



A96 Dualling Inverness to Nairn (including Nairn Bypass)

DMRB Stage 2 Scheme Assessment Report Volume 1 – Main Report Part 1 – The Scheme

October 2014



A96 Dualling Inverness to Nairn (including Nairn Bypass)

DMRB Stage 2 Scheme Assessment Report

Part 1: The Scheme

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Glossary of Terms

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| <i>'A' weighting dB(A)</i> | The human ear does not respond uniformly to different frequencies. A-weighting is commonly used to simulate the frequency response of the ear. |
| <i>Above Ordnance Datum (AOD)</i> | The mean sea level at Newlyn (UK) used as a base measurement on Ordnance Survey Maps for contours. |
| <i>Allocation</i> | A proposal for land for housing, industry or other uses within a Local Plan that identifies a specific area of land to be developed within the time period of the plan. |
| <i>Alluvium</i> | Sediment deposited by a river. |
| <i>Amenity Value</i> | Defined as the relative pleasantness of a journey and relates in particular to the exposure of pedestrians and others to traffic. |
| <i>Appropriate Assessment</i> | An assessment of likely impacts associated with a development on a European Protected Site. An Appropriate Assessment is required by law under Regulation 48 of the Habitats Regulations (1994), implementing Article 6(3) of the Habitats Directive (92/43/EEC). |
| <i>Aquifer</i> | A body of rock through which appreciable amounts of water can flow. |
| <i>Assessment</i> | An umbrella term for description, analysis and evaluation. |
| <i>Attenuation</i> | Increase in duration of flow hydrograph with a consequent reduction in peak flow. |
| <i>At-grade junction</i> | A junction arrangement at which two or more roads meet at the same level. |
| <i>Baseline</i> | The existing conditions which form the basis or start point of the environmental assessment. |
| <i>Bedrock</i> | Hard rock that lies beneath a superficial cover of soils and sediments. |
| <i>Benefit to Cost Ratio (BCR)</i> | An indicator, used in the formal discipline of cost-benefit analysis that attempts to summarize the overall value for money of a project or proposal. A BCR is the ratio of the benefits of a project or proposal, expressed in monetary terms, relative to its costs, also expressed in monetary terms. |
| <i>Biodiversity</i> | Biological diversity, or richness of living organisms present in representative communities and populations. |
| <i>Bund</i> | An embankment, wall or dam that can be used to minimise noise or alternatively built around an oil tank to contain the contents in the event of spillage. |
| <i>Calcareous</i> | Refers to a sediment, sedimentary rock, or soil type which is formed from or contains a high proportion of calcium carbonate. |
| <i>Compulsory Purchase Order (CPO)</i> | A legal document giving the government (Scottish Ministers) power to compulsorily purchase the areas of land necessary for the construction of the scheme. |

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| <i>Community Severance</i> | Community severance is defined here as the separation of residents from facilities and services they use within their community caused by new or improved roads or by changes in traffic flows. |
| <i>Coniferous Woodland</i> | An area of woodland with predominantly coniferous tree species (less than 10% deciduous trees in the canopy). |
| <i>Contaminated Land</i> | The 'Environmental Protection Act 1990' defines Contaminated Land as 'any land which appears to the local authority as to be in such condition, by reason of substances in, on or under the land that (a) significant harm is being caused or there is a significant possibility of such harm being caused; or (b) significant pollution of controlled waters is being, or there is a significant possibility of such pollution being caused'. |
| <i>Conservation Area</i> | Area of special architectural or historic interest, the character or appearance of which it is desirable to preserve or enhance. Designated under section 61 Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997. |
| <i>Culvert</i> | A metal, wooden, plastic, or concrete conduit through which surface water can flow under or across roads. |
| <i>Cutting</i> | Typically where part of a hill or mountain is cut out to make way for a road or railway line. |
| <i>Critical Load</i> | The quantitative estimate of the level of exposure of natural systems to pollutants below which significant harmful effects on specified sensitive elements of the environment do not occur. |
| <i>Decibel (dB)</i> | <p>The range of audible sound pressures is approximately 0.00002 Pa to 200 Pa. Using decibel notation presents this range in a more manageable form, 0 dB to 140 dB.</p> <p>Mathematically:</p> $\text{Sound pressure Level (dB)} = 20 \log (p_t/p_0)$ <p>Where $p_0 = 2 \times 10^{-5}$ Pa</p> |
| <i>Diverge</i> | A link road departing the main carriageway to a subsidiary road or junction. |
| <i>Do-minimum</i> | The base situation where there are no modifications to the existing road network. May also refer to the minimum modifications, which will necessarily take place in the absence of a proposed scheme. |
| <i>Do-Something</i> | The proposed scenario involving construction of a dual carriageway from Inverness to Nairn, including a Nairn bypass. |
| <i>Drift Deposits</i> | Drift geology overlying bedrock. |
| <i>Effect</i> | The result of change or changes on specific environmental resources or receptors. |
| <i>Element</i> | A component part of the landscape or environment (e.g. roads, hedges, woodlands). |
| <i>Environmental Impact Assessment (EIA)</i> | The process by which information about the environmental effects of a project is evaluated and mitigation measures are identified. |

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| <i>Eutrophication</i> | A process where water bodies receive excess nutrients that stimulate excessive plant growth. This can lead to effects such as lack of oxygen and reductions in water quality, fish, and other animal populations. |
| <i>Fill</i> | Material deposited by man in ground depression or excavated area or to construct an embankment. |
| <i>Floodplain</i> | Land adjacent to a river, which is subject to regular flooding. |
| <i>Fluvial Geomorphology</i> | The study of landforms associated with river channels and the sediment processes which form them. |
| <i>Fragmentation</i> | Breaking up of an organism's habitat into smaller fragments that may vary in size. |
| <i>Free Flow Alignment</i> | A road layout that allows traffic to join and leave the carriageway at speed |
| <i>Geomorphology</i> | The branch of geology concerned with the structure, origin and development of topographical features of the earth's crust. |
| <i>Geophysical Survey</i> | Geophysical survey is a non-intrusive <i>pre-construction archaeological evaluation</i> technique that exploits a variety of physical or chemical characteristics of rocks and soils etc, in an attempt to locate underground features of archaeological interest. Types of geophysical survey include magnetometer survey, magnetic susceptibility survey and resistivity survey. |
| <i>Glaciofluvial</i> | Pertaining to streams fed by melting glaciers, or to the deposits and landforms produced by such streams. |
| <i>Glacial Till</i> | Glacial till is that part of glacial drift which was deposited directly by the glacier. It may vary from clays to mixtures of clay, sand, gravel and boulders. |
| <i>Grade Separated Junction</i> | A junction arrangement that is separated by level from the through carriageway. |
| <i>Ground Investigation</i> | Exploratory investigation to determine the structure and characteristics of the ground influenced by a development. The collected information is used to establish or predict ground and groundwater behaviour during, and subsequent to, construction. |
| <i>Groundwater</i> | Water below the surface of the ground in the saturation zone and in direct contact with the ground or subsoil. |
| <i>Habitat</i> | Term most accurately meaning the place in which a species lives, but also used to describe plant communities or agglomerations of plant communities, as used, for example in a Phase 1 Habitat Survey. |
| <i>HA Rating/Loading</i> | A loading arrangement defined within bridge design standards for normal design loading of vehicles up to 44 tonne gross vehicle weight. |
| <i>HB Rating/Loading</i> | A loading arrangement defined within bridge design standards comprising a vehicle with 4 axles and 4 wheels per axle. |
| <i>Heavy Goods Vehicle (HGV)</i> | Vehicles with 3 axles (articulated) or 4 or more axles (rigid and articulated). |

