the holding. Access to field areas severed to the south of the option would be primarily retained via the realigned local road network.	Moderate adverse	**Moderate adverse** residual effect as a result of a significant land-loss, division of fields and fragmentation of the holding.

Predicted Effects	Significance of Predicted Effects	Predicted Residual Effects (and Significance)
MMS Farm ID68 - predicted loss of 10.5ha (c.14.5% of the holding) of predominantly arable land farmed by the business. Affecting multiple fields of varying land quality (including some LCA Class 3.1 land to the east of the B9010) resulting in field division and fragmentation of the holding. Access is maintained via the B9010, however the realignment of the access to the B9010 and the farm access would result in some adverse impacts to access across the holding.	Major adverse	**Major adverse** residual effect as a result of a significant land-loss, fragmentation of the holding and alteration to accessing some areas of the farm.
MMS Farm ID41 – predicted loss of 6.5ha (c.8% of the holding) of the arable land farmed by the business. Affecting multiple arable fields of LCA Classes 3.2 and 4.2 causing division of the fields and fragmentation of the holding. Access across the option is provided via an overbridge. Farm of high sensitivity with a moderate adverse impact.	Moderate adverse	**Moderate adverse** residual effect as a result of a significant loss of the holding, division of fields and fragmentation of the holding.
MMS Farm ID18 - predicted loss of 23ha (c.13% of the holding) of predominantly LCA Class 2 agricultural land, with a significant impact to the area of LCA Class 2 land from the siting of the Forres East junction. Affecting a small area of woodland but predominantly arable land, directly impacting multiple fields causing fragmentation of the holding and the division of fields, access to the western section of the holding is predicted to be maintained via the grade separated junction.	Major adverse	**Major adverse** residual effect as a result of a significant loss of prime agricultural land, division of fields, fragmentation of the holding with some fields located between the existing A96 and the option.
A total of eight holdings are predicted to be significantly affected by the option. **Permanent loss for route option of 166.5 ha of agricultural land of which 58.5 ha (35.5%) is of high agricultural value.** **Permanent loss of 50 ha of forestry identified on the NFI.**		

Hillhead to Lhanbryde

Table 13.12: Predicted Effects on Land Holdings - North Option

Predicted Effects	Significance of Predicted Effects	Predicted Residual Effects (and Significance)
MMS Farm ID87 – predicted loss of 13.5ha (c.5% of the holding) of Class LCA 3.2 agricultural land to the south of the existing A96. Affecting multiple fields as a result of both the route option mainline and associated side road resulting in field division and some fragmentation of the holding.	Moderate adverse	**Moderate adverse** residual effect as a result of a significant land-loss, division of fields and fragmentation of the holding.
MMS Farm ID56 - predicted loss of 14ha (c.7% of the holding) of predominantly LCA Class 3.1 agricultural land to the south of Alves Wood and at the siting of the Elgin West junction at Carden Hill. Affecting multiple arable fields resulting in field division and fragmentation of the holding with access to the fields south of the junction predicted to be affected.	Moderate adverse	**Moderate adverse** residual effect resulting from a significant loss of prime agricultural land and the fragmentation of the holding.
MMS Farm ID76 – predicted loss of 11ha (c.4% of the holding) of primarily LCA Class 3.1 agricultural land equating to c.4% of land farmed by the business. Multiple fields are predicted to be affected. Access to the northern section of the holding would be retained via the local road network however several fields are fragmented from the main part of the holding (south of the option).	Moderate adverse	**Moderate adverse** residual effect as a result of significant loss of prime agricultural land and fragmentation of the holding.
MMS Farm ID98 - predicted loss of 7ha (c.7.5% of the holding) of prime agricultural land (Class 3.1) affecting more than one arable field resulting in field division and some fragmentation of the holding.	Moderate adverse	**Moderate adverse** residual effect as a result of a significant loss of prime agricultural land and one field.
MMS Farm ID77 – predicted loss of 24ha (c.1.5% of the holding) of primarily agricultural land farmed by the business. Multiple fields of prime agricultural land (LCA Classes 2 and 3.1) are affected including the area affected by the Elgin West junction. Access to the northern section of the holding would be affected with journeys requiring a diversion through the junction to access the fields which have been fragmented from the wider holding.	Moderate adverse	**Moderate adverse** residual effect as a result of significant loss of prime agricultural land and fragmentation of the holding.
MMS Farm ID112 – predicted loss of 8ha (c.9.5% of the holding) of prime agricultural (LCA Class 3.1) nursery land, with a predicted impact to the productivity of the nursery and therefore its supply of trees to the National Forestry Estate. Affecting the southern edge of multiple fields with land to the south of the option unlikely to be retained for the production of trees.	Major adverse	**Major adverse** residual effect as a result of a significant land-loss, division of fields, fragmentation of the holding.

Predicted Effects	Significance of Predicted Effects	Predicted Residual Effects (and Significance)
MMS Farm ID45 – predicted loss of 19ha (c.2.5% of the holding) of primarily agricultural land farmed by the business. Multiple fields of prime agricultural land (LCA Classes 2 and 3.1) would be affected and access to the south-west section of the holding affected with journeys requiring a diversion via the existing A96 fragmented from the wider holding.	Moderate adverse	**Moderate adverse** residual effect as a result of significant loss of prime agricultural land and fragmentation of the holding.
MMS Farm ID94 - predicted loss of 8ha (c.12% of the holding) of predominantly prime agricultural land (LCA Class 3.1) farmed by the business. The route option would affect multiple arable fields, with the division of two fields and fragmentation of the holding.	Major adverse	**Major adverse** residual effect as a result of a loss of prime agricultural land from multiple fields.
MMS Farm ID108 – predicted loss of 2ha (c.5% of the holding) of prime agricultural land (LCA Class 3.1) farmed by the business with a further area of land to the north of the option predicted to be severed from the main part of the holding.	Moderate adverse	**Moderate adverse** residual effect as a result of the fragmentation of the holding.
MMS Farm ID65 - predicted loss of 2.5ha (c.11.5% of the holding) of prime agricultural land (LCA Classes 2 and 3.1) farmed by the business. Affecting multiple arable fields resulting in some field division and significant fragmentation of the holding. Farm of high sensitivity with a major adverse effect.	Major adverse	**Major adverse** residual effect as a result of a significant land-loss of the holding.
MMS Farm ID64 – predicted loss of 5ha (c.7% of the holding) of agricultural land farmed by the business, affecting multiple fields of LCA Class 3.2 land with the prime agricultural land within the boundaries of the holding being unaffected. Access to the field areas north and south of the option are predicted to be retained via the local road network.	Moderate adverse	**Moderate adverse** residual effect as a result of a significant land-loss, division of fields and fragmentation of the holding.
MMS Farm ID1 - predicted loss of 5ha (c.5% of the holding) of agricultural land farmed by the business. Affecting multiple fields (which are predominantly LCA Class 3.2) resulting in the fragmentation of the overall holding, however the area of prime agricultural land within the affected fields would be avoided through routing close to the southern boundary of the holding. Access to the wider holding is largely unaffected.	Moderate adverse	**Moderate adverse** residual effect as a result of a significant loss of agricultural land.
MMS Farm ID61 - predicted loss of 13ha (c.11% of the holding) of predominantly prime agricultural land farmed by the business. Affecting multiple fields of LCA Class 2 and 3.1 land and a small area of woodland in the west of the holding. Resulting in the division of fields and fragmentation of the holding, however access would be maintained via an overbridge to the west of the farm buildings and under the River Lossie crossing to the south.	Major adverse	**Major adverse** residual effect as a result of a significant land-loss, division of fields, fragmentation of the holding.

Predicted Effects	Significance of Predicted Effects	Predicted Residual Effects (and Significance)
MMS Farm ID91 - predicted loss of 13ha (c.10.5% of the holding) of predominantly agricultural land farmed by the business. Affecting multiple fields and a small area of woodland to the north of the existing A96. Option would affect some prime agricultural land (LCA Classes 2 and 3.1 adjacent to the River Lossie), however the predominant land classification affected is LCA Class 3.2. The option would result in the division of fields and fragmentation of the holding with access to some areas of the farm requiring travel via the realigned road network.	Major adverse	**Major adverse** residual effect as a result of a significant land-loss (including some prime agricultural land) and the fragmentation of the holding.
MMS Farm ID35 - predicted loss of 9.5ha (c.13.5% of the holding) of agricultural land farmed by the business. Affecting predominantly arable land of varying land quality (primarily Classes 3.2, 4.1 and 4.2) with some woodland loss in the western part of the holding. Affects multiple fields causing field division and fragmentation of the holding with access being realigned alongside the Aberdeen - Inverness Railway Line.	Major adverse	**Major adverse** residual effect as a result of a significant land-loss of medium quality land, division of fields and an associated change in access.
A total of 15 holdings are predicted to be significantly affected by the option. **Permanent loss for route option of 227.5 ha of agricultural land of which 129ha (57%) is of high agricultural value.** **Permanent loss of 21.5 ha of forestry identified on the NFI.**		

Table 13.13: Predicted Effects on Land Holdings - South Option

Predicted Effects	Significance of Predicted Effects	Predicted Residual Effects (and Significance)
MMS Farm ID87 – predicted loss of 12ha (c.4.5% of the holding) of Class LCA 3.2 agricultural land to the south of the existing A96. Affecting multiple fields as a result of both the route option mainline and associated side road resulting in field division and some fragmentation of the holding.	Moderate adverse	**Moderate adverse** residual effect as a result of a significant land-loss, division of fields and fragmentation of the holding.
MMS Farm ID50 - predicted loss of 7ha (c.6% of the holding) of LCA Class 3.2 agricultural land farmed by the business. Affecting multiple arable fields resulting in field division and fragmentation of the holding, however it is predicted that access to all areas of the farm would be maintained via the existing A96 and the realigned side road immediately west of Alves Wood.	Moderate adverse	**Moderate adverse** residual effects to multiple fields north and a fragmentation of the holding.
MMS Farm ID39 – predicted loss of 16ha (c.7.5% of the holding) of agricultural land and sporting interests operated by the business. Affecting multiple fields of varying land quality with LCA Class 3.2 predominantly affected, however some Class 3.1 in the north-west of the land holding is predicted to be affected. Loss of a clay pigeon shoot and coarse fishing area which are located under the mainline of the option.	Major adverse	**Major adverse** residual effect as a result of a significant land-loss including some prime agricultural land and the loss of the sporting activities.
MMS Farm ID15 - predicted loss of 2.5ha (c.21.5% of the holding) of LCA Class 3.2 agricultural land farmed by the business, affecting multiple fields. Access to the northern section of the holding is predicted to be severed with alternative access being required via the local road network from the east. A small area of land may be subject to increased risk of flooding, which is likely to be infrequent and of short duration.	Major adverse	**Major adverse** residual effect as a result of a significant land-loss from a small holding.
MMS Farm ID45 – predicted loss of 24.5ha (c.3.5% of the holding) of LCA Classes 3.1, 3.2 and 5.3 affecting multiple fields resulting in field division and fragmentation of the holding. Access to fragmented areas of the holding is retained through the local road network with some movements required through the Elgin West Junction.	Moderate adverse	**Moderate adverse** residual effect effects to multiple fields and a significant loss of land (including some prime agricultural land).
MMS Farm ID13 - predicted loss of 5.5ha (c.6.5% of the holding) of agricultural land predominantly used for grazing. Affecting multiple fields of varying land quality (LCA Class 3.1, 3.2 and 6.2) resulting in the division of fields and fragmentation of the holding although access is predicted to be maintained under the River Lossie crossing to retain access to the area of the farm within the meander of the river.	Moderate adverse	**Moderate adverse** residual effect effects to multiple fields and a significant loss of land.

Predicted Effects	Significance of Predicted Effects	Predicted Residual Effects (and Significance)
MMS Farm ID38 – predicted loss of 2.5ha (c.4.5%) of LCA Class 3.2 agricultural land farmed by the business in the south-west of one field.	Moderate adverse	**Moderate adverse** residual effect as a result of a minor loss to this high value holding.
MMS Farm ID107 - predicted loss of 20ha (c.8% of the holding) of agricultural land (predominantly prime agricultural land of LCA Classes 2 and 3.1) farmed by the business. Affects multiple fields resulting in field division and fragmentation of the holding, however access to these areas is retained through the local road network and specific crossings of the option in the south-east of the farm and at the Black Burn. A small area of land may be subject to increased risk of flooding, which is likely to be infrequent and of short duration.	Moderate adverse	**Moderate adverse** residual effect as a result of a significant loss of prime agricultural land.
MMS Farm ID16 - predicted loss of 8ha (c.19.5% of the holding) of LCA Class 3.2 agricultural land farmed by the business. Access to the northern section of the farm would be facilitated via the Elgin South junction.	Major adverse	**Major adverse** residual effect as a result of a significant land-loss primarily related to the siting of the Elgin South junction.
MMS Farm ID17 – predicted loss of 1.5ha (c.6% of the holding) of agricultural land farmed by the business affecting one field of LCA Class 3.2.	Moderate adverse	**Moderate adverse** residual effect as a result of a loss of land from one field.
MMS Farm ID9 - predicted loss of 4ha (c.10% of the holding) of woodland resulting in separation of the southern section of the wood from the northern section, although access via the local road network is predicted to be maintained.	Major adverse	**Major adverse** residual effect as a result of a significant land-loss.
MMS Farm ID103 – predicted loss of 7.5ha (c.7.5% of the holding) of some LCA Class 4.1 agricultural land but comprising mostly of farm woodland in the south-east of the holding. Access to the severed areas would be maintained through the retention of the local road network.	Moderate adverse	**Moderate adverse** residual effect as a result of a significant loss of woodland within the farm holding.
MMS Farm ID69 - predicted loss of 5ha (c.8% of the holding) of agricultural land farmed by the business. Resulting in more than one field being affected causing a fragmentation of the holding, however access to the fragmented area would be retained via the B9013 to the east of the holding.	Moderate adverse	**Moderate adverse** residual effect as a result of a significant land-loss and effects to multiple fields within the holding.

Predicted Effects	Significance of Predicted Effects	Predicted Residual Effects (and Significance)
MMS Farm ID35 - predicted loss of 15ha (c.21.5% of the holding) of agricultural land farmed by the business. Affects a number of fields used for outdoor reared pig production, resulting in fragmentation of the holding and the potential severance of land resulting from the location of the Elgin East junction and its associated slip roads.	Major adverse	**Major adverse** residual effect as a result of the siting of the Elgin East junction and associated slip roads.
MMS Farm ID86 – predicted loss of 1.5ha (c.4% of the holding) of LCA Class 3.2 agricultural land from more than one field farmed by the business. It is predicted that the area between the option and the existing A96 would also be lost to the Scheme.	Moderate adverse	**Moderate adverse** residual effect as a result of a fragmentation of the holding.
A total of 15 holdings are predicted to be significantly affected by the option. **Permanent loss for route option of 193.5 ha of agricultural land of which 41 ha (21.5%) is of high agricultural value.** **Permanent loss of 38.5 ha of forestry identified on the NFI.**		

Lhanbryde to East of Fochabers

Table 13.14: Predicted Effects on Land Holdings - North Option

Predicted Effects	Significance of Predicted Effects	Predicted Residual Effects (and Significance)
MMS Farm ID86 - predicted loss of 3.5ha (c.10% of the holding) of LCA Class 3,2 agricultural land farmed by the business. Affecting multiple fields in the north of the holding, resulting in division of the fields. It is also predicted that the area between the option and the existing A96 would be lost to the Scheme.	Major adverse	**Major adverse** effect as a result of the division of multiple fields within the holding.
MMS Farm ID33 - predicted loss of 15.5ha (c.8% of the holding) of medium value agricultural land (Classes 3.2 and 4.2) farmed by the business. Affecting more than one arable field and a small area of woodland. Predicted to divide the fields and fragment the holding, however access would be retained via an overbridge to access the northern portion of the farm.	Moderate adverse	**Moderate adverse** residual effect as a result a division of fields and fragmentation of the holding.
MMS Farm ID99 - predicted loss of 10ha (c.13% of the holding) of agricultural land (LCA Classes 3.2, 4.2 and 5.2) from multiple fields and woodland farmed by the business. Affects arable and woodland equally, resulting in division of the woodland and arable land and fragmentation of the holding. Access to the southern section of the holding would be maintained via an overbridge which also provides access to the neighbouring farm unit.	Major adverse	**Major adverse** effect as a result of a significant woodland and agricultural land-loss.
MMS Farm ID67 - predicted loss of 16.5ha (c.22% of the holding) of agricultural land farmed by the business, affecting multiple fields of LCA Class 3.2. The Mosstodloch junction is located within the southern portion of this section of the holding affecting multiple fields resulting in division of the fields with some further areas predicted to be unusable where they are located between the junction and its associated slip roads.	Major adverse	**Major adverse** residual effect as a result of a significant land-loss, division of fields and fragmentation of the holding.
MMS Farm ID101 - predicted loss of 3.5ha (c.3% of the holding) of prime agricultural land (LCA Class 3.1) from more than one field farmed by the business. Access to the farm would be retained via the overbridge (which requires replacing) which currently exists on the A96.	Moderate adverse	**Moderate adverse** residual effect as a result of a loss of prime agricultural land within the holding.
MMS Farm ID49 - predicted loss of 5ha (c.10% of the holding) of agricultural land (with approximately half being prime agricultural land of LCA Class 3.1) from more than one field farmed by the business. Access to the farm would be retained via an extension of the underpass which currently exists on the A96.	Major adverse	**Major adverse** residual effect as a result of a significant land-loss of the holding.

Predicted Effects	Significance of Predicted Effects	Predicted Residual Effects (and Significance)
A total of six holdings are predicted to be significantly affected by the option. **Permanent loss for route option of 108ha of agricultural land of which 3.5ha (3.5%) is of high agricultural value.** **Permanent loss of 54 ha of forestry identified on the NFI.**		

Table 13.15: Predicted Effects on Land Holdings - South Option

Predicted Effects	Significance of Predicted Effects	Predicted Residual Effects (and Significance)
MMS Farm ID86 - predicted loss of 2.5ha (c.8% of the holding) of LCA Class 3.2 agricultural land farmed by the business, affecting multiple fields. It is also predicted that the area between the option and the existing A96 would be lost to the Scheme.	Moderate adverse	**Moderate adverse** residual effect as a result of the division of multiple fields.
MMS Farm ID33 - predicted loss of 25.5ha (c.14% of the holding) of agricultural land (LCA Class 3.2 and 4.1) farmed by the business, affecting multiple fields. Access to the northern section of the farm would be retained through the Mosstodloch junction.	Major adverse	**Major adverse** residual effect as a result of a significant land-loss.
MMS Farm ID99 - predicted loss of 10ha (c.13% of the holding) of agricultural land (LCA Classes 3.2, 4.2 and 5.2) from multiple fields and woodland farmed by the business. Affecting arable and woodland equally, resulting in division of the woodland and arable land and fragmentation of the holding. Access to the southern section of the holding would be maintained via an overbridge which also provides access to the neighbouring farm unit.	Major adverse	**Major adverse** residual effect as a result of a significant woodland and agricultural land-loss and the fragmentation of the holding.
MMS Farm ID67 – predicted loss of 3ha (c.4% of the holding) of agricultural land farmed by the business, affecting more than one field but resulting in division of the holding, however access would be retained via the realignment of the local road network (U14E).	Major adverse	**Major adverse** residual effect as a result of the fragmentation of the holding.
MMS Farm ID19 - predicted loss of 2ha (c.5% of the holding) of agricultural land farmed by the business, affecting one field which is LCA Class 3.2. It is also predicted that an area of land between the option and Leitch's Wood to the south would be permanently severed from the farm unit.	Moderate adverse	**Moderate adverse** residual effect as a result of the fragmentation of the holding.
A total of five holdings are predicted to be significantly affected by the option. **Permanent loss for route option of 108.5ha of agricultural land of which 6.5ha (6.5%) is of high agricultural value.** **Permanent loss of 49.5ha of forestry identified on the NFI.**		

Cumulative Effects

13.6.3 The assessment of cumulative effects has taken account of the interaction of the options with any potential land-take required for long-term developments, based on those identified in the draft Moray Local Development Plan 2020. The assessment has focused on the loss of prime agricultural land as a key environmental and land use resource and has identified whether a cumulative effect is predicted to occur.

13.6.4 The assessment has not considered impacts to individual land holdings because the development sites identified are not currently part of a statutory Local Development Plan (see Chapter 9, Policies and Plans) and these sites and their locations have been assumed to be developed in agreement with owners and operators of the relevant land holdings taking account of effects on their enterprise.

13.6.5 The loss of prime agricultural land for the Hardmuir to Hillhead North Option combined with the anticipated future development sites to the north of Forres amounts to approximately 15ha. This is considered to be a potentially significant cumulative loss of prime agricultural land (at the local level rather than on the overall regional agricultural resource).

13.7 Summary of Effects

13.7.1 This section sets out a summary of the key findings of the options assessment based on the predicted significant residual effects on agriculture. The summaries are presented in Tables 13.16 to 13.18 below.

Table 13.16: Summary of Predicted Effects on Agriculture: Hardmuir to Hillhead

Predicted Residual Effects for the North Option	Predicted Residual Effects for the South Option
The total number of land holdings with a predicted significant adverse effect is nine with residual effects primarily related to a loss of prime agricultural land and the fragmentation of holdings. • Four **Major adverse** (MMS Farm IDs 2, 21, 44 and 93) • Five **Moderate adverse** (MMS Farm IDs 5, 18, 24, 29 and 77)	The total number of land holdings with a predicted significant adverse effect is eight with residual effects primarily related to the fragmentation of holdings and loss of commercial woodland: • Four **Major adverse** (MMS Farm IDs 18, 44, 68 and 79) • Four **Moderate adverse** (MMS Farm IDs 3, 41, 77 and 89)
The total agricultural land-take (including forestry) for the option is 121ha of which: • 92.5ha (76.5%) is prime agricultural land; • 23ha (19%) is lower quality agricultural land; and • 5.5ha (4.5%) is commercial forestry.	The total agricultural land-take (including forestry) for the option is 166.5ha of which: • 58.5ha (35%) is prime agricultural land; • 58ha (35%) is lower quality agricultural land; and • 50ha (30%) is commercial forestry.

13.7.2 The North Option affects a total of 13 land holdings between Hardmuir and Hillhead, of which significant effects are predicted to nine holdings (four major adverse effects are predicted). The North Option predominantly routes through an area of prime agricultural land with approximately 77% of the option directly affecting prime agricultural land.

13.7.3 The South Option also affects a total of 13 land holdings, with eight holdings predicted to be significantly affected (four major adverse effects predicted). The South Option routes through a mixture of agricultural land classifications with approximately 36% of the option affecting prime agricultural land. The South Option also results in a loss of a large area commercial forestry (c.50ha) with the main loss being to the south of Forres.

13.7.4 The South Option results in significantly less prime agricultural land being affected (34ha less than the North Option) however, it is predicted to have a similar overall agricultural land-take within the farm holdings identified. The options result in a similar number of significant impacts to individual farm holdings (nine on the North Option and eight on the South Option), with both options predicted to result in Major adverse effects to four land holdings.

13.7.5 Overall the South Option is considered to result in slightly less effect on agriculture, forestry and sporting interests.

Table 13.17: Summary of Predicted Effects on Agriculture: Hillhead to Lhanbryde

Predicted Residual Effects for the North Option	Predicted Residual Effects for the South Option
The total number of land holdings with a significant adverse effect is 15 with residual effects primarily related to a loss of prime agricultural land including that within the Laich o'Moray and the fragmentation of holdings: • Six **Major adverse** (MMS Farm IDs 35, 61, 65, 91, 94 and 112) • Nine **Moderate adverse** (MMS Farm IDs 1, 45, 56, 64, 76, 77, 87, 98 and 108) The total agricultural land-take (including forestry) for the option is 227.5ha of which • 129ha (57%) is prime agricultural land; • 77ha (34%) is lower quality agricultural land; and • 21.5ha (9%) is commercial forestry.	The total number of land holdings with a significant adverse effect is 15 with residual effects primarily related to a loss of agricultural land (some of it prime land), the fragmentation of holdings and a loss of some sporting activities: • Five **Major adverse** (MMS Farm IDs 9, 15, 16, 35 and 39) • Ten **Moderate adverse** (MMS Farm IDs 13, 17, 38, 45, 50, 69, 86, 87, 103 and 107) The total agricultural land-take (including forestry) for the option is 193.5ha of which • 41ha (21%) is prime agricultural land; • 114ha (59%) is lower quality agricultural land; and • 38.5ha (20%) is commercial forestry.

13.7.6 The North Option affects a total of 27 land holdings between Hillhead and Lhanbryde, of which significant effects are predicted to 15 holdings (six major adverse effects are predicted). The North Option routes through an area of prime agricultural land with approximately 129ha of the option directly affecting prime agricultural land.

13.7.7 The South Option affects a total of 28 land holdings, with 15 holdings predicted to be significantly affected (with five major adverse effects predicted). The South Option affects 41ha of prime agricultural land.

13.7.8 The South Option results in significantly less prime agricultural land being affected (88ha less than the North Option) and also results in less overall agricultural land-take (34ha less than the North Option) within the farm holdings identified. The options result in a similar number of significant impacts to individual farm holdings (15 on the North Option and 15 on the South Option), however, the South Option results in fewer land holdings with Major adverse effects.

13.7.9 Overall the South Option is predicted to have less effect on agriculture, forestry and sporting interests.

Table 13.18: Summary of Predicted Effects on Agriculture: Lhanbryde to East of Fochabers

Predicted Residual Effects for the North Option	Predicted Residual Effects for the South Option
The total number of land holdings with a significant adverse effect is six with residual effects primarily related to the fragmentation of holdings and a loss of commercial woodland: • Four **Major adverse** (MMS Farm IDs 49, 67, 86 and 99) • Two **Moderate adverse** (MMS Farm IDs 33 and 101)	The total number of land holdings with a significant adverse effect is five with residual effects primarily related to the fragmentation of holdings and a loss of commercial woodland: • Three **Major adverse** (MMS Farm IDs 33, 67 and 99) • Two **Moderate adverse** (MMS Farm IDs 19 and 86)
The total agricultural land-take (including forestry) for the option is 108ha of which • 3.5ha (3%) is of prime agricultural land; • 50.5ha (47%) is of lower quality agricultural land; and • 54ha (50%) is commercial forestry.	The total agricultural land-take (including forestry) for the option is 108.5ha of which • 6.5ha (6%) is prime agricultural land; • 51.5ha (48%) is of lower quality agricultural land; and • 49.5ha (46%) is commercial forestry.

13.7.10 The North Option affects a total of 10 land holdings, of which significant effects are predicted to six holdings (four major adverse effects are predicted). The North Option affects very little prime agricultural land with only approximately 3% of the option directly affecting prime agricultural land. Land-take from forestry areas amounts to approximately 54ha with the loss primarily being from three land holdings.

13.7.11 The South Option also affects a total of 10 land holdings, with five holdings predicted to be significantly affected (three major adverse effects are predicted). The South Option also affects a small area of prime agricultural land with only approximately 6% of the option directly affecting prime agricultural land. Land-take from forestry areas amounts to approximately 49.5ha with the loss primarily being from three land holdings.

13.7.12 The options result in a similar overall loss of prime agricultural land (3.5ha on the North Option and 6.5ha on the South Option) and a similar overall land loss within the farm holdings identified (108ha on the North Option and 108.5ha on the South Option). The options result in a similar number of significant impacts to individual farm holdings (six on the North Option and five on the South Option), with the South Option resulting in one less Major adverse effect.

13.7.13 Overall no material difference has been identified in predicted effects of each option.

13.8 Scope of the Stage 3 Assessment

13.8.1 At DMRB Stage 3, detailed site (farm) visits and further consultation with affected landowners will be undertaken to confirm the baseline and to assess the impacts of the Preferred Option on the affected land holdings (including cropping, stocking and access) and their future viability.

13.8.2 The key issues to be addressed at DMRB Stage 3 include:

- Aassessment of the effects on agriculture of additional land-take required for construction of the route;
- Assessment of the effects of additional land-take required for essential mitigation including sustainable drainage systems (SuDS) ponds and landscape planting;
- Assessment of potential impacts on access caused by fragmentation of holdings and the use of alternative access, where provided, leading to increased journey length; and
- Assessment of potential impacts on future business viability of affected land holdings.

13.8.3 The site visits will also help inform where additional measures could be undertaken to mitigate the adverse impact of the Scheme, for example realignment of the route, alternative access and location of accommodation works. These measures will be designed into the Scheme where possible and the effects of the Preferred Option assessed taking these into account.

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14. Materials

14.1 Introduction

14.1.1. This chapter presents the assessment of the predicted effects from the use and consumption of material resources and the generation of waste for the route options. Material resources include primary raw materials such as aggregates, recycled and site won materials and manufactured construction products. Waste and surplus materials are those arising from the construction process which cannot be re-used on site.

14.1.2. The assessment of materials also captures the wider environmental effects associated with the use of materials and the generation of waste and their associated embodied energy. These effects are generally out with the scope of other chapters in the environmental assessment. The materials assessment addresses, through consideration of relative quantities, the comparative effects on sustainability and environmental resources of the options.

14.1.3. The assessment of materials draws on a set of key high-level estimates of construction materials and waste quantities for the options (see Volume 1, Chapters 5 to 7, Engineering Assessments). These quantities include the length of new roads, areas of deck for new structures such as bridges and estimated quantities of earthworks. The environmental effects of quarrying, handling and transportation of materials or waste (e.g. noise, dust and nuisance) have not been directly considered at this stage since there is not sufficient information on construction methods, materials sources and haulage routes and distances to predict receptor specific effects. The materials assumptions information for each option (see Section 14.3) includes an estimate of cut and fill quantities for earthworks, sources of acceptable material on site and the required location of fill materials.

14.1.4. The relative carbon intensity of the key materials estimates has been taken into consideration through professional judgement in this options assessment, for example to inform the comparison of impacts from the anticipated use of manufactured products with those from excavated and site won materials. A quantification of embodied carbon associated with the energy used to extract, produce, process and transport materials has not been undertaken during DMRB Stage 2. Estimates of embodied carbon associated with the Preferred Option will be considered during DMRB Stage 3.

14.2 Approach to Assessment

Introduction

14.2.1. The assessment of materials has been undertaken drawing on current guidance in DMRB (Volume 11, Section 2, Part 5, HA205/08 Assessment and Management of Environmental Effects), Interim Advice Note (IAN) 153/11, Guidance on the Environmental Assessment of Material Resources (referred to as IAN 153/11) and taking account where relevant of the draft DMRB HD212/11 Materials[80] . An assessment broadly following the simple level

[80] For example where the draft Standard augments information and assessment approaches set out in IAN 153/11

assessment set out in IAN 153/11 has been carried out for this options assessment with a table-based format used for reporting of predicted effects. This has been tailored to the level of design undertaken for the options and taking account of the extent and accuracy of information on predicted materials and waste quantities for each option. Professional judgement has been used in the prediction and evaluation of environmental effects of the different types of materials and waste arisings, drawing on relevant technical guidance as appropriate.

Relevant Legislation and Policy

14.2.2. The 'Zero Waste Plan 2010'[81] sets out the Scottish Government's vision for a zero waste society. The Plan aims to minimise the generation of waste and view it as a valuable resource rather than for disposal to landfill. It includes:

- Development of a Waste Prevention Programme for all wastes, ensuring the prevention and reuse of waste is central to all Scottish Government actions and policies; and
- Setting new targets that will apply to all waste by 2025: 70% target recycled and maximum 5% sent to landfill.

14.2.3. As part of the Zero Waste agenda, a Waste Prevention Programme to reduce waste and create a more productive and circular economy was published in 2013 (Safeguarding Scotland's Resources: Blueprint for a More Resource Efficient and Circular Economy) [82]. This aims to reduce all waste in Scotland by 7% by 2017 and 15% by 2025.

14.2.4. In 2013, the Scottish Government issued its second report on proposals and policies for meeting its climate change targets for the period 2013-2017. This reiterated the requirement for waste prevention programme targets and stated a target of no waste to landfill by 2050.

14.2.5. Other key legislation relevant to material use and the generation of waste include the European Union revised Waste Framework Directive (2008/98/EC) and the Waste (Scotland) Regulations 2012. These enshrine key principles including the waste hierarchy which seek to maximise the reduction and re-use of materials, promote recycling and minimise final waste disposal.

14.2.6. A range of other UK and Scottish policies and strategies address the need for more sustainable resource management including Scottish Planning Policy[83] (SPP) and the UK Strategy for Sustainable Construction[84]. A detailed policy review is not provided here as the policy and regulatory context for waste management and materials is extensive and does not specifically inform the option-based assessment presented in this chapter. Further consideration of the effects of the options on policy including those in the Moray Local Development Plan is presented in Chapter 9 (Policies and Plans).

[81] Scotland's Zero Waste Plan 2010, available online at https://www.gov.scot/Publications/2010/06/08092645/0
[82] Safeguarding Scotland's Resources: Blueprint For A More Resource Efficient and Circular Economy available online at https://www.gov.scot/Resource/0043/00435308.pdf
[83] The Scottish Government (2014) Scottish Planning Policy, available at https://beta.gov.scot/publications/scottish-planning-policy/
[84] HM Government (2008) Strategy for Sustainable Construction, June 2008, available at http://webarchive.nationalarchives.gov.uk/+/http:/www.bis.gov.uk/files/file46535.pdf

Sources of Information

14.2.7. Information on quantities was obtained from the option designs which are described in more detail in Volume 1, Chapters 5 to 7 (Engineering Assessments).

14.2.8. An estimate of the area of tree clearance required for each route option has been based on areas identified on the National Forest Inventory (NFI). Woodland loss is also considered as part of other assessments for agriculture and ecology (see Chapter 13, Agriculture, Forestry and Sporting and 18, Nature Conservation, respectively) and key areas of woodland are shown on Figures 8.1, 8.2 and 8.3 (Volume 5).

14.2.9. The potential for encountering and handling contaminated soils for each route option is derived from the assessment in Chapter 19 (Geology, Soils, Contaminated Land and Groundwater).

Consultation

14.2.10. No specific consultation for materials has taken place at this stage. Consultation was carried out with Highland Council, Moray Council, the Scottish Environment Protection Agency (SEPA) and the Ministry of Defence on potential areas of land contamination. This is detailed in Chapter 19 (Geology, Soils, Contaminated Land and Groundwater).

Assessment Methodology

14.2.11. The magnitude of predicted impacts on materials and waste for each of the options has been considered in combination with the sensitivity of receptors to determine the potential for significant effects. The consideration of sensitivity is undertaken at a general level at the options assessment stage and has been informed by the guide descriptors set out in Table 14.1 below.

Table 14.1: Sensitivity of Receptors

Value (Sensitivity)	Typical Descriptors
High	Materials: International resource import or scarce resource on a national scale
	Waste: There is no or very limited capacity available at local or regional waste management facilities
Medium	Materials: Readily available resource on a national scale
	Waste: Capacity available at regional waste management facilities and limited capacity available locally
Low	Materials: Readily available resource on a local and national scale
	Waste: Capacity available at local and regional waste management facilities

14.2.12. The assessment of the magnitude of impacts takes account of the materials quantities and estimated waste arisings during site preparation and construction for each option set out in the 'Assumptions and Limitations' sub-section of this chapter. These include:

- Total length of each route, including any side roads;
- Estimate of bulk earthworks (total cut and total fill volumes) and calculations of material surplus/deficit volumes;
- Number of major structures (river crossings, under and over bridges) and estimated deck areas for these structures;
- Potential for encountering and handling contaminated soils; and
- An estimate of tree clearance area required within the footprint of the options.

14.2.13. No demolition of existing structures is anticipated for any option that would result in the generation of significant volumes of demolition waste.

14.2.14. The assessment of waste arisings takes account of information on potential for encountering and handling contaminated soils. This draws from the assessment of the effects of options on contaminated land presented in Chapter 19 (Geology, Soils, Contaminated Land and Groundwater). Woodland clearance has the potential to generate some wastes (albeit most timber is assumed to be re-used) and require transportation from the felled areas and subsequent processing.

14.2.15. The prediction of impact magnitude draws on this information and has been informed by the criteria in Table 14.2 below.

Table 14.2: Magnitude of Impacts

Magnitude of impact	Typical Criteria Descriptors
Major	Materials: Majority of materials used are primary and imported. No or limited potential for use of recycled or site won material
	Waste: High volumes of waste generated. Treatment and disposal options are limited, capacity is restricted and limited segregation, sorting and consideration of material re-use or recycling has been undertaken. Majority of waste is sent to landfill
Moderate	Materials: Primary and imported materials used in conjunction with recycled or site won material
	Waste: Some segregation and re-use of waste takes place in conjunction with exporting waste to landfill
Minor	Materials: Small proportion of primary and imported materials used. Use of recycled or site won material maximised
	Waste: Waste is predominantly re-used on site with minimal waste going to landfill

14.2.16. The evaluation of the significance of predicted effects takes account of the sensitivity of receptors and the magnitude of predicted impact. The significance matrix adopted for this

simple level assessment is given in Table 14.3 below. Effect significance has been evaluated based on professional judgement and with reference to this matrix. Since each of the options is of a substantial scale it is generally expected that the potential effects on materials and waste would be significant and adverse for each option. The assessment reported in this chapter has therefore concentrated on the differences in relative materials and waste effects of the options to inform the DMRB Stage 2 options assessment.

Table 14.3: Significance Matrix

	Sensitivity / value of receptor		
Magnitude of impact	**High**	**Medium**	**Low**
Major	Major adverse	Major adverse	Moderate adverse
Moderate	Major adverse	Moderate adverse	Minor adverse
Minor	Moderate adverse	Minor adverse	Minor adverse

14.2.17. The assessment of options is presented using three sub-topics which capture the principal themes of the key effects on materials and waste (see Section 14.6). These are: depletion of natural resources; demand on aggregates and material handling; and demand on handling capacity of regional waste management and disposal facilities. These sub-topics have been derived from the suggested reporting matrix for a simple assessment set out in IAN 153/11.

Assumptions and Limitations

14.2.18. Information on construction quantities is set out for each option in Table 14.4 below which includes key material estimates.

14.2.19. At DMRB Stage 3 the Preferred Option will be subject to design development and therefore estimates of materials and waste quantities would be subject to changes later in the design process. At DMRB Stage 2 the estimates are considered to be sufficiently robust to inform the options assessments.

14.2.20. No specific consideration has been made of total kerbing, drainage, fencing or lighting requirements since this is assumed to be proportionate to total route length. In addition, no landscaping or finishing requirements are included or specific accommodation works.

14.2.21. Information is also presented in Table 14.4 on estimated earthworks quantities in each of the three Scheme sections derived from a preliminary earthworks strategy. These data include the overall 'bulk' earthworks quantity (the sum of estimated cut and fill) followed by an estimate of the amount of material considered to be re-usable in earthworks (acceptable cut). In each section, there is either an estimated deficit or surplus of site won fill material depending on the required quantity of fill compared with the amount of excavated acceptable cut material.

14.2.22. In general, there is a large predicted surplus of fill in the most easterly section (Lhanbryde to East of Fochabers) due to the requirement for extensive road cuttings, and a deficit in the central (Hillhead to Lhanbryde) and western sections (Hardmuir to Hillhead). The assessment has assumed that surplus material from the eastern section would be transported to the adjacent central section and (depending on the earthworks balance for each option) any remaining surplus fill then transported to the western section. Where there is a predicted shortfall in imported fill from within the Scheme for any option then the estimated import of fill from external sources is set out in the table.

14.2.23. The estimates for percentage of cut material acceptable for re-use within the Scheme are based on a preliminary review of anticipated ground conditions within the study area (see Volume 1, Chapters 5, 6 and 7, Engineering Assessments). A future Contractor may choose to manage construction differently; however, it is not considered that these changes would significantly affect the findings of the relative nature of the assessment made at this stage.

14.2.24. It is assumed that surplus acceptable material from within the Scheme would be available for re-use in other sections of the Scheme. It has also been assumed that surplus unacceptable material would be used on-site for landscaping purposes where appropriate. The location of any required imported fill material from outwith the Scheme has not been specified at this stage.

14.2.25. Environmental effects from the use of materials and generation of waste from operation and routine maintenance of each option are predicted to be minor in comparison to permanent impacts from construction material use and have not been considered as part of this assessment.

14.2.26. The assessment of areas of potential contamination is based on desk study information. Future intrusive investigation may identify unexpected contamination or material which is not considered acceptable for re-use (e.g. due to geotechnical or chemical properties) which would inform the DMRB Stage 3 assessment of waste arisings (see Section 14.8).

Table 14.4: Key Materials Estimates

Estimated Materials Quantities and Waste Arisings	Hardmuir to Hillhead		Hillhead to Lhanbryde		Lhanbryde to East of Fochabers	
	North Option	South Option	North Option	South Option	North Option	South Option
Mainline length	15km	17km	23km	20km	11km	11km
Side road length	8km	16km	16km	15km	9km	6km
Structure deck area	18,300 m^2	20,200m^2	19,600m^2	32,600m^2	26,600m^2	55,200m^2
Culvert length	1,300m	1,500m	3,100m	800m	430m	450m
Bulk earthworks quantity	2,990,000m^3	3,830,000m^3	6,105,000m^3	5,150,000m^3	4,175,000m^3	2,630,000m^3
Fill requirement	2,470,000m^3	2,130,000m^3	3,480,000m^3	2,670,000m^3	1,290,000m^3	970,000m^3
Volume of re-use (acceptable cut material)	320,000m^3	1,300,000m^3	1,900,000m^3	2,140,000m^3	2,595,000m^3	1,490,000m^3
Import requirement	2,150,000m^3	830,000m^3	1,580,000m^3	530,000m^3	-	-
Export available	-	-	-	-	1,300,000m^3	520,000m^3
Potential for contamination	No potentially significant sources of contamination identified	Potential for contamination associated with disused airfield at former Forres RAF base to east of the River Findhorn	No potentially significant sources of contamination identified	Potential for contamination associated with disused former Forres RAF base at former Cloddach Quarry	No potentially significant sources of contamination identified	No potentially significant sources of contamination identified
Woodland clearance	5ha	50ha	21ha	38ha	54ha	49ha

Note on quantities (all approximate):
- Road lengths rounded to nearest kilometre
- Structure deck areas rounded to nearest 100m^2
- Earthworks quantities rounded to nearest 10,000m^3

14.3 Baseline Environment

14.3.1. Receptors or baseline conditions in a materials assessment are not defined specifically as for other environmental topics, except for quarries and other sources of minerals/finite raw material resources and waste management facilities and landfill sites. The specific sources of materials or locations of waste management infrastructure outwith the extents of the options being considered cannot be accurately predicted at this stage of the design and assessment process.

14.3.2. The baseline presented for this chapter provides a general context with the focus of the options assessment on the estimated materials and waste information for each option (see Table 14.4) and their comparative assessment. Future construction of the Scheme would make best use of available earthworks materials won on site through the process of excavation of cut material and its re-use for engineering and landscaping fill in other areas. This is the basis for the earthworks strategy which is described in Section 14.2.

14.3.3. The Scheme is located in an area of Scotland where there are several existing local sources of aggregate. These have the potential to provide additional material for road construction which cannot be won on site, depending on the requirements for the detailed design of the Preferred Option. Reference to the Scottish Aggregates Survey[85] identified eleven active sand and gravel quarries and eight hard rock quarries located within the Highland and Moray regions. Quarries which are currently active within approximately 10km of the Scheme include:

- Kirkhill Quarry, located on the east side of Elgin.
- Netherglen Quarry, aggregates and ready-mix concrete, located near Fogwatt approximately 7km south of Elgin.
- Bogend Quarry, aggregates and ready-mix concrete, located at Spey Bay, approximately 6km north of Fochabers.
- Clashach Quarry, Moray stone, sand, aggregates and ready-mix cement, located near Hopeman approximately 9km north-west of Elgin.
- Cloddach Quarry, sand and gravel, located approximately 2km south-west of Elgin.

14.3.4. These quarries may not still be active in the future at the time of construction of the Scheme but provide an indication of locally available material resources.

14.3.5. Existing registered landfills and other waste management sites have the potential to be required as eventual reception sites for generation of waste associated with the Scheme which cannot be re-used on site. Landfill site data published by SEPA[86] identifies one active non-hazardous landfill within Moray (Nether Dallachy near Buckie) which is anticipated to cease filling activity in 2020 and would therefore be unlikely to be available at the anticipated time of scheme construction.

[85] Scottish Aggregates Survey 2012 (published 2015) available at https://www.gov.scot/Publications/2015/06/5687
[86] Scottish Waste Sites and Capacity Tool, SEPA, available at https://www.sepa.org.uk/data-visualisation/waste-sites-and-capacity-tool/ (Accessed July 2018)

14.3.6. A further five active non-hazardous and two inert landfill sites are located within Aberdeenshire and the Highland Council area:

- Highland Council Granish landfill, Aviemore - non-hazardous landfill with remaining capacity 0.06M tonnes and estimated date for ceasing landfill of 2027.
- Savoch Quarry landfill, Peterhead – non-hazardous landfill with remaining capacity 0.06M tonnes and estimated date for ceasing landfill of 2039.
- Stoneyhill Environ Park, Peterhead – non-hazardous landfill with remaining capacity 2.0M tonnes and estimated date for ceasing landfill of 2037.
- Easter Hatton landfill, Aberdeen – non-hazardous landfill with remaining capacity 2.0M tonnes and estimated date for ceasing landfill of 2037.
- Wester Hatton landfill, Aberdeen – non-hazardous landfill with remaining capacity 2.5M tonnes and estimated date for ceasing landfill not given.
- Loch Hills Quarry, Aberdeen – inert landfill with remaining capacity 1.4M tonnes and estimated date for ceasing landfill of 2035.
- Park Quarry, Durris - inert landfill with remaining capacity 0.8M tonnes and estimated date for ceasing landfill of 2020.

14.3.7. There is only one active hazardous waste landfill within Scotland and it is located within Falkirk, Stirlingshire. This site is anticipated to remain in operation until 2023.

14.4 Potential Impacts

14.4.1. This section presents the potential impacts of the options. The magnitude of predicted impacts has been considered in combination with the sensitivity of receptors to determine the potential for significant effects (see Section 14.2).

14.4.2. The predicted impacts for each of the options are presented in Table 14.5 below. All impacts are permanent and direct. Impacts have been presented in the three overall groups defined in Section 14.2 which are considered to be representative of the range of key environmental impacts for the assessment of materials and waste at this stage. These impact groups have been used in Section 14.6 to structure the presentation of the predicted effects of each option on materials.

14.5 Mitigation

14.5.1. Material resource efficiency and waste reduction in the construction process has the potential to reduce the magnitude of environmental impacts and the significance of their effects. This can be achieved through:

- Reducing the amount of new materials used to the minimum required;
- Minimising the volume of materials used in earthworks and structures where this does not compromise other mitigation requirements; and
- Maximising the re-use of any materials derived from the Scheme.

14.5.2. The designs for the options have been developed to reduce cost and material and earthwork requirements as far as possible at this stage. Further optimisation and value engineering

will be adopted in the design development of the Preferred Option during DMRB Stage 3 to reduce cost and associated material use, where possible.

14.5.3. The following mitigation measures have been assumed in the assessment:

- MA1 - The potential for cut-fill balance will be optimised where possible, with re-use of suitable material from other sections of the Scheme where there is a material deficit (in line with implementation of a Materials Management Plan (MMP)).
- MA2 - Materials and waste will be segregated where feasible, with the re-use, recycling or recovery of appropriate materials, and with disposal as a last resort (in line with implementation of a Site Waste Management Plan (SWMP)).
- MA3 - Where feasible, the principles of responsible sourcing (e.g. through frameworks such as the Building Research Establishment's BES 6001 Framework Standard for Responsible Sourcing) will be followed.
- MA4 - Material procurement, delivery, storage and handling will be managed to minimise the potential for damaged or surplus stock.
- MA5 - The use and stockpiling of soils will be managed in accordance with the Defra Construction Code of Practice for the Sustainable Use of Soils on Construction Sites[87] and the SEPA Regulatory guidance: Promoting the sustainable reuse of greenfield soils in construction[88].
- MA6 - The use and handling of hazardous materials on site (including contaminated soils) will be avoided where practical and any hazardous waste arising through the works will be managed in accordance with relevant legislation and best practice.

[87] DEFRA (2009) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites, September 2009, available online at https://www.gov.uk/government/publications/code-of-practice-for-the-sustainable-use-of-soils-on-construction-sites

[88] SEPA (2010) Promoting the sustainable reuse of greenfield soils in construction, March 2010, available online https://www.sepa.org.uk/media/154233/reuse_greenfield_soils_construction.pdf

Table 14.5: Predicted Impacts

Predicted Impact (taking account of sensitivity of receptors)	Adverse / Beneficial	Magnitude	Potentially Significant?	Relevant Options
• Depletion of natural resources and use of energy in the production and transport to site of materials, which includes: – The sourcing and extraction of non-renewable materials and resources required to manufacture construction products – The manufacture and processing of construction products – The transportation of bulk materials to site (e.g. steel and concrete)	Adverse	Moderate	Yes	ALL
• Demand on aggregates and associated materials handling, which includes: – The extraction and processing of aggregates on site and in quarries external to the Scheme area – The transport of excavated materials between sections of the Scheme and from external sources – The formation of earthworks using site won fill and/or external materials – On-site processing of materials (e.g. road planings) to provide secondary materials and aggregates for re-use in construction	Adverse	Minor to Moderate	Yes	ALL
• Demand on the handling capacity of regional waste management and disposal facilities including: – Sorting and processing of materials on site and in materials recovery facilities for recycling and re-use (e.g. demolition wastes and forest felling residues) – Other off-site treatment and disposal options for surplus materials which cannot be re-used on site (e.g. contaminated soils)	Adverse	Minor to Moderate	Yes	ALL

14.6 Predicted Environmental Effects

14.6.1. This section presents the key predicted environmental effects of the route options on materials. Predicted effects have been assessed prior to mitigation and the residual effects then evaluated following assumed mitigation (see Section 14.5). The potentially significant predicted effects are presented in tabular format with any remaining significant residual effects following mitigation highlighted in bold in the tables below.

14.6.2. The following information is presented as follows:

- Hardmuir to Hillhead (North and South Options) – Tables 14.6 and 14.7;
- Hillhead to Lhanbryde (North and South Options) – Tables 14.8 and 14.9; and
- Lhanbryde to East of Fochabers (North and South Options) – Tables 14.10 and 14.11.

14.6.3. A narrative on the comparative assessment of the North and South Options in each of the three sections is provided in Section 14.7.

Table 14.6: Predicted Effects on Materials - Hardmuir to Hillhead (North Option)

Criteria [Value/Sensitivity]	Predicted Impacts [Magnitude]	Significance of Predicted Effects	Assumed Mitigation	Significance of Predicted Residual Effects
Use of materials (depletion of natural resources) [Medium]	• Depletion of natural resources predicted from: – Materials required for road pavement (15km mainline and 8km side roads) – Estimated deck areas for structures 18,300m^2 – 1.3km of culverts – [Moderate]	• Moderate adverse	• MA2, MA3, MA4, MA6	• **Moderate adverse** residual effect
Use of materials (demand on aggregates and materials handling) [Medium]	• Demand on aggregates and materials handling predicted from: – Estimated bulk earthworks quantity of 2,990,000m^3 – Net deficit and import of fill materials of approx. 2,150,000m^3 required – Estimated 770,000m^3 of fill would be imported from A96 site (over 10km) and 1,380,000m^3 imported from outwith site – [Moderate]	• Moderate adverse	• MA1, MA2, MA3, MA4, MA5, MA6	• **Moderate adverse** residual effect
Generation of waste (demand on waste disposal facilities) [Medium]	• Demand on the handling capacity of regional waste management and disposal facilities predicted from: – Limited potential for encountering contaminated soils – Estimated woodland clearance of 5ha – [Minor]	• Minor adverse	• MA1, MA2, MA4, MA5, MA6	• Minor adverse residual effect on regional facilities

Table 14.7: Predicted Effects on Materials - Hardmuir to Hillhead (South Option)

Criteria [Value/Sensitivity]	Predicted Impacts [Magnitude]	Significance of Predicted Effects	Assumed Mitigation	Significance of Predicted Residual Effects
Use of materials (depletion of natural resources) [Medium]	• Depletion of natural resources predicted from: – Materials required for road pavement (17km mainline and 12km of side roads) – Estimated deck areas for structures 20,200m^2 – 1.5km of culverts – [Moderate]	• Moderate adverse	• MA2, MA3, MA4, MA6	• **Moderate adverse** residual effect
Use of materials (demand on aggregates and materials handling) [Medium]	• Demand on aggregates and materials handling predicted from: – Estimated bulk earthworks quantity of 3,830,000m^3 – Net deficit and import of fill materials of approx. 830,000m^3 required – Estimated 770,000m^3 of fill would be imported from A96 site (over 10km) and 60,000m^3 imported from outwith site – [Moderate]	• Moderate adverse	• MA1, MA2, MA3, MA4, MA5, MA6	• **Moderate adverse** residual effect
Generation of waste (demand on waste disposal facilities) [Medium]	• Demand on the handling capacity of regional waste management and disposal facilities predicted from: – Potential to encounter contamination associated with disused airfield at former Forres RAF base, to the east of the River Findhorn – Estimated woodland clearance of 50ha – [Moderate]	• Moderate adverse	• MA1, MA2, MA4, MA5, MA6	• Minor adverse residual effect on regional facilities

Table 14.8: Predicted Effects on Materials - Hillhead to Lhanbryde (North Option)

Criteria [Value/Sensitivity]	Predicted Impacts [Magnitude]	Significance of Predicted Effects	Assumed Mitigation	Significance of Predicted Residual Effects
Use of materials (depletion of natural resources) [Medium]	• Depletion of natural resources predicted from: – Materials required for road pavement (23km mainline and 16km of side roads) – Estimated deck area for structures 19,600m^2 – 3.1km of culverts – [Moderate]	• Moderate adverse	• MA2, MA3, MA4, MA6	• **Moderate adverse** residual effect
Use of materials (demand on aggregates and materials handling) [Medium]	• Demand on aggregates and materials handling predicted from: – Estimated bulk earthworks quantity of 6,105,000m^3 – Net deficit and import of fill materials of approx. 1,580,000m^3 required – Estimated 1,300,000m^3 of fill would be imported from A96 site (520,000m^3 of which over 10km) and 280,000m^3 imported from outwith site – [Moderate]	• Moderate adverse	• MA1, MA2, MA3, MA4, MA5, MA6	• **Moderate adverse** residual effect
Generation of waste (demand on waste disposal facilities) [Medium]	• Demand on the handling capacity of regional waste management and disposal facilities predicted from: – Limited potential to encounter contamination – Estimated area of woodland clearance 21ha – [Minor]	• Minor adverse	• MA1, MA2, MA4, MA5, MA6	• Minor adverse residual effect on regional facilities

Table 14.9: Predicted Effects on Materials - Hillhead to Lhanbryde (South Option)

Criteria [Value/Sensitivity]	Predicted Impacts [Magnitude]	Significance of Predicted Effects	Assumed Mitigation	Significance of Predicted Residual Effects
Use of materials (depletion of natural resources) [Medium]	• Depletion of natural resources predicted from: – Materials required for road pavement (20km mainline and 15km of side roads) – Estimated deck area for structures 32,600m^2 – 0.8km of culverts – [Moderate]	• Moderate adverse	• MA2, MA3, MA4, MA6	• **Moderate adverse** residual effect
Use of materials (demand on aggregates and materials handling) [Medium]	• Demand on aggregates and materials handling predicted from: – Estimated bulk earthworks quantity of 5,150,000m^3 – Net deficit and import of fill materials of approx. 530,000m^3 required – Estimated 530,000m^3 of fill would be imported from A96 site (190,000m^3 of which over 10km) – [Moderate]	• Moderate adverse	• MA1, MA2, MA3, MA4, MA5, MA6	• **Moderate adverse** residual effect
Generation of waste (demand on waste disposal facilities) [Medium]	• Demand on the handling capacity of regional waste management and disposal facilities predicted from: – Potential to encounter contamination associated with the disused Elgin RAF base – Estimated area of woodland clearance 38ha – [Moderate]	• Moderate adverse	• MA1, MA2, MA4, MA5, MA6	• Minor adverse residual effect on regional facilities

Table 14.10: Predicted Effects on Materials - Lhanbryde to East of Fochabers (North Option)

Criteria [Value/Sensitivity]	Predicted Impacts [Magnitude]	Significance of Predicted Effects	Assumed Mitigation	Significance of Predicted Residual Effects
Use of materials (depletion of natural resources) [Medium]	• Depletion of natural resources predicted from: – Materials required for road pavement (11km mainline and 9km of side roads) – Estimated deck area for structures 26,600m^2 – 0.4km of culverts – [Moderate]	• Moderate adverse	• MA2, MA3, MA4, MA6	• **Moderate adverse** residual effect
Use of materials (demand on aggregates and materials handling) [Medium]	• Demand on aggregates and materials handling predicted from: – Estimated bulk earthworks quantity of 4,175,000m^3 – Net export of excavated materials to other sections of Scheme of approx. 1,300,000m^3 – Net surplus and export of excavated materials would be utilised within other parts of Scheme – [Minor]	• Minor adverse	• MA1, MA2, MA3, MA4, MA5, MA6	• Minor adverse residual effect
Generation of waste (demand on waste disposal facilities) [Medium]	• Demand on the handling capacity of regional waste management and disposal facilities predicted from: – Limited potential for encountering contaminated soils – Estimated area of woodland clearance 54ha – [Moderate]	• Moderate adverse	• MA1, MA2, MA4, MA5, MA6	• Minor adverse residual effect on regional facilities

Table 14.11: Predicted Effects on Materials - Lhanbryde to East of Fochabers (South Option)

Criteria [Value/Sensitivity]	Predicted Impacts [Magnitude]	Significance of Predicted Effects	Assumed Mitigation	Significance of Predicted Residual Effects
Use of materials (depletion of natural resources) [Medium]	• Depletion of natural resources predicted from: – Materials required for road pavement (11km mainline and 6km of side roads) – Estimated deck area for structures 55,200m^2 – 0.5km of culverts – [Moderate]	• Moderate adverse	• MA2, MA3, MA4, MA6	• **Moderate adverse** residual effect
Use of materials (demand on aggregates and materials handling) [Medium]	• Demand on aggregates and materials handling predicted from: – Estimated bulk earthworks quantity of 2,630,000m^3 – Net export of fill materials to other sections of Scheme of approx. 520,000m^3 – Net surplus and export of excavated materials to be utilised within other parts of Scheme – [Minor]	• Minor adverse	• MA1, MA2, MA3, MA4, MA5, MA6	• Minor adverse residual effect
Generation of waste (demand on waste disposal facilities) [Medium]	• Demand on the handling capacity of regional waste management and disposal facilities predicted from: – Limited potential for encountering contaminated soils – Estimated area of woodland clearance 49ha – [Moderate]	• Moderate adverse	• MA1, MA2, MA4, MA5, MA6	• Minor adverse residual effect on regional facilities

Cumulative Effects

14.6.4. Future development of the long-term sites in the emerging replacement Moray Local Development Plan (see Chapter 9, Policies and Plans) and the route options has the potential to increase demand on materials resources (e.g. aggregates) and the capacity of regional waste management facilities. It is predicted that significant cumulative effects on materials would be reduced through adoption of value engineering, optimisation of material resource efficiency and minimisation of waste during construction of new housing and infrastructure sites. The final selection of materials (including aggregates) for the Preferred Option would be made by the eventual contractor, taking account of specific contract requirements for materials and waste management.