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| <i>High Load Route</i> | An advisory route for extremely high abnormal loads |
| <i>Hydrogeology</i> | The branch of geology that deals with the occurrence, distribution, and effect of ground water. |
| <i>Hydrological</i> | The exchange of water between the atmosphere, the land and the oceans. |
| <i>Impact</i> | Any changes attributable to the proposed scheme that have the potential to have environmental effects (i.e. the causes of the effects). |
| <i>Impermeable</i> | Material that does not allow fluids to pass through it. |
| <i>Infrastructure Investment Plan (IIP)</i> | A Scottish Government document that sets out priorities for investment and long-term strategy for the development of public infrastructure in Scotland. |
| <i>L_{Aeq}</i> | Equivalent Continuous Sound Level. A notional steady sound level which would cause the same A-weighted sound energy to be received as that due to the actual, possibly fluctuating, sound level over a given period of time. |
| <i>Landform</i> | Combination of slope and elevation producing the shape and form of the land surface. |
| <i>Landscape</i> | Human perception of the land, conditioned by knowledge and identity with a place. |
| <i>Listed Building</i> | Building included on the list of buildings of special architectural or historic interest and afforded statutory protection under the 'Planning (Listed Buildings and Conservation Areas) (Scotland) Act 1997' and other planning legislation. Classified categories A – C(s). |
| <i>Local Road</i> | An A, B or C classified road (non Trunk Road) typically operated by a local authority or council. |
| <i>Loop</i> | A connecting road, utilising a continuous curve in the connection of two roads within a junction. |
| <i>Made Ground</i> | Material deposited by man i.e. not natural. |
| <i>Magnitude</i> | Size, extent, scale and duration of an impact. |
| <i>Mainline</i> | The principal road being considered, namely the A96 or the road proposed as its replacement. |
| <i>Merge</i> | A link road accessing the main carriageway from a subsidiary road or junction. |
| <i>Mitigation</i> | Term used to indicate avoidance, remediation or alleviation of adverse impacts. |
| <i>Native</i> | A species occurring naturally, in its normal geographic range. |
| <i>Net Present Value (NPV)</i> | The total present value of a time series of cash flows. It is a standard method for using the time value of money to appraise long-term projects. |
| <i>Neutral Grassland</i> | Grassland communities that grow on neutral soils (pH 5.5 – 7). |

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| <i>Non-Motorised User (NMU)</i> | Road users other than vehicular traffic, particularly cyclists, pedestrians and equestrians. |
| <i>Open Space</i> | Any land laid out as public parks or used for the purpose of public recreation, or land which is a disused burial ground. |
| <i>Peat</i> | Material consisting of decomposed vegetation forming a deposit found in bogs. |
| <i>Plantation Woodland</i> | Woodland of any age that obviously originated from planting. |
| <i>Prime Agricultural Land</i> | Agricultural land of Land Capability for Agriculture (LCA) classes 1, 2 and 3. |
| <i>Ramsar Sites</i> | Internationally important wetland identified for conservation under the Ramsar convention (1971). |
| <i>Regionally Important Geological Sites (RIGS)</i> | Sites designated by regional geological groups on locally developed criteria, currently the most important places for geology and geomorphology outside statutorily protected land such as Sites of Special Scientific Interest (SSSI). |
| <i>Riffle</i> | A shallow section of a river/stream where the water is fast-flowing over a gravel/cobble substrate. |
| <i>Riparian Zone</i> | Natural home for plants and animals occurring in a thin strip of land bordering a stream or river. |
| <i>Runoff</i> | Water that flows over the ground surface to the drainage system. This occurs if the ground is impermeable or if permeable ground is saturated. |
| <i>Salmonid</i> | Belonging to the salmon family. |
| <i>Scheduled Monument</i> | A monument which has been scheduled by the Scottish Ministers as being of national importance under the terms of the 'Ancient Monuments and Archaeological Areas Act 1979'. |
| <i>Scrub</i> | Climax vegetation dominated by locally native shrubs, usually less than 5m tall. |
| <i>Semi-improved pasture</i> | Pasture land that has been modified by fertilizers, drainage or intensive grazing. Contain less species diversity than unimproved pasture land. |
| <i>Semi-natural Woodland</i> | Woodland that does not obviously originate from planting. The distribution of species will generally reflect the variations in the site and the soil. Planted trees must account for less than 30% of the canopy composition. |
| <i>Severance</i> | The separation of communities from facilities and services they use within their community. Alternatively, in relation to agricultural land, the division of plots of land into separate land parcels, potentially affecting access or creating areas that may be impractical for agricultural use. |
| <i>Sites of Special Scientific Interest (SSSI)</i> | Areas of national importance. The aim of the SSSI network is to maintain an adequate representation of all natural and semi-natural habitats and native species across Britain. The site network is protected under the provisions of Sections 28 and 19 of the Wildlife and Countryside Act 1981 as well as the Amendment Act 1985 and the Environmental Protection Act 1990. |

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| <i>Slip Road</i> | A connector road facilitating access between one road and another. |
| <i>Special Area of Conservation (SAC)</i> | An area designated under the EC Habitats Directive to ensure that rare, endangered or vulnerable habitats or species of community interest are either maintained at or restored to a favourable conservation status. |
| <i>Special Protection Area (SPA)</i> | An area designated under the Wild Birds Directive (Directive 74/409/EEC) to protect important bird habitats. Implemented under the Wildlife and Countryside Act 1981. Under the Habitats Directive, all SPAs will be proposed Special Areas of Conservation. |
| <i>Strategic Environmental Assessment (SEA)</i> | The process by which information about the environmental effects of proposed plans, policies and programmes are evaluated. |
| <i>Strategic Transport Project Review (STPR)</i> | A review of the Scottish transport network undertaken by Transport Scotland and published in 2008. It identifies and prioritises road, rail and other interventions of national significance, proposed to be taken forward to improve the network. |
| <i>Superficial Deposits</i> | The youngest geological deposits formed during the most recent period of geological time, the Quaternary, which extends back 1.8 million years from the present. |
| <i>Susceptibility</i> | The ability to accommodate change arising from the proposed road without adverse effect. |
| <i>Sustainable Drainage Systems (SuDS)</i> | A sequence of management practices and control structures designed to drain surface water in a more sustainable fashion than some conventional techniques. |
| <i>Threshold</i> | The minimum intensity or value of a signal etc. that will produce a response or specified effect. |
| <i>Trunk Road</i> | Part of the road network connecting major cities, towns, airports and ports for which the Scottish Government is responsible. |
| <i>Vernacular</i> | Refers to a type of architecture which is indigenous to a specific time or place. |
| <i>Visual envelope</i> | The visual envelope illustrates the extent of potential visibility to or from a specific area. |
| <i>Vulnerable groups</i> | Children, elderly and disabled. |
| <i>Water Environment (Controlled Activities) (Scotland) Regulations</i> | Controls all engineering activity in or near watercourses. |
| <i>Water Framework Directive (WFD)</i> | Wide-ranging European environmental legislation (2000/60/EC). Addresses inland surface waters, estuarine and coastal waters and groundwater. The fundamental objective of the WFD is to maintain “high status” of waters where it exists, preventing any deterioration in the existing status of waters and achieving at least “good status” in relation to all waters by 2015. |

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Water Quality

The chemical and biological status of various parameters within the water column and their interactions, for example dissolved oxygen, indicator metals such as dissolved copper, or suspended solids (the movement of which is determined by hydrological process and forms geomorphological landforms).

Wildlife and Countryside Act 1981

Principal mechanism for wildlife protection in the UK.

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Abbreviations

| | |
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| <i>AADT</i> | Annual Average Daily Traffic |
| <i>Ac</i> | Alignment Constraint |
| <i>AEP</i> | Annual Exceedance Probability |
| <i>aOD</i> | above Ordnance Datum |
| <i>APIS</i> | Air Pollution Information System |
| <i>AQMA</i> | Air Quality Management Area |
| <i>AQO</i> | Air Quality Objective |
| <i>AQS</i> | Air Quality Strategy |
| <i>ATC</i> | Automatic Traffic Count |
| <i>AAWT</i> | Annual Average Weekday Traffic |
| <i>BCIS</i> | Building Cost Information Service |
| <i>BCR</i> | Benefit to Cost Ratio |
| <i>bgl</i> | Below ground level |
| <i>BGS</i> | British Geological Survey |
| <i>BS</i> | British Standard |
| <i>BT</i> | British Telecom |
| <i>CAR</i> | Water Environment (Controlled Activities) (Scotland) Regulations 2005 |
| <i>CEH</i> | Centre for Ecology and Hydrology |
| <i>CEMP</i> | Construction Environmental Management Plan |
| <i>CIRIA</i> | Construction Industry Research and Information Association |
| <i>COBA</i> | Cost Benefit Analysis |
| <i>COBALT</i> | Cost and Benefit to Accidents – Light Touch software |
| <i>CO₂</i> | Carbon Dioxide |
| <i>CNMA</i> | Candidate Noise Management Area |
| <i>CPO</i> | Compulsory Purchase Order |
| <i>CROW</i> | Catalogue of Rights of Way |
| <i>CRTN</i> | Calculation of Road Traffic Noise |

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|--------------|---|
| <i>CSM</i> | Conceptual Site Model |
| <i>dB</i> | Decibel |
| <i>DEFRA</i> | Department of the Environment, Food and Rural Affairs |
| <i>DfT</i> | Department for Transport |
| <i>DM</i> | Do Minimum |
| <i>DMRB</i> | Design Manual for Roads and Bridges |
| <i>DS</i> | Do Something |
| <i>D2AP</i> | Dual 2 Lane Carriageway All Purpose |
| <i>EEC</i> | European Economic Committee |
| <i>EIA</i> | Environmental Impact Assessment |
| <i>EICP</i> | Environmental Incident Control Plan |
| <i>END</i> | Environmental Noise Directive |
| <i>EPA</i> | Environmental Protection Act (1990) |
| <i>FEH</i> | Flood Estimation Handbook |
| <i>GCR</i> | Geological Conservation Review |
| <i>GIS</i> | Geographic Information System |
| <i>GWDTE</i> | Groundwater Dependent Terrestrial Ecosystems |
| <i>ha</i> | Hectare |
| <i>HA</i> | Highways Agency |
| <i>HC</i> | Hydrocarbons |
| <i>HDV</i> | Heavy Duty Vehicle |
| <i>HER</i> | Historic Environment Record |
| <i>HGV</i> | Heavy Goods Vehicle |
| <i>HLA</i> | Historic Landscape Assessment |
| <i>HRA</i> | Hot Rolled Asphalt |
| <i>HSa</i> | Hillhead Sandstone Formation |
| <i>HSE</i> | Health and Safety Executive |
| <i>HV</i> | High Voltage |

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| <i>HwLDP</i> | Highland-wide Local Development Plan |
| <i>H4a</i> | Very High Containment |
| <i>IAN</i> | Interim Advice Note |
| <i>IBAA</i> | Incinerator Bottom Ash Aggregate |
| <i>IIP</i> | Infrastructure Investment Plan |
| <i>InF</i> | Inshes Flagstone Formation |
| <i>INLP</i> | Inverness Local Plan |
| <i>ITS</i> | Intelligent Transport System |
| <i>JHI</i> | James Hutton Institute |
| <i>km</i> | Kilometres |
| <i>Kph</i> | Kilometres per hour |
| <i>kV</i> | Kilovolt |
| <i>LAQM</i> | Local Air Quality Management |
| <i>Lc</i> | Layout Constraint |
| <i>LCA</i> | Landscape Character Assessment |
| <i>LCT</i> | Landscape Character Type |
| <i>LGV</i> | Light Goods Vehicles |
| <i>LiDAR</i> | Light Detection And Ranging survey |
| <i>LLCA</i> | Local Landscape Character Area |
| <i>LNR</i> | Local Nature Reserve |
| <i>LNRS</i> | Low Noise Road Surface |
| <i>LTS</i> | Local Transport Strategy |
| <i>LV</i> | Low Voltage |
| <i>MCHW</i> | Manual of Contract Document for Highway Works |
| <i>MFTM</i> | Moray Firth Transport Model |
| <i>MLURI</i> | Macaulay Land Use Research Institute |
| <i>MMP</i> | Materials Management Plan |
| <i>MSC</i> | Matters Specified in Conditions |

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| <i>MV</i> | Morayston Variants |
| <i>NCAP</i> | National Collection of Aerial Photography |
| <i>NCR</i> | National Cycle Route |
| <i>NESA</i> | Network Evaluation from Surveys and Assignment |
| <i>NLP</i> | Nairnshire Local Plan |
| <i>NMU</i> | Non-Motorised User |
| <i>NTS</i> | National Transport Strategy |
| <i>NO</i> | Nitric Oxide |
| <i>NO_x</i> | Oxides of Nitrogen |
| <i>NO₂</i> | Nitrogen Dioxide |
| <i>NPF</i> | National Planning Framework |
| <i>NPF2</i> | National Planning Framework 2 |
| <i>NPF3</i> | National Planning Framework 3 |
| <i>NPV</i> | Net Present Value |
| <i>N2</i> | Normal Containment Level |
| <i>OGV</i> | Other Goods Vehicles |
| <i>OS</i> | Ordnance Survey |
| <i>O/H</i> | Overhead |
| <i>PAN</i> | Planning Advice Note |
| <i>PIA/MVkm</i> | Personal Injury Accidents per Million Vehicle Kilometres |
| <i>PIP</i> | Planning in Principle |
| <i>PLDP</i> | Proposed Local Development Plan |
| <i>PM₁₀</i> | Particulate Matter |
| <i>PP</i> | Pollutant Pathways |
| <i>PPG</i> | Pollution Prevention Guideline |
| <i>PSSR</i> | Preliminary Sources Study Report |
| <i>PVB</i> | Present Value of Benefits |
| <i>PVC</i> | Present Value of Costs |

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| <i>PWS</i> | Private Water Supply |
| <i>QUADRO</i> | Queues And Delays at Roadworks |
| <i>RBMP</i> | River Basin Management Plan |
| <i>RCAHMS</i> | Royal Commission on Ancient and Historical Monuments of Scotland |
| <i>RIGS</i> | Regionally Important Geological Sites |
| <i>RSPB</i> | Royal Society for the Protection of Birds |
| <i>SAC</i> | Special Area of Conservation |
| <i>SAM</i> | Scheduled Ancient Monument |
| <i>ScotWays</i> | Scottish Rights of Way and Access Society |
| <i>SEA</i> | Strategic Environmental Assessment |
| <i>SEPA</i> | Scottish Environment Protection Agency |
| <i>SERIS</i> | Scottish Executive Road Information System |
| <i>SHEP</i> | Scottish Historic Environmental Policies |
| <i>SIMD</i> | Scottish Index of Multiple Deprivation |
| <i>SLA</i> | Special Landscape Area |
| <i>SNH</i> | Scottish Natural Heritage |
| <i>SPA</i> | Special Protection Area |
| <i>SPP</i> | Scottish Planning Policy |
| <i>SSD</i> | Stopping Sight Distance |
| <i>SSE</i> | Scottish and Southern Energy |
| <i>SSSI</i> | Site of Special Scientific Interest |
| <i>STAG</i> | Scottish Transport Appraisal Guidance |
| <i>STPR</i> | Strategic Transport Projects Review |
| <i>SuDS</i> | Sustainable Drainage Systems |
| <i>SWFs</i> | Surface Water Features |
| <i>S2</i> | Single Carriageway |
| <i>TPOs</i> | Tree Preservation Orders |
| <i>TUBA</i> | Transport Users Benefit Appraisal |

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|------------|--|
| <i>USA</i> | Updating and Screening Assessment |
| <i>U/G</i> | Underground |
| <i>VEM</i> | Visual Envelope Map |
| <i>WFD</i> | Water Framework Directive |
| <i>WML</i> | The Waste Management Licensing (Scotland) Regulations 2011 |