14.6.5. Cumulative effects are not predicted to increase the significance for any of the route options in combination with other anticipated future developments.

14.7 Summary of Effects

14.7.1. This section sets out a summary of the key findings of the options assessment on the predicted significant residual effects on materials.

14.7.2. The summaries are presented in Tables 14.12 to 14.14 below.

Table 14.12: Summary of Predicted Effects on Materials - Hardmuir to Hillhead

Sub-topic/ criteria	Predicted Residual Effects for North Option	Predicted Residual Effects for South Option
Use of materials (depletion of natural resources)	• Materials required for road pavement (15km mainline and 8km side roads) • Estimated deck areas for structures 18,300m^2 • Estimated deck areas for standard structures 6,300m^2 • 1.3km of culverts • **Moderate adverse** residual effect	• Materials required for road pavement (17km mainline and 16km of side roads) • Estimated deck areas for structures 20,200m^2 • Estimated deck areas for standard structures 7,200m^2 • 1.5km of culverts • **Moderate adverse** residual effect
Use of materials (demand on aggregates and materials handling)	• Estimated bulk earthworks quantity of 2,990,000m^3 • Net deficit and import of fill materials of approx. 2,150,000m^3 required, more than half from outwith A96 site • **Moderate adverse** residual effect	• Estimated bulk earthworks quantity of 3,830,000m^3 • Net deficit and import of fill materials of approx. 830,000m^3 required, most of which from within A96 site • **Moderate adverse** residual effect
Generation of waste (demand on waste disposal facilities)	• Limited demand on the handling capacity of regional waste management and disposal facilities • Limited potential for encountering contaminated soils	• Limited demand on the handling capacity of regional waste management and disposal facilities • Potential to encounter contamination associated with disused airfield at former

Sub-topic/ criteria	Predicted Residual Effects for North Option	Predicted Residual Effects for South Option
	• Estimated woodland clearance of 5ha • Minor adverse residual effect	Forres RAF base, to the east of the River Findhorn • Estimated woodland clearance of 50ha • Minor adverse residual effect

Summary

14.7.3. The predicted residual environmental effects on materials for both options is Moderate adverse based on the criteria used and taking into account that imported materials are not considered to be particularly scarce and can be sourced from within the region. The options would require large amounts of materials for roads and bridges construction.

14.7.4. The North Option has a bulk earthworks estimate of approximately 3.0 million m^3 and the South Option has a bulk earthworks estimate of approximately 3.8 million m^3.

14.7.5. The North Option would require approximately 2.2 million m^3 of imported material, more than half of which is estimated to come from outwith the A96 site. The South Option would require approximately 0.8 million m^3 of import, most of which is estimated to come from within the A96 site.

14.7.6. The use of imported fill material from within and outwith the A96 site is significantly lower for the South Option than that associated with the North Option, but the South Option has a greater bulk earthworks demand and slightly longer route length and larger deck area for structures. Overall the South Option is predicted to have less impact on materials requirements than the North Option.

Table 14.13: Summary of Predicted Effects on Materials – Hillhead to Lhanbryde

Sub-topic/ criteria	Predicted Residual Effects for North Option	Predicted Residual Effects for South Option
Use of materials (depletion of natural resources)	• Materials required for road pavement (23km mainline and 16km of side roads) • Estimated deck area for structures 19,600m^2 • 3.1km of culverts • **Moderate adverse** residual effect	• Materials required for road pavement (20km mainline and 15km of side roads) • Estimated deck area for structures 32,600m^2 • 0.8km of culverts • **Moderate adverse** residual effect
Use of materials (demand on aggregates and materials handling)	• Estimated bulk earthworks quantity of 6,105,000m^3 • Net deficit and import of fill materials of approx. 1,580,000m^3 required, most sourced from within A96 site • **Moderate adverse** residual effect	• Estimated bulk earthworks quantity of 5,150,000m^3 • Net deficit and import of fill materials of approx. 530,000m^3 required, all sourced from within A96 site • **Moderate adverse** residual effect

Sub-topic/ criteria	Predicted Residual Effects for North Option	Predicted Residual Effects for South Option
Generation of waste (demand on waste disposal facilities)	• Limited demand on the handling capacity of regional waste management and disposal facilities • Limited potential to encounter contamination • Estimated area of woodland clearance 21ha • Minor adverse residual effect	• Limited demand on the handling capacity of regional waste management and disposal facilities • Potential to encounter contamination associated with the disused Elgin RAF base • Estimated area of woodland clearance 38ha • Minor adverse residual effect

Summary

14.7.7. The predicted residual environmental effects on materials for both options is Moderate adverse based on the criteria used and taking into account that imported materials are not considered to be particularly scarce and can be sourced from within the region. Both options would require large amounts of materials for roads and bridges construction.

14.7.8. The North Option has a bulk earthworks estimate of approximately 6.1 million m^3 and the South Option has a bulk earthworks estimate of approximately 5.2 million m^3.

14.7.9. The North Option would require approximately 1.6 million m^3 of imported material, most of which is estimated to be sourced from within the A96 site. The South Option would require approximately 0.5 million m^3 of import, all of which is assumed to be sourced from within the A96 site.

14.7.10. The use of materials for structures is significantly greater for the South Option, although the South Option is shorter. The bulk earthworks and the estimated volume of imported fill required for the North Option is greater. Overall both options are predicted to have similar impact on materials.

Table 14.4: Summary of Predicted Effects on Materials - Lhanbryde to East of Fochabers

Sub-topic/ criteria	Predicted Residual Effects for North Option	Predicted Residual Effects for South Option
Use of materials (depletion of natural resources)	• Materials required for road pavement (11km mainline and 9km of side roads) • Estimated deck area for structures 26,600m^2 • 0.4km of culverts • **Moderate adverse** residual effect	• Materials required for road pavement (11km mainline and 6km of side roads) • Estimated deck area for structures 55,200m^2 • 0.4km of culverts • **Moderate adverse** residual effect
Use of materials (demand on aggregates and	• Estimated bulk earthworks quantity of 4,175,000m^3 • Net export of excavated materials of approx. 1,300,000m^3	• Estimated bulk earthworks quantity of 2,630,000m^3 • Net export of excavated materials of approx. 520,000m^3

Sub-topic/ criteria	Predicted Residual Effects for North Option	Predicted Residual Effects for South Option
materials handling)	• Surplus material to be utilised within other sections of the Scheme • Minor adverse residual effect	• Surplus material to be utilised within other sections of the Scheme • Minor adverse residual effect
Generation of waste (demand on waste disposal facilities)	• Limited demand on the handling capacity of regional waste management and disposal facilities • Limited potential for encountering contaminated soils • Estimated area of woodland clearance 54ha • Minor adverse residual effect	• Limited demand on the handling capacity of regional waste management and disposal facilities • Limited potential for encountering contaminated soils • Estimated area of woodland clearance 49ha • Minor adverse residual effect

Summary

14.7.11. The predicted residual environmental effects on materials for both options is Moderate adverse. Both options would require large amounts of materials for roads and bridges construction.

14.7.12. The North Option has a bulk earthworks estimate of approximately 4.2 million m^3 and the South Option has a bulk earthworks estimate of approximately 2.6 million m^3.

14.7.13. The North Option would produce approximately 1.3 million m^3 of surplus material which could be exported to other sections of the A96 site. The South Option would produce approximately 0.5 million m^3 of surplus material to be exported to other sections of the A96 site.

14.7.14. The use of materials for structures is substantially greater for the South Option but the bulk earthworks for this option are lower. Overall the North Option is predicted to have slightly less impact on materials than the South Option.

14.8 Scope of the DMRB Stage 3 Assessment

14.8.1. The DMRB Stage 3 assessment for Materials will be undertaken in accordance with DMRB (Volume 11, Section 2, Part 5, HA2052/08 Assessment and Management of Environmental Effects), IAN 153/11[89] (or published updates) and professional judgement. This will include more detailed assessment of the volumes and nature of materials likely to be used and estimates for waste generation during the site remediation / preparation, demolition and construction stages.

14.8.2. Earthworks estimates will be developed as the design is progressed, supported by a review of available intrusive site investigation data to determine the likely percentage of material acceptable for re-use within the Scheme and any modifications to the earthworks design.

[89] HD212/11 is the full DMRB Standard for Materials currently in preparation as a Draft. It will be used to inform future Materials assessments including at DMRB Stage 3 if adopted

14.8.3. Professional judgement will be used to inform an assessment of effects on several factors, including:

- The availability / scarcity of the material resources and whether likely to be sourced on a regional, national or international level;
- The type of materials required and their associated embodied carbon, e.g. primary / virgin materials, manufactured materials, recycled materials;
- The type of waste generated, e.g. inert, non-hazardous, hazardous;
- The capacity and availability of suitable facilities within proximity to the Preferred Option to manage, treat or dispose of waste generated; and
- Implementation of the waste hierarchy, i.e. where the generation of the waste is avoided through design in the first instance, then minimised, recycled, recovered or disposed of.

14.8.4. Information from available intrusive site investigation data will be reviewed in line with the SEPA guidance[90] to assess the potential chemical suitability for the re-use or disposal options of materials excavated for the Preferred Option.

14.8.5. No further assessment is likely to be required for material resource use and waste generation during operation, as no significant direct or indirect effects are predicted.

14.8.6. An assessment of the carbon associated with the infrastructure for the Preferred Option will be undertaken during DMRB Stage 3 using an appropriate tool agreed with Transport Scotland and reported in the Environmental Impact Assessment Report together with other information on climate change issues for the Scheme.

[90] Environment Agency, Natural Resources Wales, Northern Ireland Environment Agency and SEPA, Technical Guidance WM3, Guidance on the classification and assessment of waste, 1st Edition v1.1, 2018, available online at https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/719394/Waste-classification-technical-guidance-WM3.pdf

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15. Visual Effects

15.1 Introduction and Scope

15.1.1. This chapter presents the findings of the visual assessment of the route options of the A96 Dualling Hardmuir to Fochabers Scheme (the Scheme). The assessment has been undertaken in accordance with: Guidelines for Landscape and Visual Impact Assessment (GLVIA)[91]; and the Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3, Part 5, Landscape Effects.

15.1.2. The chapter is supported with the following figures (in Volume 5) and appendices (Volume 4b):

- Figure 15.1, 15.2 and 15.3: Visual Receptors;
- Appendix A15.1: Visual assessment methodology; and
- Appendix A15.2: Visual receptors: baseline description and assessment of effects.

15.1.3. The scope of this assessment includes the permanent visual effects of the options. Temporary visual effects during construction have been scoped out as effects during this phase are predicted to be similar for all of the options and would therefore not contribute to an assessment of clear differences between the options.

15.2 Approach to Assessment

Introduction

15.2.1. A visual impact assessment has been carried out to identify and assess visual effects predicted for each of the route options. The visual assessment has been carried out as part of an overall Landscape and Visual Impact Assessment (LVIA), however the assessments have been separated into two chapters. This is because the two assessments may result in different conclusions and recommendations and this approach aligns with that adopted for the DMRB Stage 2 assessment. This includes the landscape topic being identified under the grouping of 'Natural and Cultural Heritage' and the visual topic grouped under 'Communities and People'. Reference should be made to Chapter 17 (Landscape) for the landscape assessment.

Sources of Information

15.2.2. The following sources of information have been used for this assessment:

- Ordnance Survey 1:50,000 and 1:25,000 maps;
- Aerial photographs and digital terrain model (5m resolution) data (2017);
- Moray Council dataset for Areas of Great Landscape Value (AGLV);
- Scotland's Great Trails (SGT) dataset;

[91] Landscape Institute and Institute of Environmental Management and Assessment (IEMA) (2013) Guidelines for Landscape and Visual Impact Assessment. 3rd ed. Abingdon, Routledge

- Zone of Theoretical Visibility (ZTV) data;
- Historic Environment Scotland (HES) dataset for the Inventory of Gardens and Designed Landscapes (GDL);
- The National Record of the Historic Environment (NRHE) available at https://canmore.org.uk/; and
- Data from site visits and field assessment undertaken during 2017 and 2018.

Consultation

15.2.3. Consultation regarding the LVIA has been undertaken with Scottish Natural Heritage (SNH), Moray Council and the Transport Scotland Landscape Advisor (carried out jointly for landscape and visual aspects). The topics relevant to this visual assessment which were discussed included the following:

- The scope and method of the DMRB Stage 2 LVIA (including the extent of the study area);
- Landscape and visual design objectives;
- The visual baseline assessment, including grouping of visual receptors;
- Assessment of the experience of the landscape and views within the DMRB Stage 2 LVIA; and
- The AGLVs and Moray Council's plans to update these, as well as other landscape studies undertaken as part of the Local Development Plan.

Assessment Methodology

15.2.4. The visual assessment methodology is detailed in Appendix A15.1 (Volume 4b), with the key elements summarised below.

- The visual assessment has been informed by a combination of desk and site-based assessment techniques.
- The study area for this assessment comprises an area within a 1km buffer around each option.
- The definition of the study area has been informed by a working ZTV model. The ZTV was prepared using a 'bare ground' digital terrain model as a 'worst-case' scenario, without taking into account surface screening features. As such, the ZTV model has been used as a tool for assessment and was supplemented by data collected on site that provided more site-specific information, such as where visibility would be affected by screening by woodland or buildings. The initial ZTV was produced to a distance of 10km to enable the landscape and visual assessments to focus in on the selection of an appropriate study area;
- The identification of visual receptors has been proportionate to that required for a Stage 2 assessment. Visual receptors have generally been grouped based on the following approach:
  - Combining receptors of a similar type, e.g. residential receptors have been grouped together.
  - Grouping receptors within proximity to each other and with a similar view. It is accepted that no two views are the same in any case, however if, for example, a

small group of three farmhouses may have a similar baseline view and would likely have a similar view of an option, they have been grouped together as one receptor.

- A focus on high and medium sensitivity residential and recreational receptors throughout the study area. This is intended to focus the assessment to locations where likely significant effects would be identified. Receptors in vehicles along local routes have been considered in the assessment, however they have not been included as specific receptors in Appendix A15.2 (Volume 4b) as they would tend to be of lower sensitivity to the type of change proposed than pedestrian users of the same routes or residents of adjacent properties.

- As part of the broader LVIA process, potential landscape and visual mitigation measures have been considered. Primary mitigation measures have been incorporated as part of the design development of the options, such as alterations to the horizontal and vertical alignment to limit landscape and visual effects. In addition, secondary mitigation measures have been considered during the assessment process where these can be certain (meeting the criteria in Section 8.2) and may reduce significant landscape and visual effects which have been identified.
- The level of detail available at DMRB Stage 2 means that secondary mitigation measures have been considered in general terms (as might be reasonably expected to be adopted as part of good practice). This also means that a precautionary approach has been taken during the LVIA regarding the ability of these measures to reduce adverse effects. Where, at this stage it has not been certain that effects could be mitigated, the residual level of effect is predicted to be the same as the pre-mitigation assessment. Further consideration will be given to the mitigation of predicted significant effects at DMRB Stage 3.

15.2.5. The visual assessment process includes consideration of many different factors, including:

- The sensitivity of visual receptors, i.e. the susceptibility of different visual receptors to the likely changes that would be associated with the options; and the value or importance that is attached to the view experienced by the visual receptor. The sensitivity of receptors has been categorised using a three-point scale: high; medium; and low; and
- The magnitude of change of views due to the options, including. the degree, geographical extent, duration and reversibility of the change to the view that is likely to arise. The magnitude of change has been categorised using a four-point scale: high; medium; low; and negligible. Where no change is assessed, this is also stated.

15.2.6. The overall level of visual effect has been categorised using a four-point scale: major; moderate; minor; and negligible. The level of effect has been assessed by combining all the considerations and criteria set out above. This is described by GLVIA as an 'overall profile' approach to combining judgements and requires that all the judgements against each of the identified criteria (i.e. susceptibility; value; degree of change; extent of change; duration of change; and reversibility of change) are utilised to allow an informed professional assessment of the overall level of effect. The relative weight attributed to each consideration is a matter of professional judgement and varies depending on the specific landscape or visual receptor being assessed.

15.2.7. The effects of the route options on visual receptors have been assessed as likely to be beneficial or adverse where possible.

15.2.8. Visual effects have been assessed as significant or not significant based on the following categories:

- Major and moderate levels of effect are considered to be significant; and
- Minor and negligible levels of effects are not considered to be significant.

Assumptions and Limitations

15.2.9. Due to the level of design detail available at DMRB Stage 2, a precautionary approach has been taken with regards to the sensitivity of visual receptors, with a worst-case scenario assumed in the assessment. This precautionary approach has also been taken when considering mitigation measures, as described above in Paragraph 15.2.4.

15.2.10. Following the approach recommended by 'Fitting Landscapes: Securing More Sustainable Landscapes'[92], initial landscape design objectives were established for the Scheme in June 2017. Following consultation with SNH, Moray Council and the Transport Scotland landscape advisor and based on the findings of the DMRB Stage 2 LVIA baseline assessment, these were progressed in more detail. The landscape objectives were informed by identification of the sensitivities and opportunities offered by the baseline conditions and, in turn, informed the identification of primary and secondary mitigation measures during the Stage 2 LVIA. It is intended that these will be refined further during DMRB Stage 3, informed by more detailed LVIA and to input to the ongoing design development.

15.2.11. The predicted visual effects of road lighting at the option junctions has been considered in general by the LVIA. Given the level of detail available at DMRB Stage 2, the lighting has only been described specifically where it has been judged to have a particular influence on the predicted visual effects (for example where this is the only element of the option that would be seen or where the baseline conditions do not include lighting). Otherwise, the effects of junction lighting are included within the overall description of visual effects at junctions. The LVIA at this stage has not assessed the predicted effects of lights from vehicles travelling along the options although this will be considered at DMRB Stage 3.

15.2.12. Site surveys of private properties for the visual assessment were carried out from the nearest available publicly accessible location, supplemented by desk-based data analysis to make an informed assumption of the view from the property. In line with guidance and industry recognised practice for a DMRB Stage 2 visual assessment, access to private properties was not requested as part of the visual assessment of effects.

15.2.13. Moray Council is currently undertaking a review of local landscape designations, leading to the identification of candidate Special Landscape Areas (SLA). These have not been included within the LVIA baseline at this stage as they remain proposed but, once approved, they will be considered for the DMRB Stage 3 assessment.

[92] Transport Scotland (2014) *Fitting Landscapes: Securing More Sustainable Landscapes.* Glasgow, Transport Scotland

15.3 Baseline Environment

Study Area Context

15.3.1. Visual receptors have been identified within the study area of each route option. Appendix A15.2 (Volume 4b) provides a description of the visual baseline for the visual receptors whilst the following section provides a summary of the overall findings:

- There are three main settlements in proximity to the options: Forres, Elgin and Fochabers. The smaller settlements in the study area (as listed in the Moray Local Development Plan, 2015) include Dyke, Rafford, Kinloss, Alves, Lhanbryde, Urquhart and Mosstodloch. However, the overall study area is predominantly rural and residential receptors generally comprise isolated farmsteads or small clusters of properties throughout the areas.
- Recreational receptors predominantly comprise users of access routes, ranging from national or regional long-distance routes, e.g. National Cycle Network routes and the Speyside Way, to routes which follow existing local roads and forest paths.
- Given the general lack of large areas of built development within the study area, the main screens to existing views are: variations in the landform and tree cover. Landform variations are highlighted on Figures 15.1, 15.2 and 15.3 (Volume 5).
- Despite being predominantly rural, there are some key elements of built infrastructure which are evident in many views, including: the existing A96 which runs west to east through the study area; pylons and overhead lines; and the Aberdeen - Inverness Railway Line.
- Occasional views are possible towards the Moray Firth, particularly from more elevated receptors at the southern extent of the study area. However, in the most part the low-lying elevation of the study area and the effect of intervening screening features limits views out towards the sea.
- In terms of scenic value, there are some designated landscapes, i.e. AGLVs and GDLs, which indicate value attributed to views experienced by visual receptors. Where these designations form part of the visual context, they are referred to in the baseline of each receptor in Appendix A15.2 (Volume 4b) and are illustrated on Figures 17.1, 17.2 and 17.3 (Volume 5) of the Landscape chapter (Chapter 17).

Hardmuir to Hillhead

15.3.2. In this section a summary is provided of the visual baseline of the Hardmuir to Hillhead section study area, with information taken from the visual receptor baseline descriptions in Appendix A15.2 (Volume 4b). Specific reference is made here to the identified differences between the North and South Option study areas:

- The South Option study area includes greater landform undulation than the North Option study area, particularly to the south-west of Forres, however neither area contains any major hills or ridges. The North Option study area comprises a reasonably flat plain with some localised undulations, whereas the South Option study area gently undulates, particularly to the south of Forres. It follows that, in general, minor variations in the landform have a more pronounced impact on screening views for the North Option than the South Option as fewer receptors are elevated above such screen features within the North Option study area.

- The South Option study area contains a much greater level of woodland cover than the North Option study area. Views tend to be more restricted in the South Option study area due to woodland cover, however this also has the consequence that there are typically more local views of a smaller scale, intimate landscape.
- Given the lower level of woodland cover in the North Option study area, there are a greater number of visual receptors which have open views across a flatter, larger scale landscape.
- Few visual receptor groups (other than recreational routes which directly cross the route option) are identified within the central, southern part of the South Option study area, due to the high level of woodland cover there (Limekilns Wood, Keymoss Wood and Office Wood).
- The South Option study area includes a group of receptors located on elevated, north-western hill slopes in the vicinity of Rafford, which look down onto the South Option.
- 59 receptor groups have been identified within the North Option study area and 62 within the South Option study area, each comprising residential and recreational receptors.
- Both study areas largely comprise isolated residential receptors, including many farmsteads, however the North Option study area includes a cluster of residential properties in the northern part of Forres.
- In terms of recreational receptors, both study areas are broadly similar in that they include a range of routes and there are no major differences in the number of designated trails. There are routes designated as 'Scotland's Great Trails' within each study area: the Dava Way within the South Option study area and the Moray Coast Trail through the North Option study area.

Hillhead to Lhanbryde

15.3.3. In this section a summary is provided of the visual baseline of the Hillhead to Lhanbryde study area, with information taken from the visual receptor baseline descriptions in Appendix A15.2 (Volume 4b). Specific reference is made here to the identified differences between the North and South Option study areas:

- The North Option is primarily located in gently undulating, predominantly agricultural landscape to the north of Elgin and the South Option is located in a gently undulating agricultural landscape to the south of Elgin.
- In terms of a key similarity, both the North and South Option study areas are located within a landscape that has a low level of woodland cover. This has the consequence that landform undulations and localised tree and hedgerow cover provide the main screen to views.
- Considering the landform, the western half of each option study area is in part defined by its relationship to a ridge which is located at Quarrelwood, directly to the west of Elgin. The North Option study area is located on the lower, north-facing slopes of this ridge and the South Option study area is set on lower ground to the south of the ridge. The ridge is well wooded and is a prominent screening feature, limiting the number of visual receptors in relation to each option in its vicinity. In the eastern half of the study areas, both options pass through areas of small hills, undulations and flat ground, resulting in local variations of visibility.

- 76 receptor groups have been identified within the North Option study area and 80 within the South Option study area, each comprising residential and recreational receptors.
- Both study areas largely comprise a set of isolated residential receptors, including many farmsteads, and also some clusters of receptors in small settlements such as Monaughty, Alves, Newton and Kirkhill in the north area and Cloves, Lochinver and Burnside of Birnie in the south. In terms of larger settlements, the North Option study area includes: Lhanbryde and the north-eastern extent of Elgin; and the South Option study area includes Lhanbryde and a very small part of Elgin on its western and southern extents.
- In terms of recreational receptors, both study areas are broadly similar in that they include a range of different types of routes and there are no major differences in the number of designated trails.

Lhanbryde to East of Fochabers

15.3.4. This section summarises the visual baseline of the Lhanbryde to East of Fochabers study area, with information taken from the visual receptor baseline descriptions which are in Appendix A15.2 (Volume 4b). Specific reference is made to the identified differences between the North and South Option study areas:

- Both option study areas are located on an undulating landform in the west and cross Strathspey in the east. The most notable change in elevation in both study areas is the sharp rise at their very eastern edge, in the vicinity of the Hill of Fochabers (see Figure 15.3 in Volume 5). However, the options join the eastern tie-in point via a different route across the River Spey:
  - The North Option study area has a slightly more variable landform: it passes through a ridge in the vicinity of Inchberry Road, to the north-west of Fochabers; it crosses the River Spey to the west of Fochabers, immediately to the south of existing bridge crossings; and it subsequently cuts through the Hill of Fochabers and Leitch's Wood to the east of Fochabers; and
  - The South Option study area crosses the River Spey 2km to the south of the North Option, passing through the wide and open River Spey strath and subsequently rising onto the hillside east of the river in the vicinity of Castle Hill.
- Both option study areas comprise a high level of woodland cover. The western extents of both study areas include extensive woodland at Loch Na Bo and Threapland Wood and at their eastern extents they are located in dense woodland at Leitch's Wood and around Ordiequish. Whilst the central areas of each option study area are less wooded, Balnacoul Wood provides some screening of each route option (see Figure 15.3 in Volume 5).
- The North Option is located closer to a higher number of visual receptors in the settlements of Mosstodloch and Fochabers. However, site studies have confirmed that both settlements are mostly visually contained.
- The South Option study area is located within a more open, less wooded area of the River Spey strath. There are, however, few visual receptors within this part of the South Option study area, with these mainly comprising isolated farmsteads and some recreational routes. Views from these receptors are less restricted due to the openness of the strath. A key recreational route located here is the Speyside Way and the South Option lies within the very northern extent of the Speyside AGLV.

- 40 receptor groups have been identified within the North Option study area and 33 within the South Option study area, each comprising residential and recreational receptors.
- In terms of recreational receptors, both study areas are broadly similar in that they include a range of routes and there are no major differences in the number of designated trails, the best example being the Speyside Way which passes as one route through both study areas. The following are the key differences between the study areas:
  - The North Option study area is located more centrally within Balnacoul Wood than the South Option and therefore passes more directly through the network of recreational routes within the woodland than the South Option;
  - The North Option study area includes recreational routes at its eastern extent, i.e. within the Gordon Castle GDL, in the vicinity of Peep's View and Leitch's Wood, while the South Option includes a set of routes further south, in the vicinity of Castle Hill and Ordiequish; and
  - The option study areas include different sections of the Speyside Way. The North Option includes a section to the north of Fochabers, in a more enclosed, narrow section of the River Spey corridor. The South Option includes a section on the west facing slope of Ordiequish and Castle Hill, which face towards a more open, large-scale section of the River Spey strath.

15.4 Potential Impacts

15.4.1. In this section, the impacts of the options which have the potential to result in visual effects are presented. The following should be noted:

- Potential impacts are all identified as having the potential to result in significant adverse visual effects; and
- Potential impact descriptions do not take into account the sensitivity of the visual baseline conditions (unlike the subsequent assessment of visual effects which is strongly influenced by visual sensitivity, summarised in Section 15.6 and reported in detail in Appendix A15.2, Volume 4b).

15.4.2. Potential impacts of the options which have the potential for significant visual effects have been identified as including:

- The introduction of a dual carriageway, grade separated junctions and link roads and associated moving vehicles (visible and audible) to the landscape and people's views;
- Changes to the existing road network and non-motorised user routes;
- Changes to the existing landform due to earthworks (embankment and cut);
- Loss of existing woodland, trees and hedgerows, as well as potential new woodland, trees and hedgerows as mitigation;
- Introduction of new built structures at bridge crossings and junctions;
- Introduction of new road furniture, including signs;
- Introduction of new lights and lighting at junctions; and
- Loss of stone boundary walls as well as potential new boundary walls as mitigation.

15.5 Mitigation

15.5.1. Possible mitigation measures, following GLVIA, are split between primary mitigation measures and secondary mitigation measures, as described in Section 15.2. Primary mitigation measures have been included in the Scheme design development, whereas the following secondary mitigation measures have been applied to mitigate adverse visual effects identified through the LVIA:

- LV1 - Trees, woodland and hedgerows removed during construction of the Scheme will be replaced in suitable locations as part of the landscape design.
- LV2 - New hedgerow planting (trees and shrubs). New lengths of hedgerow will be established where appropriate to integrate the new works with the existing landscape character and/or to screen or filter views from visual receptors.
- LV3 - Small areas of new woodland planting. Small patches of woodland will be planted to integrate the option with the existing landscape character and/or to screen or filter views from visual receptors. The species and density will be selected to relate to the distinct qualities of the landscape.
- LV4 - Extensive woodland planting. Large areas of new woodland will be planted to integrate the option with the existing landscape character and/or to screen views from visual receptors. The species and density will be selected to relate to the distinct qualities of the landscape.
- LV5 - Landform modification. Embankment and cutting slopes will be shaped to integrate the option with the surrounding existing landscape character and/or to screen views from visual receptors. Earthwork features may include linear earth bunds, convex slopes, broad landform mounds and false cuttings. The intention of some earth shaping will be to reduce the steepness and vertical edge of embankments or cuttings.
- LV6 - Reinstatement of stone walls or new stone walls. New stone walls to integrate the option with the existing landscape character and/or screen views from visual receptors.
- LV7 - Low lighting levels at junction. Design of lighting at junctions to integrate the option with the existing landscape character and/or minimise artificial lights being seen within the surrounding landscape.

15.5.2. Potential mitigation measures were considered for all the predicted adverse visual effects identified during the LVIA. These are listed in Tables 1.1 to 1.6 of Appendix A15.1 (Volume 4b). These measures are considered to help in reducing the level of effects but it is only in some cases that the level of effect has been reduced as is shown in the tables. At DMRB Stage 3 mitigation measures for the Preferred Option will be developed in more detail including those measures that have been considered at Stage 2.

15.6 Predicted Environmental Effects

15.6.1. This section presents the key predicted visual effects of the options. Predicted visual effects have been assessed prior to mitigation and the residual effects then evaluated following assumed mitigation (see Section 15.5 for assumed secondary mitigation measures).

15.6.2. A summary narrative of the key predicted visual residual effects for each option, provided below, describes the three Scheme sections from west to east across the study areas. The

descriptions capture the key findings of the assessment, with more detailed supporting assessments (based on the receptor specific identifiers used in brackets, e.g. J-N-1) set out in Appendix A15.2 (Volume 4b).

Hardmuir to Hillhead

15.6.3. The predicted effects of the North Option and South Option are set out in Appendix A15.2 (Volume 4b), Table 1.1. and Table 1.2 respectively.

15.6.4. The following are the key summary findings of the assessment of visual effects of the Hardmuir to Hillhead North Option:

- The majority of receptors which have been assessed as having the potential for significant visual effects due to the North Option are located within close proximity (approximately 0.3km) to the proposed option; and within the north-eastern part of the study area, specifically isolated residential receptors and recreational routes within open agricultural land to the north of Forres. The low number of significant effects identified elsewhere within the study area, including in Forres itself, is due mainly to: the higher level of woodland cover and subsequent low numbers of receptors within the western half of the study area; and the presence of built form within Forres providing a screen to views of the option within the central, southern portion of the study area;
- A small number of receptors are predicted to experience significant visual effects in the western section of the option study area, which are common to both options, specifically at Heathfield (J-N-6), Feddan (J-N-10), Brodie (J-N-13 and J-N-14), Tearie Farm (J-N-16) and Longley (J-N-17) which are located in close proximity to the option. The potential for glimpsed views of the option from the Brodie Castle estate has also been identified (J-N-15). Between the Forres West junction for the North Option and the vicinity of the River Findhorn a small number of receptors close to the route option would experience significant visual effects, including at Banarach (J-N-18), East Lodge (J-N-56), Dalvey Cottages (J-N-54), Dalvey Smithy Cottages (J-N-55) and at Greeshop House (J-N-30);
- The main group of significant effects within the north-eastern part of the study area are predicted for:
  - Residential receptors located within open arable farmland, for example: Monkland and Waterford Farms (receptor J-N-32); Middlefield and Lingieston (J-N-37); Milton of Grange (J-N-39); Cassieford Cottages/Cassieford (J-N-41 & 42); Tarras (J-N-46) and properties at Hillhead (receptor J-N-49); and
  - Users of the Moray Coast Trail (J-N-36).
- The western extent of the study area has a higher level of woodland cover than the central and eastern extents, limiting the number of receptors and views of the proposed option. However, the central and eastern extents of the study area largely comprise open arable farmland, with receptors experiencing open views towards the option;
- The majority of the road alignment for the North Option would be partially raised above the surrounding landscape on embankment, increasing its potential visibility to surrounding receptors. However, aside from its central extent which is located to the north of Forres, its eastern and western extents are situated close to the existing A96 and, to a lesser extent, the Aberdeen - Inverness Railway Line. The North Option's visual connection with existing linear infrastructure would limit visual change on receptors;

- The two proposed road junctions, to the west and east of Forres, would be located adjacent to the existing A96 and would visually associate with existing road infrastructure, limiting the potential visual change. The Forres West junction would also benefit from woodland screening directly to the south at Tearie Moss (within the Darnaway Castle GDL) and the Forres East junction would be screened from the south by directly adjacent woodland and minor landform undulations in the vicinity of Forres Enterprise Park. However, significant visual effects partly attributed to the new junctions are predicted for the following receptors:
  - In the vicinity of the Forres West junction: Longley (J-N-17), Woodside (J-N-59) and Tearie Farm (J-N-16)
  - In the vicinity of the Forres East junction: Tarras (J-N-46), South Lodge (J-N-57) and Sheraton House (J-N-49)
- One key bridge structure is proposed across the River Findhorn, directly to the west of Forres. This crossing would give rise to a localised significant visual effect on users of the paths beside the Findhorn (receptor J-N-28). However, the position of the bridge structure directly to the north of an existing railway bridge and the presence of tree cover beside the Findhorn, would limit adverse visual effects of the structure, particularly on nearby residential receptors which would have limited views of it.

15.6.5. The following are the key summary findings of the assessment of visual effects of the Hardmuir to Hillhead South Option:

- The majority of receptors which have been assessed as having the potential for significant visual effects due to the South Option are located within the central and eastern part of the study area, specifically to the south of Forres. The low number of significant effects identified within the western part of the study area is due mainly to the level of woodland cover which would limit the number of receptors with potential views of the option and the relatively low density of houses in this section (see paragraph 15.6.4 for a description of receptors in the western part of the study area which are common to the two route options);
- The key individual or groups of significant visual effects predicted due to the South Option are:
  - Residential and recreational receptors located 2km south-west of Forres. This is a slightly lower and flatter plain than is evident within the hills and woodland directly to the south and east. Receptors include: Newton of Dalvey (J-S-20); settlements at Mundole (J-S-23) and Riverview Park (J-S-22); and local routes within Limekilns Wood (J-S-25);
  - A small cluster of residential and recreational receptors located 1km south of Forres, in the vicinity of Dallas Dhu Distillery. This includes: a Moray Cycle Route (J-S-32); the Dava Way (J-S-34); and Sanquhar Mains (J-S-36);
  - 1km south-east of Forres, in the vicinity of Rafford and Cathay, where the option is on embankment around the north-west facing slope of Burgie Hill. Receptors here include: Marcassie Farm (J-S-39); Blervie (J-S-46); residential receptors at Knock (J-S-42); Wester Newforres (J-S-41); and a Moray Cycle Route (J-S-45);
  - Between the Rafford area and the Forres East junction, the route option follows an elevated alignment and significant visual effects are predicted for scattered properties with open views to the route at Easter Newforres (J-S-47), Pindler's Croft (J-S-58) and a group of houses at Burgie Lodge (J-S-57).
- Much of the South Option would be partially raised above the surrounding landscape on embankment, increasing its potential visibility within the study area, as would its

position on the slopes of a hill (e.g. Burgie Hill to the south-east of Forres). The option study area has a low level of existing built infrastructure and so, in the most part, the option would appear as a new feature which would be visually incongruous with its surroundings;

- The level of woodland cover, particularly within the western and central extents of the study area, would limit its visibility from the wider area and would limit the potential number of visual receptors that would experience visual effects. However, the visual enclosure of the option study area would have the potential to result in more localised, focused views of the option within smaller scale, more intimate landscapes and having the consequence of increasing the visual prominence of the route option within receptors' views;
- Three road junctions are proposed. The two junctions proposed to the west and east of Forres, would be located adjacent to the existing A96, in each case partially associating visually with existing road infrastructure, which would limit the potential visual change from the option. The Forres West junction would be screened by woodland located to the south at Tearie Moss (within Darnaway Castle GDL) however, significant effects are predicted at Woodside (J-S-61) and path network, Darnaway Castle (J-S-62). The Forres East junction would give rise to some significant visual effects on nearby residential receptors (i.e. J-S-51 – Firthview and J-S-56 – Hillcrest) given its slightly more elevated position on a raised landform. The Forres South junction would be located beside the A940 road and within woodland cover, limiting wider visual effects on receptors; and
- One key bridge structure is proposed across the River Findhorn, 2km south-west of Forres. This crossing would give rise to a localised significant visual effect on users of the paths beside the Findhorn and residential receptors in the Mundole area (e.g. Newton of Dalvey J-S-20; Riverview Park J-S-22; groups of houses at Springbank and Mundole Farm J-S-23; and local tracks through the Limekilns Wood area J-S-25). In this location the option would appear as a new visual feature, set away from other major road or rail crossings, potentially increasing the level of effects on adjacent receptors.

15.6.6. Assumed mitigation measures have been considered where they could reasonably be predicted to reduce the predicted significant visual effects on visual receptors, as set out in Section 15.5. On review of the findings of the assessment of effects on visual receptors in Appendix A15.2 (Volume 4b), it is considered that in general there would be slightly more opportunities to mitigate visual effects for the South Option than in the North Option, where typical secondary mitigation measures would most likely restrict the existing open views that receptors experience. In particular, to the south-east and east of Forres, there are some potential opportunities to mitigate significant effects, whilst protecting the existing views that receptors experience.

15.6.7. In general, whilst more opportunities have been identified to mitigate the visual effects identified on receptors of the South Option, it is predicted that mitigation measures would have limited reductions in visual effects for both the two options.

Hillhead to Lhanbryde

15.6.8. The predicted effects of the North Option and South Option are set out in Appendix A15.2 (Volume 4b), Table 1.3 and Table 1.4 respectively.

15.6.9. The following are the key summary findings of the assessment of visual effects of the Hillhead to Lhanbryde North Option:

- Predicted significant effects are identified throughout the study area, however there are some notable landform and woodland features which would restrict views and therefore limit adverse visual effects of the North Option from parts of the study area:
  - A ridge in the vicinity of Alves Wood, which is aligned west to east between Morayscairn and Church Cottages. This screens views of the North Option from receptors in much of the north-western part of the study area;
  - A south-west to north-east orientated ridge which is located at Quarrelwood and screens views of the option from part of the central, southern extent of the study area;
  - A ridge in the vicinity of Pitgaveny Wood which restricts views from part of the study area to the north-east of the option; and
  - A wooded ridge (Kirkhill Wood) at the eastern edge of Elgin, which restricts views of the option site from within Elgin.
- The following are key groups of significant visual effects that have been predicted in the assessment:
  - At the western extent of the option, between Glenburgie Distillery and Alves, significant effects are predicted on mainly isolated residential receptors to the north and south of the option. An exception to this is in the vicinity of Alves Wood where the option would be located south of the woodland which would screen views from further north. The option would be mainly at-grade throughout this section, with some cutting proposed, and would be located within gently undulating agricultural land. Aside from a small extent of the western extent of the option, beside Burgie Lodge (K-N-1) and Distillery Cottages (K-N-3), the option would be set away from the existing infrastructure including the existing A96 and would appear visually incongruous as new infrastructure within existing views of a rural landscape. Key receptors with predicted significant effects here are: houses at Brodieshill (K-N-7) and Morayscairn (K-N-10); and from groups of farms and houses in the strath area south of Alves Wood including at Asleisk (K-N-12), Rheeves/Toreduff (K-N-13) and Monaughty (K-N-17);
  - Between Alves and Newton the route crosses rising ground and the Aberdeen - Inverness Railway Line predominantly on embankment and includes the Elgin West junction. Significant visual effects in this location are predicted for a small number of receptors in this area including at Alves Station House and Cottages (K-N-19), at a row of properties with west facing views on the hillside at Carsehill (K-N22); at Ardgye House (K-N-26) and for users of routes between Cloves and Alves (K-N-20);
  - At the central extent of the option, between Newton Nursery and Hill of Spynie, there would be significant visual effects on mainly isolated and groups of residential receptors (e.g. K-N-29: houses around Newton House and Cottage; K-N-32: properties on the sloping ground between Pinewood Cottage and Dykeside; K-N-33: group of houses at Ardgilzean/Garage Cottage; K-N-36: Easter and Wester Kintrae Farm and properties; K-N-37: Loanhead/Sealladh; K-N-39: Westerton, Lower Mains and Midtown; K-N-47: Findrassie Lodge and the roadside properties along the minor road north from Findrassie towards Lossiemouth including Gilston (K-N-43) and Lochside Cottage (K-N-44)) and on some recreational routes, including a National Cycle Route (National Cycle Network Route 1, ref: K-N-35 and Moray Cycle route along the edge of Quarrel Wood (K-N-27 and K-N-44)). Within

this area, the North Option would be located on the broadly north facing lower slopes of Quarrelwood Hill and also at the southern extent of a wide, open and shallow strath in which it would appear in views as new infrastructure;

- At the eastern extent of the option, between Kirkhill Wood and Lhanbryde, it is predicted that there would be significant visual effects on mainly isolated residential receptors, such as: Muir of Linksfield and Pitgaveny Farm and cottages (K-N-53); Wester Calcots Farm and cottages (K-N-55); Kirkhill (K-N-59); Sheriffston (K-N-66); Greens of Coxton (K-N-63); and Barmuckity (K-N-58). Significant effects are also predicted in the vicinity of the eastern section of the option at Easter Coxton (K-N-71) which would have close range views of the road.
- Users of some local routes, including those in the vicinity of Calcots (K-N-59) and the River Lossie path (K-N-60), are also predicted to experience significant effects on visual amenity in some areas. Minor undulations in the landform throughout this area would result in narrow views of small sections of the option, limiting views in some locations. It is also of note that through some of this section, the option would be in proximity to the existing A96 and a railway line, limiting the extent of visual change from some receptors in proximity to existing infrastructure.

- Three junctions are proposed, to the west, north and east of Elgin:
  - The Elgin West junction is located 1km to the east of Alves and to the north of Carden Hill. This junction is located on the north facing slope of Carden Hill which would screen it from the south. The proposed junction and associated mainline would be partially cut into the landform, limiting visibility from the surrounding area, however a small number of residential receptors to the north of the option would experience significant visual effects, such as Ardyge and Ben Wyvis (K-N-26);
  - The Elgin North junction is located 1km to the north of Elgin. This junction is screened by extensive woodland cover in the vicinity of Spynie to the north-east and east. To the south and south-west, views would be more open and a small number of significant visual effects have been identified on residential receptors and a local route between Spynie Hill to Myreside Cottage (K-N-49); and Myreside properties (K-N-48). However, there are few visual receptors in an area of predominantly arable farmland and visual effects of the junction would be limited;
  - The Elgin East junction is located 1km to the east of Elgin. This junction is located directly beside the existing A96 and the proposed slip roads connect onto the existing A96. The junction would be largely screened from the north as a low rise in the landform screens views. However, receptors at: Barmuckity (K-N-58); Greens of Coxton (K-N-63); and Sheriffston (K-N-66), would have potential close-range views of the junction and experience significant visual effects.
- One main river is crossed, the River Lossie approximately 1km east of Elgin, and the structure required would be visually contained by woodland and minor landform undulations, limiting its visual effects.

15.6.10. The key findings of the assessment of visual effects of the Hillhead to Lhanbryde South Option are set out here:

- Predicted significant effects are identified throughout the study area, however there are some notable landform and woodland features which would restrict views and therefore limit adverse visual effects of the South Option from parts of the study area:
  - A ridge which runs from west to east between Morayscairn and Church Cottages, upon which Alves Wood is located, screening views from receptors within the study areas (the option passes through the northern part of the wood);

- A west to east orientated ridge which is located between Carden Hill and Quarrelwood and would screen views in the northern extent of the study area;
- Woodland cover and a north-west to south-east orientated ridge between the western extent of Elgin and Duffus Hillock, which is to the south-west of Elgin, and would screen views from Elgin;
- A series of woodland blocks and slight undulations in the landform between Birkenhill Wood to the south of Elgin and Mains of Coxton in the east which would screen views of the option locally.

- The following are key groups of significant visual effects that have been identified in the assessment:
  - In the western section of the option study area, significant visual effects are predicted at: Burgie Lodge (K-S-1), the Glenburgie Distillery Cottages (K-S-3), Brodieshill properties (K-S-7), properties at Carsehill (K-S-21) which overlook the route, various farmsteads and individual houses in the vicinity of Sweethillock and Cloves (K-S-22) and for the houses in relatively elevated positions and south-facing views of the road at Cairnstead and Easter Wards (K-S-24).
  - In the central part of the option, between Carden Hill and Wester Pittendreich, significant effects are predicted on mainly isolated residential receptors and some recreational routes, including: Lyneside (K-S-31); Burnside Farm (K-S-32); Lochinver, Whitefield Croft and Inverlochty properties (K-S-36, 37 & 39); and a Moray Cycle Route, the 'Elgin Experience' (K-S-35). In this area, the option would be located within a gently undulating landscape with only occasional belts of woodland and would appear in views as a new, major element of infrastructure within a rural landscape; at the eastern extent of the option, between Duffus Hillock and Greens of Coxton, there would be significant effects on occasional isolated residential receptors and recreational routes located in proximity to the option, such as at: the Kirkside/Dykeside area to the south of the route (K-S50); houses at Brackairlie, Blossombank and Burnside of Birnie (K-S-55); Birkenhill (K-S-58); Fairfield House (K-S-65),Troves (K-S-65); Wester Coxton (K-S-67); Lilac Cottage, Mains of Coxton and Doohill (K-S-70); and Easter Coxton (K-S-74). Where views of the option would be possible within this part of the study area, this would appear as a new, major element of infrastructure within a rural landscape given the lack of existing infrastructure here.

- Three junctions are proposed, to the west, south and east of Elgin:
  - The Elgin West junction would be located 2km to the west of Elgin. This junction would be situated in an open or gently sloping landscape and, although some screening would be provided by the landform, it would be visually prominent from a small group of isolated residential receptors within the local area such as at Inverlochty and Lochinver (K-S-39) and Aldroughty (K-S-42). The mainline between this junction and the crossing of the River Lossie (see below) would also have significant visual effects on: Dunroamin (K-S-40), Wester Manbeen (K-S45) and on users of local routes in the Miltonduff area (e.g. K-S-41);
  - The Elgin South junction is located approximately 1.5km to the south of Elgin. This would be largely screened to the east by extensive woodland cover at Birkenhill Wood. However, a small group of residential and recreational receptors are in close proximity and would experience close-range significant visual effects of the junction and mainline component of the option, such as: Birkenhill Wood properties (K-S-54); properties at Burnside of Birnie (K-S-55); and an aspirational Core Path (K-S-60);

  - The Elgin East junction is located 3km to the east of Elgin and 0.5km south-west of Lhanbryde. This junction would be largely screened by the surrounding woodland, railway line and landform slopes, however a small group of residential receptors is located in close proximity and would experience close-range significant visual effects of the junction and mainline component of the option, such as: Green Acres (K-S-73); Easter Coxton (K-S-74); and a recreational route (B9103, K-S-75).

- A link road is proposed between the Elgin West junction at Inverlochty and the western edge of Elgin, connecting to the existing A96. Visibility of this road would benefit from some screening to the north by Quarrelwood, however it would give rise to some significant visual effects on residential receptors in close proximity with typically south facing views, such as at: Aldroughty (K-S-42); Bruceland (K-S-43); on a local route to the south of Aldroughty Wood (K-S-44); and on the Riverside Caravan Park (K-S-80).
- One main river, the River Lossie, is crossed in two locations, at the aforementioned proposed access road beside Aldroughty (K-S-42) and 1.5km south-west of Elgin for the mainline of the option, in the vicinity of Mossend (K-S-49). At the bridge crossing locations the associated mainline would be elevated above the surrounding landscape on embankment and, as such, vehicles on the proposed option mainline would be more visible in views from the surrounding landscape including for users of local recreational routes east of the river (K-S-48).

15.6.11. Assumed mitigation measures have been considered where they could reasonably be assessed as reducing the predicted significant visual effects on visual receptors (see Section 15.5). On review of the findings of the assessment of effects on visual receptors in Appendix A15.2 (Volume 4b), it is considered that there would be slightly more opportunities to mitigate visual effects within the North Option than for the South Option. This is partly because there is a greater number of visual receptors experiencing significant visual effects in the North Option study area which would experience a reduction in visual effects with mitigation and the implementation of these (such as earth mounds and tree planting) would be less disruptive on longer range or more open existing views. Receptors experiencing significant visual effects due to the South Option tend to be located closer to the proposed scheme and secondary mitigation would restrict existing views across the wider landscape in some areas.

15.6.12. In general, whilst more opportunities have been identified to partially mitigate the visual effects identified on receptors of the North Option, it is predicted that mitigation measures would have limited reductions in visual effects for both options.

Lhanbryde to East of Fochabers

15.6.13. The predicted effects of the North Option and South Option are set out in Appendix A15.2 (Volume 4b), Table 1.5 and Table 1.6 respectively.

15.6.14. The following are the key summary findings of the assessment of predicted significant visual effects of the Lhanbryde to Fochabers North Option:

- The majority of receptors with the potential for significant visual effects of the option are located within the northern part of the study area, which is due mainly to a higher level of woodland cover in the southern part of the study area which screens views and limits the number of potential visual receptors;

- The following are the key groups of receptors with significant visual effects that have been predicted in the assessment:
  - Isolated residential receptors located within farmland at the western part of the study area, such as: Glenesk and Bogton (L-N-3); Greystokes/The Pines (L-N-6); Wester Marchfield (L-N-12); houses along the road west of Blackdam Wood (L-N-13); Easter and Wester Bauds Farms (and nearby house at The Cobbles) (L-N-14); at Ivy Cottage/Blackdam (L-N-16) and at Cowfords/Cowfords Cottages (L-N-18);
  - Recreational routes such as: a core path located to the north of Loch Na Bo (L-N-7: CPEG52); and some National Forest Recreational Routes (L-N-34) in the woodland areas east of Fochabers;
  - Residential receptors and recreational routes in and around Gordon Castle Estate, such as: Laundry Cottages (L-N-32); Gordon Castle Farm Properties (L-N-35); and recreational routes within and adjacent to the estate (L-N-29 & 30);
  - In and around Fochabers: from properties on Inchberry Road (L-N-26); from a small number of residential receptors at the western extent of Fochabers, i.e. Gordon Castle Gate Lodges (L-N-39) and a small group of properties directly beside the River Spey (L-N-40); and from residential receptors at the far eastern extent of Fochabers High Street (L-N-38), looking towards the proposed landform changes in the vicinity of Leitch's Wood.
- Two junctions are proposed, to the west and east of Fochabers:
  - The Mosstodloch junction takes advantage of woodland screening directly to its west at Balnacoul Wood; and is located 0.5km to the south of the existing A96. While the junction would have limited visual association with the existing A96, it would be located beside the B9015 single carriageway road which would limit the visual change. The mainline would be in cutting through this section and the adjacent slip roads would be most visible, limiting the visibility of traffic on the mainline. A small number of visual receptors which would likely experience significant visual effects here would be: Forestry Houses (L-N-20); and The Old School and Balnacoul (L-N-21);
  - The Fochabers junction would connect to the existing A98 road and would involve the introduction of a new roundabout with slip roads to the north of the existing roundabout at the east end of Fochabers. This junction would contribute to some significant visual effects on residential and recreational receptors within the Gordon Castle GDL (e.g. Laundry Cottages, L-N-32, Gordon Castle Farm, L-N-35 and the Gordon Castle tower). The utilisation of existing infrastructure along the stretch of the existing A96 sunk down in cutting between Gordon Castle and the town of Fochabers would, however, limit the extent of adverse visual effects in this area. Visual effects in the vicinity of the eastern junction are primarily predicted to be due to the elevation of the mainline above the height of the existing Fochabers bypass (the proposed mainline component of the North Option would be approximately 8m above the existing bypass road level);
- One key bridge structure is proposed across the River Spey, directly to the north-west of Fochabers. This crossing would give rise to localised significant visual effects on residential receptors at Inchberry Road (L-N-26) which have key views over the river and down Strathspey to the south. The position of the bridge structure near two existing bridges across the River Spey would limit the susceptibility for significant visual effects, particularly on users of the recreational routes to the north of the existing bridge crossings and the Speyside Way, although it would have significant visual effects on views from the old Fochabers Bridge experienced by pedestrians and cyclists.

15.6.15. The following are the key summary findings of the assessment of visual effects of the Lhanbryde to Fochabers South Option:

- There would be a slightly greater number of receptors with the potential for significant visual effects of the option located within the northern part of the study area, which is due mainly to a slightly higher level of woodland cover in the southern part of the study area which screens views and limits the number of potential visual receptors;
- The following are the key groups of predicted significant visual effects that have been identified in the assessment:
  - Isolated residential receptors located within farmland at the western extent of the study area, such as: Glenesk (L-S-3); two houses at Greystokes/The Pines (L-S-5); Wester Marchfield (L-S-11); houses along the road west of Blackdam Wood (L-S-12); properties at Cairnend/Trochelhill/Millhill (L-S-17) and at Ivy Cottage (L-S-15);
  - Recreational routes such as: a core path located to the north of Loch Na Bo (L-S-6: CPEG52); and some National Forest Recreational Routes (L-N-33) at the eastern end of the option;
  - Within the River Spey strath, on isolated residential receptors such as: properties around Westerton and Burnside of Dipple (L-S-19); and Newbiggin Cottages and properties at Dipple (L-S-21); and recreational routes, including a Scenic Speyside Cycle Route (L-S-22); and
  - On residential and recreational receptors in the vicinity of Ordiequish and Castle Hill as the South Option meets the higher ground prior to the eastern tie-in point of the road with the existing A96 south of Fochabers, in particular at: the far southern edge of Fochabers, including Castle Hill Farm (L-S-29); Upper Ordiequish (L-S-23); Ordiequish (L-S-26); and users of the Speyside Way (L-S-25) and a network of paths through the woodland east of the river in this area (L-S-24, 28 & 33).
- Two junctions are proposed, to the west and east of Fochabers:
  - The Mosstodloch junction would be located in the vicinity of Easter Bauds and, while it is predicted to give rise to a small number of significant effects on residential receptors in close proximity (e.g. Easter and Wester Bauds, L-S-13 and Ivy Cottage, L-S-15), screening features approximately 0.5km to the west (Threapland Wood) and east (Balnacoul Wood and associated ridge) would limit wider visual effects;
  - The Fochabers junction would be visually contained within surrounding woodland (Leitch's Wood and Slorach's Wood). Visual effects of the eastern junction would be associated within the mainline, which would give rise to a significant visual effect on recreational routes within Slorach's Wood (L-S-33) in this location.
- One key bridge structure is proposed across the River Spey, 0.5km to the south-west of Fochabers. The structure required would be long, beginning at Dipple and ending approximately 1.2km to the east at Castle Hill as the option approaches the hillside to the south-east of Fochabers. This would be a highly visible structure within the River Spey strath given the lack of screening features. Despite its large-scale and openness, the strath itself contains a low number of visual receptors, with significant effects identified on properties in the Dipple area (L-S-19 and L-S-21) and recreational routes such as a Scenic Speyside Cycle Route (L-S-22) which passes through the strath.

15.6.16. Assumed mitigation measures have been considered where they could reasonably be predicted to reduce the predicted significant visual effects on visual receptors, as set out in

Section 15.5. However, on review of the findings of the assessment of effects on visual receptors in Appendix A15.2 (Volume 4b), it is considered that, at this stage, relatively few clear opportunities to mitigate either the North or South Option have been identified.

Cumulative Effects

15.6.17. A review of the proposed future development areas from the Proposed Moray Local Development Plan (LDP) 2020 indicates that the following possible developments may lead to cumulative visual effects, in conjunction with the relevant route option, if they were to be built:

- In relation to the Hardmuir to Hillhead North Option, future developments around the industrial land at the Greshop area and mixed-use development sites clustered around the east end of Forres;
- In relation to the Hillhead to Lhanbryde North Option, potential development of mixed use sites around the Findrassie/Pitgaveny area north of Elgin;
- For the Hillhead to Lhanbryde South Option, potential residential and mixed-use development around the southern fringe of Elgin; and
- In relation to the Lhanbryde to East of Fochabers North Option, potential residential and industrial developments at Mosstodloch.

15.6.18. The potential for significant cumulative visual effects will be considered in detail during DMRB Stage 3, however it is not considered that the visual effects of these developments alter the overall findings of this options assessment.

15.7 Summary of Effects

15.7.1. This section sets out a summary of the key findings of the options assessment based on the predicted significant residual effects. The summaries are presented in Tables 15.1 to 15.3 below.