1 Scheme Background

1.1 Background to Study

- 1.1.1 The Strategic Transport Projects Review (STPR), published in 2008, set out the Scottish Government's transport investment priorities over the coming decades. Specific trunk road interventions that emerged from the review included upgrading the A96 between Inverness and Nairn to dual carriageway (Intervention 18) and a bypass of Nairn (Intervention 22).
- 1.1.2 In 2010, Transport Scotland commissioned Jacobs to undertake a Design Manual for Roads and Bridges (DMRB) Stage 2 Assessment study (i.e. route option assessment) in relation to upgrading the A96 between Inverness and Nairn to dual carriageway standard (with at-grade junctions) and a single carriageway bypass of Nairn. The methodology for the study initially involved identifying and assessing the effects of a number of alternative route options. The assessment findings were documented in a series of assessment tables, and this information was then used as the basis of a decision-making process to identify a number of feasible routes worthy of further investigation. The decision-making process also resulted in a number of options being rejected on the grounds that they were less favourable than other options available.
- 1.1.3 On 6 December 2011, the then Cabinet Secretary for Infrastructure and Capital Investment launched the Infrastructure Investment Plan (IIP) which provides an overview of the Scottish Government's plans for infrastructure investment over the coming decades. Contained within the document is a commitment to complete the dualling of the A96 between Inverness and Aberdeen by 2030.
- 1.1.4 In February 2012, Transport Scotland and The Highland Council undertook a joint consultation on the emerging Local Development Plan proposals and options for the supporting trunk road infrastructure between Inverness and Nairn, including a Nairn Bypass. The Nairn Bypass options exhibited were all developed as single carriageways in advance of the Scottish Government's announcement that it proposed to dual the A96 between Inverness and Aberdeen through the 2011 Infrastructure Investment Plan.
- 1.1.5 Following comments received during the 2012 consultation in relation to the proposals for the section between Inshes and Smithton, Transport Scotland has taken the opportunity to re-examine the wider context of the connection between the A9 and A96. Work is on-going separately to develop and appraise further options in addition to those previously presented that could potentially address the problems and opportunities within the area. This work is not within the scope of this report.
- 1.1.6 On 9 May 2013 the Minister for Transport and Veterans set out how the A96 dualling programme would be taken forward. The outline strategy identifies packages of design and development work to be progressed over the next few years with the objective of completing full dualling between Inverness and Aberdeen by 2030. These packages of work included updating route option assessment work for the section of the A96 between Inverness and Nairn, including a Nairn Bypass, to reflect the commitment to dual the entire route.
- 1.1.7 In November 2013, Transport Scotland undertook further consultation to present the updated route options for the A96 Dualling Inverness to Nairn (including Nairn Bypass) and seek public feedback on the developing scheme proposals. Over 200 responses were received during the consultation period and three changes were made to the design options as a result of the feedback received.

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1.2 A96 Aberdeen – Inverness Trunk Road

- 1.2.1 The scheme location plan is shown on Drawing B1557601/LOC/0001 (Volume 2). The A96 between Aberdeen and Inverness is approximately 99 miles (160km) long and consists mostly of single carriageway with some overtaking lanes and sections of dual carriageway.
- 1.2.2 It passes through or nearby the settlements of Nairn, Forres, Elgin, Fochabers, Keith, Huntly, and Inverurie. The remainder of the route is generally through rural settings.
- 1.2.3 The western and eastern limits of the trunk road have already been upgraded to dual carriageway standard. At Inverness, the dualling extends for less than 1 kilometre from Raigmore Interchange to the roundabout at Inverness Retail and Business Park. At Aberdeen, the dualling extends westwards for 20 kilometres from Haudagain Roundabout to Port Elphinstone, south-east of Inverurie.
- 1.2.4 Within the remaining length of single carriageway there are six eastbound overtaking lanes with a combined length of 5.9km and six westbound overtaking lanes with a combined length of 6.3km.
- 1.2.5 There are approximately 600 at-grade junctions and accesses along the A96 in the rural sections where the national speed limit applies, these include other A-Roads, B-Roads, C-Roads and unclassified roads. There is a grade separated junction with the A9 at Raigmore and two grade separated junctions at Kintore.

1.3 Scheme Objectives

- 1.3.1 The scheme objectives for the A96 Dualling Inverness to Nairn (including Nairn Bypass) scheme are as follows:
- To improve the operation of the A96 and inter-urban connectivity through:
 - reduced journey times;
 - improved journey time reliability;
 - increased overtaking opportunities;
 - improved efficiency of freight movements along the transport corridor; and
 - reduced conflicts between local traffic and other traffic in urban areas.
 - To improve safety for motorised and non-motorised users through:
 - reduced accident rates and severity;
 - reduced driver stress; and
 - reduced non-motorised user conflicts with strategic traffic in urban areas.
 - To provide opportunities to grow the regional economies on the corridor through:
 - improved access to the wider strategic transport network; and
 - enhanced access to jobs and services.
 - To facilitate active travel in the corridor
 - To facilitate integration with Public Transport facilities
 - To minimise the environmental effect on the communities in the corridor

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1.4 Previous Studies

- 1.4.1 Previous studies have been undertaken by a number of different parties, which considered issues associated with the improvement of the existing transport network at different levels of detail. The reports of these studies are summarised below. The current route option assessment process has taken consideration of previous studies, reports and consultations.
- 1.4.2 **A96 Inverness to the Airport, STAG Assessment, Scott Wilson, 2006:** This report details the findings of a STAG assessment of potential transport improvement options within the A96 corridor between Raigmore Interchange and Inverness Airport. It reports the analysis of problems, the development of objectives, the generation, sifting and development of options, and the outcomes of Part 1 and Part 2 Appraisals. The conclusions of this report were that short and medium-term packages of measures would achieve the project objectives. The short-term package of measures proposed dualling of the A96 to Smithton, providing bus lanes and enhancing pedestrian/cyclist facilities. The medium-term package of measures proposed dualling of the A96 between Smithton and Mid Coul and providing a new rail halt.
- 1.4.3 **The A96 Growth Corridor Development Framework, The Highland Council, 2007:** This planning framework was approved by The Highland Council in September 2007 and formed supplementary planning guidance to the approved Development Plan for the area until adoption of the Highland wide Local Development Plan in April 2012 and the subsequent Inner Moray Firth Local Development Plan. The A96 Growth Corridor Framework was developed in consultation with local stakeholders and included a line for a Nairn Bypass commencing at Drumdivan, crossing the River Nairn at Howford and rejoining the A96 at Auchnacloch (although the Framework noted the line as indicative with the precise route to be determined). It is important to note that the options presented within the Framework were not subject to an engineering and environmental assessment and focused on planning development growth.
- 1.4.4 **A96 Dualling to the Airport, DMRB Stage 2 Assessment, Atkins, 2008:** This report details the findings of a DMRB Stage 2 assessment of options to dual the A96 between Raigmore Interchange and Inverness Airport. The report is presented in three sections: the Engineering Assessment, the Environmental Assessment, and the Traffic and Economic Assessment. The individual sections of this report present an assessment of each of the options considered against a range of criteria. The report does not make a final recommendation of a preferred route option.
- 1.4.5 **The Strategic Transport Projects Review (STPR), Jacobs, 2008:** The STPR set out 29 investment priorities within an investment hierarchy for the 20 year period following the programme in place at that time. This programme was identified as a means of supporting the National Planning Framework 2 (NPF2) and the government's Purpose. STPR recommended a number of road and rail based interventions to take forward on the Aberdeen to Inverness corridor. Specific trunk road interventions that emerged from the review included upgrading the A96 between Inverness and Nairn to dual carriageway (Intervention 18) and a bypass of Nairn (Intervention 22).
- 1.4.6 **Inverness Trunk Link Road – East Link Summary Status, The Highland Council, 2009:** This report summarised work undertaken by The Highland Council and concentrated on the development of the eastern section of the proposed Inverness Trunk Link Road, a proposed link between the A9 at Inshes and the A96 at Smithton. It included a STAG Part 1 appraisal of options, which assessed each option for engineering, environmental, and traffic and economics criteria. A preferred alignment was identified for the eastern section of the Trunk Link Road, although it was noted that refinement of the junction design at the connection with the A96 would be required. A preferred option for a junction with the A9 at Inshes was not identified.
- 1.4.7 **A9, A96 Inverness, Nairn Strategic Corridor Options Study Stage 1 DMRB Route Options Assessment – Existing Conditions Report, Atkins, 2010:** This report provides

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information relating to the engineering condition of the existing road network between the A9 at Inshes and the A96 east of Nairn. As the report focuses on the existing network it does not include any discussion of transport improvement options.