Table 15.1: Summary of Predicted Visual Effects: Hardmuir to Hillhead

Predicted Residual Effects for North Option	Predicted Residual Effects for South Option
• The option would be located within a largely rural area and would give rise to relatively few significant effects within the western and central parts of the study area due mainly to woodland screening and the influence of existing infrastructure. Significant effects in this section include at Feddan (J-N-10), Blinkbonny (including Rowan Cottage (J-N-13), Brodie (J-N-14), Banarach (J-N-18), Dalvey Smithy Cottages (J-N-55), Greshop (J-M-30) and for users of paths along the river Findhorn (J-N-28) which would be crossed by the new route. • The main group of significant effects are predicted within the north-eastern part of the study area, north of Forres, and would most notably affect receptors within open, flat arable farmland such as: Monkland and Waterford Farms (receptor J-N-32); Middlefield and Lingieston (J-N-37); Milton of Grange (J-N-39); Cassieford (J-N-49); and Hillhead (receptor J-N-49); and users of The Moray Coast Trail (J-N-36). • The two proposed junctions, to the west and east of Forres, would be located adjacent to the existing A96 and thus associated with existing infrastructure, generally limiting adverse visual effects. Significant effects are, however, predicted at Longley (J-N-17), Tearie Farm (J-N-16) and Woodside (J-N-59) for the Forres West junction and Tarras (J-N-46), South Lodge and Hillhead (J-N-57 and 49) at the Forres East junction.	• The option would be located within a largely rural area and would give rise to relatively few significant effects within the western part of the study area due to screening by woodland and the influence of existing infrastructure. Significant effects in this section include at Feddan (J-S-10), Brodie (J-S-14), and Newton of Dalvey (J-S20) • The main group of significant effects are predicted on residential and recreational receptors located: 2km south-west of Forres, including: Riverview (J-S-22), Mundole (J-S-23); and local routes within Limekilns Wood (J-S-25); a small cluster of residential and recreational receptors located 1km south of Forres, in the vicinity of Dallas Dhu, including: a Moray Cycle Route (J-S-32); the Dava Way (J-S-34); and Sanquhar Mains (J-S-36); and 1km south-east of Forres, in the vicinity of Rafford and Cathay, including: Marcassie Farm (J-S-39); Knock (J-S-42); Blervie (J-S-46); Wester Newforres (J-S-41); Pindler's Croft (J-S-58) and a Moray Cycle Route (J-S-45). • Three junctions are proposed. The junctions to the west and east of Forres would be located adjacent to the existing A96 and thus associated with existing infrastructure, limiting the visual change due to the option, whilst the Forres South junction is within extensive woodland cover, limiting the extent of visibility. Significant effects are predicted at Longley (J-S-17), Tearie Farm (J-S-16), Woodside (J-S-61) and the path network at Darnaway Castle (J-S-62) at the Forres West junction and the Hillhead area (e.g. J-S-51) at the Forres East junction.

Summary

15.7.2. The South Option would be visually contained by woodland, limiting its visual effects. However, it would give rise to significant visual effects on receptors within more open spaces to the south, south-east and east of Forres and overall would be predicted to have a greater number of significant visual effects than the North Option. The North Option is located closer to the existing A96, which limits its predicted visual change in some areas.

15.7.3. Overall the North Option is predicted to have less effects on visual amenity.

Table 15.2: Summary of Predicted Visual Effects: Hillhead to Lhanbryde

Predicted Residual Effects for North Option	Predicted Residual Effects for South Option
• The option study area comprises a largely rural landscape to the north of Elgin with variation in the landform. • The study area has a relatively low level of woodland cover, however some blocks of woodland provide some screening, such as Alves Wood and Quarrelwood. • There are significant visual effects identified throughout the study area. The following are key groups of receptors with significant visual effects predicted: at the western extent of the option, between Glenburgie Distillery and Alves (e.g. K-N-3 - Distillery Cottages;; K-N-17 – Monaughty & K-N-19 – Station House & Cottages; and K-N-22 Carsehill area); in the central part of the option, between Newton Nursery and Hill of Spynie (e.g. K-N-33 Ardgilzean; K-N-32 - Dykeside; K-N-36 - Easter Kintrae; K-N-37 – Sealladh/Loanhead; K-N-39 – Westerton and Midtown; K-N-44&47 – Lochside and Findrassie Lodge; and K-N-35 - National Cycle Network Route 1); and at the eastern extent of the option, between Kirkhill Wood and Lhanbryde (e.g. K-N-59 - Kirkhill; K-N-66 - Sheriffston; K-N-63 - Greens of Coxton; K-N-58 – Barmuckity and K-N-71 – Easter Coxton). • Three junctions are proposed, to the west, north and east of Elgin. All give rise to some significant visual effects, however nearby undulations in the landform and tree cover would limit their visibility on the wider study area. Key significant effects include at Ardgye (K-N-26) for the Elgin West junction, and at Myreside properties (K-N-48) for the Elgin North junction and Sheriffston (K-N-66) for Elgin East junction.	• The option study area comprises a largely rural landscape to the south of Elgin, with variation in the landform. • The study area has a fairly low level of woodland cover, however some blocks of woodland provide some screening, such as near Alves Wood, Quarrelwood and Birkenhill Wood. • The main significant effects would occur in the central and eastern parts of the study area, with the western extent being generally well screened by surrounding woodland and landform undulations and associating with the existing A96, which would limit visual effects. Key significant visual effects are: in the western section (e.g. K-S-1 – Burgie Lodge; K-S-3 – Distillery Cottages; K-S-22- Cloves and K-S-24 – Easter Wards), in the central part of the option, between Carden Hill and Wester Pittendreich (e.g. K-S-31 - Lyneside; K-S-32 - Burnside Farm; K-S-39 - Lochiver and Interlochty properties; K-S-40 – Dunroamin; and K-S-35 - the Elgin Experience Moray Cycle Route); and at the eastern extent of the option (e.g. K-S-49 – Mossend; K-S-65 – Troves; K-S-67 - Wester Coxton; K-S-70 - Lilac Cottage, Mains of Coxton and Doohill; and K-S-74 - Easter Coxton). • Three junctions are proposed, to the west, south and east of Elgin. All give rise to some significant effects. The Elgin West junction and an associated link road give rise to significant effects on adjacent residential and recreational receptors including at K-S-37 - Lochinver and at K-S-43 - Bruceland and K-S-42 Aldroughty. The Elgin South junction is predicted to have significant effects on properties at and near K-S-55 - Brackairlie, Blossombank and Burnside of Birnie; and whilst the Elgin East junction associates with the adjacent existing A96, visual effects are predicted, including at K-S-74 – Easter Coxton.

Summary

15.7.4. The North and South Options take very different routes on opposite sides of Elgin and, for each, the majority of effects would be on isolated residential receptors (both options are mainly screened from the main settlements by the landform, including Elgin). However, the South Option would be predicted to give rise to fewer visual effects overall, particularly at its western extent, which is well screened by the surrounding landform and woodland cover.

15.7.5. Overall the South Option is predicted to have slightly less effects on visual amenity.

Table 15.3: Summary of Predicted Visual Effects: Lhanbryde to East of Fochabers

Predicted Residual Effects for North Option	Predicted Residual Effects for South Option
• The option is located within a predominantly rural area which is well wooded in the west and eastern ends and less significant visual effects are predicted within the southern extent of the study area than the northern extent due to screening by the woodland cover. • Significant visual effects are most notably predicted for: receptors in the western extent of the study area (e.g. L-N-3- Glenesk; L-N-6 - Greystokes; L-N-12 - Wester Marchfield; L-N-13 – properties near Blackdam; L-L-N-16 - Ivy Cottage; L-N-7 – CPEG52 to the north of Loch Na Bo; and L-N-34 - National Forest Recreational Routes); on residential receptors and recreational routes in and around Gordon Castle Estate (e.g. L-N-32 - Laundry Cottage; L-N-35 - Gordon Castle Farm Properties; and L-N-29 - recreational routes within and adjacent to the estate); and in and around Fochabers (e.g. from L-N-26 - properties on Inchberry Road; from a small number of residential receptors at the western extent of Fochabers, i.e. L-N-40 – Gordon Castle Gate Lodges; and L-N-40 - a small group of properties directly beside the River Spey; and from L-N-38 - residential receptors at the eastern extent of Fochabers High Street, looking towards the proposed landform changes in the vicinity of Leitch's Wood). • Two junctions are proposed which would give rise to limited significant visual effects. The Mosstodloch junction would be visually contained by surrounding landform undulations and woodland cover (significant effects at L-N-21 - Balnacoul and L-N-20 – Crofts of Dipple) and the Fochabers junction would comprise an extension of the existing A96/A98 junction, with the more elevated mainline component of the option giving rise to some significant visual effects in this location including recreational users of paths in the woods east of Fochabers and within the Gordon Castle GDL.	• The option is located within a predominantly rural area which is well wooded in the west and eastern ends and fewer significant visual effects are predicted within the southern extent of the study area than the northern extent due to screening from woodland cover. • Significant effects are most notably predicted for: isolated residential receptors located within farmland at the western extent (e.g. L-S-3 – Glenesk; L-S-5 - Greystokes; L-S-11 - Wester Marchfield; L-S-12 – properties near Blackdam; L-S-8 – CPEG52 to the north of Loch Na Bo; and L-S-33 - National Forest Recreational Routes); within the River Spey strath, on isolated residential receptors (e.g. L-S-19 - Westerton properties; L-S-21 - Dipple properties and Newbiggin Cottages; and L-S-22 - Scenic Speyside Cycle Route); on residential and recreational receptors in the vicinity of Ordiequish and Castle Hill as the route option meets the higher ground prior to the eastern tie-in point (e.g. L-S-29 - Castle Hill Farm; L-S-23 - Upper Ordiequish; L-S-26 - Ordiequish; L-S-24 Core Path CP-FB21 and L-S-25 - the Speyside Way). • Two junctions are proposed which would both give rise to limited significant visual effects. The Mosstodloch junction would be visually contained within the open landscape space by surrounding woodland, although with significant effects at L-S-13 – Easter & Wester Bauds and L-S-15 Ivy Cottage. The Fochabers junction would be visually enclosed within surrounding woodland (Leitch's Wood and Slorach's Wood), although affecting local paths (e.g. L-S-33).

Summary

15.7.6. Both options would give rise to the same predicted visual effects at their western extents. Where the routes diverge and follow alignments to the north and south of Fochabers, the North Option would most notably give rise to significant visual effects on Inchberry Road properties and receptors within the Gordon Castle Estate, whilst the South Option would give rise to significant visual effects on receptors within the Spey strath, particularly in the vicinity of Dipple and Ordiequish. The number and level of visual effects for each of the options similar.

15.7.7. Overall both options are predicted to have a similar level of effects on visual amenity.

15.8 Scope of the DMRB Stage 3 Assessment

15.8.1. The DMRB Stage 3 assessment process will be based on GLVIA and DMRB (Volume 11, Section 3, Part 5, Landscape Effects). This maintains the approach taken at DMRB Stage 2, however a more detailed assessment of visual effects is required, as stated in paragraphs 9.9 to 9.11 (DMRB Volume 11, Section 3, Part 5, Landscape Effects Chapter 9).

15.8.2. DMRB Stage 3 visual assessment work will review and expand upon the baseline information collated during the DMRB Stage 2 assessment and will provide a more detailed assessment of effects on receptors within the study area.

15.8.3. The following will be key aspects of the DMRB Stage 3 visual assessment process:

- Initially the suitability of the 1km study area will be reviewed and it may be appropriate that this is extended to ensure that all significant effects are identified;
- A digital ZTV will be produced and will be updated during design development;
- Extensive site work will be carried out to identify all visual receptors within the chosen study area. This will be carried out from publicly accessible locations and will include all residential properties, roads, public buildings, work places and recreational buildings and outdoor locations to which the public has access;
- Visual effects will be assessed for both the construction and operational stages of the Scheme. For the operational stage, assessment of effects will be for Year 1 winter and Year 15 summer, as suggested by DMRB Volume 11, Section 3, Part 5 (within Annex IV, Photomontages and Sketches), unless otherwise agreed with consultees;
- Assessment of effects will be undertaken to inform the development of mitigation proposals. This will be carried out in conjunction with the assessment of landscape effects. The development of landscape and visual mitigation proposals will be carried out to ensure an integrated approach with scheme design;
- Particular consideration will be paid during Stage 3 to visual receptors for which significant residual effects have been identified at DMRB Stage 2; and
- Ongoing consultation with SNH and Moray Council will be undertaken during the DMRB Stage 3 assessment to input the scope of the assessment.

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16. Cultural Heritage

16.1 Introduction and Scope

16.1.1. This chapter sets out the predicted effects on cultural heritage arising from the options for the A96 Dualling Hardmuir to Fochabers Scheme.

16.1.2. This chapter is supported by Figures 16.1, 16.2 and 16.3 (Volume 5) and the following appendices (Volume 4b):

- Appendix A16.1: Gazetteer; and
- Appendix A16.2: Impact Assessments for Heritage Assets.

16.2 Approach to Assessment

Introduction

16.2.1. The assessment follows the guidance outlined in Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3, Part 2, HA 208/07 Cultural Heritage and is completed in accordance with relevant Chartered Institute for Archaeologists (CIfA) standards and guidance as well as taking cognisance of existing legislation and Historic Environment Scotland (HES) policy and guidance, comprising:

- CIfA (2017) Standard and guidance for historic environment desk-based assessment. Available at https://www.archaeologists.net/sites/default/files/CIfAS%26GDBA_3.pdf
- The Scottish Government (2014) The Historic Environment Scotland Act 2014, available at http://www.legislation.gov.uk/asp/2014/19/pdfs/asp_20140019_en.pdf
- The Scottish Government (2014) Scottish Planning Policy available at https://www.gov.scot/Resource/0045/00453827.pdf
- HES (2016) Managing Change in the Historic Environment: Setting, available at https://www.historicenvironment.scot/archives-and-research/publications/publication/?publicationId=80b7c0a0-584b-4625-b1fd-a60b009c2549
- HES (2016) Historic Environment Scotland Policy Statement 2016, available at https://www.historicenvironment.scot/advice-and-support/planning-and-guidance/legislation-and-guidance/historic-environment-scotland-policy-statement/
- UK Government, Ancient Monuments and Archaeological Areas Act 1979, available at http://www.legislation.gov.uk/ukpga/1979/46/pdfs/ukpga_19790046_en.pdf
- UK Government, Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997, available at http://www.legislation.gov.uk/ukpga/1997/9/contents

Sources of Information

16.2.2. The following additional sources of information have been used for this assessment:

- HES datasets, updated in May 2018:
  - Listed Buildings

  - Scheduled Monuments
  - Inventory of Gardens and Designed Landscapes
- Moray Council Sites and Monuments Record (SMR), updated datasets April 2018;
- Highland Council Historic Environment Record (HER), accessed December 2016;
- The National Record of the Historic Environment (NRHE) available at https://canmore.org.uk/ and accessed continually to provide additional information; and
- Notes from site visits and field observations undertaken in 2017 and 2018.

Consultation

16.2.3. Consultation has been undertaken with HES, Moray Council and Aberdeenshire Council Archaeology Service (ACAS) in their role as advisers to Moray Council in matters pertaining to archaeology. Highland Council was also contacted in relation to the extent of the Hardmuir to Hillhead section located within their authority area. Comments were sought from all the above consultees on potential impacts on cultural heritage assets arising from the options.

16.2.4. HES provides advice on all heritage assets which are protected by statutory legislation, including Scheduled Monuments, Category A Listed Buildings and sites included in the Inventory of Gardens and Designed Landscapes. Topics highlighted during discussion through meetings and email correspondence with HES included:

- Agreement of the methodology based on DMRB, accepted practice and relevant HES and CIfA guidance;
- The ongoing process to remove dual designation from specific sites protected as both Scheduled Monuments and A Listed Buildings (including Dallas Dhu Distillery and Coxton Tower)[93];
- The importance of relevant designated heritage assets and potential impacts to sensitive sites along the Scheme; and
- Agreement to continued consultation during the development of the DMRB Stage 3 process and beyond.

16.2.5. ACAS maintains the Moray Council Sites and Monuments Record. During consultation conducted through meetings, phone calls and email correspondence, ACAS:

- Agreed the approach employed at DMRB Stage 2 was in accordance with their requirements;
- Confirmed they were content to act as main point of contact for archaeological issues and would liaise with Highland Council to ensure consistency across the Scheme; and
- Discussed the geographic spread of the SMR sites, noting the preponderance of prehistoric cropmark sites in proximity to the northern options is partly due to historic land usage and discovery through deep ploughing in the northern study area, rather than a complete lack of occupation during prehistory in the southern study area.

[93] Both sites were de-Scheduled by HES during the assessment process: Dallas Dhu on 23/01/18 and Coxton Tower on 24/04/18

16.2.6. A meeting with Moray Council Planning Officer (Listed Buildings and Conservation Areas) in July 2017 highlighted concern for particular monuments along the Scheme, including the A Listed Dallas Dhu Distillery and A Listed Pittensair House.

16.2.7. Correspondence conducted with Highland Council through email and phone conversation in November 2017 noted that:

- They were content for ACAS to lead on potential archaeological impacts on the part of the Scheme in the Highland Council area; and
- There were no significant impacts anticipated in the area under the Highland Council authority.

Assessment Methodology

16.2.8. The Stage 2 assessment was based on DMRB (Volume 11, Section 3, Part 2 HA 208/07 Cultural Heritage) 'Simple Assessment' methodology (see Section 8.3 in Chapter 8, Introduction and Approach to Environmental Assessment). Simple Assessment was considered suitable to reach an appropriate understanding of the potential effects of the route options and to inform the DMRB Stage 2 design development.

16.2.9. The assessment considered monuments protected by statutory designation as well as those identified as Regionally Significant by Moray Council SMR. Historic landscape evidence was not assessed beyond consideration of those GDL sites considered nationally significant. Categories of site considered in the assessment include:

- Scheduled Monuments;
- Gardens and Designed Landscapes (GDL);
- Listed Buildings;
- Regionally Significant archaeological sites; and
- Conservation Areas.

16.2.10. A study area extending 500 metres (m) from the outermost edge of the route options was defined, with heritage assets assessed for direct (physical and setting) and indirect impacts. Direct impacts are those that arise as a clear consequence of the Scheme, such as alteration to the fabric of a building or archaeological site (physical) or the change to the setting of an asset (setting). Indirect impacts are those which can be considered a secondary consequence, such as the change in use of land or a structure as a result of the Scheme. Adoption of a 500m study area meant that assets identified were adequately understood within their context, whilst ensuring that setting issues were fully identified and addressed. At the request of HES, one heritage asset (Spynie Palace MMS232) located just outwith the 500m corridor was considered during the assessment.

16.2.11. Desk-based research informed a baseline for the study area of each option. This was used to identify key assets where potential impacts were predicted. Targeted surveys and site assessments were completed for sites to inform the impact assessment. Visiting individual heritage assets allowed the setting of each site to be clearly understood and the potential effects of the route options to be assessed.

16.2.12. In line with guidance for Stage 2 in the DMRB, heritage assets are assigned a level of sensitivity or value. The magnitude of impact on the assets is assessed and correlated with the assigned value to provide the predicted significance of effect. This process is informed by a series of tables which have been collated following accepted practice and guidance. The tables presented in DMRB (Volume 11, Section 3, Part 2 HA 208/07 Cultural Heritage) for archaeological sites, built heritage and historic landscapes have been modified and combined to accurately reflect the heritage assets covered by the methodology. The assets values used in this assessment are presented in Table 16.1 below. Those criteria in the DMRB standard example which were either not present in the respective study areas or not considered at Stage 2 have been removed from the table.

16.2.13. Following completion of the baseline survey, each heritage asset has been categorised using an assessment of its cultural heritage sensitivity/value along with professional judgement. A monument's statutory designation is also used to inform this process where relevant.

Table 16.1: Heritage Asset Value

Sensitivity / Value	Criteria
High	• Scheduled Monuments (including proposed sites). • Category A Listed Buildings. • Other Listed Buildings that can be shown to have exceptional qualities in their fabric or historical associations not adequately reflected in the listing grade. • Sites in the Inventory of Gardens and Designed Landscapes. • Undesignated sites assessed as being of national importance.
Medium	• Category B Listed Buildings. • Conservation Areas. • Undesignated sites (including buildings) assessed as being of regional importance.
Low	• Category C Listed Buildings.

16.2.14. The magnitude of impact on heritage assets has been categorised on a five-point scale, from an anticipated 'major adverse' impact to one of 'no change'. It is not predicted that the assessment would result in any clear beneficial impacts on the monuments and potential beneficial impacts are therefore not considered. The magnitude of impact, as shown in Table 16.2 below, has been assigned using professional judgement guided by the criteria provided in Table 16.1. This assessment is supported by site visits which were undertaken to review key heritage assets.

Table 16.2: Impact Magnitude Criteria

Magnitude	Criteria
Major	Change to most or all key archaeological materials, such that the resource is totally altered. Comprehensive changes to setting such that the ability to appreciate the heritage asset is entirely compromised. Change to most or all key historic landscape elements; extreme visual effects; change of sound quality; fundamental changes to access or use; resulting in a total change to the historic landscape character.
Moderate	Changes to many key archaeological materials, such that the resource is clearly modified. Considerable changes to setting that affect the character of the asset and severely affect the ability to appreciate the asset. Change to many key historic landscape elements; visual change to many key aspects; noticeable difference in sound quality; considerable changes to access or use; resulting in moderate changes to the historic landscape character.
Minor	Changes to key archaeological materials, such that the asset is slightly altered. Slight changes to setting that will have a minor effect on the ability to appreciate the asset. Change to few key historic landscape elements; slight visual change to few key aspects; limited change in sound levels; slight changes to access or use; resulting in minor changes to the historic landscape character.
Negligible	Very minor changes to archaeological materials or setting. Very minor changes to few key historic landscape elements; virtually unchanged visual effects; slight changes in sound levels; very slight changes to access or use; resulting in a very small change to the historic landscape character.
No Change	No change.

16.2.15. The significance of effect has been defined by correlating the value of a heritage asset with the magnitude of the potential impact and informed by the criteria in Table 16.3 below. In this assessment, impacts of 'moderate' significance and above are considered to be 'significant' and therefore most likely to inform selection of a Preferred Option. Where two alternatives are provided in the table (e.g. Moderate/Major significance), professional judgement has been used to define a single significance rating.

Table 16.3: Matrix of Effects Significance

	Magnitude of Effect				
Sensitivity	**Major**	**Moderate**	**Minor**	**Negligible**	**No Change**
High	Major	Moderate / Major	Minor / Moderate	Minor	Neutral
Medium	Moderate / Major	Moderate	Minor	Negligible / Minor	Neutral

	Magnitude of Effect				
Sensitivity	**Major**	**Moderate**	**Minor**	**Negligible**	**No Change**
Low	Minor / Moderate	Minor	Negligible / Minor	Negligible / Minor	Neutral
Negligible	Minor	Negligible / Minor	Negligible / Minor	Negligible	Neutral

Assumptions and Limitations

16.2.16. While heritage assets within the study area were visited during site visits, none of the options has been subject to a full archaeological walkover survey or archaeological investigation designed to identify previously unrecorded archaeological sites. The assessment is therefore based primarily upon those heritage assets previously recorded in databases and documentary sources. This methodology is in accordance with DMRB (Volume 11, Section 3, Part 2 HA 208/07 Cultural Heritage) Simple Assessment and a level of investigation expected for DMRB Stage 2 Assessment.

16.2.17. Final details of structure designs, associated landscape design and final land-take are not available at this stage and have therefore not been used in this assessment although key design information set out in Volume 1, Chapters 5 to 7 (Engineering Assessments) have informed the assessment.

16.2.18. This chapter focusses on the permanent effects predicted from the options. At this stage of the design and assessment process, the exact nature, location and scale of construction activities has not been established and it is not possible to assess the impact of these on heritage assets. The cultural heritage baseline will be considered when planning the detail of construction activities and infrastructure.

16.3 Baseline Environment

Study Area Context

16.3.1. The summary baseline for each of the options is provided in this section with full details provided in Appendix A16.1 (Volume 4b). Each heritage asset has been assigned a unique identifying number prefixed by MMS. This number corresponds with more detailed information on the asset available in Appendix A16.1 (Volume 4b). The locations of these assets can be viewed in the accompanying Figures 16.1, 16.2 and 16.3 (Volume 5).

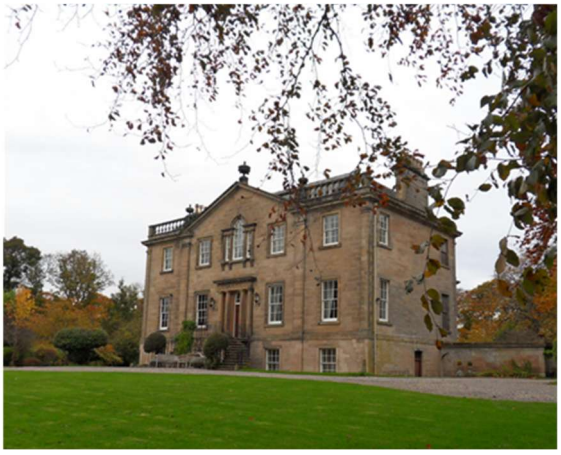
16.3.2. The descriptions presented in this chapter are designed to provide an indication of the nature of the historic landscape and the types of heritage assets found within the respective study areas. The heritage assets discussed are not exhaustive, but the summaries are intended to highlight the key assets within the study area of each option. Full lists of heritage assets recorded within the study areas of each option and the assessment of the predicted effects from the options are set out in full in Appendix A16.2 (Volume 4b).

Hardmuir to Hillhead

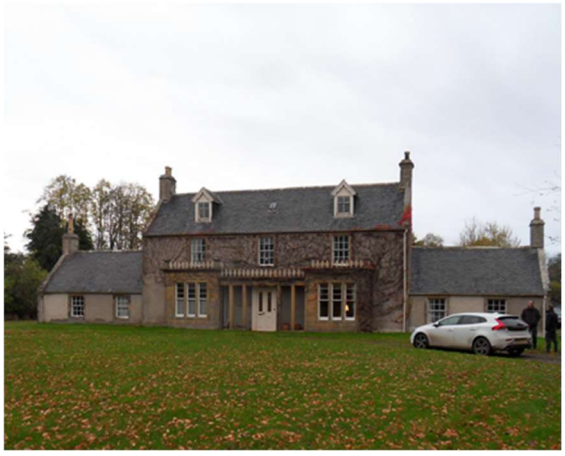
16.3.3. At the western end of this section, the North and South Options follow the same alignment, diverging south of Brodie Castle onto their respective alignments to the north and south of Forres. This area of common route corridor contains the B Listed Feddan Farmhouse (MMS105) and C Listed Earlsmill Bridge (MMS103). This is also the case at the eastern end of the section, where the options converge adjacent to B Listed Burgie Lodge (MMS149).

North Option

16.3.4. The cultural heritage baseline of the North Option is characterised by the presence of houses and estates dating from the 18th and 19th centuries. At the western end, Brodie Castle GDL (MMS002) lies to the north and Darnaway Castle GDL (MMS003) to the south, while associated buildings such as A Listed Darnaway Gate Lodge (MMS113) and C Listed Brodie Castle Station Lodge (MMS102) lie within the study area. In addition, Listed Buildings at; the Dalvey House Estate (including C Listed Dalvey House East Lodge (MMS111) and the B Listed Dalvey House (MMS107) - Photograph 16.1); B Listed Greshop House (MMS136 - Photograph 16.2); B Listed Bogton (MMS139); B Listed Springfield House (MMS138); and the Grange Hall Estate (including the C Listed Walled Garden (MMS127) and B Listed Grange Hall South Lodge (MMS126), but excluding Grange Hall itself) are all located within the North Option study area.



Photograph 16.1: Dalvey House MMS107



Photograph 16.2: Greshop House MMS136

16.3.5. A number of smaller domestic buildings such as C Listed Tearie Farmhouse (MMS114) and B Listed Dalvey Cottage (MM112) are also located west of Forres.

16.3.6. In addition, the cultural heritage baseline is characterised by the presence of heritage assets indicative of prehistoric occupation, including Sueno's Stone, an intricately carved Pictish cross-slab, and cropmarks showing enclosures and a possible prehistoric settlement at Greshop Farm. Both Sueno's Stone and Greshop Farm are Scheduled Monuments, recorded as MMS005 and MMS004 respectively. Several prehistoric cropmark sites are also notable, particularly the Regionally Significant cropmark sites at Longley (MMS194), Newton of Dalvey (MMS193 and MMS210) and Waterford Road (MMS214). Variously

interpreted as enclosures, hut stances, ring ditches and a possible timber hall, these cropmarks are likely indicative of prehistoric settlement.

16.3.7. The North Option crosses the River Findhorn adjacent to the A Listed Findhorn Viaduct, MMS135.

South Option

16.3.8. The South Option does not have the same level of recorded historical occupation as the North Option, partly from the presence of more undulating, less fertile land. While this may have resulted in lower occupation levels, it is also due to less deep ploughing taking place. Such agricultural methods can often lead to the discovery of archaeological deposits.

16.3.9. Passing south of the Brodie Castle GDL (MMS002), the South Option directly crosses the northern extent of the Darnaway Castle GDL (MMS003), with the A Listed Darnaway East Lodge (MMS113) also located within the study area. Other key Listed Buildings include C Listed Tearie Farmhouse (MMS114); B Listed East Lodge (MMS156) on the northern limit of the Altyre estate; A Listed Mains of Blervie (MMS148); and B Listed Cathay House (MMS140).

16.3.10. The A Listed Dallas Dhu Distillery complex (MMS134) lies on the northern edge of the study area and the South Option crosses the recently de-Scheduled area (see Section 16.2). This area, MMS199 is identified as Regionally Significant on the SMR and encompasses elements such as the former railway line and the below ground water supply associated with the distillery.

16.3.11. Two Regionally Significant prehistoric cropmark sites at Newton of Dalvey (MMS193 and MMS210) are also identified within the study area for this option. These are interpreted as evidence for prehistoric occupation and include pits, enclosures, a ring ditch and a possible timber hall.

Summary

16.3.12. Table 16.4 below presents a summary list of the numbers of heritage assets identified within the respective study areas as defined by the criteria established in the methodology.

Table 16.4: Summary of Baseline: Hardmuir to Hillhead

Heritage Assets	Number within Study Area	
	North Option	South Option
Scheduled Monument	2	1
Garden and Designed Landscape	2	2
Category A Listed Building	2	3
Category B Listed Building	16	10

Heritage Assets	Number within Study Area	
	North Option	South Option
Category C Listed Building	10	3
Regionally Significant Archaeological Site	9	5
Conservation Area	1	0

Hillhead to Lhanbryde

16.3.13. The Regionally Significant Newmill cropmark (MMS222) is located at the western end of this section, located a short distance to the north of the route options before the two option alignments diverge.

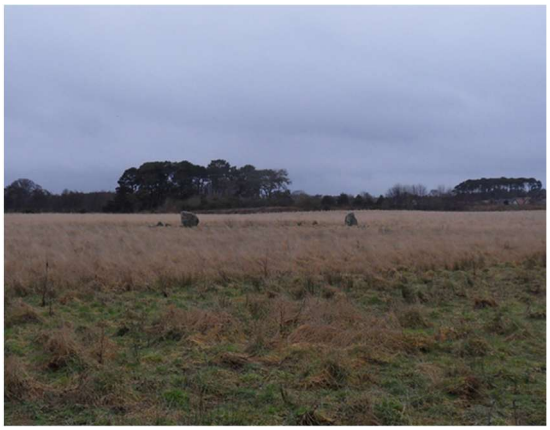
North Option

16.3.14. At the western end, there is a degree of archaeological potential indicated by Regionally Significant prehistoric cropmarks at Kilbuiack (MMS216) and Newmill (MMS222 – above). However, the landscape south of Alves Wood through which the North Option passes contains few designated heritage assets, with the exception of Alves Parish Church (MMS121).

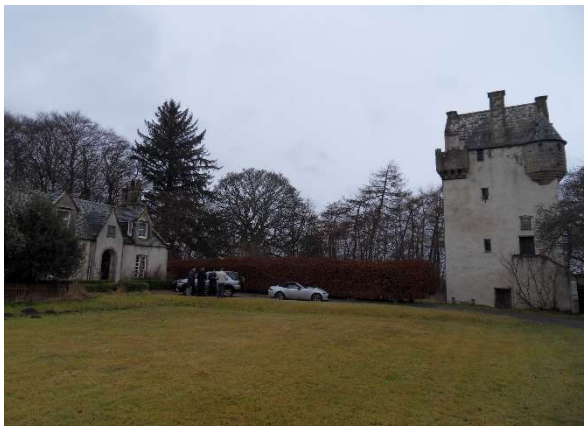
16.3.15. North and west of Elgin several Listed Buildings lie within the study area, predominantly large 19th century farmhouses and houses such as Newton House (MMS116) and Findrassie House (MMS154). The majority of these, including Rosebrae House (MMS145) and Wester Kintrae Farmhouse (MM147) are B Listed Buildings.

16.3.16. To the north and east of Elgin a concentration of cropmarks indicates potential for extensive prehistoric activity. Three of these sites at Midtown, Myreside and Barmuckity are considered Regionally Significant (MMS212, MMS215 and MMS190 respectively).

16.3.17. South of Lhanbryde the pattern of prehistoric settlement continues with the Bogton Stone Circle Scheduled Monument (MMS007 - Photograph 16.3) and Regionally Significant cropmarks at Lhanbryde (MMS204) and Bogton (MMS221). In this area the North Option also passes to the north of A Listed Coxton Tower and adjacent C Listed Coxton Tower House (MMS163 and MMS164 - Photograph 16.4).



Photograph 16.3: Bogton Stone Circle MMS007 from the south-east



Photograph 16.4: Coxton Tower House (MMS163 left) and Coxton Tower (MMS164 right)

16.3.18. Spynie Palace (MMS232) lies to the north-west of Elgin, a short distance beyond the 500m study area. The remains of this prominent fortified residence originate in the 14th century and are included in the assessment at the request of HES.

South Option

16.3.19. There is evidence of prehistoric activity in cropmarks at the western end of the Scheme, particularly the Regionally Significant site at Kilbuiack/Newmill (MMS216), the exact location of which is unclear. However, there are few significant heritage assets recorded between Hillhead and the River Lossie, apart from the B Listed Alves Parish Church (MMS121) which lies a short distance to the south of the option.

16.3.20. This pattern continues south of Elgin, although a Regionally Significant cropmark site at Lochinver (MMS202) is notable. A Listed Pittendreich Dovecot (MMS124) is also located within the study area, while the link road from the Elgin West junction to the existing A96 passes two B Listed Buildings (Aldroughty House (MMS152) and The Bield (MMS153)) and a further three Regionally Significant cropmark sites (MMS186, MMS197 and MMS217).

16.3.21. The landscape south of Lhanbryde is sensitive, with evidence of prehistoric occupation from the Scheduled Bogton Stone Circle (MMS007 - Photograph 16.3) and two Regionally Significant cropmark sites (MMS204 and MMS221). The A Listed Coxton Tower and accompanying C Listed Coxton Tower House (MMS163 and MMS164 - Photograph 16.4) both lie a short distance north of the South Option.

Summary

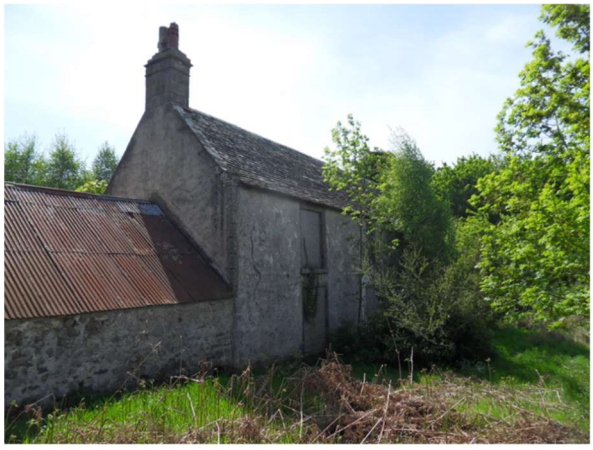
16.3.22. Table 16.5 below presents a summary of the numbers of heritage assets identified within the respective study areas as defined by the criteria established in the methodology.

Table 16.5: Summary of Baseline: Hillhead to Lhanbryde

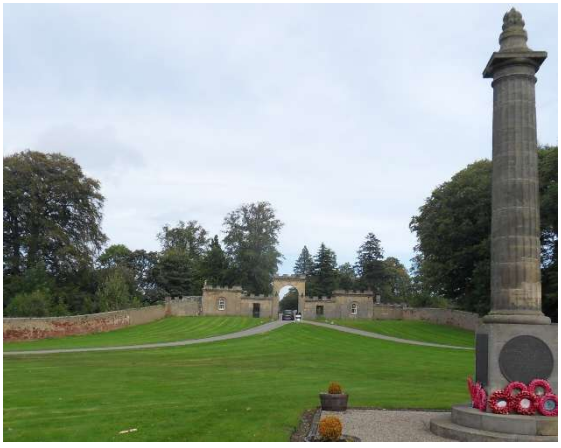
Heritage Assets	Number within Study Area	
	North Option	South Option
Scheduled Monument	2[94]	1
Garden and Designed Landscape	0	0
Category A Listed Building	2	3
Category B Listed Building	14	9
Category C Listed Building	7	2
Regionally Significant archaeological site	12	13
Conservation Area	0	0

Lhanbryde to East of Fochabers

16.3.23. At the western and eastern ends of this section, the North and South Options follow short sections of common route alignment, diverging at Blackdam and merging again east of Fochabers. The common alignments covered by both options contains the three Regionally Significant cropmark sites (MMS195, MMS213 and MMS228) east of Lhanbryde, as well as A Listed Pittensair House (Photograph 16.5 - MMS168) and B Listed Bridge over the Meikle Dramlach Burn (MMS123).



Photograph 16.5: Pittensair House (MMS168) from the north-east



Photograph 16.6: Looking north-east towards the Gordon Castle West Lodge MMS092

North Option

16.3.24. The primary cultural heritage characteristic of the North Option is the proximity with which it passes adjacent to the historic town of Fochabers, bordered by the Conservation Area

[94] Spynie Palace (MMS232) lies outwith the 500m Study Area but is included at the request of HES

(MMS009) to the south and the Gordon Castle GDL (MMS001) to the north. Fochabers contains over 60 Listed Buildings within the Conservation Area boundary and the limits of the Gordon Castle GDL and these are presented in Appendix A16.1 (Volume 4b). Outwith this concentration of cultural heritage sites, there are a number of other important heritage receptors in the study area for the North Option. These are set out in Table 16.6 below.

Table 16.6: Cultural Heritage Sites outwith Gordon Castle GDL and Fochabers Conservation Area

MMS Number	Designation	Name
MMS161	A Listed Building	(Old) Spey Bridge
MMS168	A Listed Building	Pittensair House
MMS160	B Listed Building	Mosstodloch, Cosy Corner
MMS162	B Listed Building	Spey Bridge, Old Toll House
MMS172	B Listed Building	Crofts of Dipple
MMS123	B Listed Building	Bridge over Meikle Dramlach Burn
MMS195	Regionally Significant archaeological site	Pittensair Cropmark
MMS213	Regionally Significant archaeological site	Larchfield Cropmark
MMS228	Regionally Significant archaeological site	Lhanbryde Cropmark

16.3.25. Notable sites within Fochabers and the Gordon Castle GDL include the A Listed Gordon Castle Chapel (MMS014); Gordon Castle East Lodge (MMS061); Gordon Castle West Lodge (MM092); Gordon Castle Lakeside House (MMS096); and Gordon Castle Farm (MMS231).

16.3.26. At the western end of this section, there are a number of Regionally Significant prehistoric cropmark sites in the landscape south and east of Lhanbryde with other cropmark sites in the area between Lhanbryde and Fochabers indicating a degree of archaeological potential. These are listed in Table 16.7 below.

South Option

16.3.27. While there is evidence for prehistoric activity through non-designated cropmarks at Blackdam, the landscape of the South Option study area is predominantly devoid of recorded heritage assets.

16.3.28. Earthworks have been recorded on Castle Hill (MMS191) overlooking Mains of Blackdam. The option passes in close proximity to MMS157, the C Listed Dipple Burial Ground, before crossing the River Spey.

Summary

16.3.29. Table 16.7 presents a summary of the numbers of heritage assets identified within the respective study areas as defined by the criteria established in the methodology.

Table 16.7: Summary of Baseline: Lhanbryde to East of Fochabers

Heritage Assets	Number within Study Area	
	North Option	South Option
Scheduled Monument	0	0
Garden and Designed Landscape	1	0
Category A Listed Building	9	1
Category B Listed Building	42	1
Category C Listed Building	27	3
Regionally Significant archaeological site	5	4
Conservation Area	1	0

16.4 Potential Impacts

16.4.1. This section presents the potential impacts of the options (set out in Tables 16.8 – 16.10 below). Impacts shown in the tables which are not predicted to be potentially significant have not been assessed or reported further in this chapter. Further details of the predicted impacts assessed for each individual heritage asset within the respective study areas are presented in Appendix A16.2 (Volume 4b).

Table 16.8: Potential Impacts for Hardmuir to Hillhead - North and South Options

Potential Impact (taking account of sensitivity of baseline)	Adverse / Beneficial	Magnitude		Potentially Significant?	
		North	South	North	South
Permanent Impacts					
• Predicted impacts on the setting of High sensitivity Scheduled Monuments from the proximity of the new road and associated infrastructure	None	No Change	No Change	x	x
• Predicted impacts on the setting of High sensitivity GDLs from the proximity of the new road and associated infrastructure	Adverse	Minor	Minor	x	x
• Predicted direct impacts on High sensitivity GDLs from the new road and associated infrastructure	Adverse	n/a	Moderate	x	✓
• Predicted impacts on the setting of High sensitivity Category A Listed Buildings from the proximity of the new road and associated infrastructure	Adverse	Minor - Moderate	Negligible - Minor	✓	x
• Predicted impacts on the setting of Medium sensitivity Category B Listed Buildings from the proximity of the new road and associated infrastructure	Adverse	No Change - Major	No Change - Moderate	✓	✓
• Predicted impacts on the setting of Low sensitivity Category C Listed Buildings from the proximity of the new road and associated infrastructure	Adverse	No Change - Moderate	Negligible - Moderate	x	x
• Predicted impacts on Medium sensitivity Regionally Significant archaeological sites from the new road and associated infrastructure	Adverse	No Change - Major	No Change - Moderate	✓	✓
• Predicted impacts on the setting of a Medium sensitivity Conservation Area from the proximity of the new road and associated infrastructure	None	No Change	n/a	x	x

Table 16.9: Potential Impacts for Hillhead to Lhanbryde - North and South Options

Potential Impact (taking account of sensitivity of baseline)	Adverse / Beneficial	Magnitude		Potentially Significant?	
		North	South	North	South
Permanent Impacts					
• Predicted impacts on the setting of High sensitivity Scheduled Monuments from the proximity of the new road and associated infrastructure	Adverse	Minor - Major	Major	✓	✓
• Predicted impacts on the setting of High sensitivity Category A Listed Buildings from the proximity of the new road and associated infrastructure	Adverse	Negligible - Moderate	Negligible - Major	✓	✓
• Predicted impacts on the setting of Medium sensitivity Category B Listed Buildings from the proximity of the new road and associated infrastructure	Adverse	No Change - Moderate	No Change - Moderate	✓	✓
• Predicted impacts on the setting of Low sensitivity Category C Listed Buildings from the proximity of the new road and associated infrastructure	Adverse	No Change - Minor	No Change - Moderate	x	x
• Predicted impacts on Medium sensitivity Regionally Significant archaeological sites from the new road and associated infrastructure	Adverse	No Change - Major	No Change - Major	✓	✓

Table 16.10: Potential Impacts for Lhanbryde to East of Fochabers - North and South Options

Potential Impact (taking account of sensitivity of baseline)	Adverse / Beneficial	Magnitude		Potentially Significant?	
		North	South	North	South
Permanent Impacts					
• Predicted direct impacts on High sensitivity GDLs from the new road and associated infrastructure	Adverse	Major	n/a	✓	x
• Predicted impacts on the setting of High sensitivity Category A Listed Buildings from the proximity of the new road and associated infrastructure	Adverse	No Change - Major	Major	✓	✓
• Predicted impacts on the setting of Medium sensitivity Category B Listed Buildings from the proximity of the new road and associated infrastructure	None/ Adverse	No Change - Minor	No Change	x	x
• Predicted impacts on the setting of Low sensitivity Category C Listed Buildings from the proximity of the new road and associated infrastructure	Adverse	No Change - Negligible	Negligible - Major	x	✓
• Predicted impacts on Medium sensitivity Regionally Significant archaeological sites from the new road and associated infrastructure	None	No Change	No Change	x	x
• Predicted impacts on the setting of a Medium sensitivity Conservation Area from the proximity of the new road and associated infrastructure	None	No Change	n/a	x	x

16.5 Mitigation

16.5.1. It is assumed that best practice will be followed during construction of the proposals and committed mitigation from the cultural heritage assessment implemented in the works. More specific mitigation will be developed for the Preferred Option during DMRB Stage 3.

16.5.2. The following assumed mitigation measures have been used in this assessment:

- CH1 - Landscaping and screening will be put in place where appropriate to reduce the visual impact on heritage assets affected. Such screening will involve planting of vegetation suitable to the landscape and, where necessary, suitable to the heritage asset itself.
- CH2 - Where appropriate, noise mitigation measures or acoustic screening will be included in the design to reduce impacts on the setting of heritage assets.
- CH3 - Where appropriate, the Scheme will be designed to preserve archaeology *in situ*, for instance retaining archaeological remains under earthworks or bunds.
- CH4 - Where appropriate and subject to more detailed design, low-level, directional street lighting will be used to reduce lightspill and its effects on the setting of heritage assets.
- CH5 - All heritage assets impacted by the Scheme will be recorded in their present state prior to development through completion of an archaeological walkover survey.
- CH6 - Where appropriate, buried archaeology predicted to be affected by the Scheme will be subject to a programme of archaeological investigation to ensure all physically impacted significant archaeological remains are recorded for dissemination and knowledge enhancement.
- CH7 - If historic buildings are impacted, these will be recorded through a programme of building recording involving photographic or measured surveys as required.

16.6 Predicted Environmental Effects

16.6.1. This section presents the key predicted environmental effects of the options on Cultural Heritage. Predicted effects have been assessed prior to mitigation and the residual effects then evaluated following mitigation (see Section 16.5). It should be noted that mitigation measures may not always be sufficient to reduce the overall significance category for the predicted residual effects. The predicted effects identified as being 'significant' prior to mitigation are presented in Tables 16.11 to 16.16 below, and therefore capture the key findings of the assessment (residual effects that are predicted to remain significant are highlighted in bold). The assessment of all heritage assets within the respective study areas is set out in Tables 16.8 to 16.10 above and Appendix A16.2 (Volume 4b).

Hardmuir to Hillhead

16.6.2. The predicted effects of the North and South Options in this section are presented in Table 16.11 and Table 16.12 below.

Table 16.11: Predicted Environmental Effects: Hardmuir to Hillhead – North Option

Sub-topic	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects (and Significance)
Category A Listed Buildings	• Permanent setting effect on MMS113 Darnaway Castle East Lodge due to proximity of option • Permanent setting effect on MMS135 Findhorn Viaduct due to proximity of option	• Moderate adverse	• CH1, CH2, CH4, CH5, CH7	• **Moderate adverse** residual effect on two Category A Listed Buildings
Category B Listed Buildings	• Permanent setting effect on MMS105 Feddan Farmhouse due to proximity of option • Permanent setting effect on MMS112 Dalvey Cottage due to proximity of option • Permanent setting effect on MMS107 Dalvey House due to proximity of option • Permanent setting effect on MMS136 Greshop House due to proximity of option • Permanent setting effect on MMS126 Grange Hall South Lodge due to proximity of option	• Moderate - Major adverse	• CH1, CH2, CH4, CH5, CH7	• **Moderate adverse** residual effect on Category B Listed Buildings

Sub-topic	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects (and Significance)
Regionally Significant non-designated archaeological sites	• Permanent loss to aspects of a cropmark site at Longley MMS194 • Permanent loss to aspects of a cropmark site at Waterford Road MMS214	• Moderate - Major adverse	• CH3, CH5, CH6	• **Moderate adverse** residual effect on Regionally Significant archaeological sites

Table 16.12: Predicted Environmental Effects: Hardmuir to Hillhead – South Option

Sub-topic	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects (and Significance)
Garden and Designed Landscape	• Permanent loss of aspects of the Darnaway Castle GDL MMS003	• Moderate adverse	• CH5	• **Moderate adverse** residual effect on one GDL
Category B Listed Buildings	• Permanent setting effect on MMS105 Feddan Farmhouse due to proximity of option	• Major adverse	• CH1, CH2, CH4, CH5, CH7	• **Moderate adverse** residual effect on one Category B Listed Building
Regionally Significant non-designated archaeological sites	• Permanent loss of aspects of the archaeological site at Dallas Dhu MMS199	• Moderate adverse	• CH3, CH5, CH6	• **Moderate adverse** residual effect on one Regionally Significant archaeological site

Hillhead to Lhanbryde

16.6.3. The predicted effects of the North and South Options in this section are presented in Table 16.13 and Table 16.14 below.

Table 16.13: Predicted Environmental Effects: Hillhead to Lhanbryde – North Option

Sub-topic	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects (and Significance)
Scheduled Monument	• Permanent setting effect on MMS007 Bogton Stone Circle due to proximity of option	• Major adverse	• CH1, CH2, CH4, CH5, CH7	• **Major adverse** residual effect on one Scheduled Monument
Category A Listed Buildings	• Permanent setting effect on MMS163 Coxton Tower due to proximity of option	• Moderate adverse	• CH1, CH2, CH4, CH5, CH7	• **Moderate adverse** residual effect on one Category A Listed Building
Category B Listed Buildings	• Permanent setting effect on MMS145 Rosebrae House due to proximity of option • Permanent setting effect on MMS116 Newton House Gatepiers and Walled Garden due to proximity of option	• Moderate adverse	• CH1, CH2, CH4, CH5, CH7	• **Moderate adverse** residual effect on two Category B Listed Buildings
Regionally Significant non-designated archaeological sites	• Permanent loss to aspects of an archaeological site at Midtown MMS212 • Permanent loss to aspects of an archaeological site at Myreside MMS215 • Permanent loss to aspects of an archaeological site at Lhanbryde MMS204	• Major adverse	• CH3, CH5, CH6	• **Moderate adverse** residual effect on Regionally Significant archaeological sites

Table 16.14: Predicted Environmental Effects: Hillhead to Lhanbryde – South Option

Sub-topic	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects (and Significance)
Scheduled Monument	• Permanent setting effect on MMS007 Bogton Stone Circle due to proximity of option	• Major adverse	• CH1, CH2, CH4, CH5, CH7	• **Major adverse** residual effect on one Scheduled Monument
Category A Listed Buildings	• Permanent setting impact on MMS163 Coxton Tower due to proximity of option	• Major adverse	• CH1, CH2, CH4, CH5, CH7	• **Major adverse** residual effect on one Category A Listed Building
Category B Listed Building	• Permanent setting effect on MMS121 Alves Parish Church due to proximity of option • Permanent setting effect on MMS152 Aldroughty House due to proximity of option • Permanent setting effect on MMS153 The Bield due to proximity of option	• Moderate adverse	• CH1, CH2, CH4, CH5, CH7	• **Moderate adverse** residual effect on Category B Listed Buildings
Regionally Significant non-designated archaeological sites	• Possible permanent loss to aspects of an archaeological site at Kilbuiack/Newmill MMS216 • Permanent loss to aspects of an archaeological site at Lochinver MMS202 • Permanent loss to aspects of an archaeological site at Lhanbryde MMS204 • Permanent loss to aspects of an archaeological site at Bogton MMS221	• Moderate - Major adverse	• CH3, CH5, CH6	• **Moderate adverse** residual effect on Regionally Significant archaeological sites

Lhanbryde to East of Fochabers

16.6.4. The predicted effects of the North and South Options in this section are summarised in Table 16.15 and Table 16.16 below.

Table 16.15: Predicted Environmental Effects: Lhanbryde to East of Fochabers – North Option

Sub-topic	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects (and Significance)
Garden and Designed Landscape	• Permanent loss to aspects of the Gordon Castle Designed Landscape MMS001	• Major adverse	• CH5	• **Major adverse** residual effect on the GDL
Category A Listed Buildings	• Permanent setting effect on MMS168 Pittensair House due to proximity of option • Permanent setting effect on MMS092 Gordon Castle West Lodge due to proximity of option	• Major adverse	• CH1, CH2, CH4, CH5, CH7	• **Major adverse** residual effect on Category A Listed Buildings

Table 16.16: Predicted Environmental Effects: Lhanbryde to East of Fochabers – South Option

Sub-topic	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects (and Significance)
Category A Listed Buildings	• Permanent setting effect on MMS168 Pittensair House due to proximity of option	• Major adverse	• CH1, CH2, CH4, CH5, CH7	• **Major adverse** residual effect on Category A Listed Buildings
Category C Listed Buildings	• Permanent setting effect on MMS157 Dipple Burial Ground due to proximity of option	• Moderate adverse	• CH1, CH2, CH4, CH5, CH7	• **Moderate adverse** residual effect on Category C Listed Buildings

Cumulative Effects

16.6.5. A review of the proposed future development areas from the draft Moray Local Development Plan (LDP) 2020 revealed one archaeological site where the potential for increased (cumulative) effects are predicted with a route option. Proposed future residential development in the proposed LDP in the locality of the Elgin North junction between the Hillhead to Lhanbryde North Option and the existing A941 would result in complete removal of the Regionally Significant cropmark site at Myreside (MMS215).

16.6.6. It is not predicted that there would be cumulative effects on other heritage assets identified along the route of any of the options from the information available at this stage.

16.7 Summary of Effects

16.7.1. This section sets out a summary of the key findings of the options assessment based on the predicted significant residual effects. The summaries are presented in Tables 16.17 to 16.19 below.

Table 16.17: Summary of Predicted Environmental Effects: Hardmuir to Hillhead

Predicted Residual Effects for North Option	Predicted Residual Effects for South Option
• There is a **Moderate adverse** residual effect predicted on two A Listed Buildings – MMS113 Darnaway Castle East Lodge and Gatepiers and – MMS135 Findhorn Viaduct. • There is a **Moderate adverse** residual effect predicted on five B Listed Buildings – MMS105 Feddan Farmhouse; – MMS112 Dalvey Cottage; – MMS107 Dalvey House; – MMS136 Greshop House; and – MMS126 Grange Hall South Lodge. • There is a **Moderate adverse** residual effect predicted on two Regionally Significant non-designated archaeological sites – MMS194 Longley Cropmark; and – MMS214 Waterford Road Cropmark. • Overall, a **Moderate adverse** residual effect on cultural heritage is predicted	• There is a **Moderate adverse** residual effect predicted on one GDL – MMS003 Darnaway Castle GDL. • There is a **Moderate adverse** residual effect predicted on one B Listed Building – MMS105 Feddan Farmhouse. • There is a **Moderate adverse** residual effect predicted on one Regionally Significant non-designated archaeological site – MMS199 Dallas Dhu. • Overall, a **Moderate adverse** residual effect on cultural heritage is predicted

16.7.2. Whilst the overall residual significance of adverse effects for both options is predicted to be Moderate, for the South Option this is primarily based on the predicted effect on two sites, the Darnaway Castle GDL, MMS003 and the listed Feddan Farmhouse (MMS105). Although the Darnaway Castle GDL is considered to be of high sensitivity and national importance, the physical impact is confined to the northern periphery of the site, in an area of lower value to the wider GDL as a whole. There are more assets with predicted adverse

residual effects on the North Option, including the A Listed Darnaway Castle East Lodge (MMS113), A Listed Findhorn Viaduct (MM135), five B Listed Buildings including Greshop House (MMS136) and The Grange Hall South Lodge (MMS126) and on the Regionally Significant cropmark sites at Longley (MMS194) and Waterford Road (MMS214).

16.7.3. The South Option is predicted to have less impact on cultural heritage.

Table 16.18: Summary of Predicted Environmental Effects: Hillhead to Lhanbryde

Predicted Residual Effects for North Option	Predicted Residual Effects for South Option
• There is a **Major adverse** residual effect predicted on one Scheduled Monument – MMS007 Bogton Stone Circle. • There is a **Moderate adverse** residual effect predicted on one A Listed Building – MMS163 Coxton Tower. • There is a **Moderate adverse** residual effect predicted on two B Listed Buildings – MMS145 Rosebrae House; – MMS116 Newton House Gatepiers and Walled Garden • There is a **Moderate adverse** residual effect predicted on three Regionally Significant non-designated archaeological sites – MMS204 Lhanbryde Cropmark; – MMS212 Midtown Cropmark; and – MMS215 Myreside Cropmark. • Overall, a **Major adverse** residual effect on cultural heritage is predicted	• There is a **Major adverse** residual effect predicted on one Scheduled Monument – MMS007 Bogton Stone Circle. • There is a **Major adverse** residual effect predicted on one A Listed Building – MMS163 Coxton Tower. • There is a **Moderate adverse** residual effect predicted on three B Listed Buildings – MMS121 Alves Parish Church; – MMS152 Aldroughty House; – MMS153 The Bield. • There is a **Moderate adverse** residual effect predicted on four Regionally Significant non-designated archaeological sites – MMS202 Lochinver Cropmark; – MMS204 Lhanbryde Cropmark; – MMS216 Kilbuiack/Newmill Cropmark; – MMS221 Bogton Cropmark. • Overall, a **Major adverse** residual effect on cultural heritage is predicted

16.7.4. Both options result in a predicted Major adverse residual effect, partly due to the residual effect predicted on the setting of Bogton Stone Circle (MMS007) Scheduled Monument, which is equally impacted by both options. The South Option has a Major adverse residual effect on the A Listed Coxton Tower (MMS163), whilst a Moderate adverse residual effect is predicted for the North Option. The primary viewpoint from the Tower, the open bartizan on the south-west corner, has open views to the south and south-west across the South Option. Views to the north are less clear, with no clear viewpoints from the tower and a band of mature trees screens the view in this direction. There are more B Listed Buildings with a predicted Moderate adverse residual effect on the South Option, and an additional Regionally Significant archaeological site is predicted to be directly affected.

16.7.5. The North Option is predicted to have slightly less impact on cultural heritage.

Table 16.19: Summary of Predicted Environmental Effects: Lhanbryde to East of Fochabers

Predicted Residual Effects for North Option	Predicted Residual Effects for South Option
• There is a **Major adverse** residual effect predicted on one GDL – MMS001 Gordon Castle GDL. • There is a **Major adverse** residual effect predicted on two A Listed Buildings – MMS092 Gordon Castle West Lodge; and – MMS195 Pittensair House. • Overall, a **Major adverse** residual effect on cultural heritage is predicted	• There is a **Major adverse** residual effect predicted on one A Listed Building – MMS195 Pittensair House. • There is a **Moderate adverse** residual effect on one C Listed Building – MMS157 Dipple Burial Ground. • Overall, a **Moderate adverse** residual effect on cultural heritage is predicted

16.7.6. A Major adverse residual effect is predicted on the North Option and a Moderate adverse effect is predicted for the South Option. For the South Option, the overall significant effect is primarily based on the predicted impact on one site, the A Listed Pittensair House (MMS195 - which is equally affected by the North Option). The North Option results in predicted Major adverse residual effects on two additional nationally important heritage assets, the Gordon Castle GDL (MMS001) and the A Listed Gordon Castle West Lodge (MMS092). This adverse residual effect is partly as a result of the extent of land take from the GDL; proximity to the West Lodge; further alteration to the relationship between the Lodge and the GDL, and significant change to the setting of these monuments.

16.7.7. The South Option is predicted to have less impact on cultural heritage.

16.8 Scope of the Stage 3 Assessment

16.8.1. The DMRB Stage 3 assessment process will be based on DMRB (Volume 11, Section 3, Part 2 HA 208/07 Cultural Heritage). It will review and expand upon the baseline information collated during the DMRB Stage 2 assessment and will follow the scope established in DMRB for 'Detailed Assessment'.

16.8.2. A Detailed Assessment is designed to clearly establish the cultural heritage baseline of the Preferred Option through in-depth research, allowing the predicted impact of the Scheme on Cultural Heritage to be fully assessed and detailed mitigation to be defined. The baseline collation will contain a higher level of detail and analysis than that undertaken at Stage 2. Detailed Assessment involves two broad modes of investigation:

- Desk-based assessment: sources consulted to inform the baseline of the desk-based assessment will include:
  - Relevant heritage databases, including the SMR, HES lists of Designated sites and the NRHE;
  - Historic map regression to record the development of heritage assets, and identifying any previously unrecorded historic features;

  - Historic and current aerial images, held at the National Collection of Aerial Photography and locally with the SMR;
  - Historic land use along the Preferred Option; and
  - Published and unpublished documentary sources, including books, journals and archaeological grey literature reports.
- Field survey: forms of survey could include both non-intrusive and intrusive survey and may include:
  - Comprehensive archaeological walkover survey along the route of the Preferred Option. This survey will be designed to assess the condition of existing assets and identify previously unrecorded archaeological and historical sites;
  - Geophysical survey to establish the extent of buried heritage assets;
  - Field walking of suspected archaeological sites to identify artefacts providing an indication of age, importance and extent of sites; and
  - Archaeological evaluation (with the landowner's permission) involving investigation of an area through the systematic excavation of trial trenches. These will cover a specific percentage of a site and are designed to provide an indication of the presence, extent, importance and condition of a heritage asset.

16.8.3. The programme of field survey required will be formulated during the compilation of the desk-based assessment. This can involve both non-intrusive and intrusive survey designed to establish the extent of the cultural heritage baseline and individual heritage assets. An archaeological walkover survey will be completed as a minimum.

16.8.4. Particular consideration will be paid at DMRB Stage 3 to those heritage assets where residual effects have been identified at DMRB Stage 2, particularly where these effects are considered significant. Setting impact assessments will be completed for these heritage assets in accordance with HES guidance. In addition, cropmark sites and other assets directly impacted by the proposed scheme will be further investigated to better define their extent, condition and importance.

16.8.5. Ongoing consultation with HES, ACAS and Moray Council will be undertaken during the DMRB Stage 3 assessment to identify and address potential issues as they arise.

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17. Landscape

17.1 Introduction and Scope

17.1.1. This chapter presents the findings of the landscape assessment of the shortlisted options of the A96 Dualling Hardmuir to Fochabers Scheme (the Scheme). The assessment has been undertaken in accordance with the Guidelines for Landscape and Visual Impact Assessment (GLVIA)[95] and the Design Manual for Roads and Bridges (DMRB), Volume 11, Section 3, Part 5, Landscape Effects.

17.1.2. This chapter is supported by Figures 17.1, 17.2 and 17.3 (Landscape Designations) and Figures 17.4, 17.5 and 17.6 (Landscape Character) in Volume 5, and the following appendices (Volume 4b):

- Appendix A17.1: Landscape assessment methodology; and
- Appendix A17.2: Landscape baseline and effects.

17.1.3. The scope of this assessment includes the permanent landscape effects of the options. Temporary landscape effects during construction have been scoped out as effects during this phase are predicted to be similar for each option and would therefore not contribute to an assessment of clear differences between the options.

17.2 Approach to Assessment

Introduction

17.2.1. The focus of the landscape assessment is on the predicted landscape effects of the options on key landscape receptors. These receptors are defined in GLVIA as: '*…including the constituent elements of the landscape, its specific aesthetic or perceptual qualities and the character of the landscape in different areas'* (p36). For this landscape assessment, the receptors are categorised into Local Landscape Character Areas (LLCA).

17.2.2. The landscape assessment forms one part of an overall Landscape and Visual Impact Assessment (LVIA), with the visual assessment included in Chapter 15 (Visual Effects). This separation of the landscape and visual assessments has been undertaken because these may result in different recommendations for the Preferred Option and to enable these to fit within the structure of this assessment, which includes the landscape topic within 'Natural and Cultural Heritage' and the visual topic within 'Communities and People'.

Sources of Information

17.2.3. The following sources of information have been used for this assessment:

- Ordnance Survey 1:50,000 and 1:25,000 maps;
- Aerial photographs;

[95] Landscape Institute and Institute of Environmental Management and Assessment (IEMA) (2013) Guidelines for Landscape and Visual Impact Assessment. 3rd ed. Abingdon, Routledge

- Scottish Natural Heritage (SNH) dataset for Landscape Character Types and Landscape Character Assessment (LCA) descriptions within the Moray Landscape Character Assessment[96];
- Moray Council dataset for Areas of Great Landscape Value (AGLV);
- Mott MacDonald Sweco (MMS) dataset for Scotland's Great Trails (SGT);
- Zone of Theoretical Visibility (ZTV) data, including MMS Land xml route elevation datasets, MMS route alignment CAD drawings and a Digital Terrain Model at 5m resolution provided by Cyient (BLOM) for Transport Scotland;
- Historic Environment Scotland (HES) dataset for the Inventory of Gardens and Designed Landscapes (GDL);
- The National Record of the Historic Environment (NRHE) available at https://canmore.org.uk/; and
- Site data from MMS site visits and field assessment undertaken in 2017 and 2018.

Consultation

17.2.4. Consultation regarding the LVIA has been undertaken with SNH, Moray Council and the Transport Scotland Landscape Advisor (carried out jointly for landscape and visual aspects). The landscape topics discussed during meetings included the following:

- The scope and method of the LVIA (including the extent of the study area);
- Landscape and visual design objectives;
- The landscape baseline assessment of LLCAs;
- Assessment of the experience of the landscape within the LVIA;
- The relationship between GDLs and local landscape character;
- SNH plans to replace their current LCA; and
- The AGLVs and Moray Council plans to update these, as well as other landscape studies undertaken as part of the Local Development Plan.

Assessment Methodology

17.2.5. This section summarises the main aspects of the landscape assessment methodology, as part of the LVIA. This is detailed fully in Appendix A17.1 (Volume 4b).

17.2.6. The landscape assessment has been informed by a combination of desk and site-based assessment techniques. The method has been guided by the following publications:

- The Guidelines for Landscape and Visual Impact Assessment (GLVIA);
- Landscape Character Assessment: Guidance for England and Scotland[97];
- Fitting Landscapes: Securing More Sustainable Landscapes[98];

[96] Turnbull Jeffrey Partnership (1998) Moray and Nairn landscape assessment. Scottish Natural Heritage Review No 101. Redgorton, Scottish Natural Heritage

[97] Scottish Natural Heritage and the Countryside Agency (2002) *Landscape Character Assessment: Guidance for England and Scotland.* Redgorton, Scottish Natural Heritage

[98] Transport Scotland (2014) *Fitting Landscapes: Securing More Sustainable Landscapes.* Glasgow, Transport Scotland

- DMRB (Volume 11, Section 3, Part 5, Landscape Effects); and
- DMRB (Volume 10, Section 1, Part 1, New Roads Landform and Alignment).

17.2.7. The landscape study area for this assessment was established following consultation with SNH, Moray Council and Transport Scotland. The starting point for identifying this study area was an area extending to 5km from all the option centrelines. This was then refined to include all places from where it was assessed that the options may have significant landscape effects (resulting in a study area of variable distance and shape in relation to the option centrelines). This was further narrowed-down in two stages: first, following preliminary landscape assessment of the options that were being considered in June 2017 (labelled the 'outer study area' on Figures 17.4, 17.5 and 17.6, Volume 5); and second, following more detailed landscape assessment of the options shortlisted in 2018 (labelled the 'focused study area' on Figures 17.4, 17.5 and 17.6, Volume 5). Although this process resulted in the extent of the study area becoming narrower, it remained important to also consider the wider landscape setting during the LVIA. For this reason, Figures 17.4, 17.5 and 17.6 (Volume 5) show both the 'outer' and 'focused' study area boundaries.

17.2.8. Establishment of the study area and assessment of receptor sensitivity and landscape effects was informed by a Zone of Theoretical Visibility (ZTV) map that extended to 10km from all the options. The ZTV was prepared using a 'bare ground' digital terrain model as a 'worst-case' scenario, without taking into account surface screening features. As such, the ZTV model was used as a tool for assessment which was supplemented by data collected on site to provide more site-specific information, such as where visibility would be affected by screening by woodland or buildings.

17.2.9. Following the approach recommended by 'Fitting Landscapes: Securing More Sustainable Landscapes'[99], initial landscape design objectives were established for the Scheme in June 2017. Following consultation with SNH, Moray Council and the Transport Scotland landscape advisor and based on the findings of the LVIA baseline assessment, these were progressed in more detail. The landscape objectives were informed by identification of the sensitivities and opportunities offered by the baseline conditions and, in turn, informed the identification of primary and secondary mitigation measures during the LVIA. It is intended that these will be refined further during DMRB Stage 3, informed by the more detailed LVIA and to input to the ongoing design development.

17.2.10. Following GLVIA, landscape receptors are aspects of the landscape resource that have the potential to be affected by a proposal, for example the nature of the landscape pattern, qualities of spatial enclosure, or the shape and scale of the landform. For this assessment, these receptors were categorised as LLCAs, based on the key landscape characteristics of the study area and how these are experienced as well as the potential sensitivities of these to the Scheme. The LLCAs built upon the SNH regional Landscape Character Types (LCT)[100] but they are different in three key ways: they follow more detailed assessment than carried out to identify regional LCTs; the key characteristics have been identified for their

[99] Scotland (2014) *Fitting Landscapes: Securing More Sustainable Landscapes.* Glasgow, Transport Scotland
[100] Turnbull Jeffrey Partnership (1998) Moray and Nairn landscape assessment. Scottish Natural Heritage Review No 101. Redgorton, Scottish Natural Heritage

specific relevance to the Scheme (i.e. they are key characteristics that are likely to be sensitive to, or provide opportunities for, a potential dual-carriageway road scheme, not necessarily other types of landscape change); and the LLCAs are area-specific, meaning they reflect area-specific combinations of landscape characteristics, landscape features, places and their sense of place.

17.2.11. Assessment of the sensitivity of landscape receptors at this stage, following GLVIA, was based on both 'susceptibility' and 'value'. Given the amount of detail required for a DMRB Stage 2 LVIA, a combined measure for sensitivity of landscape receptors is provided within the landscape assessment, categorised using a three-point scale: high; medium; and low.

17.2.12. Assessment of the magnitude of landscape change, following GLVIA, has included considerations of scale, geographical extent, duration and reversibility of effects that would result from the options. The magnitude of change is categorised using a four-point scale: high; medium; low; and negligible. Where no change is assessed, this has also been stated.

17.2.13. As part of the LVIA process, potential landscape and visual mitigation measures have been considered. Primary mitigation measures[101] have been incorporated as part of the design development of the options, such as alterations to the horizontal alignment to limit landscape effects. Secondary mitigation measures have also been considered during the assessment process where these can be certain (meeting the requirements described in Section 8.3 of Chapter 8, Introduction and Approach to Environmental Assessment[102]) and may reduce significant landscape effects which have been identified. Secondary mitigation measures have only been considered in general at this stage (as might be reasonably expected to be adopted as part of good practice). This means that, where secondary mitigation measures are ambiguous or uncertain, a precautionary approach has been taken during the LVIA regarding the ability of these measures to reduce adverse effects.

17.2.14. The level of landscape effect (sometimes termed 'significance') has been categorised using a four-point scale: major; moderate; minor; and negligible. Effects have been assessed as being either beneficial or adverse. The level of effect has been assessed by combining all the considerations and criteria set out above. This is described by GLVIA as an 'overall profile' approach to combining judgements and requires that all the judgements against each of the pre-defined criteria for sensitivity of receptors and magnitude of change contribute to an informed professional judgement of the overall level of effect.

17.2.15. Landscape effects have been categorised as 'significant' or 'not significant' based on the level of effects as follows:

- Major and moderate levels of effect are considered *significant*; and
- Minor and negligible levels of effects are considered *not significant*.

[101] Following GLVIA (4.21), mitigation measures fall into three categories: primary measures incorporated within the design development of the proposal; standard construction and operational management practices for avoiding and reducing environmental effects; and secondary measures that should address any residual adverse effects remaining after primary measures and standard construction practices have been incorporated
[102] Section on mitigation within Chapter 8 (Introduction and Approach to Environmental Assessment)

Assumptions and Limitations

17.2.16. The LVIA has primarily followed the standard approach of GLVIA, with respect to assessing sensitivity, magnitude and significance of effects, although it has referred to DMRB (Volume 11, Section 3, Part 5, Landscape Effects) where this provides more information and/or requires more detail specific to a trunk road scheme.

17.2.17. The level of detail available at this stage has meant a precautionary approach has been taken with regards to the sensitivity of landscape receptors and a 'worst-case' scenario has been assumed with regards to the assessment of landscape effects. This precautionary approach has also been relevant to the consideration of mitigation measures, as described above in 17.2.13. This has meant that the assessment of residual landscape effects has not taken account of secondary mitigation measures if these or their resulting change in significance of effects have been ambiguous or uncertain.

17.2.18. The LVIA has considered the existing A96 as part of the baseline conditions. Although traffic flows along this existing route will reduce after construction of the Scheme, the landscape and visual effects of these changes have not been assessed in detail at this stage.

17.2.19. Moray Council is currently undertaking a review of local landscape designations, leading to the identification of candidate Special Landscape Areas (SLA). These have not been included within the LVIA baseline at this stage as they remain proposed but, once approved, they will be considered for the DMRB Stage 3 assessment.

17.2.20. The predicted landscape effects of road lighting at junction locations has been considered in general by the LVIA. The effects of this lighting at this stage are only described specifically where they have a particular influence on the predicted landscape effects (for example where this is the only element of the option that would be seen or where the baseline conditions do not include lighting). Otherwise, the effects of junction lighting are included within the overall description of landscape effects at junctions. The LVIA at this stage has not assessed the predicted effects of lights from vehicles travelling along the options although this will be considered at DMRB Stage 3.

17.3 Baseline Environment

Study Area Context

17.3.1. The landscape study area is shown on Figures 17.4, 17.5 and 17.6 (Volume 5). At a broad level, the landscape of this area is summarised below.

- The study area is linear in overall shape, running west – east. Most of the area extends over a mixed agricultural, wooded and settled plain, sandwiched between the Moray Firth coast to the north and high hills to the south. This broad linear shape is intersected in three places by rivers crossing north – south: the Rivers Findhorn, Lossie and Spey, which create very distinctive river corridors.
- The study area is predominantly rural in character although there are many infrastructure routes that pass through, including the existing A96, the Aberdeen - Inverness Railway Line and high voltage power lines.

- There are three main settlements within the west, centre and east of the study area: Forres; Elgin; and Fochabers. Outside these, there is not a clear hierarchy of settlement (for example villages to hamlets to isolated houses). Instead, there is typically a fairly even dispersal of houses (individual and clusters) and relatively few small settlements or areas which don't include any houses at all.
- There are several historic and designed landscapes within the study area. These include four on the Inventory of Gardens and Designed Landscapes (GDL), of which Brodie Castle, Darnaway Castle and Gordon Castle (Bog of Gight) are of highest relevance to the Scheme. There are also some historic and designed landscapes which are not designated but contain important historic landscape features that contribute to the landscape value, such as policy trees and woodland, large focal houses, avenues, stone boundary walls and stone towers[103].
- The landscape within most of the study area is popular for recreation with residents and visitors. These are served by a range of attractions/facilities including woodlands containing networks of paths, several long-distance paths, a network of minor roads, National Cycle Network Route 1, Findhorn Bay, historic buildings and grounds, and rivers (popular for boating/canoeing, fishing and walking along riverside paths)[104].
- There are two AGLVs within the study area which are relevant to the Scheme: the River Findhorn AGLV and the Speyside AGLV.

17.3.2. The LVIA baseline assessment in the study area resulted in the identification of 43 LLCAs. A full list of these is included in Table 1.1 of Appendix A17.2 (Volume 4b) and their coverage is shown on Figures 17.4, 17.5 and 17.6 (Volume 5). The key characteristics of each of the LLCAs that would be affected by the options are described in Tables 3.1, 3.2 and 3.3 of Appendix A17.2[105] (Volume 4b).

17.3.3. For the purposes of this section describing the study area context, a summary of the 43 LLCAs is provided in the following Table 17.1. This categorises the LLCAs into six general groups for simplicity. The landscape effects of the Scheme have been assessed in relation to the individual LLCAs and not these groups because of the level of detail and analysis necessary.

[103] Refer to Chapter 16, Cultural Heritage, for more information on historic features
[104] Refer to Chapter 12, People and Communities, for more information on recreation and NMUs
[105] Information on the LLCA baseline is recorded alongside the assessment of predicted effects within Tables 3.1, 3.2 and 3.3 in Appendix A17.2. This information is structured in this way so a clear link can be seen between the key characteristics and effects on these. This follows advice in GLVIA section 8.4. p137

Table 17.1: Groups of Local Landscape Character Areas across the Study Area

LLCA group		Key characteristics/ sense of place
Open, agricultural landscape *Containing LLCAs: 14, 16, 18, 21, 26, 42*		• Large scale landscapes • Exposed • Simple landscape composition • Horizontal emphasis • Prevailing rural and agricultural character
Distinctive river corridor and/or gorge *Containing LLCAs: 13, 25*		• Linear landscape features • Sense of containment, contributing to qualities of sanctuary • Mature trees and vertical emphasis within space • Linear routes used for recreation along rivers
Patchwork of woodland and open spaces with variable landform *Containing LLCAs: 3, 5, 7, 8, 9, 19, 23, 28, 30, 37*		• Patchwork of woodland and agricultural fields, with defined spaces and edges • Variable landform and enclosure/ openness at a local level • Dispersed houses and farms • Typical rural character with some qualities of sanctuary
Historic designed landscape Containing LLCAs: 15, 17, 22, 31, 36, 39, 40, 41		• Historic estate elements, including avenues, policy trees and historic structures which create focal features • Distinct landscape pattern, with framework of woodland, trees, access routes and open spaces • Prevailing rural character and enclosure with qualities of sanctuary
Contained strath *Containing LLCAs: 2, 10, 11,*		• Wide open spaces within strath contained by surrounding woodland/ slopes, contributing to enclosure and perceived sanctuary • Prevailing rural character, managed mainly for agriculture • Dispersed residences and farms that create point foci • Typical gentle, rolling slopes
Dense woodland and/or hill backcloth *Containing LLCAs: 1, 6, 12, 24, 29, 43*		• Woodland is predominant land cover, although there are some open spaces. • Typical enclosure and qualities of sanctuary, although some woods are actively managed. • Woodland varies in extent and type, including policy trees, native woods and plantations. • Woodland and clearings/ edges contrast strongly in shelter, enclosure and views.

LLCA group		Key characteristics/ sense of place
Town margins and infrastructure *Containing LLCAs: 4, 20, 27, 32, 33, 34, 35, 38*		• Mixed land use, including agriculture, industry and residential, plus strong influence of infrastructure. In some places, woodland, buildings and/or landform creates enclosure. • Prevailing developed character with high levels of activity and noise. • Some mature trees and distinctive features/structures along/near historic routes.

Hardmuir to Hillhead

17.3.4. This section of the report summarises the baseline conditions within the study area between Hardmuir and Hillhead[106] which are described in detail within Table 3.1 of Appendix A17.2 (Volume 4b). Reference should be made to Figures 17.1 and 17.4 (Volume 5) for the distribution of landscape designations and LLCAs, respectively.

17.3.5. The study area includes 17 different LLCAs Between Hardmuir and Hillhead. At the broadest level, the landscape to the north of Forres includes a wide open, simple, agricultural plain that extends north towards the coast whilst, in contrast, the landscape to the south of Forres has a much more mixed land use, variable landform and intricate spaces. The distribution and range of LLCAs are summarised below.

- The town of Forres (LLCA38) is located within the centre of the study area, with a band of industry and infrastructure on its northern side (LLCA27). It contains the distinctive feature of Cluny Hill and Nelson's Tower, which offers panoramic views from its top as well as forming a focal feature within the surrounding landscape.
- North of Forres, there is an extensive area of open, agricultural land across a coastal plain (LLCA26) which extends north towards Findhorn Bay. This landscape is large in scale, simple in pattern, horizontal in emphasis and offers open, distant views.
- Away from the main infrastructure routes and settlement, there are areas south of Forres (LLCA23 and LLCA2) and north of Brodie (LLCA28) that comprise a mixed patchwork of woodland, agriculture and settlement overlaid upon a variable landform. These seem distinctly rural in character and possess qualities of enclosure and sanctuary.
- West of Forres, the River Findhorn flows south - north through the landscape (LLCA25), comprising a distinct linear corridor which is edged by riparian woodland and/or steep river banks or gorge sides. The focus here is on the river, as well as riparian woodland, river channel braids and beaches. This corridor is popular for recreation, including within the river itself and along its river banks, and its southern stretch lies within the River Findhorn AGLV (Figure 17.1 in Volume 5).
- South-east of Forres is the southern tip of a linear, hill ridge which provides the enclosing edge and backdrop to the lower-lying coastal plain that extends to the north and west. Much of this ridge is forested but, where open spaces exist, elevated and distant views are offered over the distinct landscape below, for example from Califer.

[106] Where several individual LLCAs are listed together, these are ordered broadly west - east

- Throughout the study area, there are many historic estates and historic landscape features, including Brodie Castle and Darnaway Castle (LLCA31) and Dyke and Dalvey (LLCA39) in the west, and Grange Hall (LLCA41) and Burgie Castle in the east (LLCA22). Historic landscape features include: policy trees, avenues and woodland; open parkland; stone buildings, bridges and walls; and moot-hills. Brodie Castle and Darnaway Castle grounds are included in the Inventory of GDLs.
- Large woodlands extend outwards from many of the agricultural areas, some linking to historic estates (LLCA24) and containing a network of paths popular for recreation. The woodlands have a strong enclosed character and offer qualities of sanctuary.
- Along the existing A96 corridor, the landscape is strongly influenced by this road as well as other infrastructure such as the railway line and power lines. In some areas, the infrastructure passes through a mixed pattern of farmland and woodland (LLCA30 and LLCA19) which reduces its prominence within the wider landscape, whilst in other places it is more prominent from open, agricultural slopes (LLCA18).

Hillhead to Lhanbryde

17.3.6. This section of the report summarises the baseline conditions between Hillhead and Lhanbryde[107]. The study area is described in detail within Table 3.2 of Appendix A17.2 (Volume 4b), and Figures 17.2 and 17.5 (Volume 5) show the location of landscape designations and LLCAs, respectively.

17.3.7. Seventeen different LLCAs were identified in the study area between Hillhead to Lhanbryde. At a broad level, this area contrasts between the west and east. The western part includes a long ridge along which the existing A96 runs, with wide open slopes running parallel to the north and a more contained, discreet strath to the south. In contrast, the eastern part of the study area includes the town of Elgin, contained by an arc of low hills to the north and extending gradually into the River Lossie plain and a patchwork of agriculture and woodland to the south. The distribution and range of LLCAs are summarised below.

- Within the western part of the study area, there is a low ridge of mixed woodland, agriculture and settlement (LLCA19) running broadly west – east. The existing A96 runs through this area and, consequently, vehicle activity and noise strongly influence the local landscape. The ridge provides an edge to wide, open agricultural slopes that extend to the north and it offers elevated views over the simple, agricultural pattern of this area (LLCA18) that extends towards the Moray Firth coast.
- The low ridge running through the western part of the study area (LLCA19) forms the northern side of a discrete, open farmland strath (LLCA2) which is enclosed in combination with larger scale, simple hills to the south (LLCA1). The containment of this strath shields it from the effects of main infrastructure routes and settlements outwith and it has a prevailing rural character and qualities of sanctuary.
- The eastern part of the study area includes the town of Elgin (LLCA35). This is contained around its northern side by an arc of hills, including Quarrelwood, which forms a distinctive wooded hill feature and backdrop, and is popular for recreation. The arc also includes a chain of lower, subtler wooded hills (LLCA36) around Linksfield, Kirkhill and Sheriffston. Collectively, these hills separate Elgin from the surrounding landscape to the west, north and east, including an expansive, simple agricultural plain that extends towards the coast and has a horizontal emphasis (LLCA16).

[107] Where several individual LLCAs are listed together, these are ordered broadly west - east

- Elgin extends more gradually to the south into a mixed patchwork of houses, agriculture and woodland together with infrastructure and some industry (LLCA4 and LLCA7). Within this framework, the landscape tends to be more open and flat to the south-west of the town, corresponding to the route of the River Lossie (LLCA3 and LLCA42), and there are also some views to distant hills to the south. Here, the landscape is simpler and more horizontal in emphasis, although with several distilleries forming local point focal features.
- At the eastern edge of the study area is the settlement of Lhanbryde (LLCA34) which is located within the surrounding undulating, irregular and intimate-scale hills with mixed land cover (LLCA9). This settlement is edged on its south side by an infrastructure corridor including the existing A96 and railway (LLCA4) and woodland beyond (LLCA8).
- There are many historic landscapes and features within the study area, including at Burgie in the far west (LLCA22), Newton, Westfield and Ardgye (including York Tower) in the central part of the area, and Findrassie, Pitgaveny, Spynie and Calcots to the north of Elgin (LLCA36). These include distinctive policy woodland, avenues and specimen trees as well as stone walls and focal buildings that create landscape features within the area.

Lhanbryde to East of Fochabers

17.3.8. This section of the report summarises the baseline conditions within the study area between Lhanbryde and East of Fochabers[108] which are described in detail within Table 3.3 of Appendix A17.2 (Volume 4b). Reference should be made to Figures 17.3 and 17.6 (Volume 5) for the location of landscape designations and LLCAs, respectively.

17.3.9. Between Lhanbryde and Fochabers, the study area includes 14 different LLCAs. At a broad level, this area contrasts between the west and east. The western part includes a mixed patchwork of woodland and open agricultural land through which the existing A96 and railway pass. Here, there are variable shapes and enclosure of spaces and variable extent and focus of views. In contrast, the eastern part of the study area is crossed by Strathspey running north – south, edged by hills either side and including the River Spey, the settlements of Mosstodloch and Fochabers on opposite sides of the river, and the distinctive historic landscape of Gordon Castle GDL. The distribution and range of LLCAs are summarised below.

- In the east of the study area, the River Spey cuts through the landscape north – south, appearing as a distinct linear feature along which there are characteristic riverside elements such as riparian woodland, river meanders, beaches and braiding (LLCA13 and LLCA11). South of Dipple, the river corridor is located within the Speyside AGLV.
- South of Fochabers, the strath floor through which the River Spey passes (LLCA10) forms a distinctive valley in-between surrounding woodland and slopes (LLCA7 and 8 to the west and LLCA11 and 12 to the east), its low, flat floor emphasising the contrasting side slopes and vice versa. There are key views across and along the strath, extending in the south to distant hills.
- The main settlement within this area is Fochabers (LLCA32), sandwiched between the River Spey and steep hills. This contains distinctive historic buildings set within a grid-iron layout and bounded by the existing A96 to the north. Beyond this lies the historic

[108] Where several individual LLCAs are listed together, these are ordered broadly west - east

GDL of Gordon Castle (LLCA15) which includes extensive parkland and prominent focal features. Although the B9104 and the A98 strongly influence the western and eastern margins of this estate, it has no obvious edge to the north and it gradually extends into open and rolling farmland and woodland with historic elements (LLCA14 and LLCA37).

- Mosstodloch (LLCA33) lies immediately to the west of Fochabers, with the River Spey creating a narrow division inbetween. Its character is quite contrasting, influenced strongly by industrial units and the existing A96, apart from the Inchberry Road area which seems more closely associated with the adjacent river corridor.
- In the western part of the area, there is a patchwork of woodland and open spaces with variable visibility (LLCA7 and LLCA8). Within this framework, near to the existing A96, vehicle noise and activity strongly influences the local landscape character (LLCA4). Away from the existing A96 corridor, the landscape is more rural in character and possesses qualities of enclosure and sanctuary, especially within some of the extensive woodlands.
- The settlement of Lhanbryde (LLCA34) is located at the western edge of the study area, fitting within the surrounding undulating, irregular and intimate-scale hills with mixed land cover (LLCA9).
- This area is popular for recreation, contributing to the landscape being experienced in many different ways. This includes along the Speyside Way long distance path, mountain bike tracks and a network of paths within woodlands, as well as within the grounds of Gordon Castle and the town of Fochabers. Some places are important for offering views of the surrounding landscape character, such as Peeps View (part of Winding Walks, east of Fochabers), the old Fochabers Bridge and along the Speyside Way at Ordiequish, whilst other places are important for offering an experience of enclosure and qualities of sanctuary, such as Loch na Bo.

17.4 Potential Impacts

17.4.1. In this section, the potential impacts of the options which may result in landscape effects are presented. The following should be noted:

- Potential impacts are identified as all having the potential to result in significant adverse landscape effects; and
- Potential impact descriptions (listed in 17.4.2 below) do not take into account the sensitivity of the landscape baseline conditions (unlike the subsequent assessment of predicted landscape effects which is strongly influenced by landscape sensitivity, summarised in Section 17.6).

17.4.2. The potential impacts of the options which may result in significant landscape and/or visual effects have been identified as including:

- Introduction of dual carriageway, grade separated junctions and link roads and associated moving vehicles (visible and audible) to the landscape and people's views;
- Changes to the existing road network and non-motorised user routes;
- Changes to the existing landform due to earthworks (embankment and cut);
- Loss of existing woodland, trees and hedgerows, as well as potential new woodland, trees and hedgerows as mitigation;
- Newly built structures at bridge crossings and junctions;

- New road furniture, including signs;
- New lights and lighting at junctions; and
- Loss of stone boundary walls as well as potential new boundary walls as mitigation.

17.5 Mitigation

17.5.1. Possible mitigation measures, following GLVIA, are split between primary mitigation measures and secondary mitigation measures, as described in Section 17.2. Primary mitigation measures have been included in the Scheme design development, whereas the following secondary mitigation measures have been applied to mitigate adverse landscape effects identified through the LVIA:

- LV1 - Trees, woodland and hedgerows removed during construction of the Scheme will be reinstated as part of the landscape design;
- LV2 - New hedgerow planting (trees and shrubs). New lengths of hedgerow will be established where appropriate to integrate the option with the existing landscape character and/or to screen or filter views;
- LV3 - Small areas of new woodland planting. Small patches of woodland will be planted to integrate the option with the existing landscape character and/or to screen or filter views. The species and density will be selected to relate to the distinct qualities of the landscape;
- LV4 - Extensive woodland planting. Large areas of new woodland will be planted to integrate the option with the existing landscape character and/or to screen views. The species and density will be selected to relate to the distinct qualities of the landscape;
- LV5 - Landform modification. Embankment and cutting slopes will be shaped to integrate the option with the surrounding existing landscape character and/or to screen views. Earthwork features may include linear earth bunds, convex slopes, broad landform mounds and false cuttings. The intention of some earth shaping will be to reduce the steepness and vertical edge of embankments or cuttings;
- LV6 - Reinstatement of stone walls or new stone walls. New stone walls will be added to integrate the option with the existing landscape character and/or screen views; and
- LV7 - Low lighting levels at junction. Lighting at junctions will be designed to integrate the option with the existing landscape character and/or minimise artificial lighting being seen within the surrounding landscape.

17.5.2. Where application of these secondary mitigation measures has been assumed for the options, these are listed within Tables 3.1, 3.2 and 3.3 of Appendix A17.2 (Volume 4b) for each landscape receptor. Where the effects of these secondary mitigation measures are uncertain, a precautionary approach has been taken during the LVIA regarding the ability of these measures to reduce adverse landscape effects.

17.5.3. The landscape and visual mitigation measures listed above are general in nature, reflecting the broad level of assessment at this stage. Information on how these have been assumed to be applied within some locations for the LVIA is provided within Table 2.1 of Appendix A17.2 (Volume 4b).

17.5.4. Potential mitigation measures were considered for all the predicted adverse landscape effects identified during the LVIA. These are listed in Tables 3.1, 3.2 and 3.3 of Appendix A17.2 (Volume 4b) whether their application resulted in a reduction of significant effects or not. This is so that it is clear which mitigation measures have been considered by the DMRB Stage 2 LVIA and to also highlight which measures may be assessed in more detail during DMRB Stage 3.

17.5.5. All the LVIA mitigation measures are based on the options as currently proposed and thus these will be adjusted and developed in more specific detail during DMRB Stage 3.

17.6 Predicted Environmental Effects

17.6.1. This section presents a summary of the predicted landscape effects of each option. These effects are described more fully within Tables 3.1, 3.2 and 3.3 of Appendix A17.2 (Volume 4b). Where several individual LLCAs are listed together, these are ordered broadly west – east.

Hardmuir to Hillhead

17.6.2. The predicted landscape effects of the North and South Options are described in Table 3.1 of Appendix A17.2 (Volume 4b). This section of the report summarises the key findings. Reference should be made to Figures 17.1 and 17.4 (Volume 5) for the location of landscape designations and LLCAs, respectively.

North Option

- This option would have significant adverse residual effects in LLCAs: 26; 27; 31; and 39. These are of varying character, including historic landscapes in the west, the northern edge of Forres and the open, agricultural plain to the south of Findhorn Bay.
- Across the area, the option would typically appear within the infrastructure corridor of the existing A96, railway and power lines, resulting in reduced incongruity (LLCAs 30, 39, 27, 19). The introduction of this option however, would generally increase the collective dominance of infrastructure as a key characteristic within the area, seeming to diminish the importance or prominence of other key characteristics.
- This option would in many places contrast in scale and seem imposing (due to its proximity) to existing buildings that contribute to the distinctive character of the landscape (LLCAs 19, 26, 27 and 39), particularly where it is elevated upon embankments or where there would be collective encircling by the option in addition to existing roads or the railway.
- Within the Darnaway and Dalvey area (LLCAs 31 and 39), the Forres West junction would contrast to the scale and pattern of the landscape as well as the focal prominence, small scale and historic character of some existing houses. In this area, the option would also involve the removal of some important policy trees and woodland, including one of the two moot-hills at Tearie which are distinctive landscape features (LLCA39), roadside trees at the edge of the Darnaway Castle GDL (C10E, LLCA31) and along the minor road (C7E) between Dalvey Smithy Cottages and Dalvey House (LLCA39), and woodland north of the Darnaway East Lodge (LLCA31).
- The bridge over the River Findhorn (LLCA25) would be clearly visible, but the local landscape sensitivity to this is reduced by the presence of the adjacent railway bridge.

- Around the north side of Forres, the option would relate to the edge of the settlement as well as existing industrial, business and infrastructure land uses and the large scale of structures associated with these (LLCA27). The addition of the option to this area would appear to collectively extend these land uses slightly further to the north, towards a landscape that has a prevailing rural and agricultural character (LLCA26). This would also amplify the separation of Forres (LLCA38) from the landscapes to the north (including LLCA26 and Findhorn Bay).
- Across the open, low-lying agricultural plain between Forres and Findhorn Bay (LLCAs 26 and 27), the option would relate to the large scale and simplicity of the landscape composition. This openness would also mean that the option would be prominent. Furthermore, at a local level, the vertical scale of embankments and bridges would contrast to the openness and horizontal emphasis of the landscape. These vertical elements (and associated vehicles) would be imposing upon surrounding low-lying elements and foci, such as houses and trees, and they would distract from the existing vertical focal feature of Cluny Hill and Nelson's Tower to the south (a GDL, within LLCA38).

17.6.3. A summary of the levels of receptor sensitivity, magnitude of change and predicted effects for the North Option is provided below in Table 17.2. Effects judged as significant are highlighted in bold.

Table 17.2: Predicted Landscape Effects: Hardmuir to Hillhead - North Option

LLCA Landscape Receptor		Sensitivity of Receptor	Magnitude of Change	Predicted Effects*	Assumed Mitigation	Predicted Residual Effects*
LLCA1	Massive hills side slopes and foot slopes	Medium	Low	Minor	LV3, 5	Minor
LLCA2	Enclosed agricultural strath	Medium	Low	Minor	LV5, 7	Minor
LLCA18	Broad, linear strath	Low	Low	Minor	LV3, 5, 7	Minor
LLCA19	Enclosing slopes along broad, linear strath	Low	Low	Minor	LV2, 3, 5, 6, 7	Minor
LLCA20	Kinloss settlement and landscape setting	Low	Negligible	Negligible	N/A	Negligible
LLCA22	Burgie Estate rolling slopes, contained spaces and historic features	Medium	Low	Minor	LV2, 5, 6	Negligible
LLCA23	Intimate patchwork of woodland, agriculture and settlement upon undulating slopes	Low	Negligible	Negligible	N/A	Negligible
LLCA24	Extensive, dense woodland containing some open spaces and historic features	Low	Negligible	Negligible	N/A	Negligible
LLCA25	River Findhorn corridor and gorge	Medium	Low	Minor	LV1, 2	Minor
LLCA26	Flat, open and exposed landscape with simple pattern, occasional foci and offering panoramic views	Medium	Medium	**Moderate**	LV2, 3, 5, 6	**Moderate**
LLCA27	Forres industrial and infrastructure fringe	Low	Medium	**Moderate**	LV2, 3, 5, 6	**Moderate**
LLCA28	Patchwork of agriculture and woodland adjacent to the extensive backdrop of Culbin Forest	Medium	Low	Minor	LV2, 3, 5, 7	Negligible

LLCA Landscape Receptor		Sensitivity of Receptor	Magnitude of Change	Predicted Effects*	Assumed Mitigation	Predicted Residual Effects*
LLCA30	Hardmuir mixed farmland, woodland and infrastructure upon a rolling landform	Low	Low	Minor	LV1, 2, 3, 5, 6	Minor
LLCA31	Brodie and Darnaway estate landscapes including prominent historic features and some extensive woodland	Medium	Medium	**Moderate**	LV1, 2, 3, 5, 6, 7	**Moderate**
LLCA38	Forres town and southern margins	Medium	Low	Minor	LV2, 5, 6	Minor
LLCA39	Mixed land use and foci around Dyke and Dalvey	Medium	High	**Moderate**	LV1, 2, 3, 5, 6, 7	**Moderate**
LLCA41	Grange Hall estate landscape	Medium	Low	Minor	LV1, 2, 3, 5, 6, 7	Minor

* All effects are adverse unless noted

South Option

- This option would have significant adverse residual effects in LLCAs: 1; 2; 23; 24; 25; 31 and 39 (named in Table 17.3 below). These effects would result primarily from its contrast to an intricate landscape of undulating woodland and small spaces in the east, cutting through a large area of woodland south of Forres, reducing historic landscape qualities in the west and crossing the River Findhorn.
- Across this area, the linear form of the option would contrast strongly with the distinctive pattern of woodland, agriculture and settlement, (LLCAs 39, 23, 24, 2 and 19) and strongly increase the influence of infrastructure within the mix of land uses. It would also contrast in scale and seem imposing upon the semi-enclosed spaces within the area and smaller scale landscape elements and features such as houses, knolls and roadside trees, especially where raised upon embankments or bridges (LLCAs 39, 23, 2 and 19).
- Apart from in the far west and east by the existing A96, the option and the activity and noise of associated vehicles using the road would contrast to the perceived rural character within many parts of this area, including in LLCAs 25, 23, 24 and 2. It would also diminish the qualities of tranquillity and sanctuary within these LLCAs.
- This option would cut through a large extent of woodland. This varies in type but includes policy woodlands within the Darnaway Castle GDL (LLCA31), riparian woodland along the River Findhorn (LLCA25), mature roadside trees at Darnaway (LLCA31) and north of Rafford (LLCA23), and extensive woodland within Limekilns Wood and Fairyhills Wood (LLCA24). It would also alter existing woodland margins by the A940 and C14E roads (south of Dallas Dhu). Although the visibility of the option would be limited in some places by surrounding tree screening, the option (including overbridges, link roads and the Forres South junction with the A940) would involve removal of an extensive area of trees, creating multiple open corridors that would contrast in pattern and spatial character (increased where there are cuttings and embankments). This would fragment the existing extent of woodland between Loch of Blairs and Knockomie (LLCA24) and change the experience of the landscape for many people that use the woodlands for recreation. This would include the sound of vehicles diminishing the perceived tranquillity and sanctuary within some parts of this area, such as by the Loch of Blairs, even where the option is not visible due to tree screening.
- The option would cut through the north-east corner of the Darnaway Castle GDL and involve removal of a large area of existing woodland between Woodside and Newton of Dalvey (LLCA31). It would also involve the removal of existing policy trees alongside the minor road to East Lodge (C10E) that are of high landscape value.
- Around Newforres (LLCA2), this option would contrast to the distinct linear space, landscape pattern and prevailing openness of the strath, appearing prominent and incongruous.
- The Forres East junction between Hillhead and Leys would contrast to the local scale of existing structures and the openness and simplicity of the landscape pattern (LLCA19). These effects would be increased by the elevation of embankments and due to collective effects with existing roads to the north and south, although the landscape characteristics also offer scope for mitigation such as sensitively designed landform shaping, new planting and discreet lighting.
- The bridge over the River Findhorn would contrast to the line and vertical emphasis of the river corridor (LLCA25), distracting from the existing focus of the river and seeming overbearing upon the spatial enclosure of the river corridor. The sound of vehicles upon the bridge and adjacent option embankments would also be intrusive from below (even where these are not seen) and diminish existing qualities of perceived

naturalness and sanctuary, including as perceived in the south from the River Findhorn AGLV. The option would also involve removal of mature trees either side of the river that form distinct landscape features.

17.6.4. A summary of the levels of receptor sensitivity, magnitude of change and predicted effects for the South Option is provided below in Table 17.3. Effects judged as significant are highlighted in bold.

Table 17.3: Predicted Landscape Effects: Hardmuir to Hillhead - South Option

LLCA Landscape Receptor		Sensitivity of Receptor	Magnitude of Change	Predicted Effects*	Assumed Mitigation	Predicted Residual Effects*
LLCA1	Massive hills side slopes and foot slopes	High	Medium	**Moderate**	LV4	**Moderate**
LLCA2	Enclosed agricultural strath	Medium	High	**Major**	LV5, 7	**Major**
LLCA18	Broad, linear strath	Low	Medium	Minor	LV7	Minor
LLCA19	Enclosing slopes along broad, linear strath	Low	Medium	**Moderate**	LV2, 3, 5, 6, 7	Minor
LLCA20	Kinloss settlement and landscape setting	Low	Negligible	Negligible	N/A	Negligible
LLCA22	Burgie Estate rolling slopes, contained spaces and historic features	Medium	Low	Minor	LV2, 5, 6, 7	Minor
LLCA23	Intimate patchwork of woodland, agriculture and settlement upon undulating slopes	High	High	**Major**	LV1, 2, 3, 5, 6	**Major**
LLCA24	Extensive, dense woodland containing some open spaces and historic features	Medium	High	**Major**	LV1, 2, 3, 5, 6, 7	**Moderate**
LLCA25	River Findhorn corridor and gorge	High	Medium	**Moderate**	LV1	**Moderate**
LLCA26	Flat, open and exposed landscape with simple pattern, occasional foci and offering panoramic views	Medium	Low	Minor	LV1, 3, 5	Minor
LLCA27	Forres industrial and infrastructure fringe	Low	Negligible	Negligible	LV5	Negligible
LLCA28	Patchwork of agriculture and woodland adjacent to the extensive backdrop of Culbin Forest	Medium	Low	Minor	LV2, 3, 5, 7	Negligible

LLCA Landscape Receptor		Sensitivity of Receptor	Magnitude of Change	Predicted Effects*	Assumed Mitigation	Predicted Residual Effects*
LLCA30	Hardmuir mixed farmland, woodland and infrastructure upon a rolling landform	Low	Low	Minor	LV1, 2, 3, 5, 6	Minor
LLCA31	Brodie and Darnaway estate landscapes including prominent historic features and some extensive woodland	High	Medium	**Moderate**	LV1, 2, 3, 5, 6, 7	**Moderate**
LLCA38	Forres town and southern margins	Low	Low	Minor	LV1, 2, 3, 5	Minor
LLCA39	Mixed land use and foci around Dyke and Dalvey	Medium	Medium	**Moderate**	LV1, 2, 3, 5, 6,7	**Moderate**
LLCA41	Grange Hall estate landscape	Medium	Low	Minor	LV1, 2, 3, 5, 6, 7	Negligible

* All effects are adverse unless noted

Hillhead to Lhanbryde

17.6.5. The predicted landscape effects of the North and South Options are described in Table 3.2 of Appendix A17.2 (Volume 4b). The following text summarises the key findings[109]. Reference should be made to Figures 17.2 and 17.5 (Volume 5) for the location of landscape designations and LLCAs, respectively.

North Option

- This option would have significant adverse residual effects in LLCAs: 2; 4; 17; 18; 19; 36; and 43 (named in Table 17.4 below). At a broad level, these would result primarily from cutting through the edge of a discreet strath in the west, involving the removal of woodland and some historic landscape features, cutting across some prominent strath side slopes, and compromising the distinct north landscape edge of Elgin.
- Along sections of the option around Hillhead, Alves, Newton and Lhanbryde (LLCAs 19, 17 and 4), the option would appear closely related to the existing A96, railway or overhead power lines as well as other main roads such as the B9013. This would reduce its incongruity although there would also be collective effects with the existing infrastructure. In contrast, most other sections of the option would be located within rural, agricultural and relatively undeveloped landscapes, resulting in greater incongruity (LLCAs 2, 19 east, 18, 36 and 7).
- In the west, the option would pass through a discreet strath between Morayscairn and Cloves (LLCA2), intruding into the containment of the strath and contrasting to the rural character and qualities of sanctuary. Here, the option would contrast in scale to existing houses and farms and its imposition would be increased where there are embankments and, conversely, reduced where in cutting.
- In areas of existing woodland and/or variable landform and hills (LLCAs 19, 17, 36 and 7), views of the option would be limited in extent due to screening. The option would, however, be locally imposing upon the smaller-scale character and enclosure within these areas, amplified where the option is raised upon embankment or bridges.
- The linear form of the option would typically contrast with the distinctive landscape pattern of areas of mixed woodland, agriculture and settlement within this area (LLCAs 19, 36 and 7). Within this composition, it would also involve removal of some existing trees/woodland, such as at Ardgilzean, Lower Mains, Spynie and Kirkhill (LLCAs 17, 18 and 36).
- This option would contrast to historic landscape elements, features and/or character at Newton, Findrassie, Spynie and Calcots (LLCAs 17, 36 and 16, including removal of some prominent mature and/or policy trees at Newton (LLCA17)).
- To the west of Elgin, between Newton and Findrassie (LLCAs 19 and 18), the option would appear prominent within the landscape which is open and simple in composition, and it would contrast to the landscape pattern defined by elements such as hedgerows, watercourses and the dispersed foci of buildings and farms.
- Between Newton and Westerton, the option would contrast with the distinctive landform slopes (LLCA19) to the north-west of Quarrelwood (LLCA43). Conversely, near Lower Mains (LLCA18), the option would relate better to the large scale of the landscape and the curved line of the hills to the south, although also prominent. The contrast between the option and the landform, as well as its prominence, would be amplified where the

[109] Where several individual LLCAs are listed together, these are ordered broadly west - east

option is raised on embankment (such as the overbridges of the B9012 and the U47E, at the boundary between LLCAs 18 and 19) and reduced where the option is in cutting.

- From Quarrelwood (LLCA43), views are often screened by trees but the option would be visible and/or vehicles on it audible from some areas upon the north-western slopes/woodland edge (including the signed 'viewpoint' along the FCS trail[110]). From here, the option would be prominent and seem imposing (largely due to its proximity and scale), affecting key views of the distinctive characteristics and qualities of the landscape setting to the north and north-west (including LLCAs 17, 18 and 19).
- North and east of Elgin, the option would generally seem to extend the influence of urban or industrial elements outwards, seeming to breach the hills that currently form an important edge and buffer to the town (LLCA36). This would change the distinctive experience of the rural landscape around the north-eastern side of Elgin which is accessed via a network of minor roads and paths.
- The line of the option would broadly follow the line of the northern edge of Kirkhill Wood but, conversely, it would contrast very strongly to the hill landform where it would cross the slopes between Kirkhill and Sheriffston (LLCA36). Here, the option would breach the hill edge, which is an important landscape feature (albeit not very high in elevation) thereby reducing the perceived containment of Elgin (LLCA35) and its separation from the open landscapes to the north (LLCA16). This effect would be increased by the removal of trees upon the hill that contribute to the landscape feature (LLCA36), including along the hill top at Kirkhill (between Kirkhill Wood and Kirkhill House) and within one of the woodland blocks west of Sheriffston.
- In the east, this option would cross the low-lying corridor between Barmuckity and Lhanbryde (LLCA4). Here, the option would relate to the character of the existing A96 and railway but it would contrast to the existing landscape pattern, most obviously where it crosses the open linear space between the railway and the existing A96. It would also seem to reduce the distinction between Elgin and Lhanbryde.

17.6.6. A summary of the levels of receptor sensitivity, magnitude of change and predicted effects for the South Option is provided below in Table 17.4. Effects judged as significant are highlighted in bold.

[110] Forestry Commission Scotland Elginia trail

Table 17.4: Predicted Landscape Effects: Hillhead to Lhanbryde - North Option

LLCA Landscape Receptor		Sensitivity of Receptor	Magnitude of Change	Predicted Effects*	Assumed Mitigation	Predicted Residual Effects*
1	Massive hills side slopes and foot slopes	Medium	Low	Minor	LV3, 4, 5	Minor
2	Enclosed agricultural strath	High	Medium	**Major**	LV2, 4, 5, 6	**Major**
3	Miltonduff open basin with mixed landscape pattern and edged by adjacent hills	Low	No change	None	N/A	None
4	Elgin town margins with infrastructure and mixed wooded and open surroundings	Medium	Low	**Moderate**	LV1, 2, 3, 5, 6	**Moderate**
7	Rural, undulating slopes with a mix of open ground and woodland	Medium	Low	Minor	LV1, 2, 3, 5, 6	Minor
8	Woodlands and open spaces enclosed by surrounding trees	Low	Low	Minor	LV3, 5	Minor
9	Undulating, irregular landform with patchwork of woodland and farmland and an intimate landscape scale	Medium	Low	Minor	LV1, 2, 3, 5, 6, 7	Minor
16	Flat, open, expansive landscape with horizontal emphasis	Low	Low	Minor	LV1, 2, 3, 5, 6	Minor
17	Westfield, Newton and Ardgye historic landscapes with open spaces and historic built foci within a framework of trees	High	Medium	**Moderate**	LV1, 2, 3, 5, 6	**Moderate**
18	Broad, linear strath	Medium	Medium	**Moderate**	LV1, 2, 5, 6	**Moderate**
19	Enclosing slopes along broad, linear strath	Medium	High	**Major**	LV1, 2, 3, 5, 6	**Major**
22	Burgie Estate rolling slopes, contained spaces and historic features	Medium	Low	Minor	LV1, 2, 3, 5, 6	Negligible

LLCA Landscape Receptor		Sensitivity of Receptor	Magnitude of Change	Predicted Effects*	Assumed Mitigation	Predicted Residual Effects*
34	Lhanbryde	Low	Low	Minor	LV1, 3, 5	Minor
35	Elgin	Medium	Low	Minor	LV3, 5	Minor
36	Hills north of Elgin and discreet landscape of mixed woodland, agriculture and historic elements	High	High	**Major**	LV1, 2, 3, 5, 6	**Major**
42	Open, simple, managed River Lossie plain with horizontal emphasis	Low	No change	None	N/A	None
43	Quarrelwood wooded hill	Medium	Medium	**Moderate**	LV1, 2, 5, 6	**Moderate**

* All effects are adverse unless noted

South Option

- This option would have significant adverse residual landscape effects in LLCAs: 2; 4 and 43 (named in Table 17.5 below). These significant effects would occur primarily east of Alves Wood, resulting from cutting through the edge of a discreet strath and crossing the River Lossie floodplain (including the proposed link road to Elgin), and passing through a mixed patchwork of farmland and woodland to the south of Elgin.
- The option would relate strongly to the existing infrastructure (including the existing A96 and railway line) between Burgie and Alves (LLCA19). It would also follow the landform ridge and slopes of the landscape along this stretch, although it would typically appear higher than the existing A96 which would result in it seeming less contained by the landform edges. The addition of this option would generally increase the collective dominance of infrastructure as a key characteristic within this area, seeming to diminish the importance or prominence of other characteristics such as the mixed land use pattern of agriculture, woodland and settlement.
- The option would contrast in scale and seem imposing upon existing houses and settlements within the study area, particularly where it is elevated on embankment or where it would collectively encircle these in addition to the existing A96 or railway (such as by Easter Cloves, LLCA2).
- Between the Alves railway crossing with the C4E and Lochinver (LLCA2), the option would be prominent and appear incongruous due to its large size relative to surrounding landscape elements, its high visibility where crossing wide open spaces (especially where elevated upon embankments) and moving vehicles contrasting to the typical low levels of activity within the rural landscape. Although it would broadly follow the railway line within this section, this would not aid its integration significantly as the railway is not an obvious feature here. Conversely, the option would appear to contrast to the distinctive landscape pattern and strath space to the south (LLCA2). The option would also contrast in scale and seem imposing upon existing houses and farms within the area, especially where it is raised upon embankments or bridges and/or would sandwich these between the option and the existing railway line.
- The option would not be visible from many parts of the historic landscape around Ardgye and Newton (LLCA17) due to screening by trees (that are expected to remain long-term). It would be visible from York Tower (LLCA17), from which the option and associated vehicle activity and noise would seem intrusive and to sever this landmark from the rural landscape visible to the south (including LLCAs 2, 1, 3, 5 and beyond).
- By Lochinver, the option would cross an open or sparsely-wooded, low-lying space in the west (LLCA2) and the River Lossie in the north-east (LLCA4), contrasting strongly to the openness and landscape pattern. In this area, the option would be very prominent and appear highly incongruous, partly due to being elevated upon embankments or bridges and partly due to contrasting to the overriding rural, quiet character with qualities of sanctuary.
- Around Bruceland and Aldroughty, the option link road to Elgin would change the existing close relationship between the wooded hill edge to the north (LLCA43), the River Lossie (LLCA4) and the open farmland to the south (LLCA42). Its prominence and imposition would be increased significantly by the elevation of the option embankments and bridges (and associated vehicles) which would contrast to the low-lying and open character of the landscape to the south (LLCA2). Furthermore, it would contrast with the scale and foci of houses and seem out of place to the prevailing rural character of the area. It would also impinge upon local qualities of tranquillity and sanctuary around Aldroughty (LLCA43) which is shielded from the effects of the existing A96 by the landform and woodland to the north.

- To the south-west of Elgin, the option would cross the River Lossie floodplain (LLCAs 3 and 42). Here, it would be highly prominent due to the openness of the landscape and these effects would be amplified where the option would be raised upon embankments or bridges. The option would however relate to the large scale of the landscape and its horizontal emphasis and it would seem to follow a simple line that relates to the simplicity of the landscape composition. The option would relate to the prevailing managed character of this area.
- To the south of Elgin, the option may be visible from some open edges of the town which offer distant views (LLCA35). From here, the option would seem to reduce the linkage between the town and the more distant landscape to the south (LLCA4 and beyond) but its incongruity would be reduced by existing development and infrastructure on the south side of the town.
- The option and the Elgin South junction would cut through the distinct hill and woodland feature of Birkenhill Wood (LLCA4). This would not only involve removal of a wide corridor of trees but, by breaching this feature, the option would diminish existing qualities of sanctuary within the area on the east side of the wood which is currently shielded from the A941 and views of Elgin.
- South-east of Elgin (LLCA7), the option would typically appear to relate to the gentle, rolling slopes and wide, open spaces west of Troves, although it would contrast to the landscape pattern and involve the loss or reduction in size of some distinctive woodland blocks that create prominent landscape features. Furthermore, near Coxton, the option would be more imposing upon a more intricate scale and enclosure of the landscape, this is amplified where the option would be raised on embankments or bridges and, conversely, reduced where the option would be in cutting.
- In the east, around Lhanbryde (LLCA4 and LLCA34), the option would relate in character to the existing A96, railway and overhead powerlines. The option including the Elgin East junction would, however, extend over a large area and be imposing locally as well as having collective effects with the existing infrastructure that would result in infrastructure becoming the key characteristic of the area south of the settlement.

17.6.7. A summary of the levels of receptor sensitivity, magnitude of change and predicted effects for the South Option is provided below in Table 17.5. Effects judged as significant are highlighted in bold.