- 1.4.8 Following assessment of the existing conditions, Atkins continued work to identify and assess measures to improve the transport network between Inverness and Nairn. This work considered the corridor within four geographic sections namely: A9/A96 Trunk Road Link; A96 between Raigmore Interchange to Mid Coul; A96 between Mid Coul and a Nairn Bypass; and a Nairn Bypass.
- 1.4.9 **A9, A96 Inverness, Nairn Strategic Corridor Options Study Environmental and Planning Constraints – Preliminary Assessment, Atkins, 2010:** This report was prepared broadly in parallel with the Existing Conditions Report, and presents an assessment of the existing environment and environmental constraints within the study area. As with the previous report, it is focussed on the existing environment and, therefore, does not include any discussion of transport improvement options.
- 1.4.10 **A9, A96 Inverness, Nairn Strategic Corridor Options Study Geotechnical Preliminary Sources Study Report, Atkins, 2010:** This report was again prepared broadly in parallel with the two reports discussed above, and presents the findings of an assessment of the existing ground conditions. While this report discusses transport improvement options, it does so in a superficial manner, focussing on the implications of these options in terms of existing ground conditions. Recommendations are limited to the extent of ground investigation potentially required for different options.
- 1.4.11 In 2010 and 2011 Jacobs carried out an initial assessment of route options in accordance with DMRB Stage 2 in relation to upgrading the A96 between Inverness and Nairn to dual carriageway (with at-grade junctions) and a single carriageway bypass of Nairn. The assessment findings were documented in a series of assessment tables, and this information was then used as the basis of a decision-making process to identify a number of feasible routes worthy of further investigation. These options were presented at public exhibition in February 2012.
- 1.4.12 **Highland-wide Local Development Plan April 2012:** This included an indicative line of a Nairn Bypass first published in the 2007 A96 Growth Corridor Framework. The Plan states that “all proposed new roads are indicative and are subject to detailed consideration by Transport Scotland”.

1.5 Stakeholders

- 1.5.1 There are numerous stakeholders with interests in the A96 Dualling Inverness to Nairn (including Nairn Bypass). The scheme is of particular interest to the following key stakeholders:
- Transport Scotland;
 - The Highland Council;
 - MSPs, MPs, MEPs, and local Councillors;
 - Community Councils;
 - Landowners within the study area;
 - Network Rail;
 - Inverness Airport;
 - Scottish Natural Heritage (SNH);
 - Historic Scotland;

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- Scottish Environment Protection Agency (SEPA);
- Forestry Commission Scotland;
- Scottish Water; and
- Health and Safety Executive.

1.5.2 The work Transport Scotland is progressing along the A96 corridor includes a rolling programme of regular engagement with local communities and other stakeholders, which started with the public exhibitions held in November 2013. Further public consultations will be undertaken as part of the design and development of dual carriageway proposals. This engagement will help ensure that individuals, communities and businesses affected by the dualling are kept fully informed and consulted, and their feedback taken into account as A96 dualling proposals are developed.

1.6 Current A96 Commissions

1.6.1 In 2013, Transport Scotland commissioned Jacobs to undertake a Preliminary Engineering Assessment (DMRB Stage 1 Assessment) for the A96 between Inverness and Aberdeen. This study will gather information on physical and engineering constraints throughout the study corridor. The information will then inform the development of a number of potential improvement strategies for the upgrading of the A96 to dual carriageway standard. A Preliminary Engineering Report will be prepared which will broadly follow the format and requirements of the engineering aspects of a DMRB Stage 1 scheme assessment.

1.6.2 As the wider dualling of the A96 between east of Auldearn to Aberdeen is at the broad improvement strategies stage of assessment there are at present no definitive scheme proposals to the east of the A96 Dualling Inverness to Nairn (including Nairn Bypass) scheme. The A96 Preliminary Engineering Report will identify potential improvement strategies to the east of this scheme between Auldearn and Aberdeen.

1.6.3 In parallel with the A96 Preliminary Engineering Assessment, Transport Scotland has commissioned CH2M Hill to undertake a Strategic Environmental Assessment (SEA) of the dualling of the A96. This study will identify baseline environmental conditions and constraints and, along with the Preliminary Engineering Assessment, will inform the assessment and identification of a number of potential improvement strategies for future development. It is envisaged that the A96 Dualling Inverness to Nairn (including Nairn Bypass) scheme will be included in the "Do-Minimum" or reference case in terms of the A96 dualling SEA as the scheme was included in the STPR SEA published in 2008.

1.6.4 As stated in section 1.1, Transport Scotland is also examining the wider context of the A9/A96 connection and is working in consultation with The Highland Council. This on-going work is looking at updated information on transport and land use issues in the study area. The Study is being undertaken in line with the principles of Scottish Transport Appraisal Guidance (STAG).

1.7 DMRB Stage 2 Scheme Assessment Report

1.7.1 This DMRB Stage 2 Scheme Assessment Report has been prepared in accordance with TD37/93, Scheme Assessment Reporting, of the DMRB.

1.7.2 The purpose of this report is to document the factors that have been taken into account in the assessment of route options, considering the scheme objectives and the engineering, environmental, traffic and economic advantages/disadvantages and constraints associated with each.

1.7.3 Preliminary route option drawings showing the options considered in this DMRB Stage 2 assessment have been prepared and are included within Volume 2 of this report.

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- 1.7.4 For the purposes of this study the proposed scheme has been split into two geographic sections.
- **Inverness to Gollanfield:** This section starts at the roundabout for the Inverness Retail Park and runs in a north-easterly direction to just south of the settlement of Gollanfield. A total of eight route options have been identified for assessment; each option proposes varying lengths of online and offline construction.
 - **Nairn Bypass:** Commencing at the eastern end of the previous section at Gollanfield, nine potential route options have been developed to bypass the town of Nairn to the south, offline of the existing A96. The options pass the village of Auldearn with the eastern extent for the scheme at Hardmuir, approximately 4km to the east of Nairn.

1.8 Report Layout

- 1.8.1 Whilst following the format prescribed in TD 37/93 to the extent practicable, the volume of information presented within this DMRB Stage 2 Scheme Assessment Report dictates that it be presented in the following Volumes:

Volume 1 – Main Report and Appendices

- Part 1: The Scheme
- Part 2: Engineering Assessment
- Part 3: Environmental Assessment
- Part 4: Transport and Economic Assessment
- Part 5: Assessment Summary and Recommendation
- Part 6: Appendices

Volume 2 – Engineering Drawings

Volume 3 – Environmental Figures

- 1.8.2 This report can be viewed at the Transport Scotland website:
www.transportscotland.gov.uk/project/a96-inverness-nairn-including-nairn-bypass
- 1.8.3 A bound paper copy of the complete A96 Dualling Inverness to Nairn (including Nairn Bypass) DMRB Stage 2 Scheme Assessment Report can be purchased (£200), and is available in DVD format (£10) on application in writing to the “A96 Dualling Team” at Transport Scotland.

2 Existing Conditions

2.1 Introduction

2.1.1 This section of the report describes the engineering conditions of the existing A96 Aberdeen – Inverness Trunk Road within the scheme extents shown on Drawing B1557601/LOC/0001 (Volume 2). The scheme is split into two sections: Inverness to Gollanfield and the Nairn Bypass. Within this chapter, the Nairn Bypass section is referred to as Gollanfield to Hardmuir since the A96 does not currently bypass Nairn. For each section, the existing route is described with regard to engineering factors including traffic flows, pavement condition, junctions, structures, roadside features, drainage and public utilities. The existing conditions through Nairn have been considered in less detail, and the junctions and accesses on the existing A96 have not been assessed.

2.1.2 The existing road network is shown on Drawings B1557601/EXI/0001 and 0002 (Volume 2).

2.2 Scheme Location and Environment

Location

2.2.1 The scheme starts east of the roundabout for Inverness Retail Park, approximately 850m east of Raigmore Interchange, and continues approximately 30km east and ends at Hardmuir, 3.5km to the east of Auldearn. The study area runs between the Moray Firth to the north and the rolling Drummosie Muir to the south.

Topography

2.2.2 The land within the vicinity of the existing A96 Aberdeen – Inverness Trunk Road is generally flat and low-lying in nature. This is also the case moving in a northerly direction from the carriageway, towards the coastline of the Moray Firth. To the south of the existing A96 the land gradually rises towards Drummosie Muir.

2.2.3 The lowest ground level is less than 10mAOD and is located along the coastline of the Moray Firth. The highest ground level is approximately 85mAOD and is located south Morayston House in the vicinity of High Wood.

Climate

2.2.4 The climate in the study area is typical of the northern highlands. The average monthly temperature range is between 0°C and 19°C while the average monthly rainfall is between 39mm and 65mm. It should be noted that the study area receives a higher hourly average of sunshine and a lower than average level of rainfall when compared to the Scottish average. In winter months, the local climate can also include sub-zero temperatures and snow.

Land Use

2.2.5 The land within the study area is principally agricultural and comprises open fields used for both grazing and crops. However, there are several industrial estates, communities and settlements located within the study area.