Table 17.5: Predicted Landscape Effects: Hillhead to Lhanbryde - South Option

LLCA Landscape Receptor		Sensitivity of Receptor	Magnitude of Change	Predicted Effects*	Assumed Mitigation	Predicted Residual Effects*
1	Massive hills side slopes and foot slopes	Medium	Low	Minor	LV3, 5, 7	Minor
2	Enclosed agricultural strath	High	High	**Major**	LV1, 2, 3 5, 6, 7	**Major**
3	Miltonduff open basin with mixed landscape pattern and edged by adjacent hills	Low	Low	Minor	LV2, 3, 5, 6	Minor
4	Elgin town margins with infrastructure and mixed wooded and open surroundings	Medium	Medium	**Moderate**	LV1, 2, 3, 5, 6	**Moderate**
7	Rural, undulating slopes with a mix of open ground and woodland	Medium	Medium	**Moderate**	LV1, 2, 3, 5, 6	Minor
8	Woodlands and open spaces enclosed by surrounding trees	Low	Low	Minor	LV3, 5, 7	Minor
9	Undulating, irregular landform with patchwork of woodland and farmland and an intimate landscape scale	Low	Low	Minor	LV1, 2, 3, 5, 6, 7	Minor
16	Flat, open, expansive landscape with horizontal emphasis	Low	Negligible	Negligible	N/A	Negligible
17	Westfield, Newton and Ardgye historic landscapes with open spaces and historic built foci within a framework of trees	Medium	Minor	Minor	LV1, 3, 5, 6	Minor
18	Broad, linear strath	Low	Low	Minor	LV1, 2, 3, 5, 6	Negligible
19	Enclosing slopes along broad, linear strath	Medium	Low	Minor	LV1, 2, 3, 5	Minor
22	Burgie Estate rolling slopes, contained spaces and historic features	Medium	Low	Minor	LV1, 2, 3, 5, 6	Negligible

LLCA Landscape Receptor		Sensitivity of Receptor	Magnitude of Change	Predicted Effects*	Assumed Mitigation	Predicted Residual Effects*
34	Lhanbryde	Low	Low	Minor	LV1, 3, 5, 7	Minor
35	Elgin	Low	Low	Minor	LV1, 2, 3, 5, 6, 7	Minor
36	Hills north of Elgin and discreet landscape of mixed woodland, agriculture and historic elements	Low	Negligible	Negligible	N/A	Negligible
42	Open, simple, managed River Lossie plain with horizontal emphasis	Medium	Medium	**Moderate**	LV1, 2, 3, 5	Minor
43	Quarrelwood wooded hill	Medium	Medium	**Moderate**	LV1, 2, 5, 6	**Moderate**

* All effects are adverse unless noted

Lhanbryde to East of Fochabers

17.6.8. The predicted landscape effects of the North and South Options are described in Table 3.3 of Appendix A17.2 (Volume 4b). The following text summarises the key findings. Reference should be made to Figures 17.3 and 17.6 (Volume 5) for the location of landscape designations and LLCAs, respectively.

North Option

- This option would have significant adverse residual landscape effects in LLCAs: 8; 10; 11; 12; 13; 15; 32; and 33 (named in Table 17.6 below). These significant effects would occur along Strathspey, within the settlement of Fochabers and Gordon Castle grounds (GDL) and within the wooded landscapes in the west.
- In the west, the option would pass through an area of prevailing woodland around Threapland and Lochnabo Wood (LLCA8). Here, visibility of the option would be limited in extent due to screening by trees and the landform, but the option would also seem imposing upon the enclosed spaces within the woodland, such as around Loch na Bo. This imposition would be reduced where the option is in cutting and, conversely, increased where the option is raised on embankments, including either side of overbridges. Even where the option would not be visible due to tree screening, the noise of vehicles along the option may be intrusive and contrast to the prevailing rural character and existing qualities of sanctuary in places. These effects would influence the distinctive landscape experience via paths and tracks through the wooded landscapes, including around Loch na Bo and within Threapland Wood and Balnacoul Wood.
- In the west, between Lhanbryde and Balnacoul Wood (LLCA8) the option would relate to the character of the existing A96 which would run broadly parallel to the north. The option would, however, have collective effects with this existing route as, together, they would isolate a linear area of LLCA8 from its surroundings (including Loch Oire).
- Between Wester Marchfield and Balnacoul Wood, the option would be clearly visible crossing the extensive agricultural landscape around Wester and Easter Bauds (LLCA8). The option would, however, relate to the large scale and openness of this area and the simplicity of the landscape pattern and landform.
- The Mosstodloch junction by Balnacoul would contrast strongly to the landscape pattern (LLCA8). Its effects would relate to the existing influence of both the existing A96 and B9010 within the vicinity and it would seem spatially contained and screened from the wider landscape by surrounding woodland and slopes.
- The option would cross the River Spey and its open strath floor near the two existing bridges inbetween Fochabers and Mosstodloch (LLCAs 33, 10, 13 and 32). Here, the option would be very prominent and, notably, would be higher, longer and at a different orientation to the existing bridges. This means that it would contrast to these bridges, have a less obvious relationship to the river and would obstruct some key views along the strath (LLCAs 13 and 10). Specifically, from the Inchberry Road area (LLCA33) and the pedestrian Fochabers Bridge (LLCA13), the bridge would be highly prominent and intrusive, crossing key views of the distinct landscape characteristics of Strathspey and the hills to the south (LLCAs 8, 10, 13, 11, 12 and beyond) [111]. The large scale and high elevation of this bridge (at a similar elevation to Inchberry Road and higher than

[111] Refer to Chapter 15 for a description of the predicted visual effects

Fochabers Old Bridge) as well as the activity and noise of vehicles upon this structure would increase the imposition.

- To the east of Fochabers, the option would cut through the Hill of Fochabers (LLCAs 11 and 12), contrasting strongly to the distinct landform and involving removal of a wide corridor of existing trees. This would include very deep cuttings which would be highly prominent and appear to compromise the wooded hill edge (LLCA11) that forms the backcloth to the adjacent strath, settlement and Gordon Castle GDL.
- Within Fochabers (LLCA32), the option would not be widely visible as it would be screened in many places by surrounding structures and the landform. It would be visible from the High Street and at its north-western edge (by the boundary with LLCAs 10 and 13) and at its north-eastern edge (by the boundary with LLCAs15 and 11). Furthermore, vehicles associated with the road would be audible in places that they would not be seen, especially where elevated upon embankments or the bridge.
- Looking south-east along the High Street through the centre of Fochabers (LLCA32), the option would be seen directly ahead within the framed view of the existing wooded hill backcloth to this settlement (in line with the existing Peeps View shelter, LLCA11). From here, the high cutting slope face on the eastern side of the option would be prominent and intrusive in scale. The option would also be very imposing due to its higher elevation than the settlement below and because it would seem to breach the existing perceived settlement/strath edge.
- The option and associated vehicle activity and noise would be prominent and imposing within the Gordon Castle grounds (GDL) (LLCA15). Here, the effects would be increased by the raised elevation of the option and the embankment slopes in the south-east that would contrast to the existing landform. The option would be seen from the castle grounds continuing beyond the GDL to the south-east, cutting through the Hill of Fochabers (LLCA11). This would change the distinct qualities of the wooded hill backcloth to Gordon Castle grounds, diminishing its perceived shielding edge. These landscape effects would mainly be experienced from the extensive open areas of the GDL that extend south and west of Gordon Castle Farm as well as from the Gordon Castle tower which forms a key focal feature within the GDL and adjacent LLCA11 and LLCA32.
- The option cutting through Hill of Fochabers (LLCA11) would involve removal of existing paths (which form part of the Winding Walks) and removal of the Peeps View vantage point from which the distinctive landscape characteristics of the area and its surroundings are experienced.
- At its eastern end (LLCA12), the option would follow the existing A96 and thus its effects would be limited, mainly resulting from carriageway widening, roadside cuttings/ embankments and tree removal.

17.6.9. A summary of the levels of receptor sensitivity, magnitude of change and predicted effects for the North Option is provided below in Table 17.6. Effects judged as significant are highlighted in bold.

Table 17.6: Predicted Landscape Effects: Lhanbryde to East of Fochabers - North Option

LLCA Landscape Receptor		Sensitivity of Receptor	Magnitude of Change	Predicted Effects*	Assumed Mitigation	Predicted Residual Effects*
4	Elgin town margins with infrastructure and mixed wooded and open surroundings	Low	Low	Minor	LV1, 2, 3, 5, 6	Minor
7	Rural, undulating slopes with a mix of open ground and woodland	Low	Low	Minor	LV1, 2, 3, 5, 6	Minor
8	Woodlands and open spaces enclosed by surrounding trees	Medium	Medium	**Moderate**	LV1, 2, 3, 4, 5, 6	**Moderate**
9	Undulating, irregular landform with patchwork of woodland and farmland and an intimate landscape scale	Low	Low	Minor	LV1, 2, 3, 5, 6	Minor
10	River Spey strath floor	Medium	Medium	**Moderate**	N/A	**Moderate**
11	River Spey and wooded slopes	High	High	**Major**	LV1, 5	**Major**
12	Dense, forested hills	Medium	Medium	**Moderate**	LV1, 5	**Moderate**
13	River Spey corridor	Medium	Medium	**Moderate**	N/A	**Moderate**
14	Open, flat agricultural fields surrounded by woodland edge	Low	Negligible	Negligible	N/A	Negligible
15	Gordon Castle historic landscape	High	High	**Major**	LV1, 2, 3, 5, 6, 7	**Major**
32	Fochabers	High	Medium	**Major**	LV1, 3, 5	**Major**
33	Mosstodloch	Medium	Medium	**Moderate**	LV1, 2, 3, 4, 5, 6	**Moderate**
34	Lhanbryde	Low	Low	Minor	LV1, 2, 3, 5	Minor
37	Rolling farmland, woodland and historic elements at periphery of designed landscape	Medium	Low	Minor	LV1, 3, 5, 7	Minor

* All effects are adverse unless noted

South Option

- This option would have significant adverse residual landscape effects in LLCAs: 8; 10; 11; 12; 13; and 32 (named in Table 17.7 below). These significant effects would occur within Strathspey, including both the floor and slopes, as well as within the settlement of Fochabers and the wooded landscapes in the west.
- In the west between Lhanbryde and Wester Bauds (LLCAs 4 and 8), this option would be largely the same as the North Option and thus its landscape effects would be similar. This would include the option relating to the character of the existing A96, which would run broadly parallel to the north, but also having collective effects with this route, isolating a band in-between the existing A96 and the option (which would include Loch Oire) from the surrounding LLCA8.
- The landscape effects of this option within the wooded area between Lhanbryde and Wester Marchfield (LLCA8) would also be the same as the North Option. This would include limited visibility of the option from the wider landscape but it would seem to impose upon the enclosed spaces within this landscape, such as around Loch na Bo. This imposition would be reduced where the option is in cutting and, conversely, increased where the option is raised on embankments, including overbridges. Even where not visible due to tree screening, the noise of vehicles along the option may be intrusive and contrast to the prevailing rural character and qualities of sanctuary in many parts of this woodland area. These effects would also influence the experience of the landscape via a network of paths and tracks through the woodland, including around Loch na Bo and within Threapland Wood and Balnacoul Wood.
- The option would cross Strathspey west – east between Balnacoul Wood and Ordiequish (LLCAs 10 and 13). Here, it would be highly prominent, mainly crossing the strath via embankments and a long bridge, although it would be in cutting across Dipple Brae (LLCA10). Along this line, the option would pass through the Speyside AGLV.
- The option would contrast strongly to the linear, open space of the strath (LLCA10). The bridge would tower over the low-lying strath floor below, conflicting in its line and elevation and the distinction of the strath space in relation to the slopes either side (LLCAs 7 and 8 in the west and LLCAs 11 and 12 in the east). It would also contrast to the scale and point foci of the houses and farms within the agricultural landscape beneath (LLCA10). The option would involve removal of part of the Dipple Brae woodland which forms a distinct landscape feature.
- The activity and sound of vehicles upon the bridge and embankments would intrude upon the experience of the low-lying landscape underneath (LLCAs 10 and 13) and diminish the perceived rural character and tranquillity in some places.
- At the eastern side of the strath, the option would contrast in its line and elevation to the west-facing slopes (LLCAs 11 and 12). It would also require tree removal, reducing the qualities of the wooded slopes as an edge and backdrop that emphasises the distinct characteristics of the juxtaposed strath floor and strath edges. The option cuttings and overbridge at Castle Hill (LLCA11) would contrast to the distinctive landform of the local area.
- The option would change the distinctive landscape experience of Strathspey south of Fochabers (LLCAs 10, 11 and 13), including when travelling along the Speyside Way, the River Spey and its riverside paths, and from the Ordiequish area. It would also disrupt key views looking down and across the strath, diminishing the sense of tranquillity and sanctuary experienced in many parts of this landscape.

- The scale of the option would contrast and seem imposing upon the small-scale character of buildings, crofts, sheltered spaces and the landscape pattern in and around Ordiequish (LLCA11).
- The Fochabers junction and embankments next to the Burn of Fochabers (border of LLCAs 11 and 12) would contrast strongly to the line, elevation and landform of the glen and river below. The option would not be highly prominent within the wider landscape due to landform and woodland screening and its incongruity would be reduced due to the proximity of the existing A96.
- Through Slorach's Wood (LLCA12), this option would involve removal of a wide corridor of existing woodland. Although some of the trees within this wood are of relatively low landscape value due to being part of a dense conifer plantation, some of the trees comprise mature native or policy trees that are landscape features and of higher landscape value.
- The option is unlikely to be visible from the central core of Fochabers (LLCA32). It would be visible from some southern parts of the settlement, albeit many views would be filtered or narrow in extent, including from the southern parts of the housing estates west and east of Milne's High School (LLCA32). Where visible, the bridge would seem imposing in this area and the sound of vehicles would be audible.
- The bridge over the River Spey would be clearly visible from the pedestrian Fochabers Bridge (LLCA13) from which key views are provided of the key characteristics of the surrounding landscape that includes Strathspey and the surrounding hills (including LLCAs 8, 10, 12, 13 and beyond). From here, the bridge would create a focal feature that may distract attention from other elements, characteristics and features in the landscape.
- At its eastern end (LLCA12), the option would follow the route of the existing A96 and be broadly the same as the North Option.

17.6.10. A summary of the levels of receptor sensitivity, magnitude of change and predicted effects for the South Option is provided below in Table 17.7. Effects judged as significant are highlighted in bold.

Table 17.7: Predicted Landscape Effects: Lhanbryde to East of Fochabers - South Option

LLCA Landscape receptor		Sensitivity of Receptor	Magnitude of Change	Predicted Effects*	Assumed Mitigation	Predicted Residual Effects*
4	Elgin town margins with infrastructure and mixed wooded and open surroundings	Low	Low	Minor	LV1, 2, 3, 5, 6	Minor
7	Rural, undulating slopes with a mix of open ground and woodland	Medium	Low	Minor	LV1, 5	Minor
8	Woodlands and open spaces enclosed by surrounding trees	Medium	Medium	**Moderate**	LV1, 2, 3, 4, 5, 6	**Moderate**
9	Undulating, irregular landform with patchwork of woodland and farmland and an intimate landscape scale	Low	Low	Minor	LV1, 2, 3, 5, 6,	Minor
10	River Spey strath floor	High	High	**Major**	LV1, 5	**Major**
11	River Spey and wooded slopes	High	High	**Major**	LV1, 2, 3, 5, 6	**Major**
12	Dense, forested hills	Medium	Medium	**Moderate**	LV1, 5	**Moderate**
13	River Spey corridor	High	High	**Major**	N/A	**Major**
14	Open, flat agricultural fields surrounded by woodland edge	Low	Negligible	Negligible	N/A	Negligible
15	Gordon Castle historic landscape	Medium	Negligible	Negligible	N/A	Negligible
32	Fochabers	Medium	Medium	**Moderate**	LV1, 3, 5, 6	**Moderate**
33	Mosstodloch	Medium	Low	Minor	LV1, 3, 4, 5	Minor
34	Lhanbryde	Low	Low	Minor	LV1, 2, 3, 5	Minor
37	Rolling farmland, woodland and historic elements at periphery of designed landscape	Low	Negligible	Negligible	N/A	Negligible

* All effects are adverse unless noted

Cumulative Effects

17.6.11. A review of the proposed future development areas from the Proposed Moray Local Development Plan (LDP) 2020 identified four sites which could alter the predicted landscape effects of the options on landscape receptors. These are the proposed developments for residential, mixed use and long-term use north of Elgin (EL9(W), EL9(E), EL10/LONG1 and R14) along the Hillhead to Lhanbryde North Option. These could change the nature of landscape effects within LLCAs 16 and 36.

17.6.12. The predicted cumulative effects are not considered to change the overall landscape assessment for these options.

17.7 Summary of Effects

17.7.1. This section sets out a summary of the key findings of the options assessment based on the predicted significant residual effects. The summaries are presented in Tables 17.8 to 17.10 below.

Table 17.8: Summary of Predicted Landscape Effects: Hardmuir to Hillhead

Predicted Residual Effects for the North Option	Predicted Residual Effects for the South Option
• There would be Moderate adverse predicted residual landscape effects in: – LLCA26; – LLCA27; – LLCA31; and – LLCA39. • This option would relate to existing infrastructure west of Forres, including the existing A96 and railway line (LLCA30 and LLCA31). To the east, it would relate to the northern fringes of Forres, including existing industry and business units (LLCA27 and LLCA38). It would also include a new bridge over the River Findhorn immediately north of the existing railway bridge (LLCA25). • The option would have adverse effects on some historic landscape elements within the landscape (LLCA31 and LLCA39), including near the Forres West junction. The option would also contrast in vertical scale and seem imposing where crossing open expanses of agricultural land to the north of Forres where raised upon embankment and bridges (LLCA26). It would also seem imposing upon some local houses which form dispersed foci within the landscape (LLCA30, LLCA39, LLCA26, LLCA27).	• There would be Moderate adverse predicted residual landscape effects in: – LLCA1; – LLCA24; – LLCA25; – LLCA31; and – LLCA39. • There would be Major adverse predicted residual landscape effects in: – LLCA2; and – LLCA23. • This option would pass through an area of mixed landform and land cover, resulting in trees and slopes limiting distant visibility and containing spaces. Where seen, the option would tend to appear intrusive within the landscape, contrasting to the enclosed and semi-enclosed spaces, mixed landscape pattern and prevailing rural character and qualities of sanctuary (LLCA23, LLCA24, LLCA25, LLCA2, LLCA1). • It would also cut through the edge of the Darnaway Castle GDL (LLCA31 and LLCA24), involving the removal of some historic landscape elements. The crossing of the River Findhorn would be intrusive locally, occurring in a rural location away from existing infrastructure and imposing upon the adjacent enclosed space at Mundole. The option would also affect the sequential landscape experience of the River Findhorn, including within the AGLV.

Summary

17.7.2. The North Option generally relates to an existing infrastructure corridor and to the northern edge of Forres, although it will affect some historic elements and contrast to the open agricultural plain where raised on embankments. In contrast, the South Option would be more out of place with the landscape character, passing through a rural area and seeming intrusive upon a more intricate landscape pattern and enclosed spatial characteristics as well as small-scale landscape elements.

17.7.3. Overall, the North Option is predicted to have less effects on the landscape.

Table 17.9: Summary of Predicted Landscape Effects: Hillhead to Lhanbryde

Predicted Residual Effects for the North Option	Predicted Residual Effects for the South Option
• There would be Moderate adverse predicted residual landscape effects in: – LLCA4; – LLCA17; – LLCA18; and – LLCA43. • There would be Major adverse predicted residual landscape effects in: – LLCA2; – LLCA19; and – LLCA36. • This option would relate to existing infrastructure along a few short sections at Hillhead, Alves and Barmuckity (LLCA17, LLCA19 and LLCA4). Most of the option would pass through rural agricultural landscapes in which it would seem incongruous and intrusive, contrasting to the landscape pattern, the scale of existing buildings, qualities of sanctuary and the landform, especially where raised on embankments (LLCA2, LLCA19, LLCA36). • The option would breach the existing hill edge around the north of Elgin (LLCA36). Whilst visibility of the option would be limited by tree screening in places, it would be highly visible crossing open slopes in other locations (LLCA2, LLCA18, LLCA19 and LLCA36), including to the north and below Quarrelwood (LLCA43) from where it would impose upon key views. The option would involve removal of some areas of woodland and historic landscape features (LLCA17 and LLCA36).	• There would be Moderate adverse predicted residual landscape effects in: – LLCA4; and – LLCA43; • There would be Major adverse predicted residual landscape effects in: – LLCA2. • This option would relate to the existing A96 and railway line in both the west and far east (LLCA19 and LLCA4), although it would involve removal of some woodland, impose on some local houses (especially where there are collective effects with existing routes) and obstruct open spaces (e.g. by Sheriffston). • The option would pass through predominantly rural landscapes between Alves and Coxton, including a discreet strath between Cloves and Lochinver (LLCA2). The option would contrast to the ruralness, openness and qualities of sanctuary, especially where raised on embankments. • Near the east edge of this strath (LLCA2), the link road to Elgin would be very prominent and incongruous, including as experienced from Aldroughty (LLCA43) from where it would cross distant views to the south. Further east near Cloddach Quarry, it would relate to the managed character of the landscape as well as its large scale and simplicity of landscape composition.

Summary

17.7.4. The South Option would relate closely to an existing infrastructure corridor west of Alves and the distinct landform and landscape pattern east of Mayne Wood, although it would have significant adverse effects in-between, near Lochinver and Aldroughty. The North Option would typically contrast strongly to the landform through which it passes and have significant effects on some historic landscape features. It would also be imposing upon the slopes on the northern side of Quarrelwood and cut through the distinctive hills that arc around the northern side of Elgin, compromising the distinct edge of this settlement and changing its relationship with the landscape.

17.7.5. Overall, the South Option is predicted to have slightly less effects on the landscape.

Table 17.10: Summary of Predicted Landscape Effects: Lhanbryde to East of Fochabers

Predicted Residual Effects for the North Option	Predicted Residual Effects for the South Option
• There would be Moderate adverse predicted residual landscape effects in: – LLCA8; – LLCA10; – LLCA12; – LLCA13; – LLCA33 • There would be Major adverse predicted residual landscape effects in: – LLCA11; – LLCA15; and – LLCA32. • This option would relate to existing infrastructure west of Balnacoul but would intrude upon the distinct landscape experience of some woodland areas, e.g. Loch na Bo (LLCA8). Further east, the option would contrast greatly to the distinct landscape characteristics of the River Spey, strath and strath slopes (LLCA13, LLCA10 and LLCA11), affecting the landscape experience when viewing along the river and strath (towards Speyside AGLV), such as at Inchberry Road (LLCA33) & Fochabers Old Bridge (LLCA13). • The option would intrude upon the Gordon Castle GDL (LLCA15), partly due to its embankment in the south-east of the grounds. From both the GDL and Fochabers (LLCA32), including along the High Street, the cutting through Fochabers Hill would be prominent and contrast to the landform, compromising the distinct wooded hill backcloth of the strath (LLCA11 and LLCA12).	• There would be Moderate adverse residual predicted landscape effects in: – LLCA8; and – LLCA12; – LLCA32 • There would be Major adverse predicted residual landscape effects in: – LLCA10; – LLCA11; and – LLCA13. • This option would relate to existing infrastructure in the west, although it would intrude upon the distinct landscape experience of some woodland areas, e.g. Loch na Bo (LLCA8). In the east, the option would cross the River Spey and strath (LLCA13 and LLCA10) over an embankment and very long bridge. This would be highly prominent and contrast in line and elevation to the strath, imposing upon the space below (including within the Speyside AGLV). • The option would also contrast to the landform of Castle Hill and the Burn of Fochabers and with the rural character and qualities of sanctuary in the Ordiequish area (LLCA11, LLCA12), including along the Speyside Way. The line of the South Option would be simple and spatially separate from the LLCAs of Fochabers, Mosstodloch and Gordon Castle GDL in the north (LLCA32, LLCA33 and LLCA15).

Summary

17.7.6. The South Option would have fewer significant effects on LLCAs in the north of the study area than the North Option, including Fochabers, Mosstodloch and Gordon Castle GDL. Where the South Option crosses Strathspey it would be highly prominent and contrast in line and elevation to the strath. Conversely, the North Option would cut through Hill of Fochabers and would intrude upon the Gordon Castle GDL. The embankments and River Spey bridge crossing for the North Option would be prominent locally and contrast to the distinct strath space and key views of the distinct landscape characteristics to the south.

17.7.7. Overall, the South Option is predicted to have slightly less effects on the landscape.

17.8 Scope of the DMRB Stage 3 Assessment

17.8.1. The DMRB Stage 3 assessment process will be based on GLVIA and DMRB (Volume 11, Section 3, Part 5, Landscape Effects). This will continue the approach taken at this stage, although a more detailed assessment of landscape effects will be required at Stage 3.

17.8.2. The DMRB Stage 3 landscape assessment will review and expand upon the baseline information collected during the DMRB Stage 2 assessment and will provide a more detailed assessment of effects on receptors within the study area for the preferred route selected.

17.8.3. The following section lists key aspects of the DMRB Stage 3 landscape assessment process:

- The landscape assessment study area will be defined for the Preferred Option.
- A new digital ZTV will be produced of the Preferred Option and will be updated as any minor design changes occur.
- Visualisation tools will be used to inform more detailed assessment of the predicted landscape and visual effects and may include wireline diagrams and photomontages as appropriate.
- The landscape baseline will be reviewed and further assessment carried out as required for the preferred route. This is likely to include some private land as well as publicly accessible locations.
- The landscape design objectives will be reviewed and developed further to reflect a greater level of detail. These will provide the framework for landscape and visual advice on the Scheme design.
- Consideration will be paid to sensitive landscape receptors and predicted significant residual landscape effects identified in this report.
- Based on the assessment of the baseline conditions, receptor sensitivity and predicted landscape effects, further mitigation measures will be identified and explored. These will build upon the mitigation measures identified in this chapter (Table 2.1 of Appendix A17.2, Volume 4b)). Following GLVIA, these will include primary mitigation measures, which will be incorporated into the Scheme design, and secondary mitigation measures which will be identified to mitigate any significant adverse landscape effects identified through the LVIA. The assessment of landscape mitigation measures will be carried out in conjunction with the assessment of assumed mitigation measures for other environmental topics including visual amenity.
- Landscape effects will be assessed for both the construction and operational stages of the scheme. For the operational stage, assessment of effects will be for Year 1 winter and Year 15 summer, as suggested by DMRB (Volume 11, Section 3, Part 5, Landscape Effects, within Annex IV, Photomontages and Sketches), unless otherwise agreed with consultees.
- There will be ongoing consultation with SNH, Moray Council and the landscape advisor at Transport Scotland during DMRB Stage 3 to discuss the method and scope of the LVIA, landscape sensitivities, further development of the landscape design objectives and potential landscape effects and mitigation measures.

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18. Nature Conservation

18.1. Introduction and Scope

18.1.1. This chapter presents the Design Manual for Roads and Bridges (DMRB) Stage 2 assessment of the predicted effects on Nature Conservation for the shortlisted options.

18.1.2. At this stage in the design and assessment process, information about the likely nature, location and scale of some construction activities (e.g. location of construction compounds) is not available. The predicted effects reported in this chapter, therefore, focus on the permanent effects of the options. Where construction activities can be predicted these are included.

18.1.3. This chapter is supported by the following appendices (Volume 4b):

- Appendix A18.1: Assessment Methodology;
- Appendix A18.2: Valuation of Ecological Receptors;
- Appendix A18.3: Extended Phase 1 Habitat Survey – Target Notes;
- Appendix A18.4: Description of Designated Sites;
- Appendix A18.5: Estimated Habitat Loss; and
- Appendix A18.6: Legislation and Conservation Status.

18.1.4. The following figures (Volume 5) also support the assessment:

- Figures 8.1 – 8.3 Key Environmental Constraints;
- Figures 18.1 – 18.3 Phase 1 Habitat Overview; and
- Figure 18.4 – Wintering Geese Overview.

18.2. Approach to Assessment

Introduction

18.2.1. This assessment was undertaken based on the guidance provided in DMRB (Volume 11, Section 3, Part 4, Ecology and Nature Conservation) and Interim Advice Note (IAN) 130/10 Ecology and Nature Conservation. The assessment considers the impacts of the options on habitats and biodiversity including:

- Designated sites (biological interests only);
- Terrestrial habitats and plant species;
- Terrestrial faunal species; and
- Freshwater habitats and species.

18.2.2. The chapter sets out the mitigation (Section 18.5) which it is assumed will be further developed and delivered and reports residual effects following mitigation. A full description

of the assessment methodology is set out in Appendix A18.1 (Volume 4b) and Chapter 8 (Introduction and Approach to Environmental Assessment), Section 8.3.

Sources of Information

18.2.3. In addition to the DMRB guidance, other policy documents and published guidance were taken into account in the preparation of this chapter, these include:

- Transport Scotland (2015) Scottish Transport Appraisal Guidance[112] (STAG);
- Chartered Institute of Ecology and Environmental Management (CIEEM, 2016[113]) Guidelines for Ecological Impact Assessment;
- Scottish Natural Heritage (SNH) (2018): A Handbook on Environmental Impact Assessment[114]; and
- Best practice literature relating to specific species and habitats
  - Phase 1 Habitat Survey[115], and;
  - Wintering Bird Survey.[116] [117]

Consultation

18.2.4. Consultation was undertaken with key statutory bodies including: SNH; the Scottish Environment Protection Agency (SEPA), non-statutory consultees and other local ecology groups (e.g. North-East Scotland Biological Records Centre (NESBReC)) to obtain any relevant baseline data.

18.2.5. Topics highlighted during discussion with SNH:

- Appropriateness of the methodology for the Phase 1 Habitat Surveys given the size of the study area;
- An update to the Habitat Regulations Appraisal (HRA) would be required at DMRB Stage 2 and that the HRA should take cognisance of the mitigation measures and principles set out in the A96 Dualling Programme SEA Post Adoption Statement[118] and the A96 Programme Strategic Environmental Principles[119] (agreed between TS and the statutory environmental consultees);
- Wintering bird surveys would be required to inform the HRA; and
- Ancient Woodland should be avoided wherever possible due to its irreplaceability and importance.

[112] Transport Scotland (2015) STAG Technical Database Section 7.4.5 Biodiversity and Habitats
[113] Chartered Institute of Ecology and Environmental Management (CIEEM, 2016) Guidelines for Ecological Impact Assessment in the United Kingdom: Terrestrial, Freshwater and Coastal
[114] SNH (2018): A Handbook on Environmental Impact Assessment: Guidance for Competent Authorities, Consultees and others involved in the Environmental Impact Assessment Process in Scotland
[115] JNCC (2010) Handbook for Phase 1 habitat survey - a technique for environmental audit
[116] Patterson, I.J. (2013). Goose distribution in relation to SPAs in Grampian. Scottish Natural Heritage, Commissioned Report No. 546
[117] Keller, V.E., Gallo-Orsi, U., Patterson, I J. and Naef-Daenzer, B. (1997). Feeding areas used by individual pink-footed geese (*Anser brachyrhynchus*) around the Loch of Strathbeg, Northeast Scotland. Wildfowl 48, 52-64
[118] Transport Scotland (2016) A96 Dualling Programme, Strategic Environmental Assessment Post Adoption Statement
[119] Transport Scotland (2015) A96 Dualling Programme, Strategic Environmental Assessment Tier 2 Environmental Report

18.2.6. Other consultees including: the Royal Society for the Protection of Birds (RSPB); Buglife Scotland; The Woodland Trust Scotland and Forestry Commission Scotland (FCS) provided information on species and habitats within the study area and these were incorporated into the baseline assessment where relevant.

Assessment Methodology

18.2.7. The evaluation of nature conservation features (or assessment of values) was undertaken taking into consideration advice provided in IAN130/10, guidance published by CIEEM (2016) and experience from assessment of other trunk road schemes. Updated CIEEM Guidelines were published on 14 September 2018. A review of the new guidelines indicates that adopting them would not alter the assessment or conclusions of this chapter.

18.2.8. In line with guidance for DMRB Stage 2, following completion of the baseline survey, nature conservation receptors are assigned a level of sensitivity or value. The magnitude of impact on the nature conservation assets was assessed including considerations of scale, duration and reversibility of effects, as well as categorising whether the impact was adverse or beneficial.

18.2.9. A magnitude of impact value was assigned based on a scale of high, medium, low or negligible. This magnitude of impact was correlated with the assigned receptor value to provide the predicted significance of effect, on the scale range of major, moderate, minor or negligible.

18.2.10. The full methodology and criteria used to assess the value of nature conservation features is detailed in Appendix A18.1 Assessment Methodology (Volume 4b). The assigned valuation to each receptor is set out in Appendix A18.2 Valuation of Ecological Receptors (Volume 4b).

18.2.11. A separate HRA report will assess the options in relation to potential impacts on European designated sites (Special Protection Areas (SPA) and Special Areas of Conservation (SAC)) and the potential for 'Likely Significant Effects' (LSE) under the Habitats Regulations (1992)[120]. SNH will be consulted on the conclusions of the HRA and the development of the HRA process during DMRB Stage 3.

Limitations and Assumptions

18.2.12. The main constraints at this stage of assessment are associated with the field surveys:

- Seasonality: Due to the large survey area, some sections of the Phase 1 Habitat Survey were undertaken outside the optimum season, as a result some botanical interests may be under recorded; and
- Receptors: only those receptors captured as part of a standard extended Phase 1 Habitat Survey and wintering bird surveys have been recorded during the field surveys. For example, invertebrates, aquatic invertebrates and macrophytes are not recorded,

[120] European Commission (1992). Council Directive (92/43/EEC) Conservation of Natural Habitats and Wild Flora and Fauna http://www.central2013.eu/fileadmin/user_upload/Downloads/Document_Centre/OP_Resources/HABITAT_DIRECTIVE_92-43-EEC.pdf

therefore the assessment of these receptors is based on available desk-based data and experience from assessment of other trunk road schemes.

18.2.13. It is considered that, despite the above constraints, the information available is sufficient to inform this assessment.

18.3. Baseline Environment

Study Area Context

18.3.1. The study area for field surveys was defined using a 500m buffer width from the outermost edge of each option. The study area is shown on Figures 18.1, 18.2 and 18.3 (Volume 5).

Baseline Data

18.3.2. The Extended Phase 1 Habitat Survey consists of a desktop study and field surveys within the study area undertaken following best practice. All habitats encountered were identified and coded according to the survey methods outlined in the Handbook for Phase 1 Habitat Survey - A Technique for Environmental Audit[121].

18.3.3. Target notes (as set out in Appendix A18.3, Volume 4b) were made where necessary to record key habitat features and other features of nature conservation interest such as field signs or incidental sightings of any protected/notable species. Botanical names (common and scientific) follow guidance provided by Stace[122]. It is standard practice to keep some protected species data such as badger sett records confidential and therefore these are not mapped as Target Notes on the Phase 1 Habitat map. All badger evidence recorded will be collated in a confidential appendix at Stage 3 together with any other confidential protected species information. The sensitivity of data on other species has been assessed on a case by case basis.

18.3.4. Wintering bird surveys for geese are being undertaken and the data collected to date has been used to inform this assessment and will continue during DMRB Stage 3 to inform the assessment of the Preferred Option and the Stage 3 HRA.

Desk Study

18.3.5. A desk study was undertaken as part of the assessment to review any relevant literature and to identify statutory and non-statutory designated sites of nature conservation value which may be relevant to the surveys, and to obtain information on protected and/or notable species and habitats which may be present within the study area.

18.3.6. Information to inform the desk study was collated from the following sources:

- Joint Nature Conservation Committee (JNCC) website;
- National Biodiversity Atlas Scotland (NBN) website;

[121] JNCC (2010) Handbook for Phase 1 Habitat Survey – a technique for environmental audit. JNCC, Peterborough
[122] Stace, C.S. (2010) New Flora of the British Isles. 3rd Edition, Cambridge University Press, Cambridge

- Mammal Atlas of North-East Scotland and the Cairngorms[123];
- SNH Information Service website;
- SNH Sitelink website;
- Scottish Biodiversity List (SBL); and
- Consultee input (see Sections 18.2.4 – 18.2.6).

18.3.7. The desk study shows that the following biological designated sites are located within 2km of the centreline of each option (geological designated sites are addressed in Chapter 19, Geology, Soils, Contaminated Land and Groundwater). These are listed along with a summary of their qualifying features in Table 18.1 below. A full description of the sites is included as Appendix A18.4 (Volume 4b).

[123] NESBReC (2017) Mammal Atlas of North-East Scotland and the Cairngorms

Table 18.1: Designated Sites

Site Name and Designation	Grid Reference (centre point)	Qualifying Features
Culbin Sands, Culbin Forest and Findhorn Bay Site of Special Scientific Interest (SSSI)	NH9823161622	Fungi assemblage, hydromorphological mire range, invertebrate assemblage, lichen assemblage, mesotrophic loch, saltmarsh, sand dunes, shingle and vascular plant assemblage
Darnaway and Lethen Forest SPA	NH9851451912	Capercaillie (*Tetrao urogallus*)
Findhorn Bay Local Nature Reserve (LNR)	NJ0401062674	N/A
Loch Oire SSSI	NJ2883860833	Mesotrophic loch
Loch Spynie SPA, SSSI & Ramsar	NJ2349066406	Breeding bird assemblage, eutrophic loch, fen meadow, greylag goose (*Anser anser* non-breeding), open water transition fen, wet woodland
Lower Findhorn Woods SAC & SSSI	NJ0050852147	Bryophyte assemblage, lichen assemblage, oligotrophic river/stream, upland mixed ash woodland, upland oak woodland, wet woodland and mixed woodland on base-rich soils associated with rocky slopes
Lower River Spey - Spey Bay SAC	NJ3276664588	Alder woodland on floodplains and coastal shingle vegetation outside the reach of waves
Lower River Spey SSSI	NJ3447662431	Fluvial geomorphology of Scotland (geological), wet woodland and river shingle/sand
Moray and Nairn Coast SPA and Ramsar	NJ3449363220 (East section) NH9850161849 (West section)	Bar-tailed godwit (*Limosa lapponica*), dunlin (*Calidris alpina alpina*), greylag goose (*Anser anser*), osprey (*Pandion haliaetus*), oystercatcher (*Haematopus ostralegus*), pink-footed goose (*Anser brachyrhynchus*), red-breasted merganser (*Mergus serrator*), redshank (*Tringa totanus*), waterfowl assemblage and wigeon (*Anas penelope*) Intertidal mudflats and sandflats, saltmarsh, sand dunes, shingle and wet woodland

Site Name and Designation	Grid Reference (centre point)	Qualifying Features
Quarry Wood SSSI	NJ1928462853	Upland oak woodland
River Spey SAC & SSSI	NJ1796941011	Atlantic salmon (*Salmo salar*), freshwater pearl mussel (*Margaritifera margaritifera*), otter (*Lutra lutra*) and sea lamprey (*Pertromyzon marinus*)
Spey Bay SSSI	NJ3237065930	Dingy skipper (*Erynnis tages*), hydromorphological mire range, saltmarsh, shingle, small blue (*Cupido minimus*), vascular plant assemblage and wet woodland

Hardmuir to Hillhead North Option

18.3.8. This option crosses mainly grassland and arable fields of limited nature conservation value. It passes through some small areas of woodland including the northern edge of Hardmuir Wood. It crosses several watercourses including the River Findhorn.

18.3.9. Badger prints were present within Hardmuir Wood, noted during Phase 1 Habitat surveys, while records show that possible breeding red kite (*Milvus milvus*) was present approximately 130m from the option. Woodland in proximity to the option offers suitable nesting habitat for this Schedule 1A (see Glossary) species. Based on professional judgement and desk study information, it can be assumed that woodland along this option would support several protected species such as roosting bat species, badger (*Meles meles*), red squirrel (*Sciurus vulgaris*), a range of nesting bird species (including crossbill) and pine marten (*Martes martes*) within suitable woodland. Grassland fields close to the North Option were identified as a Year 1 'hotspot' for foraging geese, which were recorded during wintering bird surveys. These are a qualifying feature of the Moray and Nairn Coast and Loch Spynie SPAs (see Figure 18.2 in Volume 5).

18.3.10. The option passes adjacent to the southern boundary of an area of ancient woodland (of semi-natural origin) on the eastern bank of the River Findhorn. There are several invasive non-native species (INNS) present here, including Himalayan balsam (*Impatiens glandulifera*), Japanese knotweed (*Fallopia japonica*) and giant hogweed (*Heracleum mantegazzianum*). The option also passes adjacent to Tearie Wood, listed on the Ancient Woodland Inventory (AWI) as Long-Established (of plantation origin).

18.3.11. The option crosses several watercourses which are of higher ecological value due to their potential to support a number of notable species. The River Findhorn, Muckle Burn and Mosset Burn are all crossed, and riparian woodland associated with these watercourses would also be impacted. Watercourses are likely to support a range of salmonid and cyprinid fish species, water vole (*Arvicola amphibious*) where habitat is suitable and to be used by otter (*Lutra lutra*) (TN1) for commuting and feeding. In addition, riparian woodland would potentially provide resting places for otter, badger and red squirrel.

18.3.12. The River Findhorn has been identified as part of the Findhorn and Culbin Sands Important Invertebrate Area (IIA) due to its important populations of freshwater pearl mussel (*Margaritifera margaritifera*), the Critically Endangered aspen hoverfly (*Hammerschmidtia ferruginea*) and the endemic Northern February red stonefly (*Brachytera putata*). In addition to these species, the river would support a high diversity of freshwater macroinvertebrate species typical of fast flowing oligotrophic rivers. There are several INNS present within riparian woodland along the banks of the River Findhorn, including Himalayan balsam, Japanese knotweed and giant hogweed (TN2 and TN3). During Phase 1 Habitat Surveys of the river, evidence of badger activity was also found within this area.

Hardmuir to Hillhead South Option

18.3.13. This option crosses a variety of habitat types, including large areas of ecologically valuable woodland. The option also crosses several watercourses including the River Findhorn,

while it runs adjacent to waterbodies which may have the potential to support great crested newt (*Triturus cristatus*). NESBReC records also show probable and confirmed breeding barn owl (*Tyto alba*) records adjacent to the option.

18.3.14. Based on desktop study, site survey and professional judgement it can be assumed that woodland along the option would support several protected species such as roosting bat species, badger, red squirrel, a number of nesting bird species (including crossbill) and pine marten within suitable woodland.

18.3.15. The option bisects the northern extent of Darnaway Forest, also listed on the AWI as Long-Established (of plantation origin) and is connected to the Darnaway and Lethen Forest SPA which is designated for its breeding population of capercaillie (*Tetrao urogallus*), however the option does not pass through the SPA designated area. NESBReC records also show that red squirrel, and badger are present within this woodland.

18.3.16. The option also bisects a large area of Limekilns Wood, Fairyhills Wood and Office Wood, all of which are listed on AWI as Long-Established (of plantation origin) and include ancient woodland indicator species such as creeping ladies tresses (*Goodyera repens*). These woods will also provide suitable habitat for a range of protected species including those listed in paragraph 18.3.14 above.

18.3.17. Evidence from historical mapping suggests that the woodlands at Darnaway, Limekilns Wood, Fairyhills Wood and Office Wood may qualify as Planted Ancient Woodland Sites (PAWS). They are not currently classified as such and have been assessed accordingly.

18.3.18. The option also passes between two other AWI Long-Established (of plantation origin) woodlands, south of Muiry Wood and through the north-western edge of New Forres Wood.

18.3.19. The option crosses several watercourses which are of higher ecological value due to their potential to support a number of notable species. The River Findhorn, Muckle Burn and Mosset Burn are all crossed, and riparian woodland associated with these watercourses would also be impacted. Watercourses are likely to support a range of salmonid and cyprinid fish species where habitat is suitable and to be used by otter for commuting and feeding. In addition, riparian woodland would potentially provide resting places for otter, badger and red squirrel.

18.3.20. The River Findhorn has been identified as part of the Findhorn and Culbin Sands Important Invertebrate Area (IIA) due to its important populations of freshwater pearl mussel, the Critically Endangered aspen hoverfly and the endemic Northern February red stonefly. In addition to these species, the river would support a high diversity of freshwater macroinvertebrate species typical of fast flowing oligotrophic rivers. There are several INNS present within riparian woodland along the banks of the River Findhorn, including Himalayan balsam, Japanese knotweed and giant hogweed (TNs 2 and 3). An otter spraint was found during Phase 1 Habitat Surveys confirming that otters are using the watercourse, while a badger sett was found within the unnamed riparian woodland on the western bank of the river to the north of the option.

18.3.21. The option also passes adjacent to the Lower Findhorn Woods SSSI which is designated for its botanical features including woodland assemblage, lichens and bryophytes.

Hillhead to Lhanbryde North Option

18.3.22. This option mainly crosses grassland and arable fields of limited nature conservation value, however some ecologically valuable watercourses including the River Lossie are crossed, and it severs areas of woodland including Alves Wood and several smaller unnamed woodlands. The option also passes adjacent to some small waterbodies which may have the potential to support great crested newt, while records exist for breeding and roosting barn owl (TN64) along the option.

18.3.23. Based on desktop study, site survey and professional judgement it can be assumed that woodland along the option would likely support several protected species such as roosting bat species, badger, red squirrel, a number of nesting bird species and pine marten within suitable woodland. In addition, grassland fields to the north of the option were identified as a Year 1 survey 'hotspot' for whooper swan (*Cygnus cygnus*) and foraging geese which were recorded during wintering bird surveys and are a qualifying feature of the Moray and Nairn Coast and Loch Spynie SPAs (see Figure 18.4 in Volume 2).

18.3.24. Overall AWI woodland loss along the option is low, as the option generally passes adjacent to woodland or loss is along the outer edges. AWI woodland adjacent or overlapping the edge of the option includes Alves Wood, Quarrelwood, Pitgaveny Wood and Kirkhill Wood which are all Long-Established (of Plantation Origin). There is additionally an area of wet woodland (bay willow *Salix pentandra* canopy with bottle sedge *Carex rostrata*) and rush pasture at Pitgaveny Farm that is likely to be classified as a Ground Water Dependent Terrestrial Ecosystem habitat (GWDTE).

18.3.25. There are a number of ecologically valuable freshwater habitats, both standing and running water. Several small watercourses and unnamed field drains would be crossed by the option, while the River Lossie provides suitable habitat, commuting and foraging opportunities for otter. Signs of otter have been observed (TN22, TN37 and TN66) along the river, and this watercourse is likely to be frequently used by this species. The River Lossie and other watercourses are likely to support a range of salmonid and cyprinid fish species, potentially water vole and may be used by otter for commuting and feeding.

Hillhead to Lhanbryde South Option

18.3.26. This option crosses grassland and arable fields of limited nature conservation value, in addition to more ecologically valuable areas. The option bisects a number of AWI woodlands and crosses a number of watercourses including the River Lossie. The option also crosses an ecologically valuable mosaic of freshwater ponds, woodland and scrub on the eastern bank of the River Lossie at Cloddach Quarry.

18.3.27. Based on desktop study, site survey and professional judgement, it can be assumed that woodland along the option would support several protected species such as roosting bat species, badger, red squirrel, a number of nesting bird species and pine marten (TN37)

within suitable woodland. Grassland fields to the south-west of Elgin have been identified as a Year 1 'hotspot' that supports foraging geese which were recorded during wintering bird surveys and are a qualifying feature of the Moray and Nairn Coast and Loch Spynie SPAs (see Figure 18.4 in Volume 5).

18.3.28. The option bisects a number of AWI woodlands including Alves Wood and Birkenhill Wood which are all Long Established (of Plantation Origin). There are NESBReC records of red squirrel within each woodland, while records also exist for pine marten within Alves Wood with confirmed breeding barn owl nearby.

18.3.29. There are a number of ecologically valuable freshwater habitats including both standing and running water. Several small watercourses and unnamed field drains would be crossed by the option, while the River Lossie provides suitable habitat, commuting and foraging opportunities for otter. Signs of otter have been observed (TN22, TN37 and TN66) along the river, and this watercourse is likely to be frequently used by this species. The River Lossie and other watercourses are likely to support a range of salmonid and cyprinid fish species, potentially water vole and be used by otter for commuting and feeding.

18.3.30. The option crosses a number of gravel ponds which have been restored as a habitat improvement scheme, east of the River Lossie at Cloddach Quarry, which are surrounded by scrub and immature woodland. There are also a number of small wooded islands present within the waterbodies in this area. This area is ecologically valuable and would support a range of species due to its habitat diversity. During Phase 1 Habitat Surveys signs of badger, pine marten and otter were present, while vegetated islands have the potential to provide sheltering places for otter. Woodland present in the area is likely to support red squirrel and roosting bats with records of pipistrelle bats (*Pipistrellus* spp.) in Birkenhill Wood, and there is excellent foraging habitat for bat species as the area is likely to support a large number of invertebrates.

18.3.31. The gravel ponds at Cloddach Quarry also support a number of nesting bird species, while several species of wildfowl winter in the area as observed incidentally during wintering bird surveys. The most easterly pond in the area also supports a large number of roosting gull species including herring gull (*Larus argentatus*) and common gull (*Larus canus*). The ponds are likely to support a range of salmonid and cyprinid fish species. In addition, there are some smaller more isolated ponds adjacent to the option which have the potential to support great crested newt.

Lhanbryde to East of Fochabers North Option

18.3.32. This option crosses a variety of habitats, including grassland and arable fields of limited nature conservation value in addition to ecologically valuable watercourses including the River Spey (designated as SAC/ SSSI).

18.3.33. Based on desktop study, site survey and professional judgement it can be assumed that woodland along the option would likely support several protected species such as roosting bat species, badger, red squirrel, a number of nesting bird species (including crossbill) and pine marten within suitable woodland.

18.3.34. The option bisects a number of AWI woodlands including Threapland Wood, Balnacoul Wood and Whiteash Hill Wood which are all Long Established (of Plantation Origin). There are NESBReC records of red squirrel within each woodland, while records also exist for pine marten within Threapland and Balnacoul Woods. NESBReC records also show that within Threapland Wood is a soprano pipistrelle (*Pipistrellus pygmaeus*) roost with over 200 individuals, within 100m of the option. Forestry Enterprise Scotland (FES) records show that capercaillie breed/lek and that osprey has bred within Ordiequish Wood to the south of the option (although the 2017 nest failed). NESBReC records also indicate barn owl presence along the option.

18.3.35. There are a number of ecologically valuable freshwater habitats including standing and running water. This includes the option crossing the River Spey SSSI/SAC and passing adjacent to Loch Oire SSSI (designated as a mesotrophic loch, see Appendix A18.4, Volume 4b) and Loch Na Bo. The River Spey is designated for a number of ecological features (see Table 18.1 and Appendix A18.4, Volume 4b). Loch Oire and Loch Na Bo support numerous wintering wildfowl as noted incidentally during wintering bird surveys and provide feeding opportunities for otter. The surrounding woodland would also provide potential shelter for otter. NESBReC records exist of an osprey hunting in Loch na Bo where there is suitable nesting habitat for this species.

18.3.36. The woodland surrounding Loch na Bo contains areas of wet woodland, noticeably around Kettle Loch and Bridesfauld Loch, and areas of acid flush, which are likely to be GWDTE. These areas are 500m south of the route option and unlikely to be impacted.

18.3.37. A number of smaller watercourses and field drains would also be crossed by the option. Watercourses and waterbodies are likely to support a range of salmonid and cyprinid fish species, potentially water vole, and be used by otter for commuting and feeding. In addition, there are some smaller, more isolated ponds adjacent to the option which have the potential to support great crested newt.

Lhanbryde to East of Fochabers South Option

18.3.38. This option follows the same alignment as the North Option at both its western and eastern ends and therefore some elements of the baseline apply to both options as set out below.

18.3.39. The Southern option crosses a variety of habitats, including grassland and arable fields of limited nature conservation value in addition to ecologically valuable watercourses including the River Spey SAC / SSSI, and the option would result in significant woodland loss.

18.3.40. Based on desktop study, site survey and professional judgement it can be assumed that woodlands such as Threapland Wood, Balnacoul Wood and Slorach's Wood along the option would support several protected species such as roosting bat species, badger, red squirrel, a number of nesting bird species (including crossbill) and pine marten within suitable woodland. There are also buildings close to the option which may be used by roosting bat species (TNs 79 and 86).

18.3.41. As with the North Option, this option bisects a number of AWI woodlands including Threapland Wood and Slorach's Wood, and also runs through the southern edge of Balnacoul Wood. All of these are listed on the AWI as Long Established (of Plantation Origin). There are NESBReC records of red squirrel within each woodland, while records also exist for pine marten within Threapland and Balnacoul Woods. In addition to NESBReC records of capercaillie within Whiteash Hill Wood and Ordiequish Wood, FES records also indicate that capercaillie breed/lek and that osprey have bred within Ordiequish Wood to the south of the option. NESBReC records also show barn owl presence along the option.

18.3.42. As stated for North Option, the woodland surrounding Loch na Bo contains areas of habitat which are likely to be GWDTE. These areas are 500m south of the route option and unlikely to be impacted.

18.3.43. There are a number of ecologically valuable freshwater habitats including standing and running water. This includes crossing the River Spey SSSI/SAC and passing adjacent to Loch Oire SSSI (designated as a mesotrophic loch) and Loch Na Bo. The River Spey is designated for a number of ecological features (as set out in Table 18.1 and Appendix A18.4, Volume 4b). Loch Oire and Loch na Bo support numerous wintering wildfowl as noted incidentally during wintering bird surveys and provide feeding opportunities for otter and potential shelter within the surrounding woodland. NESBReC records exist of an osprey hunting in Loch na Bo where there is suitable nesting habitat for this species (see above).

18.3.44. A number of smaller watercourses and field drains would also be crossed by the option. Watercourses and waterbodies are likely to support a range of salmonid and cyprinid fish species, potentially water vole, and be used by otter for commuting and feeding. In addition, as for the North Option, there are some smaller more isolated ponds adjacent to the option which have the potential to support great crested newt.

18.4. Potential Impacts

18.4.1. This section presents the potential impacts of the options. The magnitude of predicted impacts has been considered in combination with the sensitivity of the baseline to determine the potential for significant effects (see Section 18.6). The predicted impacts are presented in Tables 18.2 to 18.5 below. Impacts shown in the tables which are not predicted to be potentially significant have not been assessed or reported further in this chapter.

18.4.2. The detailed assessment methodology and valuation of receptors can be found in Appendices A18.1 Assessment Methodology and A18.2 Valuation of Receptors (Volume 4b).

18.4.3. The potential impacts detailed in Tables 18.2 to 18.5 are reported in line with the following:

- Potential impacts represent those which could result from the construction, land-take (permanent) or operation (traffic) of the options.
- Potential impacts are described without mitigation, and therefore represent a worst-case scenario. Mitigation measures are considered in Section 18.5 (Assumed

Mitigation). Further mitigation to reduce impacts and effects will be developed for the Preferred Option during DMRB Stage 3.

- The assessment of impacts includes those that are common to all options and those that vary between the options. The potential impacts that are common to all have been based on the level of significance for a given receptor in a specific location.
- For each option, the amount of habitat loss has been calculated (habitat loss calculations for each option are included in Appendix A18.5, Volume 4b). This includes areas which are predicted to be permanently lost as a result of the option (and not construction loss as explained in Section 18.1).

18.4.4. It is important to note that many potential impacts may interact with each other. For example, habitat loss resulting from construction work has the potential to result in disturbance as well as longer term habitat fragmentation effects. As a result, a combination of impacts has the potential to increase the overall adverse effect and this will require further analysis during DMRB Stage 3.

18.4.5. The options assessed have significant overlaps in terms of their predicted impacts, therefore a combined table has been produced of the generic impacts that are applicable to the options being assessed at this stage of the assessment. Table 18.2 presents these outcomes. This is followed by individual tables covering additional potential impacts for each option.

Table 18.2: Potential Ecological Impacts – All Options

Potential Impact	Value	Adverse / Beneficial	Magnitude
Construction Activity Impacts			
Moray and Nairn Coast SPA Pollution risk, potential for mortality and changes to habitat suitability	International	Adverse	High
Otter Direct mortality of individuals from collisions with construction traffic, entrapment in excavations, disturbance of places of shelter leading to abandonment	Regional	Adverse	Low
Bats Disturbance of bat roosts through construction noise, vibration and lighting leading to abandonment	Regional	Adverse	Low
Badger Direct mortality of individuals from collisions with construction traffic, entrapment in excavations, disturbance of places of shelter leading to abandonment	Local	Adverse	Low
Red squirrel Direct mortality of individuals from collisions with construction traffic, entrapment in excavations, disturbance of places of shelter leading to abandonment	Local	Adverse	Low
Pine Marten Direct mortality of individuals from collisions with construction traffic, entrapment in excavations, disturbance of places of shelter leading to abandonment	Authority	Adverse	Medium
Reptiles Direct mortality of individuals from collisions with construction traffic, entrapment in excavations, disturbance of places of shelter leading to abandonment	Local	Adverse	Low

Potential Impact	Value	Adverse / Beneficial	Magnitude
Great Crested Newt (GCN) Direct mortality of individuals from collisions with construction traffic, entrapment in excavations, disturbance of places of shelter leading to abandonment	National	Adverse	High
Amphibians (excluding GCN) Direct mortality of individuals from collisions with construction traffic, entrapment in excavations, disturbance of places of shelter leading to abandonment	Local	Adverse	Medium
Wintering Birds Disturbance of foraging areas from noise, vibration and light spill	International	Adverse	Low
Breeding Birds (incl. Corn Bunting, Barn Owl) Direct mortality from site clearance of vegetation during breeding season, disturbance of nesting locations leading to abandonment	Regional	Adverse	Medium
Fish (all species) Direct mortality from pollution, disturbance from noise vibration during migration, reduction in spawning habitat through siltation	National	Adverse	High
Macroinvertebrates (not including Freshwater Pearl Mussel) Direct mortality from in-stream works at small crossings (burns, ditches, culverts etc), loss of habitat, pollution risk of mortality and changes to habitat suitability	Authority	Adverse	Medium
Freshwater Pearl Mussel (FWPM) Direct mortality from in-stream works at small crossings (burns, ditches, culverts etc), loss of habitat, pollution risk of mortality and changes to habitat suitability	International	Adverse	High

Potential Impact	Value	Adverse / Beneficial	Magnitude
Macrophytes Direct mortality from in-stream works at small crossings (burns, ditches, culverts etc), loss of habitat, pollution risk of mortality and changes to habitat suitability	Site	Adverse	Medium
Terrestrial Invertebrates Direct mortality from loss of habitat, pollution risk of mortality through changes to habitat suitability	Authority	Adverse	Medium
Transfer of INNS Scheme wide (all receptors) – Introduction or transfer of invasive species during construction may result in squeezing out of native habitats/species	National	Adverse	High
Transfer of disease Scheme wide (all receptors) - Introduction of diseases during construction could result in death of plants/animals (examples: Ash dieback, amphibian red-leg disease)	Authority	Adverse	Medium
Permanent Impacts[124]			
Loss of Ancient Woodland: Direct loss of Ancient Woodland (AWI)	National	Adverse	High
Loss of Native Woodland: Direct loss of Native Woodland (NWSS)	Authority	Adverse	High
Terrestrial habitats Direct loss of other habitats (other habitats primarily Non-designated woodland, arable, improved grassland and scrub)	Local	Adverse	Medium

[124] Including those impacts which arise as a result of construction (e.g. land-take, permanent change in land use)

Potential Impact	Value	Adverse / Beneficial	Magnitude
Waterbodies Potential for alteration of aquatic habitat, mortality of species and loss of diversity	Authority	Adverse	High
Non-statutory Designated Watercourses Potential for loss of aquatic habitat, mortality of species and loss of diversity	Authority	Adverse	High
Hydrological changes Alteration of hydrology could result in loss of/change in habitat types (e.g. GWDTE, wetland habitats, vegetated ditches) as well as loss of diversity within those habitats, and potentially impact upstream movement of species	Authority	Adverse	Medium
Otter Habitat fragmentation and severance of commuting routes, disturbance resulting in avoidance, pollution of watercourses resulting in reduced prey	Regional	Adverse	Medium
Water Vole Habitat fragmentation and severance of commuting routes, disturbance resulting in avoidance, pollution of watercourses resulting in changes in habitats reducing foraging resource	Regional	Adverse	Low
Bats Direct mortality through roost destruction	Regional	Adverse	High
Bats Permanent loss of foraging habitat, severance of commuting routes and foraging areas, disturbance resulting in avoidance and abandonment of habitats/roosts, pollution of water courses could lead to reduction in prey availability	Regional	Adverse	High

Potential Impact	Value	Adverse / Beneficial	Magnitude
Badger Potential loss of setts, reduction in commuting and foraging areas, habitat fragmentation and severance effects, disturbance results in altered use of habitats and avoidance of areas	Local	Adverse	Medium
Red Squirrel Destruction of dreys, loss of suitable habitat for foraging and breeding, fragmentation of habitat and links between woodlands	Local	Adverse	High
Pine Marten Destruction of denning sites, loss of suitable habitat for foraging and breeding, fragmentation of habitat and links between woodlands	Authority	Adverse	High
Reptiles Reduction in habitat, fragmentation of habitats affecting dispersal	Local	Adverse	High
Amphibians (excluding GCN) Reduction in habitat, fragmentation of habitats affecting dispersal, risk of disease and non-native species introduction, hydrological changes alter habitats	Local	Adverse	High
Great Crested Newt Reduction in habitat, fragmentation of habitats affecting dispersal, risk of disease and non-native species introduction, hydrological changes alter habitats	National	Adverse	High
Wintering Birds Loss of foraging habitat	International	Adverse	High
Breeding Birds Loss of habitat including breeding habitat, fragmentation of habitat, loss of links between woodlands and other species-specific habitats	Regional	Adverse	Medium

Potential Impact	Value	Adverse / Beneficial	Magnitude
Fish Permanent habitat loss at water crossings including potential spawning areas	National	Adverse	High
Macroinvertebrates (not including FWPM) Permanent loss of habitat at water crossings, pollution risk of mortality and changes to habitat suitability	Authority	Adverse	High
Freshwater Pearl Mussel (FWPM) Permanent loss of habitat at water crossings, pollution risk of mortality and changes to habitat suitability	International	Adverse	High
Terrestrial Invertebrates Permanent loss of habitat, pollution risk of mortality and changes to habitat suitability	Authority	Adverse	Low
Operational Impacts[125]			
Moray and Nairn Coast SPA Pollution risk of mortality to species and changes to habitat suitability	International	Adverse	High
Otter Direct mortality through traffic collisions	Regional	Adverse	Low
Bats Direct mortality through traffic collisions	Regional	Adverse	High
Bats Disturbance for noise, vibration or light spill resulting in avoidance and abandonment of habitats/roosts	Regional	Adverse	Low

[125] Impacts associated with traffic using the road, pollution refers to all potential pollutants including run-off/sediment, oils, chemicals and salt spray

Potential Impact	Value	Adverse / Beneficial	Magnitude
Badger Direct mortality through traffic collisions	Local	Adverse	High
Red Squirrel Direct mortality through traffic collisions	Local	Adverse	Low
Pine Marten Direct mortality through traffic collisions	Authority	Adverse	Low
Great Crested Newt Direct mortality of individuals from collisions with traffic, entrapment in drainage, disturbance of places of shelter leading to abandonment and pollution of habitats	National	Adverse	Medium
Reptiles Direct mortality through traffic collisions	Local	Adverse	Low
Amphibians (non-GCN) Direct mortality of individuals from collisions with traffic, entrapment in drainage, disturbance of places of shelter leading to abandonment and pollution of habitats	Local	Adverse	Medium
Breeding Birds (excluding Barn Owl) Direct mortality through traffic collisions	Regional	Adverse	Low
Barn Owl Direct mortality through traffic collisions (listed separately to breeding birds due to specific identified risk factors)	Authority	Adverse	Medium

Potential Impact	Value	Adverse / Beneficial	Magnitude
Waterbodies Pollution from run-off (incl. fine sediments, salt spray) resulting in reduced water quality in water courses (Rivers Spey & Findhorn, burns and other small crossings)	Authority	Adverse	High
Fish Pollution from run-off/sediment and salt spray results in decreased water quality and result in degradation and loss of habitat	National	Adverse	Low
Macroinvertebrates Pollution from run-off/sediment and salt spray results in decreased water quality and result in degradation and loss of habitat	Authority	Adverse	High
Freshwater Pearl Mussel Pollution from run-off/sediment and salt spray results in decreased water quality and result in degradation and loss of habitat	International	Adverse	High
Terrestrial Invertebrates Pollution risk of mortality to species through changes to habitat suitability	Authority	Adverse	Low

Table 18.3: Potential Ecological Impacts – Hardmuir to Hillhead

Potential Impact	Value	Adverse / Beneficial	Magnitude	Relevant Options
Construction Activity Impacts				
Capercaillie Direct mortality from site clearance of vegetation during breeding season, disturbance of lek sites leading to abandonment	International	Adverse	Medium	South
Culbin Sands, Culbin Forest and Findhorn Bay SSSI Pollution risk, potential for mortality and changes to habitat suitability	National	Adverse	High	Both
Findhorn Bay LNR Pollution risk, potential for mortality and changes to habitat suitability	Authority	Adverse	High	Both
Permanent Impacts[126]				
Capercaillie Habitat loss and severance, potential loss of lekking sites and disturbance of individuals resulting in habitat abandonment	International	Adverse	High	South
Darnaway & Lethen Forest SPA Habitat loss and severance, potential loss of capercaillie lekking sites and disturbance of individuals resulting in habitat abandonment	International	Adverse	High	South

[126] Impacts common to all options are those reported in Table 18.2

Potential Impact	Value	Adverse / Beneficial	Magnitude	Relevant Options
Operational Impacts[127]				
Capercaillie Direct mortality through road traffic collisions and disturbance of lekking sites leading to abandonment	International	Adverse	Medium	South
Darnaway & Lethen Forest SPA Disturbance to designated features through noise, vibration or light spill	International	Adverse	Medium	South
Culbin Sands, Culbin Forest and Findhorn Bay SSSI Pollution risk, potential for mortality and changes to habitat suitability	National	Adverse	High	Both
Findhorn Bay LNR Pollution risk of mortality to species and changes to habitat suitability	Authority	Adverse	High	Both
Lower Findhorn Woods SAC/SSSI Pollution, risk of mortality to species and changes to habitat suitability	International	Adverse	Medium	South

[127] Impacts associated with traffic using the road, pollution refers to all potential pollutants including run-off/sediment, oils, chemicals and salt spray

Table 18.4: Potential Ecological Impacts – Hillhead to Lhanbryde

Potential Impact	Value	Adverse / Beneficial	Magnitude	Relevant Options
Construction Activity Impacts				
Culbin Sands, Culbin Forest and Findhorn Bay SSSI Pollution risk, potential for mortality and changes to habitat suitability	National	Adverse	High	Both
Findhorn Bay LNR Pollution, risk of mortality to species and changes to habitat suitability	Authority	Adverse	High	Both
Loch Spynie SPA/SSSI/Ramsar Pollution risk, potential for mortality and changes to habitat suitability Disturbance of Icelandic greylag geese foraging areas from noise, vibration and light spill	International	Adverse	Medium	Both
Permanent Impacts[128]				
Operational Impacts[129]				
Loch Spynie SPA/SSSI/Ramsar Pollution risk, potential for mortality and changes to habitat suitability Disturbance of Icelandic greylag geese foraging areas from noise, vibration and light spill	International	Adverse	Medium	Both
Culbin Sands, Culbin Forest and Findhorn Bay SSSI Pollution risk, potential for mortality and changes to habitat suitability	National	Adverse	High	Both

[128] Impacts common to all options are those reported in Table 18.2
[129] Impacts associated with traffic using the road, pollution refers to all potential pollutants including run-off/sediment, oils, chemicals and salt spray

Potential Impact	Value	Adverse / Beneficial	Magnitude	Relevant Options
Findhorn Bay LNR Pollution, risk of mortality to species and changes to habitat suitability	Authority	Adverse	High	Both
Quarry Wood SSSI Pollution risk, potential for mortality and changes to habitat suitability	National	Adverse	High	South

Table 18.5: Potential Ecological Impacts – Lhanbryde to East of Fochabers

Potential Impact	Value	Adverse / Beneficial	Magnitude	Relevant Options
Construction Activity Impacts				
Loch Oire SSSI Pollution risk, potential for mortality and changes to habitat suitability	National	Adverse	High	Both
Lower River Spey – Spey Bay SAC Pollution risk, potential for mortality and changes to habitat suitability	International	Adverse	High	Both
Spey Bay SSSI Pollution risk, potential for mortality and changes to habitat suitability	National	Adverse	High	Both
Lower River Spey SSSI Pollution risk, potential for mortality and changes to habitat suitability	National	Adverse	High	Both
River Spey SAC Pollution risk, potential for mortality and changes to habitat suitability	International	Adverse	High	Both
Capercaillie Direct mortality from site clearance of vegetation during breeding season, disturbance of lek sites leading to abandonment	International	Adverse	Medium	Both

Potential Impact	Value	Adverse / Beneficial	Magnitude	Relevant Options
Permanent Impacts[130]				
Capercaillie Habitat loss and severance, potential loss of lekking sites and disturbance of individuals resulting in habitat abandonment	International	Adverse	High	Both
Operational Impacts[131]				
Loch Oire SSSI Pollution risk, potential for mortality and changes to habitat suitability	National	Adverse	High	Both
Lower River Spey – Spey Bay SAC Pollution risk, potential for mortality and changes to habitat suitability	International	Adverse	High	Both
Spey Bay SSSI Pollution risk, potential for mortality and changes to habitat suitability	National	Adverse	High	Both
Lower River Spey SSSI Pollution risk, potential for mortality and changes to habitat suitability	National	Adverse	High	Both
River Spey SAC Pollution risk, potential for mortality and changes to habitat suitability	International	Adverse	High	Both
Capercaillie Direct mortality through road traffic collisions and disturbance of lekking sites leading to abandonment	International	Adverse	Medium	Both

[130] Impacts common to all options are those reported in Table 18.2
[131] Those impacts associated with traffic using the road, pollution refers to all potential pollutants including run-off/sediment, oils, chemicals and salt spray

18.5. Mitigation

18.5.1. It is not possible at this stage of the design process for mitigation measures to be designed in detail. This section identifies possible mitigation measures that have been considered in this assessment. These mitigation measures will be further developed and refined based on detailed ecological survey work for each receptor, in order to produce a detailed mitigation schedule during DMRB Stage 3.

18.5.2. These measures take into account best practice, legislation and guidance documents including CIEEM, DMRB and SNH guidance. The hierarchical approach to mitigation design has been adopted throughout the design process where practical, in order to avoid impacts in the first instance and then minimise remaining impacts where possible, in line with PAN 1/2013: Environmental Impact Assessment (Rev 1.0 (2017))[132] and the A96 Dualling Strategic Environmental Principles Report[133] and A96 Dualling SEA – Post Adoption Statement[134].

18.5.3. It has been assumed that impacts of negligible significance, and the majority of impacts of minor significance will be mitigated through the application of best practice.

18.5.4. Moderate or above significant impacts will be mitigated by a combination of best practice and mitigation techniques (detailed below) which would target specific locations.

18.5.5. The following mitigation measures have been assumed in this assessment:

- ECO1 - Construction disturbance will be mitigated by timing of noisy activities to be outwith specific seasons (where practical) and utilising systems that minimise noise and vibration and soft-start processes.
- ECO2 – Visual screens will be used to shield construction areas from important areas for qualifying species of designated sites (or other identified sensitive receptors if applicable). Exclusion zones will be created in sensitive areas and access routes selected to minimise potential for disturbance.
- ECO3 – Existing habitats will be enhanced to increase the available supporting habitat for species to mitigate for habitat loss and disturbance at appropriate locations.
- ECO4 – The potential loss of botanical species of conservation interest will be mitigated by minimisation of land-take and control of working corridor width. Individual species will be transplanted to new locations and topsoil stored correctly for re-use in the creation of similar habitats post-construction where practical.
- ECO5 – The transfer of INNS (Himalayan balsam, Japanese knotweed and giant hogweed most notably) during construction will be mitigated by implementation of an INNS management plan. This will contain knowledge of existing INNS and appropriate treatment methods to ensure that construction proceeds within the legal framework to ensure prevention of spread both within and beyond the site boundaries. The INNS plan will also cover animal biosecurity if necessary.

[132] Scottish Government (2013) Planning Advice Note 1/2013: Environmental Impact Assessment (Rev. 1.0 (2017))
[133] Transport Scotland (2016) A96 Dualling Programme: Strategic Environmental Principles
[134] Transport Scotland (2016) A96 Dualling programme: Strategic Environmental Assessment Post Adoption Statement

- ECO6 – Construction impacts on species will be mitigated by the provision of applicable protection systems and exclusion zones. Applicable fencing (mammal, amphibian) will be utilised to prevent direct mortality through traffic collisions. Permanent fencing systems will be installed to mitigate for operational traffic mortality where required.
- ECO7 – The severance of commuting routes for otters and badgers will be mitigated by the provision of mammal crossings where possible.
- ECO8 – The impact on protected species and their habitats will be minimised by exclusion zones to reduce disturbance. Restriction on night-time working, appropriate lighting during construction activities, as well as appropriate lighting design for operation will reduce disturbance to badgers, bats and otters (and other nocturnal species).
- ECO9 – Provision of alternative artificial refuges will be provided for many species to mitigate loss of habitat (artificial badger setts, otter holts, bird boxes, bat boxes, den boxes for pine marten and red squirrel and artificial refuges and hibernation sites for reptiles and great crested newt). Suitable planting will be used to provide opportunities for above ground habitat including resting sites for otter and great crested newt, and foraging habitat for other species.
- ECO10 – New planting will be used where applicable to create new linkages between habitats to mitigate for severance of bat commuting routes and fragmentation of red squirrel and capercaillie habitat.
- ECO11 – The enhancement of re-aligned or altered sections of watercourses will be mitigated through enhancement including creating naturalistic habitats. These will also be used to create positive impacts in poor quality areas through channel and riparian enhancement work. All realignments will be designed to minimise sedimentation and erosion and effects on fish.
- ECO12 – Proposed extensions to culverts and new culverts will be constructed to take into account migratory fish species, where applicable.
- ECO13 – The potential for pollution incidents during construction to affect nature conservation resources will be mitigated through the adherence to standard best practice and guidelines, such as the SEPA Pollution Prevention Guidelines / Guidance for Pollution Prevention.
- ECO14 – Operational potential pollution impacts (e.g. run-off) will be mitigated through appropriate provision of Sustainable Drainage Systems (SuDS).

18.6. Predicted Ecological Effects

18.6.1. This section presents the key predicted ecological effects of the options on nature conservation using the assessment methodology set out in Appendix A18.1 (Volume 4b). Potential impacts have been assessed prior to mitigation and the residual effects then evaluated taking account of the assumed mitigation (see Section 18.5). The predicted effects are presented in Tables 18.6 to 18.12 below. The estimation of extent of habitat loss for each option are included in Appendix A18.5 (Volume 4b).

Common to All Options

18.6.2. The predicted effects common across all the options on nature conservation receptors are set out in Table 18.6. These include sites such as the Moray and Nairn Coast SPA which covers a large area and is designated for wide ranging species such as geese which will be

foraging across the site. In addition, protected species such as badger, red squirrel, otter and fish species are likely to be common to each option as suitable habitat is present across the site and desk records provided by NESBReC as well as consultation with SNH highlight the presence of these species across the north of Moray. Species which are relatively abundant in northern Scotland, as evidenced by biological records both within and outwith the survey area[135], such as amphibians, breeding birds and reptiles are also included within this table as they are likely to be found across the site and can be present within a variety of habitat types.

18.6.3. Also included within Table 18.6 are predicted effects which are more generic and not location specific which could arise during construction. These include dust pollution and pollution of watercourses and transfer of disease, where it is not possible to provide a location and effects can occur at any time throughout the construction phase.

[135] NESBReC (2017) Mammal Atlas of North-East Scotland and the Cairngorms

Table 18.6: Predicted Ecological Effects – Common to All Options

Sub-topic / criteria and Value	Predicted Effects (and Magnitude)	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects following Mitigation (Significance)
Moray and Nairn Coast SPA (International)	Potential for pollution causing mortality and changes to habitat suitability from construction activities close to or crossing rivers and streams that flow downstream into SPA Magnitude: High	Major adverse	ECO11, ECO13, ECO14	Negligible
	Potential for pollution causing mortality and changes to habitat suitability from operational run-off close to or crossing rivers and streams that flow downstream into SPA Magnitude: High	Major adverse	ECO11, ECO13, ECO14	Negligible
Otter (Regional)	Potential for direct mortality of individuals from collisions with construction traffic, entrapment in excavations and the disturbance of places of shelter leading to abandonment Magnitude: Low	Minor adverse	ECO6, ECO7, ECO8, ECO9	Negligible
	Land-take for road results in habitat loss, fragmentation and severance of commuting routes, disturbance resulting in avoidance of habitats. Potential for pollution of watercourses resulting in reduced prey Magnitude: Medium	Moderate adverse	ECO6, ECO7, ECO8, ECO9, ECO13, ECO14	Minor adverse
	Direct mortality through traffic collisions during road operation Magnitude: Low	Minor adverse	ECO6, ECO7, ECO8, ECO9,	Negligible

Sub-topic / criteria and Value	Predicted Effects (and Magnitude)	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects following Mitigation (Significance)
Bats (Regional)	Disturbance of bat roosts through construction noise, vibration and lighting potentially leading to abandonment Magnitude: Low	Minor adverse	ECO6, ECO7, ECO8, ECO9, ECO10	Negligible
	Land-take could result in direct mortality through roost destruction Magnitude: High	Major adverse	ECO6, ECO7, ECO8, ECO9, ECO10	Minor adverse
	Land-take could result in permanent loss of foraging habitat, severance of commuting routes and foraging areas. Pollution of water courses could lead to reduction in prey availability Magnitude: High	Major adverse	ECO6, ECO7, ECO8, ECO9, ECO10, ECO13, ECO14	Minor adverse
	Disturbance from noise, vibration and light-spill could result in avoidance and abandonment of habitats/roosts Magnitude: Low	Minor adverse	ECO6, ECO7, ECO8, ECO9, ECO10	Negligible
	Direct mortality through traffic collisions during road operation Magnitude: High	Major adverse	ECO6, ECO7, ECO8, ECO9, ECO10	Negligible
Badger (Local)	Potential for direct mortality of individuals from collisions with construction traffic, entrapment in excavations and the disturbance of places of shelter leading to abandonment Magnitude: Low	Minor adverse	ECO6, ECO7, ECO8, ECO9	Negligible

Sub-topic / criteria and Value	Predicted Effects (and Magnitude)	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects following Mitigation (Significance)
	Land-take for road results in loss of setts, habitat fragmentation and severance of commuting routes, disturbance resulting in avoidance of habitats Magnitude: Medium	Minor adverse	ECO6, ECO7, ECO8, ECO9	Minor adverse
	Direct mortality through traffic collisions during road operation Magnitude: High	Minor adverse	ECO6, ECO7. ECO8, ECO9	Negligible
Red squirrel (Local)	Potential for direct mortality of individuals from collisions with construction traffic, entrapment in excavations and the disturbance of places of shelter leading to abandonment Magnitude: Low	Minor adverse	ECO6, ECO7, ECO8, ECO9	Negligible
	Land-take for road potentially results in loss of dreys, loss of suitable habitats for foraging and breeding (woodlands), habitat fragmentation and severance of links between woodlands, disturbance resulting in avoidance of habitats Magnitude: High	Minor adverse	ECO6, ECO7, ECO8, ECO9, ECO10	Minor adverse
	Potential for direct mortality through traffic collisions during road operation Magnitude: Low	Minor adverse	ECO6, ECO7, ECO8, ECO9, ECO10	Negligible
Pine Marten (Authority)	Potential for direct mortality of individuals from collisions with construction traffic, entrapment in excavations and the disturbance of places of shelter leading to abandonment Magnitude: Medium	Moderate adverse	ECO6, ECO7, ECO8, ECO9	Negligible

Sub-topic / criteria and Value	Predicted Effects (and Magnitude)	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects following Mitigation (Significance)
	Land-take for road results in loss of denning sites, loss of suitable habitats for foraging and breeding (woodlands), habitat fragmentation and severance of links between woodlands, disturbance resulting in avoidance of habitats Magnitude: High	Moderate adverse	ECO6, ECO7, ECO8, ECO9	Minor adverse
	Potential for direct mortality through traffic collisions during road operation Magnitude: Low	Minor adverse	ECO6, ECO7, ECO8, ECO9	Negligible
Water Vole (Regional)	Land-take for road potentially results in habitat loss, fragmentation and severance of commuting and dispersal routes, disturbance resulting in avoidance of habitats. Potential for pollution of watercourses resulting in reduced foraging resource Magnitude: Low	Minor adverse	ECO6, ECO7, ECO8, ECO9, ECO13, ECO14	Negligible
Reptiles (Local)	Potential for direct mortality of individuals from collisions with construction traffic, entrapment in excavations and the disturbance of places of shelter leading to abandonment Magnitude: Low	Minor adverse	ECO6, ECO7, ECO8, ECO9	Negligible
	Land-take for road results in loss of suitable habitats, habitat fragmentation and severance of dispersal routes Magnitude: High	Minor adverse	ECO6, ECO7, ECO8, ECO9	Minor adverse
	Potential for direct mortality through traffic collisions during road operation Magnitude: Low	Minor adverse	ECO6. ECO7, ECO8, ECO9	Negligible

Sub-topic / criteria and Value	Predicted Effects (and Magnitude)	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects following Mitigation (Significance)
Great Crested Newt (GCN) (National)	Potential for direct mortality of individuals from collisions with construction traffic, entrapment in excavations and the disturbance of places of shelter leading to abandonment Magnitude: High	Major adverse	ECO6, ECO7, ECO8, ECO9	Negligible
	Land-take for road potentially results in loss of suitable habitats, habitat fragmentation and severance of dispersal routes. Increased risk of disease and non-native species introduction. Hydrological changes could result in alterations to habitat availability Magnitude: High	Major adverse	ECO6, ECO7, ECO8, ECO9, ECO13, ECO14	Minor adverse
	Potential for direct mortality of individuals from collisions with traffic, entrapment in drainage and the disturbance of places of shelter leading to abandonment. Potential for pollution of habitats from run-off Magnitude: High	Major adverse	ECO6, ECO7, ECO8, ECO9, ECO13, ECO14	Negligible
Amphibians (excluding GCN) (Local)	Potential for direct mortality of individuals from collisions with construction traffic, entrapment in excavations and the disturbance of places of shelter leading to abandonment Magnitude: Medium	Minor adverse	ECO6, ECO7, ECO8, ECO9	Negligible
	Land-take for road potentially results in loss of suitable habitats, habitat fragmentation and severance of dispersal routes. Increased risk of disease and non-native species introduction. Hydrological changes could result in alterations to habitat availability Magnitude: High	Minor adverse	ECO6, ECO7, ECO8, ECO9, ECO13, ECO14	Minor adverse

Sub-topic / criteria and Value	Predicted Effects (and Magnitude)	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects following Mitigation (Significance)
	Potential for direct mortality of individuals from collisions with traffic, entrapment in drainage and the disturbance of places of shelter leading to abandonment. Potential for pollution of habitats from run-off Magnitude: High	Minor adverse	ECO6, ECO7, ECO8, ECO9, ECO13, ECO14	Negligible
Wintering Birds (International)	Disturbance of foraging areas through construction noise, vibration and lighting potentially leading to abandonment Magnitude: Low	Minor adverse	ECO1, ECO2, ECO6, ECO8	Negligible
	Scheme potentially results in loss of foraging habitat either directly or through disturbance from traffic Magnitude: High	Major adverse	ECO3	Minor adverse
Breeding Birds (excluding barn owl and capercaillie) *(Regional)*	Potential for direct mortality from site clearance of vegetation during breeding season. Disturbance of nesting locations during nesting season may lead to abandonment Magnitude: Medium	Moderate adverse	ECO8, ECO9	Negligible
	Land-take for road potentially results in loss of suitable habitats for foraging and breeding, habitat fragmentation and severance of links between woodlands and other species-specific habitats Magnitude: Medium	Moderate adverse	ECO8, ECO9, ECO10	Minor adverse
	Potential for direct mortality through traffic collisions during road operation Magnitude: Low	Minor adverse	ECO8, ECO9, ECO10	Negligible

Sub-topic / criteria and Value	Predicted Effects (and Magnitude)	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects following Mitigation (Significance)
Barn Owl (Authority)	Direct mortality through road traffic collisions during operation (listed separately to other breeding birds due to specific identified risk factors) Magnitude: Medium	Moderate adverse	ECO8, ECO9, ECO10	Minor adverse
Fish (all species) *(National)*	Potential for direct mortality of species during construction from pollution. Potential for disturbance from noise & vibration during migration and potential reduction in spawning habitat through siltation Magnitude: High	Major adverse	ECO11, ECO12, ECO13, ECO14	Negligible
	Land-take results in permanent habitat loss at watercourse crossings including potentially at spawning areas Magnitude: High	Major adverse	ECO11, ECO12, ECO13, ECO14	Minor adverse
	Pollution from run-off/sediment during operation potentially results in decreased water quality and degradation and loss of habitat Magnitude: Low	Moderate adverse	ECO11, ECO12, ECO13, ECO14	Negligible
Freshwater Macroinvertebrates (excluding Freshwater Pearl Mussel) (Authority)	Potential for direct mortality of species during construction from pollution and in-stream works at small crossings (burns, streams, ditches & culverts). Potential for loss of habitat, and changes to habitat suitability Magnitude: Medium	Moderate adverse	ECO11, ECO12, ECO13, ECO14	Negligible
	Scheme potentially results in permanent loss of habitat at water crossings, risk of pollution causing of mortality and changes to habitat suitability Magnitude: High	Moderate adverse	ECO11, ECO12, ECO13, ECO14	Minor adverse

Sub-topic / criteria and Value	Predicted Effects (and Magnitude)	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects following Mitigation (Significance)
	Pollution from run-off/sediment during operation potentially results in decreased water quality and degradation and loss of habitat Magnitude: High	Moderate adverse	ECO11, ECO12, ECO13, ECO14	Negligible
Freshwater Pearl Mussel (International)	Potential for direct mortality of species during construction from pollution and in-stream works at small crossings (burns, streams, ditches & culverts). Potential for loss of habitat, and changes to habitat suitability Magnitude: High	Major adverse	ECO11, ECO12, ECO13, ECO14	Negligible
	Scheme potentially results in permanent loss of habitat at water crossings, risk of pollution causing of mortality and changes to habitat suitability Magnitude: High	Major adverse	ECO11, ECO12, ECO13, ECO14	Negligible
	Pollution from run-off/sediment during operation potentially results in decreased water quality and degradation and loss of habitat Magnitude: High	Major adverse	ECO11, ECO12, ECO13, ECO14	Negligible
Macrophytes (Site)	Potential for direct mortality of species during construction from pollution and in-stream works at small crossings (burns, streams, ditches & culverts). Potential for loss of habitat, and changes to habitat suitability Magnitude: Medium	Minor adverse	ECO11, ECO12, ECO13, ECO14	Negligible
Transfer of Invasive Non-	Introduction or transfer of invasive species during construction may result in squeezing out of native habitats/species Magnitude: High	Major adverse	ECO5	Minor adverse

Sub-topic / criteria and Value	Predicted Effects (and Magnitude)	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects following Mitigation (Significance)
native species (INNS) *Scheme wide (all receptors)* *(National)*	Introduction or transfer of invasive species by operational traffic may result in squeezing out of native habitats/species Magnitude: Medium	Moderate adverse	None	**Moderate adverse**
Transfer of disease *Scheme wide (all receptors)* *(Authority)*	Introduction or transfer of invasive species during construction could result in death of plants/animals (examples: Ash dieback, amphibian red-leg disease) Magnitude: Medium	Major adverse	ECO5	Negligible
Waterbodies *(Authority)*	Land-take potentially results in direct loss of aquatic habitat in smaller water courses (burns, streams, ditches & culverts) Magnitude: High	Moderate adverse	ECO11, ECO12, ECO13, ECO14	Minor adverse
	Pollution from operational run-off (incl. fine sediments) potentially resulting in reduced water quality in water courses (Rivers Spey & Findhorn, burns, streams, ditches & culverts) leading to potential mortality and loss of diversity Magnitude: High	Moderate adverse	ECO11, ECO12, ECO13, ECO14	Negligible
Air pollution of surrounding habitats (Regional)	Scheme potentially results in alteration of habitats adjacent to road through air quality changes which could lead to loss of habitat types Magnitude: Medium	Moderate adverse	ECO13	Negligible (see air quality assessment in Chapter 10)

Sub-topic / criteria and Value	Predicted Effects (and Magnitude)	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects following Mitigation (Significance)
Hydrological changes *(Authority)*	Scheme potentially results in alteration of hydrology which could result in loss of/change in habitat types (e.g. GWDTE, wetland habitats, vegetated ditches), as well as loss of diversity within those habitats, and potentially impact upstream movement of species Magnitude: Medium	Major adverse	ECO11, ECO12, ECO13, ECO14	Negligible
Terrestrial Invertebrates (Authority)	Scheme potentially results in permanent loss of habitat, risk of pollution causing of mortality and changes to habitat suitability Magnitude: Low	Minor adverse	ECO9, ECO10, ECO11, ECO13	Negligible

Hardmuir to Hillhead

18.6.4. The predicted effects of the North Option and South Option are summarised in Table 18.7 and Table 18.8 below.

Table 18.7: Predicted Ecological Effects - Hardmuir to Hillhead North Option

Sub-topic / criteria	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects following Mitigation (and Significance)
Findhorn Bay LNR (Authority)	Potential for pollution causing mortality and changes to habitat suitability from construction activities close to or crossing rivers and streams that flow downstream into LNR Magnitude: High	Moderate adverse	ECO11, ECO13, ECO14	Negligible
	Potential for pollution causing mortality and changes to habitat suitability from operational run-off close to or crossing rivers and streams that flow downstream into LNR Magnitude: High	Moderate adverse	ECO11, ECO13, ECO14	Negligible
Culbin Sands, Culbin Forest and Findhorn Bay SSSI (National)	Potential for pollution causing mortality and changes to habitat suitability from construction activities close to or crossing rivers and streams that flow downstream into SSSI Magnitude: High	Major adverse	ECO11, ECO13, ECO14	Negligible
	Potential for pollution causing mortality and changes to habitat suitability from operational run-off close to or crossing rivers and streams that flow downstream into SSSI Magnitude: High	Major adverse	ECO11, ECO13, ECO14	Negligible

Sub-topic / criteria	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects following Mitigation (and Significance)
Loss of Ancient Woodland (National)	Land-take potentially results in the direct loss of approximately 3ha of Ancient Woodland of Long-established Plantation Origin and <1ha of Semi-natural Origin Magnitude: High	Major adverse	ECO3, ECO4	**Moderate adverse**
Loss of Native Woodland (Authority)	Land-take potentially results in the direct loss of approximately 4ha of Native Woodland (NWSS) Magnitude: High	Moderate adverse	ECO3, ECO4	Minor adverse
Terrestrial Habitats (Site)	Land-take potentially results in direct loss of terrestrial habitats (including Non-designated woodland, arable, improved grassland and scrub) Loss per habitat type listed in Appendix A18.5 (Volume 4b) Magnitude: Medium	Minor adverse	None	Minor adverse
QUALITATIVE ASSESSMENT The North Option crosses a largely arable environment which is not particularly ecologically diverse, however a few key areas along the option are of greater ecological significance. These include Wester Hardmuir Wood, which is listed on the Ancient Woodland Inventory (Long Established of Plantation Origin (LEPO) category). The option runs along the edge of Hardmuir Wood which is known to support protected species including badger and red kite. These protected species are known to suffer increased mortality from proximity to a large road[136]. Species such as badger, red squirrel and pine marten are likely to be subject to noise and light disturbance during the construction and operational phases, and there would be permanent loss of their habitat (and potentially resting places). There are records of breeding barn owl within 1km of the proposed option, which would potentially result in mortality of individuals[137] and loss of foraging habitat.				

[136] English Nature (2002) Return of the Red Kite and www.mammal.org.uk
[137] Barn Owl Trust (2003) Barn Owls and Major Roads

Sub-topic / criteria	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects following Mitigation (and Significance)
This option would result in a severance effect between Darnaway Forest to the South and Culbin Forest to the north by creating a significant barrier to species dispersal between these two large woodland masses, although the option passes north of Darnaway Forest and would not result in any direct loss of this woodland. In addition, the option crosses the River Findhorn and other smaller watercourses that flow into Findhorn Bay SSSI and LNR. There is a risk during the construction and operation phase of pollution to watercourses which would impact water quality and potentially salmonid fish populations. It is considered that with standard mitigation measures that the risk of any impacts on the qualifying features of the designated sites would be negligible. Watercourses such as the River Findhorn and its tributaries support commuting and foraging otter, and there are likely to be shelter opportunities for this species where there is suitable cover. Where the option crosses these watercourses, there could be noise and light disturbance to otter during the construction phase. However, it is considered likely that during operation otter would become habituated to this. Places of shelter might also be lost or impacted if present close to crossing points. It is anticipated that this could be mitigated by relocation outwith the disturbance zone. Smaller waterbodies affected by the option have the potential to be used by great crested newt for breeding, a species known to be present in the Forres area. There is potential for these waterbodies to be adversely impacted from runoff during the construction and operational phases. Suitable terrestrial habitat may also be lost within the option footprint. South of Findhorn Bay the option passes through the southern part of an area of grassland fields which has been identified as a Year 1 hotspot (see Figure 18.4, Volume 5) for wintering geese, a qualifying feature of the Moray and Nairn Coast and Loch Spynie SPAs. The presence of the road has the potential to lead to disturbance of foraging geese both during construction and operation, possibly leading to abandonment of foraging at these locations.			

Table 18.8: Predicted Ecological Effects - Hardmuir to Hillhead South Option

Sub-topic / criteria	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects following Mitigation (and Significance)
Findhorn Bay LNR (Authority)	Potential for pollution causing mortality and changes to habitat suitability from construction activities close to or crossing rivers and streams that flow downstream into LNR Magnitude: High	Moderate adverse	ECO11, ECO13, ECO14	Negligible
	Potential for pollution causing mortality and changes to habitat suitability from operational run-off close to or crossing rivers and streams that flow downstream into LNR Magnitude: High	Moderate adverse	ECO11, ECO13, ECO14	Negligible
Culbin Sands, Culbin Forest and Findhorn Bay SSSI (National)	Potential for pollution causing mortality and changes to habitat suitability from construction activities close to or crossing rivers and streams that flow downstream into SSSI Magnitude: High	Major adverse	ECO11, ECO13, ECO14	Negligible
	Potential for pollution causing mortality and changes to habitat suitability from operational run-off close to or crossing rivers and streams that flow downstream into SSSI Magnitude: High	Major adverse	ECO11, ECO13, ECO14	Negligible
Darnaway & Lethen Forest SPA (International)	Potential disturbance to designated features of SPA through noise, vibration or light spill during road construction Magnitude: Medium	Major adverse	ECO1, ECO2, ECO3, ECO8	Negligible
	Potential disturbance to designated features of SPA through noise, vibration or light spill during operation Magnitude: High	Major adverse	ECO1, ECO2, ECO3, ECO8	Minor adverse

Sub-topic / criteria	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects following Mitigation (and Significance)
Lower Findhorn Woods SAC (International)	Potential pollution risk of mortality to species and changes to habitat suitability during operation Magnitude: Medium	Major adverse	ECO13	Negligible (see air quality assessment in Chapter 10)
Lower Findhorn Woods SSSI (National)	Potential pollution risk of mortality to species and changes to habitat suitability during operation Magnitude: Medium	Major adverse	ECO13	Negligible (see air quality assessment in Chapter 10)
Capercaillie (International)	The Scheme would result in permanent habitat loss in areas used by the species and potential loss of lek sites Magnitude: High	Major adverse	ECO3, ECO6, ECO10	**Moderate adverse**
	Potential disturbance through noise, vibration or light spill during construction Magnitude: Low	Moderate adverse	ECO1, ECO2, ECO6	Minor adverse
	Potential direct mortality through road traffic collisions during operation Magnitude: High	Major adverse	ECO6	Negligible
	Potential disturbance during operation leading to loss of individuals close to the option, and potential abandonment of lek sites Magnitude: High	Major adverse	ECO3, ECO10	**Moderate adverse**
Loss of Ancient Woodland (National)	Land-take potentially results in the direct loss of approximately 43ha of Ancient Woodland of Long-established Plantation Origin Magnitude: High	Major adverse	ECO3, ECO4	**Moderate adverse**

Sub-topic / criteria	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects following Mitigation (and Significance)
Loss of Native Woodland (Authority)	Land-take potentially results in the direct loss of approximately 6ha of Native Woodland (NWSS) Magnitude: High	Moderate adverse	ECO3, ECO4	Minor adverse
Terrestrial Habitats (Site)	Land-take potentially results in direct loss of terrestrial habitats (including Non-designated woodland, arable, improved grassland and scrub). Loss per habitat type listed in Appendix A18.5 (Volume 4b) Magnitude: Medium	Minor adverse	None	Minor adverse

QUALITATIVE ASSESSMENT

The South Option passes through a large amount of woodland and would result in significant woodland loss, including approximately 42ha of AWI. This includes areas in Limekilns Wood, Fairyhills Wood and Darnaway Forest, which are all listed on the Ancient Woodland Inventory (LEPO category). The option also runs along the edge of Hardmuir Wood which is known to support protected species including badger and red kite. These protected species are known to suffer increased mortality from proximity to a large roads. Species such as badger, red squirrel and pine marten are likely to be subject to noise and light disturbance during the construction and operational phases, with permanent loss of their habitat (and potentially resting places).

The option would pass north of the Darnaway and Lethen SPA, through Darnaway Forest, however the option does not pass through the designated site. Capercaillie is listed as a qualifying species of the SPA and may be impacted by the option. Individuals may be disturbed by light and noise during construction and operation, while there is potential for habitat loss and potential loss of lekking sites. Although impacts would occur outwith the SPA, the species could be affected as the option would act as a barrier to dispersal and potentially displace individuals.

As well as the impact upon Darnaway Forest, the option would also result in a severance effect between Darnaway Forest to the south and Culbin Forest to the north by creating a significant barrier to a variety of species dispersal movements between these two large woodland masses, although capercaillie is not known to disperse north to Culbin.

The option crosses the River Findhorn and other smaller watercourses that flow into Findhorn Bay SSSI and LNR. There is a risk during the construction and operation phase of pollution to watercourses which would impact water quality and therefore potentially on salmonid fish populations. Standard good practice construction mitigation measures would ensure that the risk of any impacts on the qualifying features of the designated sites would be negligible.

Sub-topic / criteria	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects following Mitigation (and Significance)
Watercourses may support commuting and foraging otter, and there is likely to be shelter opportunities for this species where there is suitable cover. Where the option crosses these watercourses, there may be noise and light disturbance to otter during the construction phase, however it is likely that during operation otter will become habituated to this. Places of shelter may also be lost or impacted if present close to crossing points. Smaller waterbodies affected by the option have the potential to be used by great crested newt for breeding and may be adversely impacted from pollution during the construction and operational phases. Suitable terrestrial habitat may also be lost within the option footprint.				

Hillhead to Lhanbryde

18.6.5. The predicted effects of the North Option and South Option are summarised in Table 18.9 and Table 18.10 below.

Table 18.9: Predicted Ecological Effects - Hillhead to Lhanbryde North Option

Sub-topic / criteria	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects following Mitigation (and Significance)
Loch Spynie SPA (International)	Potential disturbance of qualifying species' foraging areas through construction noise, vibration and lighting potentially leading to abandonment Magnitude: Low	Minor adverse	ECO1, ECO2, ECO6, ECO8	Negligible
	Scheme potentially results in loss of foraging habitat for qualifying species either directly or through disturbance from traffic Magnitude: High	Major adverse	ECO3	Minor adverse
Loch Spynie SSSI (National)	Potential disturbance and changes to habitat suitability during construction activities close to the SSSI Magnitude: High	Major adverse	ECO11, ECO13, ECO14	Negligible
	Potential disturbance and changes to habitat suitability during operational activities close to the SSSI Magnitude: High	Major adverse	ECO11, ECO13, ECO14	Negligible
Loss of Ancient Woodland (National)	Land-take potentially results in the direct loss of approximately 2ha of Ancient Woodland of Long-established Plantation Origin Magnitude: High	Major adverse	ECO3, ECO4	**Moderate adverse**

Sub-topic / criteria	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects following Mitigation (and Significance)
Loss of Native Woodland (Authority)	Land-take potentially results in the direct loss of approximately 5ha of Native Woodland (NWSS) Magnitude: High	Moderate adverse	ECO3, ECO4	Minor adverse
Terrestrial Habitats (Site)	Land-take potentially results in direct loss of terrestrial habitats (including Non-designated woodland, arable, improved grassland and scrub) Loss per habitat type listed in Appendix A18.5 (Volume 4b) Magnitude: Medium	Minor adverse	None	Minor adverse

QUALITATIVE ASSESSMENT

The North Option crosses a largely arable environment, with areas of AWI woodland and watercourses which are of high ecological value. The woodlands include areas of native and ancient woodland (LEPO) at Alves Wood, Kirkhill Wood and some unnamed woodlands. Loss of woodland would be small, and where loss does occur the option generally crosses the outer edge of woodlands, therefore reducing the degree of habitat severance. Despite this the option would cause habitat severance between woodlands, where the option passes between them. Although the option is confined largely to the woodland edge, this would still result in disturbance to woodland species such as badger, red squirrel and pine marten during the construction and operational phases, with the potential for permanent loss of habitat (and potentially resting places). Records of breeding barn owl within 1km of the option in the vicinity of Alves Wood indicate the option would have potential to result in mortality of individuals and loss of foraging habitat.

The option crosses a number of smaller watercourses, in addition to the River Lossie. Otter has been observed (visually and sprainting) along the river during Phase 1 Habitat Surveys, showing that this watercourse is frequently used by this species. The option would cause noise and light disturbance to otter during the construction phase, however it is likely that during operation otter would become habituated to this. There is also a risk of pollution of the Lossie and other watercourses along the option during construction and operation which could adversely impact water quality, fish and macroinvertebrate populations. Implementation of good practice construction mitigation measures would ensure the risk of this would be negligible. The potential for an area of GWDTE habitat has been identified at Pitgaveny Farm. The area of wet woodland and rush pasture, while small is considered likely to be a GWDTE. This will be investigated further at Stage 3 if required.

The option passes through the southern part of an area of grassland fields which have been identified as a Year 1 hotspot (see Figure 18.4, Volume 5) for wintering geese, a qualifying feature of the Moray and Nairn Coast and Loch Spynie SPAs. The presence of the road has the potential to lead to disturbance of foraging geese during construction and operation, which could lead to abandonment of foraging at these locations.

Table 18.10: Predicted Ecological Effects - Hillhead to Lhanbryde South Option

Sub-topic / criteria	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects following Mitigation (and Significance)
Quarry Wood SSSI (National)	Potential for pollution resulting in changes to habitat suitability during operational activities close to the SSSI Magnitude: Medium	Major adverse	ECO13	Negligible (see air quality assessment in Chapter 10)
	Potential for pollution resulting in changes to habitat suitability during construction activities close to the SSSI Magnitude: Low	Moderate adverse	ECO13	Negligible
Loss of Ancient Woodland (National)	Land-take potentially results in the direct loss of approximately 18ha of Ancient Woodland of Long-established Plantation Origin Magnitude: High	Major adverse	ECO3, ECO4	**Moderate adverse**
Loss of Native Woodland (Authority)	Land-take potentially results in the direct loss of approximately 16ha of Native Woodland (NWSS) Magnitude: High	Moderate adverse	ECO3, ECO4	Minor adverse
Terrestrial Habitats (Site)	Land-take potentially results in direct loss of terrestrial habitats (including Non-designated woodland, arable, improved grassland and scrub) Loss per habitat type listed in Appendix A18.5 (Volume 4b) Magnitude: Medium	Minor adverse	None	Minor adverse
QUALITATIVE ASSESSMENT The South Option crosses a predominantly arable environment, with areas of AWI woodland and freshwater which are of high ecological value. These include areas of native and ancient woodland (LEPO) at Alves Wood, Birkenhill Wood and unnamed woods at Burnside Farm, Lochinver and Troves. There would be a moderate amount of woodland loss, with the option bisecting Alves and Birkenhill Woods. The option would also cause habitat severance between woodlands and would be likely to cause disturbance to woodland species such as badger, red squirrel and pine marten during the construction and operational phases. There would also be some permanent loss of habitat (and potentially resting places). Records of breeding barn owl have been				

Sub-topic / criteria	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects following Mitigation (and Significance)
identified within 1km of the proposed option in the vicinity of Alves Wood. Construction of the option could potentially result in mortality of individuals and loss of their foraging habitat. The option crosses a number of smaller watercourses, in addition to the River Lossie. Otters have been observed (visually and sprainting) along the river during Phase 1 Habitat Surveys, showing that this watercourse is frequently used by this species, however, as both the North and South Options cross these features they are not a differentiator between them. The option would cause noise and light disturbance to otter during the construction phase, however it is likely that during operation otter will become habituated to this. The South Option passes close to the Quarry Wood SSSI, however the option does not extend as far as the boundary of the site. There is a risk of air pollution impacting on the habitat suitability of the site, however if good practice construction mitigation measures were implemented there would be no significant impact on the site and significant effects from traffic emissions during operation have not been predicted (see air quality assessment in Chapter 10). To the east of the Lossie crossing, the option crosses a network of freshwater ponds adjacent to Cloddach Quarry. This is an ecologically valuable area with a mosaic of habitats including woodland, scrub, and ponds which support a range of protected and notable species. Evidence of badger, otter and pine marten has been observed and the option is likely to result in disturbance to these species during the construction and operational phases, where there is suitable habitat and shelter for these species. The area is also likely to support a high density of invertebrates and it is likely to be an important foraging area for bat species. The presence of this ecologically valuable area which would be impacted is an important differentiator between the options through this section. During the wintering bird survey, it was observed that the ponds supported large numbers of wildfowl species of conservation concern (BoCC 4[138]), and it is likely that the option could impact these species. During operation and construction phases individuals would suffer from light and noise disturbance, while there would likely be permanent impacts as any structure over the ponds could pose a collision risk as well as acting as a barrier to flight paths into the ponds which could reduce their attractiveness to wintering bird species. A bridge is also likely to increase predation risk to wildfowl, acting as a hunting platform for predators. The option passes directly through an area of grassland fields which have been identified as a Year 1 hotspot (see Figure 18.4, Volume 5) for wintering geese, a qualifying feature of the Moray and Nairn Coast and Loch Spynie SPAs. The presence of the road at this location might lead to disturbance of foraging geese both during construction and operation, which may lead to abandonment of foraging at these locations.				

[138] Birds of Conservation Concern 4: the population status of birds in the UK, Channel Islands and Isle of Man (Mark Eaton et al, 2015)

Lhanbryde to East of Fochabers

18.6.6. The predicted effects of the North and South Options are summarised in Table 18.11 and Table 18.12 below.

Table 18.11: Predicted Ecological Effects – Lhanbryde to East of Fochabers North Option

Sub-topic / criteria	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects following Mitigation (and Significance)
Loch Oire SSSI (National)	Potential disturbance and changes to habitat suitability and nutrient levels during construction activities close to the SSSI. See Chapter 19 (Geology, Soils, Contaminated Land and Groundwater) for groundwater assessment. Magnitude: High	Major adverse	ECO11, ECO13, ECO14	Minor
	Potential disturbance and changes to habitat suitability and nutrient levels during operational activities close to the SSSI See Chapter 19 (Geology, Soils, Contaminated Land and Groundwater) for groundwater assessment. Magnitude: High	Major adverse	ECO11, ECO13, ECO14	Minor
Lower River Spey – Spey Bay SAC (International)	Pollution from run-off/sediment during operation potentially results in decreased water quality and degradation and loss of habitat Magnitude: High	Major adverse	ECO11, ECO13, ECO14	Negligible
	Pollution from run-off/sediment during construction potentially results in decreased water quality and degradation and loss of habitat Magnitude: Low	Moderate adverse	ECO11, ECO13, ECO14	Negligible
Spey Bay SSSI (National)	Pollution from run-off/sediment during operation potentially results in decreased water quality and degradation and loss of habitat Magnitude: High	Major adverse	ECO11, ECO13, ECO14	Negligible

Sub-topic / criteria	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects following Mitigation (and Significance)
	Pollution from run-off/sediment during construction potentially results in decreased water quality and degradation and loss of habitat Magnitude: Low	Moderate adverse	ECO11, ECO13, ECO14	Negligible
River Spey SSSI (National)	Potential direct mortality of qualifying species during construction from pollution. Potential for disturbance from noise & vibration during migration and potential reduction in spawning habitat through siltation Magnitude: High	Major adverse	ECO11, ECO13, ECO14	Negligible
	Pollution from run-off/sediment during construction potentially results in decreased water quality and degradation and loss of habitat Magnitude: Low	Moderate adverse	ECO11, ECO13, ECO14	Negligible
	Potential for direct mortality of otter individuals from collisions with construction traffic, entrapment in excavations and the disturbance of places of shelter leading to abandonment Magnitude: Low	Moderate adverse	ECO6, ECO7, ECO8, ECO9	Negligible
	Land-take potentially results in permanent habitat loss at water crossings including potentially at spawning areas Magnitude: High	Major adverse	ECO11	Negligible
	Land-take for road potentially results in habitat fragmentation and severance of otter commuting routes, disturbance resulting in avoidance of habitats. Potential for pollution of watercourses resulting in reduced prey Magnitude: Medium	Major adverse	ECO7, ECO10, ECO11, ECO13, ECO14	Minor adverse

Sub-topic / criteria	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects following Mitigation (and Significance)
	Pollution from run-off/sediment during operation potentially results in decreased water quality and degradation and loss of habitat Magnitude: Low	Moderate adverse	ECO11, ECO13, ECO14	Negligible
River Spey SAC (International)	Potential direct mortality of qualifying species during construction from pollution. Potential for disturbance from noise & vibration during migration and potential reduction in spawning habitat through siltation Magnitude: High	Major adverse	ECO11, ECO13, ECO14	Negligible
	Potential for direct mortality of otter individuals from collisions with construction traffic, entrapment in excavations and the disturbance of places of shelter leading to abandonment Magnitude: Low	Moderate adverse	ECO6, ECO7, ECO8, ECO9	Negligible
	Land-take for road potentially results in habitat fragmentation and severance of otter commuting routes, disturbance resulting in avoidance of habitats. Potential for pollution of watercourses resulting in reduced prey Magnitude: Medium	Major adverse	ECO7, ECO10, ECO11, ECO13, ECO14	Minor adverse
	Land-take potentially results in permanent habitat loss at water crossings including potentially at spawning areas Magnitude: High	Major adverse	ECO11	Negligible
	Pollution from run-off/sediment during operation potentially results in decreased water quality and degradation and loss of habitat Magnitude: Low	Moderate adverse	ECO11, ECO13, ECO14	Negligible

Sub-topic / criteria	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects following Mitigation (and Significance)
Capercaillie (International)	The option may result in permanent habitat loss and potential loss of lek sites Magnitude: High	Major adverse	ECO3, ECO6, ECO10	Minor adverse
	Potential disturbance through noise, vibration or light spill during construction Magnitude: High	Major adverse	ECO1, ECO2, ECO6	Negligible
	Potential direct mortality through road traffic collisions during operations Magnitude: High	Major adverse	ECO6	Negligible
	Potential disturbance during operation leading to loss of individuals close to the option, and potential abandonment of lek sites Magnitude: High	Major adverse	ECO3, ECO10	**Moderate adverse**
Loss of Ancient Woodland (National)	Land-take potentially results in the direct loss of approximately 53ha of Ancient Woodland of Long-established Plantation Origin Magnitude: High	Major adverse	ECO3, ECO4	**Moderate adverse**
Loss of Native Woodland (Authority)	No loss of Native Woodland Magnitude: High	None	ECO3, ECO4	None
Terrestrial habitats (Site)	Land-take potentially results in direct loss of terrestrial habitats (including non-designated woodland, arable, improved grassland and scrub)	Minor adverse	None	Negligible

Sub-topic / criteria	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects following Mitigation (and Significance)
	Loss per habitat type listed in Appendix A18.5 (Volume 4b) Magnitude: Medium			

QUALITATIVE ASSESSMENT

There would be significant woodland loss associated with the North Option through Threapland Wood, Balnacoul Wood and Leitch's Wood. There would be significant severance of Threapland Wood which is listed on the AWI (LEPO category), reducing habitat connectivity. The presence of the Aberdeen - Inverness Railway Line at this location does not significantly mitigate this effect as it is a single line with a relatively low volume of rail traffic and very little night traffic. Breeding barn owl has been recorded south of Lhanbryde and at Dipple within 500m of the option. The introduction of a new road could cause mortality of individuals from vehicle collision and loss of foraging habitat, although this could be mitigated with appropriate planting. There are also records for osprey within Threapland Wood which may be disturbed and discouraged from nesting by potential increases in noise and lighting.

Where the option passes through Threapland Wood, it crosses between Loch Na Bo and Loch Oire SSSI, potentially severing commuting links between these two large waterbodies. In addition, there is potential for pollution of and disturbance to these waterbodies which support wintering wildfowl species including geese and whooper swan associated with nearby Moray and Nairn Coast SPA. The assessment presented in Chapter 19 (Geology, Soils, Contaminated Land and Groundwater) has highlighted the potential for changes to ground water to impact on Loch Oire SSSI which have not been assessed as part of this assessment but this would have an ecological effect if this were to happen. Loch Oire is designated as a Mesotrophic loch with undisturbed aquatic plant communities, therefore alterations to its catchment may result in changes to aquatic conditions and their associated plant communities. At this stage it is not possible to confirm pathways and potential effects on this important receptor, therefore further detailed assessment at DMRB Stage 3 may be required in order to confirm and quantify any potential effects and develop site specific mitigation and a site protection plan (as part of the Construction Environmental Management Plan).

The option passes close to a known bat roost within Balnacoul Wood, this supports over 200 individuals, and construction of the option could result in significant disturbance. The woodland would also be severed, acting as a barrier to species dispersal and resulting in fragmentation of the woodland. Similarly, continuity between Ordiequish and Whiteash Hill Woods would be lost, and there would be significant habitat loss. There are capercaillie and osprey within Ordiequish Wood, with records of historical breeding. Both these species of national importance could be disturbed by the option, and the option would also result in fragmentation of capercaillie habitat.

The loss of large areas of woodland across the option would affect protected species such as badger, pine marten and red squirrel which are present. There could be loss of places of shelter, and the option would act as a barrier to species dispersal and fragment some large areas of woodland, reducing their ability to support protected mammal species.

Sub-topic / criteria	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects following Mitigation (and Significance)
The option also crosses the designated River Spey which supports qualifying species, however as all options cross the Spey this is not a differentiator because the potential effects would be similar at each crossing location. There could be the potential for significant pollution to this watercourse which would affect habitat quality and could have direct impacts on qualifying species Atlantic salmon and freshwater pearl mussel, and impact foraging for otter. However, with implementation of good construction site practice it is considered that the risk of any impacts on the qualifying features of the designated site would be negligible.				