2.2.6 Inverness Retail Park and Stoneyfield Business Park are commercial developments located at the western end of the scheme. Norbord timber processing facility is at Morayhill and Inverness Airport and Dalcross Industrial Estate lie north of Mid Coull.

2.2.7 The communities of Culloden, Smithton and Balloch lie at the western end of the scheme and Nairn and Auldearn are the two principal communities at the eastern end of the scheme.

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There are several other small communities, settlements or individual residential properties along the scheme.

- 2.2.8 There are a number of woodland areas, used for commercial or recreational use. There is also a sizeable operational gravel quarry at Blackcastle, to the west of Nairn, and a number of minor operational and abandoned quarries within the study area.

Man-made features

Roads

- 2.2.9 The existing road network is described at the start of sections 2.3 and 2.4 using the road names given in Table 2.1.

Table 2.1: List of Roads

| Classification | Road Name |
|----------------|---|
| A939 | Tomintoul – Grantown on Spey – Nairn Road |
| A96 | Aberdeen – Inverness Trunk Road |
| B9006 | Millburn Roundabout – Culcabock – Castle Hill – Culloden Moor – Croy – Gollanfield – Fort George Road |
| B9039 | Newton – Castle Stuart – Ardersier Road |
| B9090 | Loch Flemington – Clephanton – Cawdor – Nairn Road |
| B9091 | Croy – Clephanton – Kildrummie – Nairn Road |
| B9092 | Ardersier – Nairn Road |
| B9101 | Auldearn – Cawdor Road |
| B9111 | Auchnacloch – Auldearn Road |
| C1013 | Gollanfield Road |
| C1017 | Kerrowgair – Croy Road |
| C1020 | Dalcross Station Road |
| C1024 | Tornagrain – Cantray Road |
| C1032 | Barn Church Road |
| C1163 | Delnies – Kildrummie – Howford Road |
| C1167 | Auldearn – Dalmore – Cotterton Road |
| C1170 | Moss-Side – Mosshall – Broadley Road |
| C1171 | Auldearn – Moyness Road |
| C1172 | Auldearn – Station – Drum Road |
| C1175 | Househill – Raitloan – Howford Road |
| U1008 | Morayston – Castle Stuart Road |
| U1017 | Wester Glackton – Balcroy – Kilvarock – Cawdor Road |
| U1025 | Milton Of Breachlich Road |
| U1029 | Tomhommie – Ballinreich – Balnagowan Road |
| U1033 | Link Road Between Gollanfield Road (C1013) And Tomhommie – Ballinreich – Balnagowan Road (U1029) |
| U1058 | Castlehill – Cradlehall – Smithton – Stratton Lodge Road |
| U1136 | Milton Road |
| U1144 | Milton of Culloden Road |
| U1283 | Castle Stuart – Easter Dalziel Road |

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| Classification | Road Name |
|----------------|---------------------------------------|
| U1347 | Allanfearn – Alturlie Road |
| U1351 | Loch Flemington Road |
| U2218 | McDermotts Road |
| U2350 | Loch Flemington Link Road |
| U2378 | Glackton Road |
| U2959 | Broombank Road |
| U2997 | Waterloo – Eastertown – Inshoch Road |
| U3010 | Blackpark – Grigorhill – Newmill Road |
| U3036 | Ellands – Hardmuir – Boghole Road |
| U3164 | Penick Road |
| U3226 | Balnaspirach – Nairn Moss Lands Road |

- 2.2.10 The A96 Aberdeen – Inverness Trunk Road is commonly referred to as “the A96” or “the existing A96” throughout this report. Other roads are described by their classification and road name. Junctions between the A96 and other roads listed in Table 2.1 are referenced simply by their classification, e.g. “the C1020 junction”.

Railway Lines

- 2.2.11 The Aberdeen to Inverness Railway Line is a single track line which runs east to west through the study area. It passes in close proximity to the existing A96 between Inverness and Nairn after which it continues in a generally eastern direction while the road travels south-east towards Auldearn. The railway passes through several sections of cutting and embankment as well as over several structures and level crossings.
- 2.2.12 There are five unmanned level crossings on this section of railway. The first level crossing lies to the east of Milton of Culloden and is thought to be largely redundant and only utilised by vehicles too large to access Milton of Culloden via the U1144 Milton of Culloden Road. There are also level crossings on the U1347 Allanfearn – Alturlie Road, the access track to Redhill Farm, the C1020 Dalcross Station Road, and at Moss-side.
- 2.2.13 There are several rail structures in the study area, both underbridges and overbridges, for the trunk road and local roads.

Residential and Agricultural Properties

- 2.2.14 The residential areas of Smithton, Culloden and Balloch are situated in the south-west of the study area. Other communities include Nairn and Auldearn, in the north-east of the study area.
- Smaller communities can be found at Milton of Culloden, Tornagrain, Ardersier, Lochside, Gollanfield, Moss-side, and Newmill. There are also numerous residential properties dispersed across the study area, some of which are situated immediately adjacent to and take direct access from the existing A96. Accesses to the existing A96 within the study area are listed in Section 2.3 (Existing Road Network – Inverness to Gollanfield) and Section 2.4 (Existing Road Network – Gollanfield to Hardmuir (Nairn Bypass)).
- 2.2.15 From Balloch to Gollanfield, the study area is primarily owned by Moray Estates, whose holdings within the study area are divided into tenanted agricultural farmland, woodland, and proposed development land. The remainder of the study area consists primarily of smaller agricultural holdings and woodland. As with residential properties, farm steadings are

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dispersed across the study area, some of which take direct access from the existing A96 and some of those are situated immediately adjacent to the existing A96.

Commercial Properties

2.2.16 The Inverness Retail Park and Stoneyfield Business Park are located on the south side of the existing A96 at the western end on the route. Inverness Airport is located to the north of the existing A96 at Mid Coul. Nairn Camping and Caravanning Club Site is located at Delnies Wood on the south side of the existing A96, west of Nairn. A helicopter charter company is located on the U3010 Blackpark – Grigorhill – Newmill Road, south-east of Nairn.

2.2.17 There are also several businesses located adjacent to the existing A96 through Nairn.

Industrial Properties

2.2.18 A wastewater treatment plant is located at Milton of Culloden, north of the existing A96. Norbord timber processing facility is located north of the existing A96 at Morayhill. Dalcross Industrial Estate is located next to Inverness Airport to the north of the existing A96 at Mid Coul. Two sawmills lie south of Nairn, one on the B9091 Croy – Clephanton – Kildrummie – Nairn Road, and one on the U1030 Blackpark – Grigorhill – Newmill Road.

2.2.19 The Port of Ardersier lies to the north of the study area on the U2218 McDermotts Road. Ardersier has been identified within Scottish Enterprises' National Renewables Infrastructure Plan (N RIP) as a port location for offshore wind manufacturing, installation staging and operations and maintenance for the Moray Firth arrays.

2.3 Existing Road Network – Inverness to Gollanfield

Route Description

2.3.1 This section of the existing A96 Aberdeen – Inverness Trunk Road commences 0.85km east of Raigmore Interchange, heading in a generally north-easterly direction for 14km to the C1013 junction. It is a rural route, generally through agricultural land with an area of woodland at Tornagrain. The Aberdeen to Inverness Railway Line is north of the existing A96 and follows a similar north-easterly direction.

2.3.2 The first 0.85km of the existing A96 from Raigmore Interchange to the roundabout for Inverness Retail Park is already dual carriageway and is not included within the scheme extents. East of this roundabout the A96 is single carriageway. The route continues for approximately 0.9km to a roundabout at the C1032 western junction.

2.3.3 East of the roundabout at the C1032 western junction the route continues for approximately 8.5km to a roundabout at the C1017 junction at Mid Coul. Over this length it passes north of the communities of Culloden and Balloch. There are several local road junctions and numerous other private means of access including the access for the timber processing facility at Morayhill.

2.3.4 From the roundabout at the C1017 junction, the existing A96 continues a further 4.4km to the C1013 junction at Gollanfield. There is a local road junction with the B9006 Millburn Roundabout – Culcabock – Castle Hill – Culloden Moor – Croy – Gollanfield – Fort George Road at Brackley as well as other private means of access.

Speed Limits

2.3.5 The existing A96 between Inverness and Gollanfield is subject to two speed limits; a 50mph limit extends from Raigmore Interchange to approximately 250m east of the C1032 western

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junction, while the remaining length of single carriageway is subject to the national speed limit of 60mph.

Geometric Design Standards

- 2.3.6 An assessment of the existing horizontal alignment of the existing A96 through the study area was carried out based on Ordnance Survey mapping data. Horizontal curves were compared to TD 9/93 of the DMRB to identify Departures from Standard. The minimum Stopping Sight Distance (SSD) for each curve was estimated based on the Ordnance Survey MasterMap data. The vertical alignment of the existing carriageway has not been assessed due to the limited accuracy of the topographical information at this stage in the design and assessment process. Therefore the SSD considers horizontal sight lines only and this is a limitation of the assessment of the existing carriageway. Priority junctions and accesses along the existing A96 through the study area have been assessed for key standards in accordance with TD 42/95 of the DMRB.
- 2.3.7 The assessment of existing geometric standards is a limited assessment process of the existing road and will not identify every Departure. It does, however, provide a broad measure of the geometric standard of the existing road.
- 2.3.8 Based on its Layout Constraint (Lc) and Alignment Constraint (Ac), measured based on TD 9/93 of the DMRB, the existing A96 between Inverness Retail Park and Gollanfield has a design speed of 100kph. The assessment has identified that the A96 between Inverness Retail Park roundabout and Gollanfield has several Departures based on current standards required for a single carriageway (S2) of design speed 100kph.
- 2.3.9 The noted Departures from Standards, based on current design standards, along this section of trunk road, from west to east, are described below.

Trunk Road Alignment, Stopping Sight Distance (SSD) and Verge Width

- 2.3.10 The radii and stopping sight distances of the curves on the existing A96 were checked against Table 3 of TD 9/93 of the DMRB.
- The horizontal curve at Allanfearn has a radius of approximately 580m which is a one-step relaxation. With no apparent verge widening, the stopping sight distance around this curve is 120m which is a two-step relaxation. A Departure from Standard exists at Allanfearn since these relaxations occur in combination and on the approach to the U1347 junction.
 - The horizontal curve at the Redhill Farm access has a radius of approximately 600m which is a one-step relaxation. With no apparent verge widening, the stopping sight distance around this curve is 170m which is a one-step relaxation. A Departure from Standards exists here since the SSD relaxation occurs on the approach to the Redhill Farm access.
 - The horizontal curvature on sections of the existing A96 to the west and east of the B9039 junction has radii of less than 350m with no apparent verge widening. A suitable stopping sight distance is not provided along these curves. This is a Departure from Standard for stopping sight distance on the approach to the B9039 junction.
 - 300m east of the C1024 junction, the existing A96 curves with a horizontal radius of approximately 720m with a SSD of 180m. While the horizontal curvature meets desirable minimum standard, there is substandard stopping sight distance on approach to a junction which is a Departure from Standard.
 - The horizontal curve at the Culblair access is approximately 630m with SSD of 190m. This is a one-step relaxation of SSD and a Departure from Standard exists due to the SSD on approach to a junction.

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Junction Provision

- 2.3.11 TD 42/95 of the DMRB provides guidance on the geometric design of major/minor priority junctions. There are five main areas with which junctions should comply:
- Where no provision is made for large goods vehicles, it is recommended that the minimum circular corner radius at simple junctions should be 10m in rural areas.
 - Drivers approaching a major/minor priority junction along the major road approaches shall be able to see the minor road entry from a distance of 215m (for a major road design speed of 100kph).
 - Drivers approaching from the minor road shall have unobstructed visibility of the junction from a distance corresponding to the Desirable Minimum SSD for the design speed of the minor road, as described in TD 9/93 of the DMRB.
 - From a point 15m back along the centreline of the minor road measured from the continuation of the line of the nearside edge of the running carriageway of the major road (not from the continuation of the back of the major road hardstrip if this is present), an approaching driver shall be able to see clearly the junction form, and those peripheral elements of the junction layout.
 - From a point on the minor road, 9m from the nearside edge of the running carriageway of the major road, an approaching driver shall be able to see clearly points to the left and right on the nearer edge of the major road running carriageway at a distance of 215m (for a major road design speed of 100kph), measured from its intersection with the centreline of the minor road.
- 2.3.12 Table 2.2 gives the results of the assessment of the major/minor priority junctions with the existing A96 between Inverness Retail Park and Gollanfield. In addition to these priority junctions, there are two existing roundabouts on the existing A96 within the study area: the C1032 western junction and the C1017 junction. Most private accesses have not been included in this assessment, although the Morayhill access, which provides access to the Norbord timber processing facility has been included as it is a substantial private access.

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Table 2.2: Summary of Existing Priority Junction Standards

| Junction | Compliance to TD 42/95 Standards | | | | |
|-----------------------------|----------------------------------|-----------|-----------|----------------|---------------|
| | Radius | Major SSD | Minor SSD | 15m Visibility | 9m Visibility |
| U1144 junction | x | ✓ | x | ✓ | x |
| U1136 junction | x | ✓ | ✓ | ✓ | ✓ |
| Allanfearn western junction | x | x | ✓ | x | x |
| U1347 junction | ✓ | ✓ | ✓ | ✓ | ✓ |
| Allanfearn eastern junction | ✓ | x | ✓ | x | x |
| C1032 eastern junction | ✓ | ✓ | ✓ | ✓ | ✓ |
| B9039 junction | x | x | x | ✓ | ✓ |
| U1008 junction | x | ✓ | ✓ | ✓ | x |
| Morayhill access | ✓ | ✓ | x | ✓ | ✓ |
| C1024 junction | ✓ | ✓ | ✓ | ✓ | ✓ |
| C1020 junction | ✓ | x | ✓ | ✓ | x |
| U1025 junction | x | ✓ | ✓ | ✓ | ✓ |
| B9006 southern junction | ✓ | ✓ | ✓ | ✓ | ✓ |
| B9006 northern junction | x | ✓ | x | ✓ | ✓ |
| U1017 junction | ✓ | ✓ | ✓ | ✓ | ✓ |
| C1013 junction | ✓ | ✓ | ✓ | ✓ | ✓ |

- 2.3.13 Ten of the sixteen junctions in Table 2.2 have at least one element that is substandard with only six junctions fully complying with the current DMRB standards.

Traffic Conditions

Existing Traffic Patterns

- 2.3.14 All traffic volume data has been obtained from the 2011 Automatic Traffic Count (ATC) data provided by Transport Scotland. Transport Scotland place Automatic Traffic Counters in strategic locations on the trunk road network and report the data collected annually allowing locations of heavy and light vehicle traffic flows to be identified. The traffic volume data for the existing A96 between Inverness and Gollanfield is summarised below in Table 2.3.

Table 2.3: Automatic Traffic Counter data for Inverness to Gollanfield (2011)

| Location | AADT | AM Peak Hour Flow | PM Peak Hour Flow |
|--|-------|-------------------|-------------------|
| A96 Raigmore to Inverness Retail Park (west of Scheme extents) | 38505 | 2739 | 3480 |
| A96 Inverness Retail Park to Smithton | 27308 | 2146 | 2414 |
| A96 Smithton to Balloch | 15478 | 1265 | 1384 |
| A96 Balloch to Newton of Petty | 16579 | 1332 | 1490 |
| A96 Newton of Petty to Gollanfield | 12462 | 1019 | 1136 |

- 2.3.15 The highest traffic flows are recorded between Raigmore and West Seafield. Traffic flows reduce heading east from Inverness.