Table 18.12: Predicted Ecological Effects – Lhanbryde to East of Fochabers South Option

Sub-topic / criteria	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects following Mitigation (and Significance)
Loch Oire SSSI (National)	Potential disturbance and changes to habitat suitability and nutrient levels during construction activities close to the SSSI. The assessment of impacts on groundwater in Chapter 19 (Geology, Soils, Contaminated Land and Groundwater) has informed this assessment. Magnitude: High	Major adverse	ECO11, ECO13, ECO14	Minor adverse
	Potential disturbance and changes to habitat suitability and nutrient levels during operational activities close to the SSSI. See Chapter 19 (Geology, Soils, Contaminated Land and Groundwater) for a more detailed groundwater assessment. Magnitude: High	Major adverse	ECO11, ECO13, ECO14	Minor adverse
Lower River Spey – Spey Bay SAC (International)	Pollution from run-off/sediment during operation potentially results in decreased water quality and degradation and loss of habitat Magnitude: Low	Major adverse	ECO11, ECO13, ECO14	Negligible
	Pollution from run-off/sediment during operation potentially results in decreased water quality and degradation and loss of habitat Magnitude: Low	Moderate adverse	ECO11, ECO13, ECO14	Negligible
Spey Bay SSSI (National)	Pollution from run-off/sediment during operation potentially results in decreased water quality and degradation and loss of habitat Magnitude: Low	Moderate adverse	ECO11, ECO13, ECO14	Negligible
	Pollution from run-off/sediment during construction potentially results in decreased water quality and degradation and loss of habitat Magnitude: Low	Moderate adverse	ECO11, ECO13, ECO14	Negligible

Sub-topic / criteria	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects following Mitigation (and Significance)
River Spey SSSI (National)	Potential for direct mortality of qualifying species during construction from pollution. Potential for disturbance from noise and vibration during migration and potential reduction in spawning habitat through siltation Magnitude: High	Major adverse	ECO11, ECO13, ECO14	Negligible
	Land-take potentially results in permanent habitat loss at water crossings including potentially at spawning areas Magnitude: High	Major adverse	ECO11	Negligible
	Pollution from run-off/sediment during operation potentially results in decreased water quality and degradation and loss of habitat Magnitude: Low	Moderate adverse	ECO11, ECO13, ECO14	Negligible
	Pollution from run-off/sediment during construction potentially results in decreased water quality and degradation and loss of habitat Magnitude: Low	Moderate adverse	ECO11, ECO13, ECO14	Negligible
	Potential for direct mortality of otter individuals from collisions with construction traffic, entrapment in excavations and the disturbance of places of shelter leading to abandonment Magnitude: Low	Moderate adverse	ECO6, ECO7, ECO8, ECO9	Negligible
	Land-take for road potentially results in habitat fragmentation and severance of otter commuting routes, disturbance resulting in avoidance of habitats. Potential for pollution of watercourses resulting in reduced prey Magnitude: Medium	Major adverse	ECO7, ECO10, ECO11, ECO13, ECO14	Minor adverse

Sub-topic / criteria	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects following Mitigation (and Significance)
River Spey SAC (International)	Potential direct mortality of qualifying species during construction from pollution. Potential for disturbance from noise & vibration during migration and potential reduction in spawning habitat through siltation Magnitude: High	Major adverse	ECO11, ECO13, ECO14	Negligible
	Land-take potentially results in permanent habitat loss at water crossings including potentially at spawning areas Magnitude: High	Major adverse	ECO11	Negligible
	Pollution from run-off/sediment during operation potentially results in decreased water quality and degradation and loss of habitat Magnitude: Low	Major adverse	ECO11, ECO13, ECO14	Negligible
	Potential for direct mortality of otter individuals from collisions with construction traffic, entrapment in excavations and the disturbance of places of shelter leading to abandonment Magnitude: Low	Major adverse	ECO6, ECO7, ECO8, ECO9	Negligible
	Land-take for road potentially results in habitat fragmentation and severance of otter commuting routes, disturbance resulting in avoidance of habitats. Potential for pollution of watercourses resulting in reduced prey Magnitude: Medium	Major adverse	ECO7, ECO10, ECO11, ECO13, ECO14	Minor adverse
Capercaillie (International)	The option will potentially result in permanent habitat loss and potential loss of lek sites Magnitude: High	Major adverse	ECO3, ECO6, ECO10	Minor adverse

Sub-topic / criteria	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects following Mitigation (and Significance)
	Potential disturbance through noise, vibration or light spill during construction Magnitude: High	Major adverse	ECO1, ECO2, ECO6	Negligible
	Potential direct Mortality through road traffic collisions during operations Magnitude: High	Major adverse	ECO6	Negligible
	Potential disturbance during operation leading to loss of individuals close to the option, and potential abandonment of lek sites. Reduction in suitable breeding habitat Magnitude: High	Major adverse	ECO3, ECO10	**Moderate adverse**
Loss of Ancient Woodland (National)	Land-take potentially results in the direct loss of approximately 48ha of Ancient Woodland of Long-established Plantation Origin Magnitude: High	Major adverse	ECO3, ECO4	**Moderate adverse**
Loss of Native Woodland (Authority)	Land-take potentially results in the direct loss of approximately 2ha of Native Woodland (NWSS) Magnitude: High	Moderate adverse	ECO3, ECO4	Minor adverse
Terrestrial Habitats (Site)	Land-take potentially results in direct loss of terrestrial habitats (including non-designated woodland, arable, improved grassland and scrub) Loss per habitat type listed in Appendix A18.5 (Volume 4b) Magnitude: Medium	Minor adverse	None	Minor adverse

Sub-topic / criteria	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects following Mitigation (and Significance)
QUALITATIVE ASSESSMENT There would be significant woodland loss associated with the South Option through Threapland Wood, Balnacoul Wood and Slorach's Wood. There would be significant severance of Threapland Wood which is listed on the AWI (LEPO category), reducing habitat connectivity. As with the North Option, the presence of the Aberdeen - Inverness Railway Line at this location does not significantly mitigate this effect as it is a single line with a relatively low volume of rail traffic and very little night traffic. Breeding barn owl has been recorded south of Lhanbryde and at Dipple within 500m of the option. The introduction of a new road could cause mortality of individuals from vehicle collision and loss of foraging habitat, although this could be mitigated with appropriate planting. There are also records for osprey within Threapland Wood which may be disturbed and discouraged from nesting by potential increases in noise and lighting. Where the option passes through Threapland Wood, it crosses between Loch Na Bo and Loch Oire SSSI, potentially severing commuting links between these two large waterbodies. In addition, there would be potential for pollution of and disturbance to these waterbodies which support wintering wildfowl species including geese and whooper swan associated with nearby Moray and Nairn Coast SPA. The assessment presented in Chapter 19 (Geology, Soils, Contaminated Land and Groundwater) has highlighted the potential for changes to ground water to impact on Loch Oire SSSI which have not been assessed as part of this assessment but this would have an ecological effect if this were to happen. Loch Oire is designated as a Mesotrophic loch with undisturbed aquatic plant communities, therefore alterations to its catchment may result in changes to aquatic conditions and their associated plant communities. At this stage it is not possible to confirm pathways and potential effects on this important receptor, therefore further detailed assessment at DMRB Stage 3 may be required in order to confirm and quantify any potential effects and develop site specific mitigation and a site protection plan (as part of the Construction Environmental Management Plan). Continuity between Leitch's and Slorach's Woods might be lost, and there would be significant habitat loss. Capercaillie and osprey are found in Ordiequish Wood where there are records of historical breeding. Both these species of national importance could be disturbed by the option, and the option would also result in fragmentation of capercaillie habitat. The South Option passes through the southern edge of Balnacoul Wood, which is preferable as it avoids severance and also would reduce any potentially significant impact upon the large bat roost within the woodland. The loss of large areas of woodland across the option would affect protected species such as badger, pine marten and red squirrel present. Loss of places of shelter would be likely, and the option would act as a barrier to species dispersal and fragment some large areas of woodland, reducing their ability to support protected mammal species.				

Sub-topic / criteria	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects following Mitigation (and Significance)
The option also crosses the designated River Spey which supports SAC qualifying species, however as all options cross the Spey this is not a differentiator. There is the potential for significant pollution to this watercourse which would affect habitat quality and could have direct impacts on qualifying species Atlantic salmon and freshwater pearl mussel, and impact foraging for otter.				

Cumulative Effects

18.6.7. The emerging Moray Local Development Plan 2020 pinpoints areas for prospective long-term development identified by Moray Council. Considered in conjunction with the Scheme, these developments have the potential to result in an increased, cumulative effect upon impacted nature conservation assets.

18.6.8. The current status of the identified prospective developments has been considered along with the location, designation and condition of the key receptors, as well as the legislation and guidance on assessment, mitigation and consent required for the proposals relating to nature conservation, including both planning policies and key legislation as set out in Appendix A18.6 (Volume 4b).

18.6.9. Following this review, it is considered unlikely that there would be any significant cumulative effects from identified future developments with any of the options.

18.7. Summary of Effects

18.7.1. This section sets out a summary of the key findings of the assessment of each option based on the predicted significant residual effects. The summaries are presented in Tables 18.13 to 18.15 below.

Table 18.13: Summary of Predicted Ecological Effects: Hardmuir to Hillhead

Sub-topic/ criteria	Predicted Residual Effects for North Option	Predicted Residual Effects for South Option
Ancient Woodland	**Moderate adverse** effect from loss of approximately 3ha of ancient woodland.	**Moderate adverse** effect from loss of approximately 43ha of ancient woodland.
Native Woodland	Minor adverse effect from loss of approximately 4ha of native woodland.	Minor adverse effect from loss of approximately 6ha of native woodland.
Capercaillie	No predicted adverse effects.	**Moderate adverse** effect predicted from habitat loss, potential loss of lek sites and disturbance.
Terrestrial Habitats	Minor adverse effect from loss of terrestrial habitats (see Appendix A18.5, Volume 4b, for estimate of loss) including approximately 5ha of total woodland and scrub loss and <1ha of open water to be affected.	Minor adverse effect from loss of terrestrial habitats (see Appendix A18.5, Volume 4b, for estimate of loss) including approximately 50ha of total woodland and scrub loss, approximately 1ha of marshy grassland and approximately 1ha of open water to be affected.
Qualitative Assessment	• Both options would act as a dispersal barrier between Culbin Forest to the north and Darnaway Forest to the south. The South Option passes directly through Darnaway Forest, close to the Darnaway and Lethen SPA although there would be no woodland loss within the SPA. • Arable land adjacent to the North Option is identified as a Year 1 'hotspot' for migratory wintering geese, however this is outside the footprint which lessens potential effects. • Effects on the River Findhorn and coastal designated sites are considered common to both options.	

Summary

18.7.2. The North Option would result in the loss of approximately 3ha of ancient woodland and 4ha of native woodland.

18.7.3. The South Option would result in the loss of approximately 43ha of ancient woodland and 6ha of native woodland. The South Option is predicted to result in Moderate adverse effects on capercaillie through habitat loss and disturbance effects (associated with the Darnaway and Lethan Forest SPA).

18.7.4. Both options are predicted to have minor effects due to loss of terrestrial habitats however the South Option would result in a much greater loss of total woodland and scrub.

18.7.5. Overall the North Option is predicted to have less effect on nature conservation.

Table 18.14: Summary of Predicted Ecological Effects: Hillhead to Lhanbryde

Sub-topic/ criteria	Predicted Residual Effects for North Option	Predicted Residual Effects for South Option
Ancient Woodland	**Moderate adverse** effect from loss of approximately 2ha of ancient woodland.	**Moderate adverse** effect from loss of approximately 18ha of ancient woodland.
Native Woodland	Minor adverse effect from loss of approximately 5ha of native woodland	Minor adverse effect from loss of 16ha of native woodland.
Terrestrial Habitats	Minor adverse effect from loss of terrestrial habitats (see Appendix A18.5, Volume 4b, for estimate of loss) including approximately 23ha of total woodland and scrub loss, 1ha of marshy grassland, and <1ha of open water to be affected.	Minor adverse effect from loss of terrestrial habitats (see Appendix A18.5, Volume 4b, for estimate of loss) including approximately 44ha of total woodland and scrub loss, 4ha of marshy grassland and 1ha of open water to be affected.
Qualitative Assessment	• The South Option would result in increased severance of woodlands, as it bisects Alves, Birkenhill and other unnamed woodlands. Woodland loss associated with the North Option is largely confined to woodland edge areas and would protect the ecological integrity of affected woodlands. • Both options cross the River Lossie and have the potential to adversely impact this and associated ecological receptors, however as this applies to both options it is not seen as a differentiator. • The South Option crosses an ecologically valuable network of ponds and woodland to the east of the River Lossie at Cloddach Quarry. This is an important area for protected species and wintering birds and would have adverse impacts on these receptors. • Both options cross areas used by wintering geese which are qualifying species for SPAs. The South Option in particular crosses an area identified from ongoing surveys as a potential hotspot for geese. • Potential effects on the River Lossie and coastal designated sites are considered common to both options.	

Summary

18.7.6. The North Option would result in the loss of approximately 2ha of ancient woodland and 5ha of native woodland.

18.7.7. The South Option would result in the loss of approximately 18ha of ancient woodland and 16ha of native woodland. The South Option crosses an ecologically-valuable habitat mosaic of ponds, scrub and woodland to the east of the River Lossie, which supports a range of protected species.

18.7.8. Both options are predicted to have minor effects due to loss of terrestrial habitats. Both options would adversely impact on wintering geese through habitat loss; initial surveys have indicated there are areas along the South Option which have been identified as key “hotspots”.

18.7.9. Overall the North Option is predicted to have less effect on nature conservation.

Table 18.15: Summary of Predicted Ecological Effects: Lhanbryde to East of Fochabers

Sub-topic/ criteria	Predicted Residual Effects for North Option	Predicted Residual Effects for South Option
Ancient Woodland	**Moderate adverse** effect from loss of approximately 53ha of ancient woodland.	**Moderate adverse** effect from loss of 48ha of ancient woodland.
Native Woodland	No native woodland loss predicted.	Minor adverse effect from loss of approximately 2ha of native woodland.
Capercaillie	**Moderate adverse** effect from operational disturbance and potential abandonment of lek sites. Minor adverse effect from habitat loss and potential loss of lek sites.	**Moderate adverse** effect from operational disturbance and potential abandonment of lek sites. Minor adverse effect from habitat loss and potential loss of lek sites.
Terrestrial Habitats	Minor adverse effect from loss of terrestrial habitats (see Appendix A18.5, Volume 4b, for estimate of loss) including approximately 53ha of total woodland and scrub loss and 1ha of open water to be affected.	Minor adverse effect from loss of terrestrial habitats (see Appendix A18.5, Volume 4b, for estimate of loss) including approximately 48ha of total woodland and scrub loss and <1ha of open water to be affected.
Qualitative Assessment	• Both options would result in significant woodland loss and severance. The North Option also bisects Balnacoul Wood, close to a known large bat roost. • Both options pass through Threapland Wood, between Loch na Bo and Loch Oire SSSI, severing commuting links between these two large waterbodies. There is the potential for pollution to adversely affect Loch Oire SSSI however this is common to both options. • Both options are likely to adversely impact osprey, which are known to have nest sites in the vicinity of the existing A96 within Ordiequish Wood. Both options have the potential to result in fragmentation of habitat, potential loss of nest sites and disturbance to individuals. • There is the potential for pollution to the designated River Spey which would affect habitat quality and could have direct impacts on qualifying species. This is common to both options and is considered mitigatable. • The potential for effects on coastal designated sites are considered common to both options.	

Summary

18.7.10. There is the potential for pollution from either option to impact on the designated River Spey SAC, which would affect habitat quality and could have direct impacts on qualifying species. With mitigation no adverse effects are predicted on the SAC. Both options would also have potential to impact Loch Oire SSSI due to habitat loss, disturbance and severance.

18.7.11. The North Option would result in the loss of approximately 53ha of ancient woodland, but no native woodland would be affected. The South Option would result in the loss of approximately 48ha of ancient woodland and 2ha of native woodland.

18.7.12. Both options are predicted to result in moderate adverse effects on capercaillie through habitat loss and disturbance effects. Both options would also result in severance of woodland habitat and potential effects on protected species including bats, barn owl and osprey, and both options are predicted to have minor effects due to loss of other terrestrial habitats.

18.7.13. Both options are predicted to have similar effects on nature conservation.

18.8. Scope of the DMRB Stage 3 Assessment

18.8.1. An assessment of the effects on nature conservation will be undertaken during DMRB Stage 3 in accordance with DMRB (Volume 11, Section 3, Part 4, Ecology and Nature Conservation) and IAN 130/10

18.8.2. A series of ecological surveys will be undertaken to inform the assessment and these are likely to include (but not be limited to) the following:

- Botanical/Habitat Surveys – Updates to Phase 1 habitat survey and National Vegetation Classification (NVC) surveys to provide additional botanical and habitat detail.
- Watercourses/Waterbodies – surveys to determine ability of waterbodies and watercourses to support ecologically significant species and to further identify and classify any GWDTE.
- Birds - Surveys of the utilisation of the site by seabirds from adjacent SPA and Ramsar sites (already commenced). The need for general wintering and breeding bird surveys will also be considered and discussed with SNH (particularly for raptors and other species of local interest).
- Protected Species – surveys of protected species (as required) to investigate the distribution and population of these species within the study area, potentially including:
  - Badger – surveys to determine social group territories and commuting routes;
  - Bats – surveys of foraging areas, commuting routes and roosting sites;
  - Great Crested Newt – surveys to inform extent of species within study area;
  - Otter – surveys of watercourse to assess utilisation by otter, especially at locations of water crossings;
  - Pine Marten – surveys to inform extent of species within study area;
  - Red Squirrel – surveys to inform extent of species within study area; and
  - Other protected species as determined in consultation with SNH.

18.8.3. The requirement for and scope of the above surveys (as well as any additional ecological surveys required) will be agreed with SNH during DMRB Stage 3.

18.8.4. Where required, further hydrogeological investigation will be undertaken to determine potential effects and guide development of site specific mitigation measures.

Due to the requirements of the HRA process and potential for LSE on European sites, potential construction and operational impacts (and mitigation) will be considered in detail in the DMRB Stage 3 assessment report and a final HRA report.

19. Geology, Soils, Contaminated Land and Groundwater

19.1 Introduction and Scope

19.1.1. This chapter presents the DMRB Stage 2 assessment of predicted effects on geology, soils and hydrogeology, as well as any significant environmental issues associated with contaminated land for the shortlisted options.

19.1.2. The assessment includes the following:

- Geology: effects on designated geological resources and mineral resources;
- Soils: effects on carbon rich soil resources;
- Contaminated Land: effects on contamination sources; and
- Groundwater: effects on hydrogeology and private water supplies (PWS), including distillery abstractions and the Scottish Water Spey Abstraction Scheme.

19.2 Approach to Assessment

Introduction

19.2.1. The assessment has been undertaken in accordance with the DMRB (Volume 11, Section 3, Part 10, HD45/09 Road Drainage and the Water Environment) and DMRB (Volume 11, Section 3, Part 11, Geology and Soils) and following guidance on Environmental Impact Assessment (EIA) by Scottish Natural Heritage (SNH) and Historic Environment Scotland (HES)[139]. The assessment also incorporates aspects of site investigation and contamination risk assessment best practice in BS5930[140], BS10175[141] and Construction Industry Research and Information Association (CIRIA) C552[142] and in accordance with relevant Scottish Environment Protection Agency (SEPA) guidance relating to groundwater abstractions[143].

19.2.2. As part of the preparation and design of site investigation works, a comprehensive desk study review including information on the underlying geology, soils, hydrogeology and potentially contaminated land at or within the vicinity of the options was undertaken. This has informed the understanding of the general baseline conditions for the Scheme and the baseline assessment of each of the options. It is noted that intrusive site investigation will be required during the DMRB Stage 3 process to confirm the desk-based understanding of baseline conditions, the risk assessment process and the design of mitigation.

Sources of Information

19.2.3. The following sources of information have been used for this assessment:

[139] SNH and HES (2018) A Handbook on Environmental Impact Assessment, 5th Edition
[140] British Standards Institution (2015) Code of practice for ground investigations
[141] British Standards Institution (2017) Investigation of potentially contaminated sites - Code of practice
[142] CIRIA (2001) Contaminated land risk assessment - A guide to good practice
[143] SEPA (2017) Land Use Planning System SEPA Guidance Note 31: Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems, Version 3

- British Geological Survey (BGS);
  - Historical exploratory holes;
  - Geology and hydrogeology information from the GeoIndex Onshore Online Maps and Lexicon;
  - Hydrogeological Map of Scotland (1988, 1:625,000 scale);
  - Hydrogeology – Aquifer Productivity and Groundwater Vulnerability;
  - Digital Mapping – Solid Geology and Superficial Deposits; and
  - BGS Directory of Mines and Quarries.
- James Hutton Institute, Soil Map of Scotland, Map Sheet 3, Northern Scotland (1:250,000 scale);
- Information provided by The Ministry of Defence on former RAF airbases at Forres and Elgin, including information on the age and extent of the bases;
- Scotland's Soils Website: http://soils.environment.gov.scot/ [Accessed 17/08/2018];
- SNH digital Geographical Information Systems (GIS) datasets: https://gateway.snh.gov.uk/natural-spaces/index.jsp, including Carbon and Peat Map 2016 [Accessed 17/08/2018];
- Landmark – various digital GIS datasets, including historical mapping;
- Scotland's Environment Website – Interactive Map: https://www.environment.gov.scot/maps/scotlands-environment-map/ [Accessed 17/08/2018];
- SEPA digital GIS datasets, including Registered Landfill Sites, Registered Waste Treatment or Disposal Sites, and Registered Waste Transfer Sites; and
- Zetica Ltd. Unexploded Bomb Risk Mapping: https://zeticauxo.com/downloads-and-resources/risk-maps/ [Accessed 17/08/2018].

19.2.4. The following additional literature sources have been used to inform the assessment:

- Mott MacDonald (1994) Spey Abstraction Scheme - Record of Well Construction, Volume 1 Main Report. For Grampian Regional Council;
- Mott MacDonald (1997) Spey Abstraction Scheme – Report on Wellfield Performance;
- Chen, M. Soulsby, C. and Willetts, B. (1997) Modelling river-aquifer interactions at the Spey Abstraction Scheme, Scotland: implications for aquifer protection;
- Davies, J. and O Dochartaigh, B. E. (2004) A hydrogeological Assessment of the Spey Wellfield Abstraction Scheme. BGS Commissioned Report CR/04/261C;
- BACTEC International Limited (2007) Explosive Ordnance Threat Assessment of RAF Forres, Moray, Scotland. For Moray Council;
- BAE Systems Environmental (2008) Unexploded Ordnance Investigation RAF Balnageith. For Moray Council; and
- RPS (2012) RAF Elgin, Scotland. Desk Study for Potential Historic Unexploded Ordnance Contamination. For Moray Council.

Consultation

19.2.5. Consultation with Highland Council and Moray Council was undertaken to inform the baseline conditions:

- Highland Council provided information on quarry sites and historical industrial use datasets.
- Moray Council raised concerns about potential contamination at various locations, including the RAF bases at Elgin and Forres. They also provided mineral sites and contaminated land datasets, including data on potential contamination at the former RAF airbases. Site investigation reports were supplied as detailed in Section 19.2.4. In addition, access to exploratory hole data associated with the Forres (Findhorn & Pilmuir) Flood Alleviation Scheme (FAS) and Forres (Burn of Mosset) FAS were provided.

19.2.6. Scottish Water was consulted on the Spey Abstraction Scheme to inform design development, and key information received:

- The Spey Abstraction Scheme was developed in the early 1990s and comprises 36 wells along the west bank of the River Spey extending from just north of Burnside of Dipple to just south of the bridges at Fochabers. There is an additional abstraction on the east side of the Spey (at Ordiequish) that is also connected to the network.
- The Spey Abstraction Scheme is critical to public water supply in Moray and provides water supply of approximately 17 million litres per day to many settlements. The risk of contamination to the aquifer during construction and operation is of primary concern to Scottish Water.

19.2.7. Discussions with Scottish Water included the potential risks to the water abstraction scheme from the road development, potential mitigation (both operational and construction) and further work required. This has informed the assessment by gaining a better understanding of the relative levels of mitigation required and risks to the water abstraction scheme for both of the Lhanbryde to East of Fochabers options.

Geology

19.2.8. Sites of Special Scientific Interest (SSSI) provide statutory protection for the best examples of geological and geomorphological features within the UK and were considered within this assessment. Geological Conservation Review (GCR) sites are non-statutory sites identified as having national or international importance for earth science conservation on the basis of their geology, palaeontology, mineralogy or geomorphology. Although GCR identification does not itself give any statutory protection, many GCR sites have been notified as SSSIs, and as they often form the basis of statutory geological and geomorphological site conservation they were also considered as part of this assessment.

19.2.9. Potential effects on mineral resources have been considered as part of this assessment as there are a number of existing quarries within the study area. Existing planning applications were reviewed in relation to planning boundaries and the lifespan of planning consents. This review identified that in the vicinity of the Hillhead to Lhanbryde South Option, Lochinver Quarry would be directly impacted but planning conditions show it would be exhausted and restored prior to 2030 and has therefore not been considered further. The

area of Cloddach Quarry that would be crossed is considered exhausted based on information provided during consultation with Moray Council Contaminated Land Officer (CLO), which shows that the land has been quarried and returned to agricultural use, and therefore no further assessment is required. Although minor occurrences of mineral and superficial soil reserves (e.g. sand and gravel) are present across the wider study area, for the purposes of this assessment potential effects on these resources are not considered to be significant nor an important differentiator between options, and therefore they are not considered further. Potential effects on hydrogeomorphology are considered within Chapter 20 (Roads Drainage and the Water Environment).

Soils

19.2.10. SNH's Carbon and Peat Mapping data categorises land based on its carbon richness, which is an important consideration in the potential impact on the soil resource. The mapping uses a scale from -1 (non-soil, such as built up area) to 6 (peat soils only). Where an option passes through soils categorised as peat or mixed peat and peaty soils (i.e. categories 5 and 6) this has been used as the main measure of the potential impact on the soil resource. Land Capability for Agriculture is another primary consideration, and this is considered within Chapter 13 (Agriculture, Forestry and Sporting Interests).

Contaminated Land

19.2.11. It is considered likely that all the options would encounter some contamination that may require mitigation, although the area is predominantly rural and therefore contamination is generally likely to be restricted to isolated occurrences, which could be dealt with through standard design and construction. To inform the assessment, only sources of contamination identified through desk-based research, or plausible contaminant linkages have been considered further (such as high risk uses like fuel storage and older, unmanaged landfills in close proximity to an option).

Hydrogeology

19.2.12. Potential impacts on groundwater have been assessed predominantly by considering potential effects on PWS, using location data supplied by Moray Council and Highland Council. As there is the possibility that there are PWS not recorded on the local authority databases, wells identified from historical map reviews have also been included in the assessment. Estimates of the numbers of PWS and historical wells have been derived using distances of 100m and 250m, respectively, from the options, following SEPA Guidance Note 31[144]. Potential impacts on Groundwater Dependent Terrestrial Ecosystems (GWDTE) are considered within Chapter 18 (Nature Conservation).

19.2.13. There is a major public water abstraction located on the River Spey, to the south of Fochabers, the Spey Abstraction Scheme (see Section 19.2.6). Due to the sensitivity of the abstraction scheme, particular consideration has been given to the potential construction and permanent impacts on the abstraction boreholes. This assessment has considered the

[144] SEPA (2017) Land Use Planning System SEPA Guidance Note 31, Guidance on Assessing the Impacts of Development Proposals on Groundwater Abstractions and Groundwater Dependent Terrestrial Ecosystems

relative risk from the options, based primarily on the location of the option relative to the abstraction points (i.e. those boreholes closer are at higher risk, and those downstream are at higher risk than those upstream).

Assessment Methodology

19.2.14. Potential impacts have been identified by predicting the changes (impacts) that would be caused by the options in relation to the baseline situation. Potential impacts associated with construction activities and other design risks (including geotechnical hazards such as landslides and ground instability) are important and will require assessment during DMRB Stage 3; however, it is not predicted that these are a key differentiator in the options assessment at DMRB Stage 2 and they have not been considered further at this stage.

19.2.15. The following definitions of sensitivity, magnitude and significance are site-specific criteria that have been used for the purposes of this assessment, following the EIA and contamination assessment guidance discussed above (see Section 19.2.1).

19.2.16. The sensitivity of a receptor to change includes its capacity to accommodate the type of permanent changes that may occur as a result of each option. Table 19.1 below provides examples of the characteristics that have been used to define the sensitivity of each receptor (geology, soils, contaminated land and hydrogeology).

19.2.17. The magnitude of a potential impact includes consideration of its timing, scale, size and duration, which for the purposes of this assessment are defined in Table 19.2 below.

19.2.18. The sensitivity of the receiving environment, the magnitude of the potential impact and consideration of its likelihood of occurring, help to evaluate the significance of the effect predicted prior to and after application of mitigation measures. The significance of effect has been defined using professional judgement, guided by the criteria outlined in Table 19.3 below. Effects of moderate significance and above (adverse and beneficial) are considered 'significant' and assumed mitigation measures would be considered to avoid, reduce or offset any predicted significant effects.

Table 19.1: Baseline Sensitivity Definitions

Sensitivity	Definition & Examples
Very High Receptors with a high quality and/or rarity, regional or national scale and limited potential for substitution/ replacement	**Contaminated Land:** the sensitivity associated with potential contamination relates to the receptor, e.g. very high sensitivity contamination receptors would include people, such as residents, construction workers and maintenance staff and very sensitive surface water or groundwater bodies (e.g. used for public consumption).
	Geology: option crosses designated area (e.g. SSSI) that is of rare or of national importance. Geological resources (e.g. mineral reserves) within the study area very high value and importance.
	Soils: soils of very high value and importance, e.g. very large areas of peat and peaty soils or highly productive agricultural soils.
	Hydrogeology: hydrogeological catchment area of very high value and importance and used extensively for public and private water supplies, e.g. major groundwater abstractions for drinking within 0-100m of the option.
High Receptors with a high quality and/or rarity, local scale and limited potential for substitution/replacement or receptor with a medium quality and rarity, regional or national scale and limited potential for substitution/replacement	**Contaminated Land:** the sensitivity associated with potential contamination relates to the receptor, e.g. high sensitivity surface water or groundwater bodies.
	Geology: option does not cross a designated area (e.g. SSSI) but deposits are of high importance. Geological resources (e.g. mineral reserves) within the study area of high value and importance.
	Soils: soils of high value and importance, e.g. large areas of carbon rich soils or highly productive agricultural soils.
	Hydrogeology: hydrogeological catchment area of high value and importance, e.g. designated sites of nature conservation dependent on groundwater, groundwater abstractions for drinking or industrial supply within 250m of the option.
Medium Receptors with a medium quality and/or rarity, local scale and limited potential for substitution/replacement or receptor with a low quality and rarity, regional or national scale and limited potential for substitution/replacement	**Contaminated Land:** the sensitivity associated with potential contamination relates to the receptor, e.g. buildings or infrastructure, and less sensitive surface water or groundwater bodies.
	Geology: option does not cross a designated area (e.g. SSSI) and deposits are of medium value and importance. Geological resources (e.g. mineral reserves) within the study area of medium value and importance.
	Soils: soils of medium value and importance, e.g. small areas of carbon rich soils or moderately productive agricultural soils.
	Hydrogeology: hydrogeological catchment area of medium value and importance, and not generally used for public or private water supplies.

Sensitivity	Definition & Examples
Low Receptors with a low quality and/or rarity, local scale and potential for substitution/ replacement. Environmental equilibrium is stable and is resilient to changes that are greater than natural fluctuations, without detriment to its present character	**Contaminated Land:** the sensitivity associated with potential contamination relates to the receptor, e.g. low sensitivity vegetation.
	Geology: option does not cross a designated area (e.g. SSSI), and deposits are of low value and importance. Geological resources (e.g. mineral reserves) within the study area of low value and importance.
	Soils: soils of low value and importance.
	Hydrogeology: hydrogeological catchment area of low value and importance and is not used for public or private water supplies.

Table 19.2: Impact Magnitude Criteria

Magnitude	Criteria
High	Results in loss of attribute, i.e. long term, permanent change to receptors resulting from activities associated with the Scheme and issues arising from potential contamination, e.g. major changes to the hydrogeological regime, significant effects on human health, and significant pollution of the water environment.
Medium	Impacts integrity of attribute or results in loss of part of attribute, i.e. short to medium term change to receptors resulting from activities associated with the Scheme and issues arising from potential contamination, e.g. non-significant alteration to the chemical properties of groundwater or surface water.
Low	Results in minor impact on attribute, i.e. detectable but non-material and transitory changes to receptors resulting from activities associated with the Scheme and issues arising from potential contamination, e.g. minor alteration to the chemical properties of groundwater or surface water.
Negligible	Results in an impact on attribute but of insufficient magnitude to affect the use/integrity, i.e. no perceptible changes to receptors resulting from activities associated with the Scheme and issues arising from potential contamination.

Table 19.3: Matrix of Effects Significance

	Sensitivity			
Magnitude	**Very High**	**High**	**Medium**	**Low**
High	Major	Major	Moderate	Minor
Medium	Moderate	Moderate	Moderate	Minor
Low	Minor	Minor	Minor	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible

Assumptions and Limitations

19.2.19. The options assessment is based on mapping and other predominantly desk top sources (see Section 19.2.3), however intrusive investigation at DMRB Stage 3 may identify additional sensitive receptors, such as areas of peat, sensitive groundwater bodies or unexpected contamination.

19.2.20. The assessment is based on PWS data supplied by the local authorities. However, it is likely that there are PWS not recorded in this dataset, which would need to be confirmed through contact with individual property owners (see Section 19.8). The assessment also assumes that effects on PWS can be mitigated through provision of alternative supplies, although confirmation of this is likely to require more detailed work during DMRB Stage 3.

19.3 Baseline Environment

19.3.1. Existing baseline conditions have been determined using desk-based information as detailed in Section 19.2, including data gathered in a site walkover, available existing historical ground investigation data and through consultation. A desk-based assessment of the likely ground conditions has been undertaken based on the Preliminary Sources Study Reports (Hardmuir to Newton; and, Newton to Fochabers) prepared by Mott MacDonald Sweco in August 2017.

19.3.2. The baseline information presented below includes general information on potential geology, soils, contaminated land and hydrogeology for the overall Scheme corridor. This is followed by detail specific to the individual options (see Figures 19.1, 19.2 and 19.3 in Volume 5). The level of detail provided is considered appropriate for this assessment and focuses on the information relevant to potentially significant effects.

Geology

19.3.3. Superficial deposits vary across the whole study area and include peat, alluvium, alluvial fan deposits, lacustrine deposits, raised marine deposits, glaciolacustrine deposits, glaciofluvial ice contact deposits, glaciofluvial sheet deposits and glacial till. Isolated pockets of peat are distributed across the Scheme, generally located within low-lying wetland or upland areas. Alluvium typically comprising soft to firm consolidated, compressible silty clay often with layers of silt, sand, peat and basal gravel is present local to all major watercourses and is particularly extensive on the River Lossie and River Spey floodplains. Glacial till typically comprising boulder clay of sandy pebbly clay, and slightly clayey sand is predominantly present in the north-western and southern sections, and in the eastern area of the Scheme.

19.3.4. The published geological mapping indicates that the majority of the study area is underlain by sedimentary strata of the Inverness Sandstone Group and the Forres Sandstone Group. Metamorphic strata of the Grampian Group are present in the south-western section of the study area. The depth to bedrock across the study area is expected to range from ground level to 30m below ground level.

19.3.5. Geological mapping shows several localities across the study area that comprise landscaped ground, infilled ground, made ground or worked ground. Additionally, isolated made ground is expected widely across the study area, associated with potentially infilled quarries and former land use activities.

19.3.6. A number of GCR sites and SSSIs designated on the basis of geological interest are present within the wider area, including the Lower River Spey in the east, Culbin in the north-west and approximately 5-10 smaller GCR sites spread mostly across the north and east (see Figures 19.1, 19.2 and 19.3 in Volume 5).

Soils

19.3.7. The majority of soils beneath the study area consist of humus-iron podzols most commonly derived from Glaciofluvial sand and gravels or the Upper Old Red Sandstone sediments. Small pockets of peat are recorded to be present, located mainly in the higher ground in the south and west of the study area, although with isolated areas across the lower lying areas of the Scheme, especially to the north-west and east of Elgin (see Figures 19.1, 19.2 and 19.3 in Volume 5).

Contaminated Land

19.3.8. The study area is predominantly rural with developed land in the communities of Forres, Elgin and Fochabers, and smaller settlements and other properties. The main sources of potential contamination are located within the urban areas (especially Elgin) and include historical chemical works, gas works, garages, hospitals, sewage works, workshops and builder's yards.

19.3.9. Two former RAF airbases have also been identified, Forres RAF base to the south-west of Forres (crossed by Hardmuir to Hillhead South Option), and Elgin RAF base to the south of Elgin (crossed by Hillhead to Lhanbryde South Option), as shown on Figures 19.1 and 19.2 (Volume 5). Potentially significant contamination (especially due to fuel and chemical storage) and unexploded ordnance (UXO) may be associated with these historical features, and information from Moray Council CLO indicates that large areas of the former RAF Elgin have been quarried for sand and gravel, and subsequently infilled and returned to agricultural use. As the nature of the infill materials is not known there is the potential for significant contamination, which was also expressed as a concern by the CLO.

Hydrogeology

19.3.10. Superficial quaternary sands and gravels covering the majority of the study area yield locally important superficial aquifers in which intergranular flow is significant. The Upper Old Red Sandstone Supergroup (units of the Forres Sandstone Group) is a moderately productive, multi-layered bedrock aquifer with moderate yields of regional importance. The historical mapping indicates the presence of wells and local groundwater abstractions, and records from Moray Council indicate the presence of recorded PWS across much of the study area.

19.3.11. The Spey Abstraction Scheme is a major groundwater abstraction within the study area, comprising 36 wells along the west bank of the River Spey. It abstracts groundwater from

a shallow granular aquifer adjacent to the river, and the Lhanbryde to East of Fochabers options cross within close proximity to some of these boreholes.

19.3.12. A number of low lying surface water drainage courses are present across the study area that appear to drain shallow groundwater, and which feed into important environmental receptors including Culbin Sands, Culbin Forest and Findhorn Bay SSSI, Mosstowie Canal and Spynie Canal. The drainage courses include Little Burn and the Burn of Mosset draining to Culbin Sands, Culbin Forest and Findhorn Bay SSSI, and Terchick Burn draining to Spynie Canal. In addition, the Lhanbryde to East of Fochabers Options cross near to Loch na Bo and Loch Oire SSSI, the latter which is designated on the basis of being a favourable freshwater loch habitat; both of which are likely to be at least partially fed by groundwater.

Summary of Baseline: Hardmuir to Hillhead

19.3.13. A summary of the geology, soils, contaminated land and hydrogeology baseline for Hardmuir to Hillhead Options is presented in Tables 19.4 and 19.5 below.

Table 19.4: Environmental Receptors: Hardmuir to Hillhead - North Option

Sub-topic / criteria	Potential Receptors
Geological Resource	• No designated geological resources identified that are likely to be impacted
Carbon Rich Soils	• No carbon rich soils identified that are likely to be impacted
Contaminated Land	• No high risk sources of contamination identified that are likely to be impacted
Hydrogeology	• Highly productive superficial and bedrock groundwater aquifers crossed by cuttings and embankments • Historical wells within 250m downgradient of cutting sections • 14 historical wells within 100m of option footprint • 30 historical wells and PWS within 250m of option footprint

Table 19.5: Environmental Receptors: Hardmuir to Hillhead - South Option

Sub-topic / criteria	Potential Receptors
Geological Resource	• No designated geological resources identified that are likely to be impacted
Carbon Rich Soils	• No carbon rich soils identified that are likely to be impacted
Contaminated Land	• Route option crosses disused airfield at former Forres RAF base, to the east of the River Findhorn
Hydrogeology	• Highly productive superficial and bedrock groundwater aquifers crossed by cuttings and embankments • Historical wells and PWS within 250m downgradient of cutting sections • 6 historical wells within 100m of option footprint • 24 historical wells and PWS within 250m of option footprint

Summary of Baseline: Hillhead to Lhanbryde

19.3.14. A summary of the geology, soils, contaminated land and hydrogeology baseline information for Hillhead to Lhanbryde Options is set out in Tables 19.6 and 19.7 below.

Table 19.6: Environmental Receptors: Hillhead to Lhanbryde - North Option

Sub-topic / criteria	Potential Receptors
Geological Resource	• Elgin North Junction with the A941 covers approximately 0.7ha of the Spynie GCR, although does not cross Spynie Quarry SSSI
Carbon Rich Soils	• Approx. 0.4ha carbon rich soils (peat) impacted by cutting section at Doo Hill
Contaminated Land	• No high risk sources of contamination identified that are likely to be impacted
Hydrogeology	• Highly productive superficial and bedrock groundwater aquifer crossed by cuttings and embankments • Historical wells and PWS within 250m downgradient of cutting sections • 15 historical wells and PWS within 100m of option footprint • 46 historical wells and PWS within 250m of option footprint • Crosses abstraction borehole for Glenburgie Distillery • Crosses low-lying drainage courses (possibly draining shallow groundwater) to the Spynie Canal and Loch Spynie

Table 19.7: Environmental Receptors: Hillhead to Lhanbryde - South Option

Sub-topic / criteria	Potential Receptors
Geological Resource	• No designated geological resources identified that are likely to be impacted
Carbon Rich Soils	• No carbon rich soils identified that are likely to be impacted
Contaminated Land	• Crosses former Elgin RAF base at Cloddach Quarry, including quarried areas identified by CLO as being backfilled with materials of unknown origin
Hydrogeology	• Highly productive superficial and bedrock groundwater aquifer crossed by cuttings and embankments • Historical wells within 250m downgradient of cutting sections • 16 historical wells within 100m of option footprint • 38 historical wells and PWS within 250m of option footprint • Crosses abstraction borehole for Glenburgie Distillery • Crosses granular soils associated with the River Lossie and low-lying drainage courses (possibly draining shallow groundwater) to the Mosstowie Canal and River Lossie

Summary of Baseline Lhanbryde to East of Fochabers

19.3.15. A summary of the geology, soils, contaminated land and hydrogeology baseline information for Lhanbryde to East of Fochabers Options is set out in Tables 19.8 and 19.9 below.

Table 19.8 Environmental Receptors Lhanbryde to East of Fochabers - North Option

Sub-topic / criteria	Potential Receptors
Geological Resource	• No designated geological resources identified that are likely to be impacted
Carbon Rich Soils	• No carbon rich soils identified that are likely to be impacted
Contaminated Land	• No high risk sources of contamination identified that are likely to be impacted
Hydrogeology	• Highly productive superficial and bedrock groundwater aquifer crossed by cuttings and embankments • Crosses northern part of the regionally important Spey Abstraction Scheme • Historical wells within 250m downgradient of cutting sections • 3 historical wells within 100m of option footprint • 16 historical wells within 250m of option footprint • Cutting within area of possible groundwater drainage to Loch Oire SSSI and Loch na Bo

Table 19.9: Environmental Receptors: Lhanbryde to East of Fochabers - South Option

Sub-topic / criteria	Potential Receptors
Geological Resource	• No designated geological resources identified that are likely to be impacted
Carbon Rich Soils	• No carbon rich soils identified that are likely to be impacted
Contaminated Land	• No high risk sources of contamination identified that are likely to be impacted
Hydrogeology	• Highly productive superficial and bedrock groundwater aquifer crossed by cuttings and embankments • Crosses through the central and most highly productive part of the regionally important Spey Abstraction Scheme • Historical wells within 250m downgradient of cutting sections • 9 historical wells within 100m of option footprint • 27 historical wells within 250m of option footprint • Cutting within area of possible groundwater drainage to Loch Oire SSSI and Loch na Bo

19.4 Potential Impacts

19.4.1. This section presents the potential impacts of the options. The potential impacts are presented in Tables 19.10 to 19.12 below. Impacts shown in the tables which are not predicted to be potentially significant have not been assessed or reported further in this chapter.

Hardmuir to Hillhead

19.4.2. The potential impacts predicted along the Hardmuir to Hillhead Options are presented in Table 19.10.

Table 19.10: Potential Impacts for Hardmuir to Hillhead Options

Potential Impact (taking account of sensitivity of baseline)	Adverse / Beneficial	Sensitivity	Magnitude	Significance	Relevant Options
Permanent loss of designated geological resources	Adverse	Low	Low	Negligible	Both
Permanent loss of carbon rich soils	Adverse	Low	Low	Negligible	Both
Permanent alteration to contamination causing impacts on receptors	Adverse	High	Low	Minor	North
	Adverse	Very High*	High	Major	South
Permanent change to hydrogeological regime causing impacts on PWS	Adverse	High	High	Major	Both

*Associated with potential contamination at RAF Forres

Hillhead to Lhanbryde

19.4.3. The potential impacts predicted along the Hillhead to Lhanbryde Options are presented in Table 19.11.

Table 19.11: Potential Impacts for Hillhead to Lhanbryde Options

Potential Impact (taking account of sensitivity of baseline)	Adverse / Beneficial	Sensitivity	Magnitude	Significance	Relevant Options
Permanent loss of designated geological resources	Adverse	High	Medium	Moderate	North
	Adverse	Low	Low	Negligible	South
Permanent loss of carbon rich soils	Adverse	Medium	Medium	Moderate	North
	Adverse	Low	Low	Negligible	South

Potential Impact (taking account of sensitivity of baseline)	Adverse / Beneficial	Sensitivity	Magnitude	Significance	Relevant Options
Permanent alteration to contamination causing impacts on receptors	Adverse	High	Low	Minor	North
	Adverse	Very High*	High	Major	South
Permanent change to hydrogeological regime causing impacts on PWS	Adverse	High	High	Major	Both

*Associated with potential contamination at RAF Elgin (including infilled quarries)

Lhanbryde to East of Fochabers

19.4.4. The potential impacts predicted along the Lhanbryde to East of Fochabers Options are presented in Table 19.12.

Table 19.12: Potential Impacts for Lhanbryde to East of Fochabers Options

Potential Impact (taking account of sensitivity of baseline)	Adverse / Beneficial	Sensitivity	Magnitude	Significance	Relevant Options
Permanent loss of designated geological resources	Adverse	Low	Low	Negligible	Both
Permanent loss of carbon rich soils	Adverse	Low	Low	Negligible	Both
Permanent alteration to contamination causing impacts on receptors	Adverse	High	Low	Minor	Both
Permanent change to hydrogeological regime causing impacts on PWS	Adverse	Very High*	High	Major	Both

*Associated with the Scottish Water Spey Abstraction Scheme

19.5 Mitigation

19.5.1. It is assumed in this assessment that the following actions and investigations will be undertaken and that they will inform any possible mitigation measures:

- E1 – Geological resources predicted to be affected by the options will be subject to further assessment, consultation and investigation to understand the details of the designation. Mitigation measures may include improved access to the geological features, or the preparation of additional geological exposures of scientific interest.
- E2 – Carbon rich soils (peat) predicted to be affected by the options will be subject to site investigation to assess their extent and physical properties, and preparation of a

materials management plan to, as far as possible, retain the soils and reuse them within the site to preserve the resource.

- E3 – Potentially contaminated land will be subject to suitable site investigation and risk assessment, to assess the potential risks to human health and the wider environment, with remediation where necessary.
- E4 – The hydrogeological regime in the vicinity of receptors, including private and public water supplies and groundwater dependent SSSIs, predicted to be affected by the options will be subject to further consultation and site investigation. Possible mitigation measures for the Spey Abstraction Scheme through design development could include yield replacement, physical measures to ensure the containment of errant vehicles, sealed drainage systems, long-term groundwater monitoring, and appropriate structure foundation design.

19.6 Predicted Environmental Effects

19.6.1. This section presents the key predicted environmental effects of the options on Geology, Soils, Contaminated Land and Groundwater. Predicted effects have been assessed prior to mitigation and the residual effects then evaluated following assumed mitigation (see Section 19.5).

19.6.2. The predicted effects of the options in each of the sections are presented in Tables 19.13 to 19.18 below.

Table 19.13: Predicted Environmental Effects: Hardmuir to Hillhead - North Option

Sub-topic / criteria	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects (and Significance)
Geological Resource	• No designated geological resources identified that are predicted to be significantly affected	Negligible	None	No significant residual effects
Carbon Rich Soils	• No carbon rich soils identified that are predicted to be significantly affected	Negligible	None	No significant residual effects
Contaminated Land	• No potentially significant contamination effects on receptors predicted	Minor	None	No significant residual effects
Hydrogeology	• Potentially significant effect on highly productive superficial and bedrock groundwater aquifers from road cuttings and embankments, with potential effects on PWS	Major	E4	Minor adverse residual effects
Overall	• No significant effects on designated geological resources or carbon rich soils, or effects associated with potential contamination • Potentially significant effects on hydrogeology and PWS are predicted	Major	E4	Minor adverse overall residual effect

Table 19.14: Predicted Environmental Effects: Hardmuir to Hillhead - South Option

Sub-topic / criteria	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects (and Significance)
Geological Resource	• No designated geological resources identified that are predicted to be significantly affected	Negligible	None	No significant residual effects
Carbon Rich Soils	• No carbon rich soils identified that are predicted to be significantly affected	Negligible	None	No significant residual effects
Contaminated Land	• Potentially significant contamination effects on receptors where option crosses disused airfield at former Forres RAF base, to the east of the River Findhorn	Major	E3	No significant residual effects
Hydrogeology	• Potentially significant effect on highly productive superficial and bedrock groundwater aquifers from cuttings and embankments, with potential effects on PWS	Major	E4	Minor adverse residual effects
Overall	• No significant effects predicted on designated geological resources or carbon rich soils • Potentially significant contamination effects on receptors where option crosses disused airfield at former Forres RAF base, to the east of the River Findhorn • Potentially significant effects on hydrogeology and PWS are predicted	Major	E3, E4	Minor adverse overall residual effect

Table 19.15: Predicted Environmental Effects: Hillhead to Lhanbryde - North Option

Sub-topic / criteria	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects (and Significance)
Geological Resource	• Route option covers approximately 0.7ha of Spynie GCR, although does not cross Spynie Quarry SSSI	Moderate	E1	Minor adverse residual effects
Carbon Rich Soils	• Loss of approximately 0.4ha peat beneath the option footprint at Doo Hill	Moderate	E2	Minor adverse residual effects
Contaminated Land	• No potentially significant contamination effects on receptors predicted	Minor	None	No significant residual effects
Hydrogeology	• Potentially significant effect predicted on highly productive superficial and bedrock groundwater aquifers from cuttings and embankments, with potential effects on PWS (including Glenburgie Distillery) and on shallow groundwater draining to the Spynie Canal and Loch Spynie	Major	E4	Minor adverse residual effects
Overall	• Loss of approximately 0.7ha of Spynie GCR • Loss of approximately 0.4ha of peat at Doo Hill • No significant effects associated with potential contamination • Potentially significant effects on hydrogeology and PWS, including Glenburgie Distillery abstraction and shallow groundwater draining to the Spynie Canal and Loch Spynie	Major	E1, E2, E4	Minor adverse overall residual effect

Table 19.16: Predicted Environmental Effects: Hillhead to Lhanbryde - South Option

Sub-topic / criteria	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects (and Significance)
Geological Resource	• No designated geological resources identified that are predicted to be significantly affected	Negligible	None	No significant residual effects
Carbon Rich Soils	• No carbon rich soils identified that are predicted to be significantly affected	Negligible	None	No significant residual effects
Contaminated Land	• Potentially significant contamination effects on receptors where option crosses former Elgin RAF base at Cloddach Quarry, including quarried areas identified by CLO as being backfilled with materials of unknown origin	Major	E3	Minor adverse residual effects
Hydrogeology	• Potentially significant effect predicted on highly productive superficial and bedrock groundwater aquifers from road cuttings and embankments, with potential effects on PWS and on shallow groundwater draining to the Mosstowie Canal	Major	E4	Minor adverse residual effects
Overall	• No significant effects on designated geological resources or carbon rich soils • Potentially significant contamination effects on receptors where option crosses disused airfield at former Elgin RAF base at Cloddach Quarry, including quarried areas identified by CLO as backfilled with materials of unknown origin • Potentially significant effects on hydrogeology and PWS (including Glenburgie Distillery), and on shallow groundwater draining to the Mosstowie Canal and granular soils associated with the River Lossie	Major	E3, E4	Minor adverse overall residual effect

Table 19.17: Predicted Environmental Effects: Lhanbryde to East of Fochabers - North Option

Sub-topic / criteria	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects (and Significance)
Geological Resource	• No designated geological resources identified that are predicted to be significantly affected	Negligible	None	No significant residual effects
Carbon Rich Soils	• No carbon rich soils identified that are predicted to be significantly affected	Negligible	None	No significant residual effects
Contaminated Land	• No potentially significant contamination effects on receptors predicted	Minor	None	No significant residual effects
Hydrogeology	• Potentially significant effect predicted on highly productive superficial and bedrock groundwater aquifers from road cuttings and embankments, with potential effects on PWS, on possible groundwater drainage to Loch Oire SSSI and Loch na Bo, and on the northern part of the regionally important Spey Abstraction Scheme	Major	E4	Minor adverse residual effects
Overall	• No significant effects predicted on designated geological resources or carbon rich soils, or associated with potential contamination • Potentially significant effects on hydrogeology and PWS, including Loch Oire SSSI and Loch na Bo, and the northern part of the Spey Abstraction Scheme	Major	E4	Minor adverse overall residual effect

Table 19.18: Predicted Environmental Effects: Lhanbryde to East of Fochabers - South Option

Sub-topic / criteria	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Predicted Residual Effects (and Significance)
Geological Resource	• No designated geological resources identified that are predicted to be significantly affected	Negligible	None	No significant residual effects
Carbon Rich Soils	• No carbon rich soils identified that are predicted to be significantly affected	Negligible	None	No significant residual effects
Contaminated Land	• No potential contamination identified that is predicted to be significantly affected	Minor	None	No significant residual effects
Hydrogeology	• Potentially significant effect predicted on highly productive superficial and bedrock groundwater aquifers from road cuttings and embankments, with potential effects on PWS, on possible groundwater drainage to Loch Oire SSSI and Loch na Bo, and on the most highly productive part of the regionally important Spey Abstraction Scheme	Major	E4	Minor adverse residual effects
Overall	• No significant effects predicted on designated geological resources or carbon rich soils, or associated with potential contamination • Potentially significant effects predicted on hydrogeology and PWS, including Loch Oire SSSI and Loch na Bo, the central and most highly productive part of the Spey Abstraction Scheme	Major	E4	Minor adverse overall residual effect

Cumulative Effects

19.6.3. Following mitigation, the effects on geology, soils, contaminated land and hydrogeology are considered unlikely to be significant. Considering the sensitivity of the identified receptors, and the legislation and guidance on assessment required for the proposed mitigation measures relating to contamination and hydrogeology, it is not predicted that there would be any significant cumulative environmental effects from identified future developments. The sites considered in the cumulative effects assessment are discussed further in Chapter 8 (Introduction and Approach to Environmental Assessment).

19.7 Summary of Effects

19.7.1. This section sets out a summary of the key findings of the options assessment based on the predicted significant residual effects on geology, soils, contaminated land and groundwater. The summaries are presented in Tables 19.19 to 19.21 below.

Table 19.19: Summary of Predicted Environmental Effects: Hardmuir to Hillhead

Sub-topic/ criteria	Predicted Residual Effects for the North Option	Predicted Residual Effects for the South Option
Geology, Soils Contaminated Land and Hydrogeology	• No significant predicted effects on designated geological resources or carbon rich soils, or effects associated with potential contamination • No significant effects are predicted on hydrogeology and PWS following mitigation	• No significant effects predicted on designated geological resources or carbon rich soils • Potentially significant predicted effects associated with contamination where option crosses disused airfield at former Forres RAF base, to the east of the River Findhorn, that are likely to require remediation • No significant effects are predicted on hydrogeology and PWS, following mitigation

Summary

19.7.2. The North Option is predicted to have no significant effects on designated geological resources or carbon rich soils, or effects associated with potential contamination. Significant effects are predicted on hydrogeology and PWS that are likely to require mitigation.

19.7.3. The South Option is predicted to have no significant effects on designated geological resources or carbon rich soils; however significant effects are predicted on hydrogeology and PWS, as well as significant effects associated with contamination where the option crosses the disused airfield at the former Forres RAF base, that are likely to require mitigation.

19.7.4. The scale of remediation is likely to be higher for the South Option to mitigate effects from potentially significant contamination associated with the former Forres RAF airbase.

19.7.5. Overall the North Option is predicted to have slightly less impact on geology, soils, contaminated land and groundwater.

Table 19.20: Summary of Predicted Environmental Effects: Hillhead to Lhanbryde

Sub-topic/ criteria	Predicted Residual Effects for the North Option	Predicted Residual Effects for the South Option
Geology, Soils Contaminated Land and Hydrogeology	• Option covers approximately 0.7ha of Spynie GCR, which is likely to require mitigation (although does not cross Spynie Quarry SSSI) • Loss of approximately 0.4ha of peat at Doo Hill that is likely to require mitigation • No potentially significant predicted effects associated with contamination • No significant effects are predicted on hydrogeology and PWS, following mitigation, including Glenburgie Distillery abstraction and shallow groundwater draining to the Spynie Canal and Loch Spynie	• No significant effects predicted on designated geological resources or carbon rich soils • No potentially significant predicted effects associated with contamination following mitigation. Option crosses former Elgin RAF base at Cloddach Quarry, which may require remediation • No significant effects are predicted on hydrogeology and PWS, following mitigation, including Glenburgie Distillery abstraction and shallow groundwater draining to the Mosstowie Canal

Summary

19.7.6. The North Option is predicted to have no significant effects associated with potential contamination, and crosses approximately 0.7ha of Spynie GCR and approximately 0.4ha of peat soils at Doo Hill. Significant effects are predicted on hydrogeology and PWS, including Glenburgie Distillery abstraction and shallow groundwater draining to the Spynie Canal and Loch Spynie.

19.7.7. The South Option is not predicted to have significant effects on designated geological resources or carbon rich soils. Potentially significant effects are predicted on hydrogeology and PWS, including Glenburgie Distillery abstraction and shallow groundwater draining to the Mosstowie Canal, as well as significant effects associated with potential contamination where the option crosses the disused airfield at the former Elgin RAF base.

19.7.8. The scale of remediation is likely to be higher for the South Option, to mitigate effects from potential contamination associated with the former Elgin RAF airbase, which includes large quarried areas identified by the CLO as backfilled with materials of unknown origin.

19.7.9. Overall the North Option is predicted to have slightly less impact on geology, soils, contaminated land and groundwater.

Table 19.21: Summary of Predicted Environmental Effects: Lhanbryde to East of Fochabers

Sub-topic/ criteria	Predicted Residual Effects for the North Option	Predicted Residual Effects for the South Option
Geology, Soils Contaminated Land and Hydrogeology	• No significant predicted effects on geological resource or carbon rich soils, or associated with potential contamination • No significant effects are predicted on hydrogeology and PWS following mitigation, including Loch Oire SSSI and Loch na Bo • Option passes through the northern extent of the Spey Abstraction Scheme, with mitigation no significant effects are predicted	• No significant predicted effects on geological resource or carbon rich soils, or associated with potential contamination • No significant effects are predicted on hydrogeology and PWS following mitigation, including Loch Oire SSSI and Loch na Bo • The Option follows a more intrusive route through the central part of the Spey Abstraction Scheme, with mitigation no significant effects are predicted

Summary

19.7.10. The North Option is predicted to have no significant effects on designated geological resources or carbon rich soils, or effects associated with potential contamination. With mitigation no significant effects are predicted on hydrogeology and PWS, including Loch Oire SSSI and Loch na Bo, and the northern part of the Spey Abstraction Scheme.

19.7.11. The South Option is predicted to have no significant effects on designated geological resources or carbon rich soils, or effects associated with potential contamination. With mitigation no significant effects are predicted on hydrogeology and PWS, including Loch Oire SSSI and Loch na Bo, and the central and most highly productive part of the Spey Abstraction Scheme.

19.7.12. Overall the North Option is predicted to have slightly less impact on geology, soils, contaminated land and groundwater, which avoids crossing the central and most highly productive part of the Spey Abstraction Scheme.

19.8 Scope of the DMRB Stage 3 Assessment

19.8.1. The DMRB Stage 3 assessment for Geology, Soils, Contaminated Land and Groundwater will be undertaken in accordance with DMRB (Volume 11, Section 3, Part 10, HD45/09 Road Drainage and the Water Environment; and Volume 11, Section 3, Part 11, Geology and Soils), and following 2018 guidance on EIA by SNH and HES. This would include more detailed assessment of the Preferred Option, and would include the following:

- A risk assessment for assessing the impacts of discharges to groundwater, which will be undertaken and reported using Method C, as prescribed in DMRB (Volume 11, Section 3, Part 10, HD45/09 Road Drainage and the Water Environment).
- Review of intrusive Site Investigation data (including environmental sampling and analysis), which will be undertaken at DMRB Stage 3, and incorporation into the assessment of the effects of the Preferred Option.
- Further consultation with landowners and, if necessary, surveys to identify active PWS potentially impacted by the Preferred Option, with a detailed assessment in line with Land Use Planning System SEPA Guidance Note 31 (September 2017).
- Further risk assessment and consultation in relation to mitigation measures which may be required for any works in proximity to the Spey Abstraction Scheme.
- More specific details of the proposed mitigation required for predicted significant effects on geological resources, carbon rich soils, contamination and hydrogeology.
- Where required, further hydrogeological investigation will be undertaken to determine potential effects and guide development of site specific mitigation measures.

20. Road Drainage and the Water Environment

20.1 Introduction

20.1.1. This chapter sets out the predicted effects on Road Drainage and the Water Environment (RDWE) arising from the shortlisted options for the A96 Dualling Hardmuir to Fochabers Scheme.

20.1.2. The effects of the options on the following sub-disciplines of the surface water environment (watercourses and catchments) are presented: hydrology and flood risk, fluvial geomorphology and water quality. Potential effects of the options on groundwater are considered in Chapter 19 (Geology, Soils, Contaminated Land and Groundwater).

20.1.3. This chapter is supported by Figures 20.1, 20.2 and 20.3 (Volume 5) and the following appendices (Volume 4b):

- Appendix A20.1: Assessment Methodology;
- Appendix A20.2: Baseline Environment; and
- Appendix A20.3: Predicted Environmental Effects.

20.2 Approach to Assessment

Introduction

20.2.1. The following section outlines the assessment methodology, including assumptions and limitations, applied to assess the effects of the options on the surface water environment.

Sources of Information

20.2.2. The following sources of information have been used for this assessment:

- Department of Environment, Food and Rural Affairs (Defra) and Environment Agency (EA) (2005) Flood and Coastal Defence R&D Programme: Use of Joint Probability Methods in Flood Management - A guide to best practice, R&D Technical Report FD2308/TR2.
- EA (2010) The Fluvial Design Guide.
- EA (2011) Coastal flood boundary conditions for UK mainland and islands: design sea levels.
- Flood Estimation Handbook (FEH) website, Web Service pages, available at: https://fehweb.ceh.ac.uk/ [accessed March 2018].
- A96 Aerial LiDAR Survey, 2017.
- National Library of Scotland, Historic mapping pages, available at: https://maps.nls.uk/geo/explore/ [accessed July 2018].
- Royal Haskoning hydrological and hydraulic reports (various) in support of the Forres and Elgin Flood Alleviation Schemes (FAS): Forres (Findhorn & Pilmuir), Forres (Burn of Mosset) and Elgin FAS.

- Scottish Environment Protection Agency (SEPA) (2010) Engineering in the water environment: good practice guide - River crossings (WAT-SG-25), 2nd edition.
- SEPA (2016) Flood Modelling Guidance for Responsible Authorities, Version 1.1.
- SEPA website, Flood Risk Management Maps, available at: http://map.sepa.org.uk/floodmap/map.htm [accessed July 2018].
- SEPA website, Water Environment Hub, available at: https://www.sepa.org.uk/data-visualisation/water-environment-hub/ [accessed July 2018].
- SEPA, Salmonid waterbodies data shapefile (supplied by SEPA; copy of data from Water Environment Hub website).
- SEPA (2015) Technical Flood Risk Guidance for Stakeholders, Version 9.1[145].
- Moray Council website, Flood Management pages, available at: http://www.moray.gov.uk/moray_standard/page_80332.html [accessed July 2018].
- The Scottish Government (2014) Scottish Planning Policy (SPP).
- Moray Council existing hydraulic models (various) and LiDAR Digital Terrain Model (DTM) data (various) for the River Findhorn and River Lossie.
- UK Climate Projections website, UKCP09 tool pages, available at: http://ukclimateprojections-ui.metoffice.gov.uk/ui/admin/login.php [accessed March 2018].

Consultation

20.2.3. Topics highlighted during discussions with Moray Council included the importance to maintain the operational functionality and standard of protection of the Moray Flood Alleviation Schemes (FAS) including at Forres and Elgin.

20.2.4. Discussions with SEPA noted that:

- Generally, two levels of treatment (sustainable drainage systems, (SuDS)) would be required for all new road drainage outfalls (with specific requirements to be discussed on a site-specific basis at DMRB Stage 3;
- They generally supported the approach to the hydrological analysis and a climate change uplift of 20% to fluvial flows; and
- They generally supported the approach to the flood modelling at this stage, including the focus on the dominant flood mechanisms (fluvial and coastal flooding), and consideration of compensatory floodplain storage where required (where options are constructed within the functional floodplain) as part of a suite of mitigation measures.

Assessment Methodology

20.2.5. The assessment for RDWE has been undertaken in accordance with the principles of the DMRB (Volume 11, Section 3, Part 10, HD45/09 Road Drainage and the Water Environment) and industry standard guidance for hydrology and flood risk, fluvial geomorphology and water quality. These sub-disciplines are further separated into various 'attributes' including conveyance of flow, water supply/quality, dilution and removal of waste products, and biodiversity.

[145] SEPA released Version 10 in July 2018, which will be utilised at DMRB Stage 3

20.2.6. The effects of routine runoff on surface waters (Volume 11, Section 3, Part 10 Methods A and B) and pollution impacts from accidental spillages (Method D) have been scoped out due to lack of detailed drainage information at this stage.

20.2.7. SEPA's sequential approach to flood risk assessment has been undertaken, which also aligns with the principles of the Strategic Environmental Assessment (see Chapter 8, Introduction and Approach to Environmental Assessment for further details), i.e.

- Avoiding development in the functional floodplain;
- Where avoidance is not possible, minimising encroachment through option design development; and
- Where predicted effects remain, consideration of mitigation to reduce effects further to acceptable levels.

20.2.8. The scope of the DMRB Stage 2 assessment on the water environment has been limited to permanent and operational effects of the options. Construction impacts have been scoped out at this stage, as specific design elements and methods of construction have not been sufficiently developed. It has been assumed at this stage that best practice mitigation measures would be likely to reduce the significance of all residual construction effects, and this will be considered in more detail at DMRB Stage 3.

20.2.9. Potential construction impacts (and assumed mitigation) will be considered in more detail at DMRB Stage 3, which will also support the requirements of the Habitats Regulations Appraisal (HRA).

20.2.10. To ensure a proportionate approach to reporting, all water features in the study area from minor field/forestry drains to large watercourses, were initially appraised and screened for baseline sensitivity (Tables 20.2 to 20.4 below) and potential effects. Only those watercourses predicted to result in significant effects were considered further as described in Section 20.6.

20.2.11. Surface water (pluvial) and groundwater flood risk have been scoped out of this assessment as river (fluvial) and coastal flooding are the dominant flooding mechanisms to differentiate between the options.

20.2.12. The study area for the fluvial geomorphology and water quality baseline assessments extends up to 500m around the outermost edge of the options. For hydrology and flood risk, the study area was determined by the size of river catchments and upstream / downstream modelling boundaries.

20.2.13. The type, number and extent of structural works within the channel and floodplain, and potential channel modifications were considered, focusing on any key differences between options. For the purposes of this assessment, in-channel works comprise culverts and associated channel realignments.

20.2.14. The design of bridge crossings has excluded in-channel piers at this stage, although some include piers within the floodplain.

Hydrology and Flood Risk

20.2.15. The term 'sensitive receptors' in terms of flood risk has been defined as referring to the following:

- Residential properties and commercial premises;
- Critical infrastructure (e.g. public water supply infrastructure);
- Existing Moray flood alleviation schemes;
- Floodplains providing flood storage and conveyance; and
- Any environmental receptors (i.e. listed buildings and other sensitive UK/European environmentally designated areas) where the importance and susceptibility to damage from flood water could result in a significant impact during a flood event.

20.2.16. Changes in peak flood depth due to the options has been considered at these sensitive receptors.

20.2.17. The flood risk methodology comprised hydrological analysis and 1d-2d hydraulic modelling to assess existing (baseline) and permanent scheme flood risk (i.e. with the option designs).

20.2.18. The hydrological assessment determined the fluvial 0.5% Annual Exceedance Probability (AEP) (1 in 200-year return period) flood event plus climate change flows (i.e. the design flood event) for the River Findhorn, Muckle Burn, River Lossie and River Spey. The analysis defined inflows for the 1d-2d hydraulic models developed for these watercourses.

20.2.19. Industry standard approaches e.g. FEH, were used to estimate the design inflows and where available, catchment-specific event analysis studies were also used to inform updates to hydrological parameters. This provided consistency in approach with the hydrological assessment undertaken for the development of the Moray Council flood alleviation schemes.

20.2.20. A climate change uplift of 20% was applied to fluvial flows, based on the SEPA regional climate change uplifts for Morayshire, using north-east Scotland as the representative hydrological area. It also adopts a consistent approach with other similar Scottish road infrastructure projects[146] as agreed with SEPA.

20.2.21. The hydraulic models developed were based on existing channel data provided by Moray Council (where available) and supplemented by LiDAR DTM data (A96 Aerial LiDAR Survey, Blom Aerofilms Ltd, 2017).

20.2.22. The River Findhorn hydraulic model included the elements of the Forres (Findhorn & Pilmuir) FAS, which is based on a standard of protection of 0.5% AEP event plus 15% climate change uplift. Joint probability analysis was used to inform the dependency between the combined fluvial flow and coastal water level for the River Findhorn.

[146] e.g. Jacobs (2016) A96 Dualling Inverness to Nairn (including Nairn Bypass), Stage 3 Flood Risk Assessment, Appendix A13.2

20.2.23. The River Lossie model included the elements of the Elgin FAS, which provides a standard of protection of 0.5% AEP event (with no climate change uplift).

20.2.24. The model outputs were validated by comparison of flood extents and flood mechanisms to the SEPA Flood Maps for the 0.5% AEP (1 in 200-year return period) and 0.1% AEP (1 in 1,000-year return period) and the respective FAS standard of protection.

20.2.25. The hydraulic models have been used at DMRB Stage 2 to:

- Assess baseline sensitivity to flood risk at sensitive receptors;
- Inform DMRB Stage 2 design development of the river crossings and approaches within the floodplain to minimise flood risk impacts. This was carried out as an iterative process to determine structure lengths over major watercourses, incorporation of additional structures for flood water conveyance and the identification of compensatory flood storage, if required.
- Assess and compare the impact of the options on sensitive receptors, based on the flood extent and flood depth model outputs. The level of significance of the predicted effects is based on the sensitivity of the flood risk and the magnitude of potential impact, as outlined in section 20.3.32 below.

20.2.26. The SEPA Flood Map (0.5% AEP) was used to inform a qualitative assessment of the baseline and option flood risk for non-modelled watercourses.

Fluvial Geomorphology

20.2.27. The fluvial geomorphological assessment has been based primarily on a desk-based study following industry accepted methods, using the Environment Agency's Fluvial Design Guide and SEPA's Good Practice Guide for River Crossings, supported by information collated from site visits.

20.2.28. Baseline sensitivity of watercourses was based on:

- Analysis of sources of current and historic mapping and recent aerial photography to identify past and present fluvial geomorphological features;
- Verification by targeted fluvial geomorphological walkover surveys at proposed crossing locations and sensitive watercourses; and
- Water Framework Directive (WFD) status (specifically morphology, hydromorphology and whether the waterbody is artificial or heavily modified).

20.2.29. The magnitude of potential impact was assessed qualitatively and informed by the type and/or location of proposed river crossings, and the resulting predicted effects on existing geomorphological forms and fluvial/sediment processes for each watercourse.

Water Quality

20.2.30. Water quality baseline sensitivity was primarily based on a desk-based study, including:

- WFD designation (notably physio-chemistry and specific pollutants status) and any specified reasons for failure to meet WFD objectives and improvement measures identified by SEPA;

- Any ecological designations on the watercourse;
- Sources of contamination associated with surrounding land-use (e.g. historic and current land-use such as industrial, residential or agricultural);
- Receptors (e.g. drinking water abstraction) and the relative size/capacity of the channel to dilute and disperse pollutants/sediment; and
- Targeted walkover surveys to verify understanding of the watercourses and catchments, and potential effects of the respective option crossings.

20.2.31. The magnitude of potential impact was assessed qualitatively and informed by the type and/or location of proposed watercourse crossings and drainage structures; and the resulting predicted effects on existing water quality attributes for each watercourse.

Impact Significance

20.2.32. The level of significance of a predicted effect was assessed based on the sensitivity of the attribute and the magnitude of potential impact, as outlined in Table 20.1 below. The sensitivity of an attribute was categorised on a scale of 'low' to 'very high', using professional judgement guided by the criteria provided in Appendix A20.1, Table 1.1 (Volume 4b). The magnitude of impact was categorised on a 7-point scale (from major adverse to major beneficial), using professional judgement guided by the criteria provided in Appendix A20.1, Table 1.2 (Volume 4b). The criteria for the impact categories has been based on the content of Table A4.4 in DMRB (Volume 11, Section 3, Part 10, HD45/09 Road Drainage and the Water Environment) with additional criteria based on professional experience of the assessment of other Scottish road infrastructure projects.

20.2.33. For the purposes of this assessment, predicted effects of Moderate significance and above (both adverse and beneficial) are considered to be 'significant' and therefore most likely to inform selection of a Preferred Option. Where there are two or three alternatives provided in Table 20.1 (e.g. Moderate/Major), a single significance rating has been chosen based on professional judgement. The table is used as a guide, and where required, professional judgement has been used to determine impact significance.

Table 20.1: Matrix of Effects Significance (significant effects in bold)

	Magnitude of Effect			
Sensitivity	**Negligible**	**Minor**	**Moderate**	**Major**
Very High	Neutral/Minor	Minor/**Moderate/Major**	**Moderate/Major**	**Major**
High	Neutral/Minor	Minor/**Moderate**	**Moderate/Major**	**Major**
Medium	Neutral/Minor	Minor	**Moderate**	**Moderate/Major**
Low	Neutral	Neutral/Minor	Minor/**Moderate**	**Moderate**

Assumptions and Limitations

20.2.34. The targeted walkover surveys provided only a snapshot of the watercourses and did not account for seasonal changes in water levels and biodiversity. For the smaller watercourses not monitored by SEPA chemistry sampling was not undertaken at this stage. To ensure the baseline assessment was robust, other factors including surrounding land-use, presence of protected habitats and species, areas of erosion and sediment deposition, and existing drainage outfalls and signs of pollution were taken into consideration.

20.2.35. This chapter focuses on the predicted effects from the options. At this stage of the design and assessment process, the exact nature, location and scale of construction activities has not been established and it is not possible to assess the impact of these on RDWE.

20.3 Baseline Environment

Study Area Context

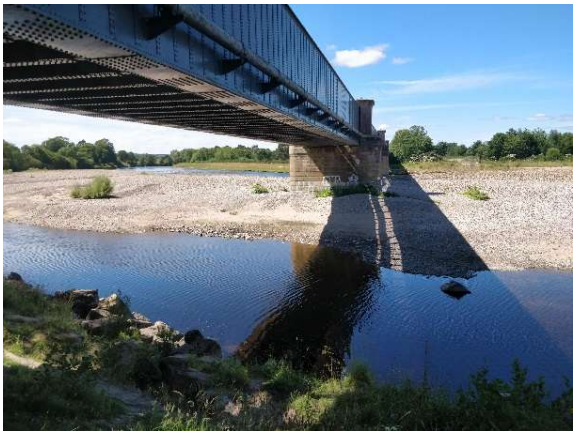
20.3.1. A summary of the baseline sensitivities for the watercourses located within each option study area is provided in Tables 20.2 to 20.4 below. More detail of the watercourse baseline conditions and assigned sensitivities within each of the respective option study areas (from west to east), is presented in Appendix A20.2 (Volume 4b).

20.3.2. Figures 20.1, 20.2 and 20.3 (Volume 5) show the baseline watercourses in the context of the options.

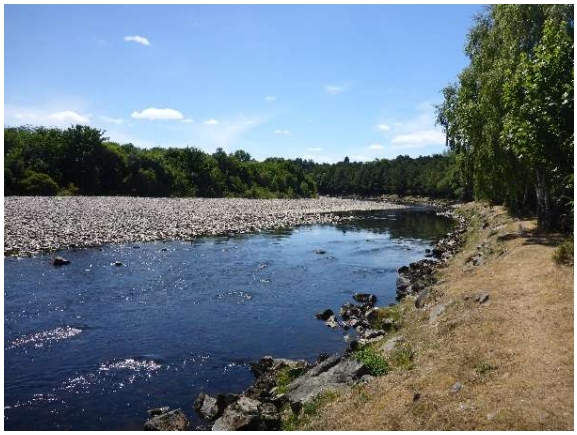
Hardmuir to Hillhead

20.3.3. A summary of the baseline sensitivities for the watercourses in the Hardmuir to Hillhead section is provided in Table 20.2.

20.3.4. The reaches of the River Findhorn in the vicinity of the proposed North and South Option crossings are shown in Photographs 20.1 and 20.2, respectively.



Photograph 20.1: River Findhorn – downstream face of the Viaduct



Photograph 20.2: River Findhorn – near Red Craig (looking upstream)

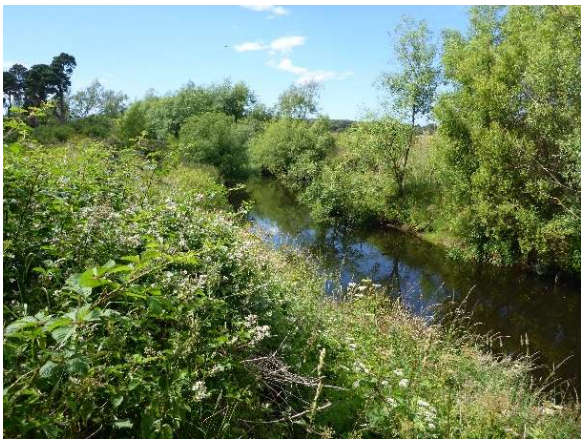
Table 20.2: Summary of Baseline Sensitivity – Hardmuir to Hillhead

Attribute Sensitivity				
Watercourse	**Size/type**	**Hydrology/Flood Risk**	**Fluvial Geomorphology**	**Water Quality**
Burn of Feddan	Small un-monitored watercourse	Medium	Low	Medium
Muckle Burn	Medium WFD watercourse	High	Medium	High
Unnamed tributary of Speedie Burn	Small un-monitored watercourse/field drain	Medium	Low	Low
Speedie Burn	Small WFD watercourse	Medium	Medium	High
River Findhorn	Large WFD watercourse	Very High	High	High
Burn of Mosset	Medium WFD watercourse	Very High	Medium	Medium
Manachy Burn	Small un-monitored watercourse/field drain	Very High	Low	Medium
Marcassie Burn	Small un-monitored watercourse	Very High	Low	Medium
Kinloss Burn	Small WFD watercourse	Medium	Medium	Medium

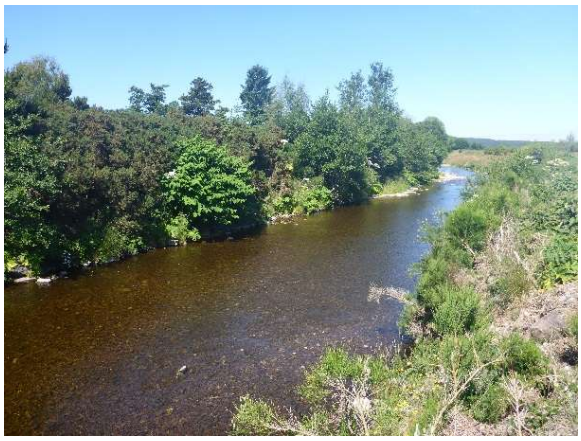
Hillhead to Lhanbryde

20.3.5. A summary of the baseline sensitivities for the watercourses in the Hillhead to Lhanbryde section is provided in Table 20.3.

20.3.6. The reaches of the River Lossie in the vicinity of the proposed North and South Option crossings are shown in Photographs 20.3 and 20.4, respectively.



Photograph 20.3: River Lossie – downstream of Elgin (looking upstream)



Photograph 20.4: River Lossie – Cloddach Quarry (looking downstream)

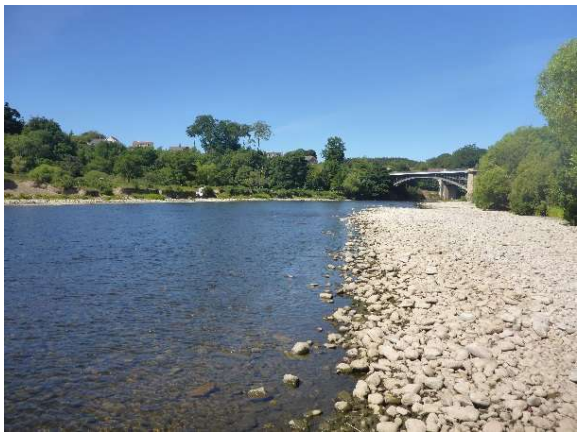
Table 20.3: Summary of Baseline Sensitivity – Hillhead to Lhanbryde

Attribute Sensitivity				
Watercourse	**Size/type**	**Hydrology/Flood Risk**	**Fluvial Geomorphology**	**Water Quality**
Kinloss Burn	Small WFD watercourse	Medium	Medium	Medium
Burgie Burn	Small un-monitored watercourse	Medium	Low	Medium
Mosstowie Canal	Small/medium WFD watercourse	Very High	Low	Medium
Black Burn	Medium WFD watercourse	Very High	Medium	High
River Lossie	Large WFD watercourse	Very High	High	High
Unnamed tributary of Spynie Canal	Small un-monitored watercourse/field drain	Medium	Low	Medium
Linkwood Burn	Small/medium WFD watercourse	Medium	Low	Medium
Spankie Burn	Small un-monitored watercourse/field drain	Medium	Low	Medium
Lhanbryde Burn	Small WFD watercourse	Very High	Low	Medium

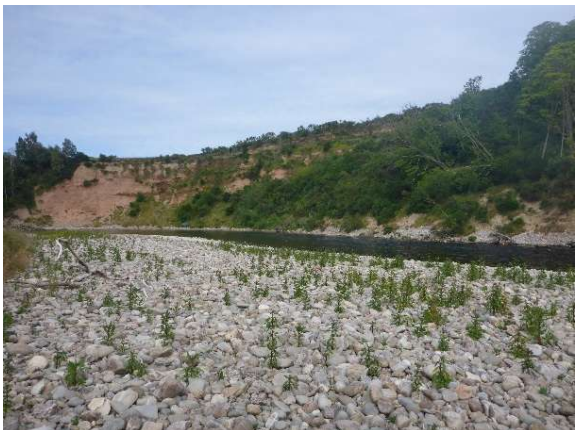
Lhanbryde to East of Fochabers

20.3.7. A summary of the baseline sensitivities for the watercourses in the Lhanbryde to East of Fochabers section is provided in Table 20.4.

20.3.8. The reaches of the River Spey in the vicinity of the proposed North and South Option crossings are shown in Photographs 20.5 and 20.6, respectively.



Photograph 20.5: River Spey – upstream of the A96 Spey Bridge (looking downstream)



Photograph 20.6: River Spey – looking towards right bank meander bend near Ordiequish

Table 20.4: Summary of Baseline Sensitivity – Lhanbryde to East of Fochabers

Attribute Sensitivity				
Watercourse	**Size/type**	**Hydrology/Flood Risk**	**Fluvial Geomorphology**	**Water Quality**
Black Burn/Stripe Burn	Small WFD watercourse	Medium	Low	Medium
Dipple Burn	Small un-monitored watercourse	High	Medium	Medium
River Spey	Large WFD watercourse	Very High	Very High	Very High
Burn of Ordiequish	Small un-monitored watercourse	Low	Medium	Medium
Burn of Fochabers	Small WFD watercourse	High	Medium	Medium
Little Dramlach	Small un-monitored watercourse/drain	Low	Low	Low
Meikle Dramlach	Small un-monitored watercourse/drain	Low	Low	Low

20.4 Potential Impacts

20.4.1. This section presents the potential impacts of the options.

Overview of Impacts

20.4.2. The indicative crossing structure type for the watercourses being assessed are summarised in Tables 20.5 to 20.7 below:

- Where the structure types proposed for a watercourse are the same for both options, or at a common location between the North and South Options, a single number is shown in the table (where structure types differ between options, North or South is referred to specifically).
- The calculation of the number of culverts for each crossing focuses on the culvert structure conveying the watercourse beneath the carriageway (and assumes a localised channel realignment as part of the culverting works). For some options, flood relief structures/culverts have also been included in the flood risk mitigation and this has been considered in the resulting assessment of effects where required.
- Road drainage outfalls from SuDS features have not been considered at this stage. It is considered that all watercourses may receive road drainage either directly or indirectly via tributaries. Road drainage outfalls will be further developed at DMRB Stage 3.

20.4.3. Only works in or adjacent to the watercourses have been considered as these activities are considered to have the potential for most impacts (works in the wider floodplain such as flood relief structures/culverts (FRSCs) and other types of structures for flood risk mitigation have not been included).

20.4.4. It is assumed for this assessment that where a culvert has been proposed to convey a watercourse beneath the carriageway, some minor localised channel realignment would also be required upstream and downstream of the culvert openings. This is to allow a watercourse to cross perpendicular to the carriageway and therefore requiring the shortest culvert length possible, in line with SEPA best practice guidance.

Hardmuir to Hillhead

20.4.5. The key difference between the works on each of the watercourses directly affected by the Hardmuir to Hillhead options include:

- Manachy Burn, Marcassie Burn and Kinloss Burn are only crossed by the South Option where culvert structures are proposed.

Hillhead to Lhanbryde

20.4.6. Key differences between the works on each of the watercourses directly affected by the Hillhead to Lhanbryde options include:

- The unnamed tributary of Spynie Canal and Spankie Burn are only crossed by the North Option where culvert structures are proposed.

- The Mosstowie Canal, Black Burn and Linkwood Burn are only crossed by the South Option. Bridges are proposed except for the Linkwood Burn where a culvert is proposed.
- Three bridge crossings are proposed for the South Option (mainline carriageway and Elgin West Junction link road) across the River Lossie, compared to one bridge crossing for the North Option.

Lhanbryde to East of Fochabers

20.4.7. Key differences between the works on each of the watercourses directly affected by the Lhanbryde to East of Fochabers options include:

- The Burn of Ordiequish and Burn of Fochabers are only crossed by the South Option. A culvert structure is proposed to convey the Burn of Ordiequish under the carriageway, whilst three bridges are proposed over the Burn of Fochabers (mainline carriageway and Fochabers Junction).
- The Dipple Burn is spanned by the River Spey bridge structure for the North Option, whereas a culvert is proposed for the Dipple Burn for the South Option.

Table 20.5: Potential Impacts for Hardmuir to Hillhead - North and South Options

Crossing Structure Type	Burn of Feddan	Muckle Burn	Unnamed tributary of Speedie Burn	Speedie Burn	River Findhorn	Burn of Mosset	Manachy Burn	Marcassie Burn	Kinloss Burn
Bridge	0	1	0	0	1	1	0	0	0
Culvert	1	0	1	1	0	0	South: 1	South: 1	South: 2

Table 20.6: Potential Impacts for Hillhead to Lhanbryde - North and South Options

Crossing Structure Type	Kinloss Burn	Burgie Burn	Unnamed tributary of Spynie Canal	River Lossie	Spankie Burn	Lhanbryde Burn	Mosstowie Canal	Black Burn	Linkwood Burn
Bridge	0	1	0	North: 1 South: 3	0	0	South: 1	South: 1	0
Culvert	1	0	North: 1	0	North: 1	1	0	0	South: 1

Table 20.7: Potential Impacts for Lhanbryde to East of Fochabers - North and South Options

Crossing Structure Type	Black Burn/Stripe Burn	Dipple Burn	River Spey	Burn of Ordiequish	Burn of Fochabers	Little Dramlach	Meikle Dramlach
Bridge	0	North: 1 (part of Spey crossing)	1	0	South: 3	0	0
Culvert	1	South: 1	0	South: 1	0	1	1

Potential Impacts of the Options

20.4.8. This section presents the potential impacts of the options during the permanent / operational phase. The magnitude of predicted impacts has been considered in combination with the sensitivity of the baseline to determine the potential for significant effects, as presented in Table 20.8 below. Impacts shown in the table which are not predicted to be potentially significant before assumed mitigation (i.e. assigned an 'X') have not been assessed or reported further in this chapter.

20.4.9. Section 20.6 provides a summary of the predicted effects, which are potentially significant for each option. Full details of the assessment are presented in Appendix A20.3 (Volume 4b).

Table 20.8: Potential Impacts

Reference	Potential Impact	Adverse / Beneficial	Magnitude	Potentially Significant?	Relevant Options
A	New impermeable area within catchment increasing the volume and peak flow of surface runoff reaching watercourse caused by a reduction in infiltration capacity.	Adverse	Minor	X	All
B	The road and its drainage system present a barrier to water movement within existing catchment, reducing flood conveyance and floodplain storage, thereby altering flow patterns and increasing flood risk.	Adverse	Negligible to Major	✓	All
C	Increased flow velocities local to bridge piers and abutments or culvert entrances and exits.	Adverse	Minor	X	All
D	Permanent impact to standard of protection of Moray Council flood alleviation schemes. These schemes include the Forres (Findhorn and Pilmuir) FAS, Forres (Burn of Mosset) FAS, Elgin FAS and Lhanbryde FAS.	Adverse	Negligible to Major	✓	Hardmuir to Hillhead North and South Options, Hillhead to Lhanbryde North and South Options
E	Culverts resulting in alterations to channel/bank morphology and water flow/level/sediment regimes.	Adverse	Minor to Moderate	✓	All
F	Watercourse crossings and associated abutments and embankments, directly impacting hydromorphology and causing potential loss of morphological features upstream and downstream due to erosion.	Adverse	Negligible to Major	✓	All
G	Road runoff and increased risk of accidental vehicular spillages entering the watercourse.	Adverse	Moderate	✓	All
H	New culvert causing localised change in dissolved oxygen levels, and associated channel realignment locally altering turbulence and effect on atmospheric oxygenation of the water.	Adverse	Moderate	✓	All

20.5 Mitigation

20.5.1. The following mitigation measures have been assumed in the options assessment and will be developed for the Preferred Option during DMRB Stage 3:

- W1 - To avoid an increase in flood risk to the road and receptors, where possible like-for-like compensatory floodplain storage volume will be identified and provided, where development occupies the existing functional floodplain and will be situated as close to the lost floodplain as possible.
- W2 - Where embankments sever the natural flow of floodwaters, FRSCs will be provided where required to alleviate an increase in upstream flood risk to receptors. The FRSCs will be adequately sized to avoid or reduce unacceptable flood risk to receptors.
- W3 - Local ground reprofiling will be used to either increase floodplain conveyance or maintain existing baseline flow pathways, where required.
- W4 - Where local access roads are affected they will be graded to avoid increasing flood risk to receptors, where required.
- W5 - Flood protection or flood resilience measures may be implemented as required at elements of the Scottish Water Spey Abstraction Scheme.
- W6 - Bridges will be designed in line with SEPA best practice, with a preference for no in-stream supports and will be positioned on straight, stable sections of channel where possible.
- W7 - In-channel structures/modifications including outfalls, culverts and realignments will be designed in line with SEPA best practice and will be positioned to limit the potential for scour and minimise alteration to flow patterns.
- W8 - SuDS will be avoided in the functional (1 in 200 year) floodplain, and where this is not possible, will be protected from inundation up to the 1 in 30 year event.
- W9 - Road drainage from the new dual carriageway will include a minimum of two levels of treatment to provide appropriate water quality and flow attenuation prior to outfall to watercourses, unless otherwise agreed with SEPA (drainage from other parts of the Scheme may require different SuDS provision and this will be agreed with SEPA). Outflows will be restricted to the greenfield (pre-development) runoff rate (50% AEP, 1 in 2 year return period). SuDS measures will be designed and maintained in line with CIRIA and SEPA guidance.
- W10 - Water quality monitoring will be undertaken where required (prior to, during and post-construction) to identify and action any pollution issues arising. The type, frequency and locations of monitoring, as well as any emergency measures in the event of a pollution incident (such as a vehicle spill), will be agreed with SEPA.

20.6 Predicted Environmental Effects

20.6.1. This section presents a summary of the key predicted environmental effects of the options on RDWE (Tables 20.9 to 20.14 below). Predicted effects have been assessed prior to mitigation and the residual effects then evaluated following assumed potential mitigation. Full details are provided in Appendix A20.3 (Volume 4b). Remaining significant residual effects are highlighted in bold.

Hardmuir to Hillhead

20.6.2. All but two of the watercourse receptors (River Findhorn and Burn of Mosset) identified in the baseline assessment (Tables 20.2 and 20.5) have been screened out of the reporting of predicted environmental effects due to the following:

- Burn of Feddan, Muckle Burn, Speedie Burn and an unnamed tributary are crossed by the North and South Options in either a common location or in close proximity to each other with similar impacts predicted. Therefore, the residual effects are predicted to be similar and are not predicted to be significant.
- Manachy Burn and Marcassie Burn are crossed by the South Option only. These have been screened out for fluvial geomorphology and water quality due to their assigned baseline sensitivity (either low or medium) and these are not predicted to result in significant residual effects.
- Kinloss Burn is crossed by the South Option only. It has been screened out for fluvial geomorphology and water quality due to its assigned baseline sensitivity (medium) and is not predicted to result in significant residual effects.

20.6.3. The predicted environmental effects of the Hardmuir to Hillhead North and South Options on the River Findhorn and Burn of Mosset are summarised in Tables 20.9 and 20.10, respectively.

Table 20.9: Predicted Environmental Effects: North Option

Sub-topic	Predicted Effects[147]	Significance of Predicted Effects	Assumed Mitigation	Significance of Residual Effects
River Findhorn				
Hydrology and Flood Risk	B, D	No predicted significant effects		
Fluvial Geomorphology	F	Major adverse	W6, W7	Minor adverse
Water Quality	G	Moderate adverse	W7, W8, W9, W10	Minor adverse
Burn of Mosset				
Hydrology and Flood Risk	B, D	No predicted significant effects		
Fluvial Geomorphology	F	No predicted significant effects		
Water Quality	G	Moderate adverse	W7, W8, W9, W10	Minor adverse

[147] The reference letters relate to the list of 'Potential Impacts' detailed in Table 20.8

Table 20.10: Predicted Environmental Effects: South Option

Sub-topic	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Significance of Residual Effects
River Findhorn				
Hydrology and Flood Risk	B, D	Major adverse	W1, W4	Minor adverse
	B, D	Major adverse	W1, W4	Neutral
Fluvial Geomorphology	F	Major adverse	W6, W7	Minor adverse
Water Quality	G	Moderate adverse	W7, W8, W9, W10	Minor adverse
Burn of Mosset				
Hydrology and Flood Risk	B, D	No predicted significant effects		
Fluvial Geomorphology	F	No predicted significant effects		
Water Quality	G	Moderate adverse	W7, W8, W9, W10	Minor adverse

20.6.4. Overall, the residual effects on watercourses associated with the Hardmuir to Hillhead options are predicted to be mitigated to either Minor or Neutral significance (not significant).

Hillhead to Lhanbryde

20.6.5. All but three of the watercourse receptors (River Lossie, Mosstowie Canal and Black Burn) identified in the baseline assessment (Tables 20.3 and 20.6) have been screened out of the reporting of predicted environment effects due to the following:

- All six watercourses (Kinloss Burn, Burgie Burn, the unnamed tributary of Spynie Canal, Spankie Burn, Lhanbryde Burn and Linkwood Burn) that have been screened out have a medium or low baseline sensitivity for fluvial geomorphology and water quality, and no significant residual effects are predicted.
- Five of the six watercourses that have been screened out have a medium baseline sensitivity for hydrology and flood risk. The Lhanbryde Burn is linked to the Lhanbryde FAS and for this reason it is assigned a Very High baseline sensitivity. However, the route options cross the burn in the same location and therefore the effects are predicted to be the same and do not influence route option choice.
- Although the Spankie Burn and unnamed tributary of Spynie Canal are only crossed by the North Option, both watercourses are extensively modified and the residual effects are not predicted to be significant.
- The Linkwood Burn (crossed by the South Option only) is a small/medium sized watercourse with a low sensitivity for fluvial geomorphology and medium sensitivity for flood risk and water quality, and the residual effects are not predicted to be significant.

20.6.6. The predicted environmental effects of the North and South Options on the River Lossie, Mosstowie Canal and Black Burn are summarised in Table 20.11 and 20.12, respectively.

Table 20.11: Predicted Environmental Effects: North Option

Sub-topic	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Significance of Residual Effects
River Lossie				
Hydrology and Flood Risk	B, D	Neutral	W2	Neutral
Fluvial Geomorphology	F	Major adverse	W6, W7	Minor adverse
Water Quality	G	Moderate adverse	W7, W8, W9, W10	Minor adverse

Table 20.12: Predicted Environmental Effects: South Option

Sub-topic	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Significance of Residual Effects
Mosstowie Canal				
Hydrology and Flood Risk	B, D	Major adverse	W1, W2	Minor adverse
Fluvial Geomorphology	F	No predicted significant effects		
Water Quality	G	Moderate adverse	W7, W8, W9, W10	Minor adverse
Black Burn				
Hydrology and Flood Risk	B, D	Major adverse	W2, W3	Minor adverse
	B, D	Major adverse	W2, W3	Neutral
Fluvial Geomorphology	F	Moderate adverse	W6, W7	Minor adverse
Water Quality	G	Moderate adverse	W7, W8, W9, W10	Minor adverse
River Lossie				
Hydrology and Flood Risk	B, D	Major adverse	W2, W3	Minor adverse
	B, D	Major adverse	W2, W3	Neutral

Sub-topic	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Significance of Residual Effects
Fluvial Geomorphology	F	Moderate adverse	W6, W7	Minor adverse
Water Quality	G	Moderate adverse	W7, W8, W9, W10	Minor adverse

20.6.7. Overall, the residual effects on watercourses associated with the Hillhead to Lhanbryde options are predicted to be mitigated to either Minor or Neutral significance (i.e. not significant).

Lhanbryde to East of Fochabers

20.6.8. Three of the watercourse receptors identified in the baseline assessment (Tables 20.4 and 20.7) have been screened out of the reporting of predicted environment effects due to the following:

- The Black Burn/Stripe Burn has a low baseline sensitivity for fluvial geomorphology and medium baseline sensitivity for hydrology/flood risk and water quality. The North and South Options cross the burn in close proximity to each other and have similar impacts, and the residual effects are not predicted to be significant.
- Little Dramlach and Meikle Dramlach are small, low sensitivity watercourses draining woodland. The North and South Options crossings of both watercourses are in close proximity and have the same impacts, and the residual effects are not predicted to be significant.

20.6.9. The predicted environmental effects of the North and South Options on the River Spey, Dipple Burn, Burn of Ordiequish and Burn of Fochabers are summarised in Table 20.13 and 20.14, respectively.

Table 20.13: Predicted Environmental Effects: North Option

Sub-topic	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Significance of Residual Effects
River Spey				
Hydrology and Flood Risk	B	Major adverse	W2, W3	Minor adverse
	B	Major adverse	W2, W3	Neutral
Fluvial Geomorphology	F	Major adverse	W6, W7	Minor adverse
Water Quality	G	Moderate adverse	W7, W8, W9, W10	Minor adverse

Table 20.14: Predicted Environmental Effects: South Option

Sub-topic	Predicted Effects	Significance of Predicted Effects	Assumed Mitigation	Significance of Residual Effects
Dipple Burn				
Hydrology and Flood Risk	B	No predicted significant effects		
Fluvial Geomorphology	E	Moderate adverse	W6, W7	Minor adverse
Water Quality	G	Moderate adverse	W7, W8, W9, W10	Minor adverse
	H	Moderate adverse	W7, W10	Minor adverse
River Spey				
Hydrology and Flood Risk	B	Major adverse	W5	Minor adverse
Fluvial Geomorphology	F	Major adverse	W6, W7	Minor adverse
Water Quality	G	Moderate adverse	W7, W8, W9, W10	Minor adverse
Burn of Ordiequish				
Hydrology and Flood Risk	B	No predicted significant effects		
Fluvial Geomorphology	E	Moderate adverse	W7	Minor adverse
Water Quality	G	Moderate adverse	W7, W8, W9, W10	Minor adverse
	H	Moderate adverse	W7, W10	Minor adverse
Burn of Fochabers				
Hydrology and Flood Risk	B	Major adverse	W6, W7	Minor adverse
Fluvial Geomorphology	F	Moderate adverse	W6, W7	Minor adverse
Water Quality	G	Moderate adverse	W7, W8, W9, W10	Minor adverse

20.6.10. Overall, the residual effects on watercourses associated with the Lhanbryde to East of Fochabers options are predicted to be mitigated to either Minor or Neutral significance (i.e. not significant).

Cumulative Effects

20.6.11. Assuming that the proposed future development areas noted in the draft Moray Local Development Plan (LDP) 2020 are developed in accordance with SPP and other relevant statutory and best practice guidance, significant cumulative effects are not predicted on the water environment at this stage.

20.7 Summary of Effects

20.7.1. This section sets out a summary of the key findings of the options assessment based on the predicted significant residual effects. The following Tables 20.15 to 20.17 provide a summary for each respective route.

Table 20.15: Summary of Predicted Effects on the Water Environment: Hardmuir to Hillhead

RDWE Sub-topic	Predicted Residual Effects for the North Option	Predicted Residual Effects for the South Option
Hydrology and Flood Risk	• There is predicted to be no significant residual effect on flood conveyance and floodplain storage of the River Findhorn and Burn of Mosset. • There is predicted to be no significant residual effect on water levels and standard of protection of the Forres (River Findhorn & Pilmuir) and Forres (Burn of Mosset) FAS.	• With provision of compensatory storage and raised local access road there is predicted to be a Minor adverse residual effect on flood risk for the River Findhorn. • There is predicted to be no significant residual effect on flood risk associated with the Burn of Mosset, as well as the Forres (River Findhorn & Pilmuir) and Forres (Burn of Mosset) FAS.
Fluvial Geomorphology	• The River Findhorn structure is immediately downstream of the existing Findhorn railway viaduct. As this location there is evidence of in-channel sediment movement, but with a clear span bridge crossing there would be no significant changes to existing morphology or sediment transport processes. There is predicted to be a Minor adverse residual effect on the River Findhorn. • No significant effects are predicted on the Burn of Mosset.	• At the location of the River Findhorn crossing structure there is evidence of bank erosion and minor bank migration. There is predicted to be a Minor adverse residual effect on the River Findhorn. • No significant effects are predicted on the Burn of Mosset.
Water Quality	• With appropriate pollution control and SuDS, there is predicted to be a Minor adverse residual effect on the River Findhorn and Burn of Mosset from road drainage.	• With appropriate pollution control and SuDS, there is predicted to be a Minor adverse residual effect on the River Findhorn and Burn of Mosset from road drainage.

Summary

20.7.2. The positioning of the Findhorn crossing on the North Option, immediately downstream of the Findhorn railway viaduct, is predicted to limit the potential effects on flood risk, fluvial geomorphology and water quality of the River Findhorn. The South Option crossing location on the River Findhorn requires mitigation to reduce potential effects on floodplain conveyance and storage. Both options are predicted to result in no effects on the functionality of the Forres (Rivers Findhorn and Pilmuir) and Forres (Burn of Mosset) FAS.

20.7.3. Both Options are predicted to have similar effects on RDWE.

Table 20.16: Summary of Predicted Effects on the Water Environment: Hillhead to Lhanbryde

RDWE Sub-topic	Predicted Residual Effects for the North Option	Predicted Residual Effects for the South Option
Hydrology and Flood Risk	• With provision of flood relief structures/culverts, there is predicted to be no significant residual effect on flood risk for the River Lossie and the Elgin FAS.	• A combination of mitigation measures may be required across multiple watercourses and combined floodplains (Mosstowie Canal, Black Burn and River Lossie) to reduce impacts to receptors, including the Aberdeen - Inverness Railway Line and Elgin FAS. Mitigation including flood compensatory storage, flood relief structures/culverts and bridge widening and realignment, is predicted to result in a Minor adverse residual effect on flood risk.
Fluvial Geomorphology	• The option crosses the River Lossie at a relatively stable channel reach. There is predicted to be a Minor adverse residual effect on the River Lossie.	• The Elgin West Junction link road crossings are located on relatively stable reaches of the River Lossie; and the main carriageway crossing at Cloddach Quarry crosses at a straightened and constrained reach. There is predicted to be a Minor adverse residual effect on the River Lossie. • No significant effects are predicted to the Mosstowie Canal and Black Burn, respectively.
Water Quality	• With appropriate pollution control and SuDS, there is predicted to be a Minor adverse residual effect on the River Lossie from road drainage.	• With appropriate pollution control and SuDS, there is predicted to be a Minor adverse residual effect on the Mosstowie Canal, Black Burn and River Lossie from road drainage.

Summary

20.7.4. The South Option includes three crossings of the River Lossie, compared to one crossing for the North Option. A combination of mitigation measures may be required to reduce the potential effects of the flood risk impact to receptors from the Mosstowie Canal, Black Burn and River Lossie crossings and development in the floodplain associated with the South Option compared to the North Option. The predicted residual effect of Minor adverse significance is dependent on the mitigation measures working in conjunction across the three watercourses. Both options are also predicted to result in no effects on the functionality of the Elgin FAS.

20.7.5. Overall the North Option is predicted to have slightly less effect on RDWE.

Table 20.17: Summary of Predicted Effects on the Water Environment: Lhanbryde to East of Fochabers

Sub-topic/ criteria	Predicted Residual Effects for the North Option	Predicted Residual Effects for the South Option
Hydrology and Flood Risk	• Provision of a flood relief structure and ground re-profiling included at the River Spey crossing maintains floodplain conveyance and reduces impact on flood levels. There is predicted to be a Minor adverse residual effect on flood risk.	• There is predicted to be a Minor adverse residual effect on flood risk for the River Spey. • The Burn of Fochabers crossing consists of a multi-span bridge, there is predicted to be a Minor adverse residual effect. • There is predicted to be no significant residual effect on the Dipple Burn and Burn of Ordiequish.
Fluvial Geomorphology	• The option crosses the River Spey at a relatively straight narrow section of the channel (constrained by existing infrastructure). With a clear span bridge crossing there would be no significant changes to existing morphology or sediment transport processes. • No works are proposed within the river corridor or within the River Spey SAC. There is predicted to be a Minor adverse residual effect on the River Spey.	• The option crosses the River Spey on a meander where there is evidence of active erosion. No works are proposed within the river corridor or within the River Spey SAC. Any scour protection and hard bank protection measures to protect the structure and stabilise the cliff bank will also be set-back from the SAC boundary and normal water levels. There is predicted to be a Minor adverse residual effect on the River Spey. • The South Option also requires a multi-span bridge crossing over the Burn of Fochabers (which has high erosive power and sediment supply). A Minor adverse residual effect is predicted for the Dipple Burn, Burn of Ordiequish and Burn of Fochabers.
Water Quality	• With appropriate pollution control and SuDS, there is predicted to be a Minor adverse residual effect on the River Spey from road drainage.	• With appropriate pollution control and SuDS, there is predicted to be a Minor adverse residual effect on the River Spey, Dipple Burn, Burn of Ordiequish and Burn of Fochabers from road drainage.

Summary

20.7.6. For both options, no works are proposed within the river corridor or within the River Spey SAC. The positioning of the South Option crossing over an actively-eroding, sharp meander on the River Spey may require scour protection measures to protect the crossing structure and hard bank protection to stabilise further erosion of the outer meander bend. It is proposed that any protection measures would be set-back outwith the SAC boundary and the river corridor during normal flow conditions. With an appropriate design and mitigation in place, this is not predicted to result in significant effects on the River Spey for both options. The South Option also requires a multi-span bridge crossing over the Burn of Fochabers.

20.7.7. Overall the North Option is predicted to have slightly less effect on RDWE.

20.8 Scope of the DMRB Stage 3 Assessment

20.8.1. The DMRB Stage 3 assessment process will follow the scope established in DMRB and other industry accepted practice for RDWE. The following text summarises the work to be developed to assess the potential effects of the Preferred Option on hydrology and flood risk, fluvial geomorphology and water quality, which will be discussed and agreed with SEPA and Moray Council where appropriate.

Hydrology and Flood Risk

- Hydrological event analysis to further validate previously calibrated hydrological parameters (including percentage runoff, time to peak, duration) using recent high flow events;
- Design event hydrological analysis for a suite of flows using standard approaches, e.g. FEH, supplemented with catchment specific parameters, where applicable;
- Updates to the model topographic data using new topographic survey for in-channel cross-sections; new topographic survey for hydraulic structures including bridges, culverts and weirs; and new topographic survey for other key land features providing hydraulic control;
- Calibration and validation of the hydrological analysis and baseline hydraulic models using gauging station data and other primary and secondary data sources from SEPA and Moray Council;
- Assessment of flood risk from all applicable sources, i.e. fluvial, pluvial, coastal, groundwater and sewer flooding;
- Production of flood extents and depths for a full suite of flow events between 50% AEP (1 in 2 year return period) and 0.1% AEP (1 in 1,000 year return period) peak flows for fluvial and coastal flood sources;
- Sensitivity analysis to standard hydrological and hydraulic parameters;
- Further refinement of the Preferred Option design with the aim to achieve no increase in flood risk at sensitive receptors where possible;
- Inform the design of bridges and culverts for a range of flow events, including appropriate freeboard allowance; and
- A review of opportunities for compensatory flood storage, as part of the combined mitigation measures, to help achieve no increase in flood risk at sensitive receptors.

Fluvial Geomorphology

- Reach-scale fluvial audit or river reconnaissance survey to collect semi-quantitative data on existing river forms and evidence/extent of erosion and deposition processes for high or very high sensitivity receptors;
- Consultation with SEPA to obtain additional data on WFD watercourse morphological condition to inform baseline and potential mitigation requirements;
- Assessment of hydraulic model outputs (flow and velocity) for key locations and comparison to published sediment transport thresholds (e.g. Hjulstrom[148]) for high or very high sensitivity receptors;

[148] Hjulstrom, F. (1935) Studies of the morphological activity of rivers as illustrated by the River Fyris, Bulletin, Geological Institute Upsalsa, 25, 221-527

- Undertake stream power calculations using model data (slope, flow, width) to consider erosion risk and potential design and mitigation requirements;
- Assessment of the Preferred Option design against qualitative baseline and quantitative sediment transport and stream power calculations to support assessment of impacts; and
- Geomorphological inputs to the design of bridge and culvert structures, watercourse realignments and drainage outfalls. Watercourse structure design specifications such as inclusion of mammal crossings, will be included where appropriate, and will also be informed by hydrological and ecological analysis.

Water Quality

- Consultation with SEPA to obtain additional water quality data, licensed discharges to, and abstractions from, watercourses within the study area to inform the baseline assessment, and specific requirements for mitigation and SuDS;
- Site visits to assess watercourse characteristics in relation to water quality;
- Qualitative assessment of potential construction impacts associated with the proposed works on water quality and associated protected species and habitats, to support the DMRB Stage 3 HRA; and
- In line with DMRB (Volume 11, Section 3, Part 10, HD45/09 Road Drainage and the Water Environment), assessment of pollution impacts from road routine runoff (Methods A and B) and potential risk of pollutant impacts from accidental spillages (Method D), using the Highways Agency Water Risk Assessment Tool (HAWRAT). HAWRAT is designed to assess the short-term and long-term impacts on receiving water and ecological quality of receiving waters from road scheme drainage, in line with the requirements of the WFD. The results will also be used to inform the requirements for SuDS at each drainage outfall.

21. Summary of Environmental Assessment Findings

21.1 Introduction and Background

21.1.1. A summary of the environmental assessment of the shortlisted options is set out in Volume 3, Chapter 25 (Assessment Summary). This chapter summarises the findings of a high-level assessment of potentially significant cumulative effects which has been undertaken to support the options assessment.

21.1.2. The approach to assessment of cumulative effects is set out in Section 8.3 of Chapter 8 (Introduction and Approach to Environmental Assessment. The assessment presented in this chapter has been divided into two sub-sections, firstly to address cumulative effects of the options predicted with other development proposals (Section 21.2) and then for in-combination effects predicted from the multiple effects of a route option on key sensitive receptors (Section 21.3).

21.2 Cumulative Effects with Other Development Proposals

21.2.1. The potential for significant cumulative effects of the options with other future developments[149] has been assessed for each environmental topic and identified in the predicted effects sections of Chapters 9 to 20. These assessments identify, at a high level, whether potentially significant cumulative effects would influence the environmental assessment findings for each option.

21.2.2. A summary of the predicted significant cumulative effects in each topic group is presented in Table 21.1 below.

Table 21.1: Summary of Cumulative Environmental Effects

Topic	Predicted Significant Effects
Policies and Plans	• No significant cumulative effects predicted • Information from the Proposed Moray Local Development Plan 2020 has been used to inform the assessment of cumulative effects for other topics (see Section 9.3 of Chapter 9, Policies and Plans) by identifying key areas where the development of long term sites (or groups of sites) recommended for inclusion in the Proposed Plan could have cumulative effects with route options
Air Quality	• Cumulative effects have been taken into account in the options assessments based on the predicted air quality effects. The assessments draw on traffic projections which allow for predicted future land use change from key development areas in the corridor and which are incorporated in the traffic model. No significant air quality effects are predicted for any of the options
Noise & Vibration	• Cumulative effects have been taken into account in the options assessments based on the predicted noise effects. The

[149] The potential for cumulative effects with other parts of the A96 Dualling Programme is addressed within the Strategic Environmental Assessment (SEA) reporting prepared during DMRB Stage 1 of the Programme. It is not predicted that the route options would have materially different cumulative effects with other dualling projects in the Programme

Topic	Predicted Significant Effects
	assessments draw on traffic projections which allow for predicted future land use change from key development areas in the corridor and which are incorporated in the traffic model
People & Communities	• Significant cumulative effects on users of woodland areas and NMU routes are predicted in the Hillhead to Lhanbryde section for the North Option (at Spynie in cumulation with proposed residential development at Lossiemouth Road)) and for the South Option (in the Birkenhill Wood area where land is allocated for long term industrial uses)
Agriculture, Forestry & Sporting	• It is not predicted that the loss of prime agricultural land associated with the options would have a significant cumulative effect on the regional agricultural resource of the Moray area • A potentially significant cumulative effect on the local prime agricultural land resource is predicted for the Hardmuir to Hillhead North Option in combination with development of future LDP sites in the Waterford Road area north of Forres
Materials	• No significant cumulative effects on material resources and waste generation are predicted
Visual Effects	• The potential for significant cumulative visual effects has been identified for sensitive visual receptors along parts of the options located close to areas of potential future development. These are predicted for the Hillhead to Hardmuir North Option (north of Forres), for both options in the Hillhead to Lhanbryde section (north and south of Elgin) and for the Lhanbryde to East of Fochabers North Option (near Mosstodloch)
Cultural Heritage	• A cumulative effect is predicted as a result of effects to archaeology in the vicinity of the Elgin North junction for the Hillhead to Lhanbryde North Option with a long-term housing development site at Lossiemouth Road North
Landscape	• Cumulative landscape effects are predicted along the Hillhead to Lhanbryde North Option associated with the development of long term housing and mixed use sites around the north and north east of Elgin between Findrassie and Calcotts Road
Nature Conservation	• No significant cumulative ecological effects are predicted
Geology, Soils, Contaminated Land & Groundwater	• No significant cumulative effects on geological resources, soils, contaminated land or groundwater are predicted
Road Drainage & the Water Environment	• No significant cumulative effects on the water environment are predicted

21.2.3. The findings of the cumulative assessments have been taken into account in the overall environmental assessments of the options reported in Chapters 9 to 20 and which are summarised in Volume 3, Chapter 25 (Assessment Summary).

21.3 In-Combination Effects

21.3.1. In-combination environmental effects have been considered for each option drawing on the findings of the topic-based environmental assessments, in particular where significant

effects have been predicted. The assessment identified where a concentration of significant effects has been predicted on sensitive receptor locations including key habitats such as ancient woodlands, important recreational areas and groups of residential properties. The findings of this assessment have been considered below and where potentially significant effects are predicted these will be a focus for the development of the Scheme design and mitigation at Stage 3 where relevant to the Preferred Option.

Hardmuir to Hillhead

21.3.2. For the North Option it is predicted that at Cassieford a group of residential properties would be affected by significant changes in visual amenity, increases in traffic noise and from the effects of severance which may be experienced by some people from the nearby town of Forres. Some of these properties are already affected to some extent by traffic using the B9011 road between Forres and Kinloss but the Scheme would be predicted to have a potentially significant adverse in-combination effect in this area.

21.3.3. Two locations of potentially significant in-combination effects have been identified for the South Option.

- At Mundole on the east bank of the River Findhorn, where the communities around the Riverview Caravan Park and nearby properties including the surrounding greenspace and recreational routes and facilities would be affected by the visual effects of the new road and by the cumulative effects of traffic on noise levels and the general amenity of the area.
- In the woodland areas of Limekilns and Fairyhills south of Forres where significant effects are predicted from: the loss of woodland resource and habitat; impacts to users of NMU routes; effects on nature conservation and generally on the amenity of an area which has been identified as being important and extensively used for recreational and conservation purposes.

Hillhead to Lhanbryde

21.3.4. On the North Option the area at Newton is considered to have particular sensitivity associated with its landscape and cultural heritage and for its horticultural importance and presence of a group of residential properties. Potentially significant in-combination effects are predicted here from loss of woodland, interruption to the commercial forest nursery, visual effects on sensitive properties in the vicinity and from the effects of increased traffic noise from the new road.

21.3.5. The South Option passes through an area in the vicinity of Lochinver and Aldroughty where there is a scattered community of residential properties in an area also extensively used for informal recreation. There is potential for significant in-combination effects from visual intrusion, noise and associated reduction in amenity in this location.

Lhanbryde to East of Fochabers

21.3.6. The woodland areas at the western and eastern ends of the North and South Options have importance for recreational uses and have ecological (habitats and species) and landscape sensitivities.

21.3.7. At the western extent there is predicted to be potential for significant in-combination effects on landscape, visual amenity, nature conservation and from traffic noise on these resources and on some residential properties in the vicinity of Threapland Wood/Loch na Bo for both options which follow the same alignment in this location. The predicted effects would be the same for both options in this section.

21.3.8. To the east of Fochabers, significant in-combination effects are predicted for the North Option in the area of Leitch's Wood and for the South Option at Slorach's Wood. These arise from the loss of habitat, disturbance to protected species, changes to recreational routes and loss of amenity for people using these areas for formal and informal recreation. The predicted effects would be similar for both options in this part of the Scheme.

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