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Traffic Accidents

- 2.3.16 An analysis of personal injury accident data between 1 January 2008 and 31 December 2012 was carried out to assess current road safety conditions and to compare current conditions with national trends. Personal injury accidents are classified as fatal, serious or slight dependent on the most severely injured casualty.
- 2.3.17 Drawing B1557601/EXI/0003 (Volume 2) shows the location and severity of personal injury accidents during the 5 year period. Fatal accidents (red) are recorded where the level of injuries sustained cause death within 30 days of the accident. Serious accidents (blue) are recorded where a casualty is detained in hospital or sustains fractures, concussion, severe cuts or where death occurs 30 or more days after the accident. Slight accidents (green) are recorded when a casualty sustains a sprain, bruise or slight cut.
- 2.3.18 Analysis of the data showed that 28 personal injury accidents occurred on the existing A96 between Inverness Retail Park and Gollanfield between 2008 and 2012. These included 2 fatal accidents, 7 serious accidents and 19 slight accidents. Accidents tend to occur in the proximity of junctions.
- 2.3.19 National accident rates express the number of personal injury accidents per million vehicle kilometres (PIA/MVkm). The rate is dependent on the road type and quality. The current national personal injury accident rate, as defined in DMRB Volume 15, Part 6, Chapter 6, Table 6/5/2, for link and junction accidents combined on modern rural single carriageway roads with hardstrips is 0.232 PIA/MVkm. Table 2.4 provides accident data for sections between Inverness Retail Park and Gollanfield. The section between Balloch and Newton of Petty has the highest injury rate, at 0.20PIA/MVkm, while Newton of Petty to Gollanfield has the lowest, at 0.05PIA/MVkm. It can be seen from Table 2.4 that the injury accident rate is below the national average of 0.232 PIA/MVkm.

Table 2.4: Personal Injury Accidents Per Million Vehicle Kilometres (PIA/MVkm) between Inverness and Gollanfield

| Location | A96 Inverness Retail Park to Smithton | A96 Smithton to Balloch | A96 Balloch to Newton of Petty | A96 Newton of Petty to Gollanfield |
|----------------------------|---------------------------------------|-------------------------|--------------------------------|------------------------------------|
| Link Length (km) | 1.0 | 3.4 | 1.3 | 8.2 |
| Number of Injury accidents | 4 | 6 | 8 | 10 |
| AADT | 27300 | 15500 | 16600 | 12500 |
| PIA/MVkm | 0.08 | 0.06 | 0.20 | 0.05 |

Road Pavement Condition

- 2.3.20 A desk study was undertaken to determine the existing pavement construction and pavement condition within the study area. The information used in the desk study was obtained from the Scottish Executive Road Information System (SERIS), which is a database maintained by Transport Scotland which is used to log and predict the current condition of the trunk road network in Scotland.
- 2.3.21 Based on the available data, the pavement is of fully flexible construction and the bituminous layer varies in depth, with an average depth of 220mm. SERIS does not contain information on the granular layer depth so this information has not been included in this section of the report.
- 2.3.22 The residual life of the existing A96 between Inverness and Gollanfield has been determined from SERIS. Table 2.5 details the percentage length and actual length of the section which falls within five defined ranges of residual life.

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Table 2.5: Range of Pavement Residual Life between Inverness and Gollanfield

| Residual Life (Years) | % Length of Section | Length of Section (m) |
|-----------------------|---------------------|-----------------------|
| <5 | 13% | 2139 |
| 5-9 | 18% | 2939 |
| 10-14 | 14% | 2289 |
| 15-19 | 26% | 4177 |
| >19 | 29% | 4570 |

2.3.23 From Table 2.5, 55% of the section has a residual life of 15 years or more with 13% approaching critical condition of less than five years residual life.

2.3.24 It should be noted that the accuracy of the pavement desk study undertaken for the existing A96 between Inverness and Gollanfield is reliant on the accuracy of the data within SERIS. A thorough pavement investigation would be required to determine the accuracy of the data obtained from SERIS and verify any data discussed in this report.

Junctions

2.3.25 There are two at-grade roundabouts and fifteen major/minor priority junctions on the existing A96 within the extents of the scheme. They are shown on Drawing B1557601/EX1/0001 and 0002 (Volume 2) and are described from west to east below. The Inverness Retail Park junction has also been included as it is immediately preceding the start of the scheme extents.

Inverness Retail Park junction

2.3.26 This junction is a roundabout providing access to the Inverness Retail Park. Street lighting and illuminated bollards are provided on the physical approach islands on each arm of the roundabout. A footway/cycleway runs along the south side of the existing A96 through this junction with dropped kerbs and a paved area in the splitter island to allow cyclists to cross the Inverness Retail Park arm of the roundabout. This is the only vehicular access to the Inverness Retail Park.

C1032 western junction

2.3.27 The C1032 western junction is a roundabout connecting to the C1032 Barn Church Road providing access to Culloden, Smithton and Balloch. Street lighting and illuminated keep left bollards are provided on the physical approach islands on each arm of the roundabout. There is an access into the properties at Firth View on the north side of the roundabout. There is a segregated shared use cycleway/footway around the southern side of the roundabout.

U1144 junction

2.3.28 This is a simple T-junction connecting to the U1144 Milton of Culloden Road, which provides access to Milton of Culloden, north of the existing A96. The junction is situated 0.5km east of the C1032 western junction.

U1136 junction

2.3.29 This is a simple T-junction connecting to the U1136 Milton Road, which provides access to Milton of Culloden South, south of the existing A96. The junction is situated 1.0km east of the C1032 western junction.

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Allanfearn western junction and U1347 junction.

- 2.3.30 This is a right-left staggered ghost island junction providing access to the sewage works, Brecknish and Alturlie to the north via the U1347 Allanfearn – Alturlie Road, and providing access to Allanfearn to the south of the existing A96. Illuminated keep left bollards are provided on a physical approach island, as is a diverge taper with a give way, prioritising westbound traffic turning right into the access. The junction is situated 1.7km west of the C1032 eastern junction.

Allanfearn eastern junction

- 2.3.31 This is a simple T-junction with a nearside diverging taper and a nearside merging taper providing access to Allanfearn to the south of the existing A96. The junction is situated 1.3km west of the C1032 eastern junction.

C1032 eastern junction

- 2.3.32 The C1032 eastern junction is a ghost island T-junction with a nearside diverge taper connecting to the C1032 Barn Church Road, which provides access to Culloden, Smithton and Balloch from the existing A96. An illuminated bollard is provided on the physical approach island of the C1032 Barn Church Road.

B9039 junction

- 2.3.33 The B9039 junction is a simple T-junction with a segregated left turn for traffic approaching from the west. No street lighting or illuminated bollards are provided. The B9039 Newton – Castle Stuart – Ardersier Road serves as a secondary access for the airport and for local access.

U1008 junction

- 2.3.34 This is a simple T-junction on the north side of the existing A96 connecting to the U1008 Morayston – Castle Stuart Road, which provides access to the B9039 Newton – Castle Stuart – Ardersier Road and Castle Stuart. The access is situated 0.7km east of the B9039 junction. Longitudinal hatched ladder markings commence at this junction and continue to the Morayhill access.

C1024 junction

- 2.3.35 This is a ghost island T-junction with nearside diverge taper on the south of the existing A96 connecting to the C1024 Tornagrain – Cantray Road, which provides access to Tornagrain, and Dalcross before connecting to the B9006 Millburn Roundabout – Culcabock – Castle Hill – Culloden Moor – Croy – Gollanfield – Fort George Road at Cantraywood. The junction is situated 1.2km west of the C1017 junction. There is a bus stop lay-by located directly opposite the junction for eastbound buses and immediately adjacent to the west of the junction for westbound buses.

C1020 junction

- 2.3.36 This is a simple T-junction connecting to the C1020 Dalcross Station Road, which provides access to Petty Church and linking with the B9039 Newton – Castle Stuart – Ardersier Road, north of the existing A96. The junction is situated 0.9km west of the C1017 junction.

C1017 junction

- 2.3.37 The C1017 Kerrowgair – Croy Road is the main access to Inverness Airport to the north and to Croy to the south via a roundabout. Street lighting and illuminated keep left bollards are provided on the physical approach islands on each arm of the roundabout. A segregated

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footway/cycleway encircles the roundabout and extends north along the C1017 towards the airport.

U1025 junction

- 2.3.38 This is a simple T-junction connecting to the U1025 Milton Of Breachlich Road, which connects to Milton of Gollanfield Farm, north of the existing A96, before turning east to connect to the B9006 Millburn Roundabout – Culcabock – Castle Hill – Culloden Moor – Croy – Gollanfield – Fort George Road. The access is situated 1.0km west of the B9006 southern junction.

B9006 northern junction and B9006 southern junction

- 2.3.39 The B9006 Millburn Roundabout – Culcabock – Castle Hill – Culloden Moor – Croy – Gollanfield – Fort George Road crosses the A96 at a right-left staggered ghost island junction. The junction provides access to Ardersier to the north via the B9006 and Cawdor to the south via the B9090 Loch Flemington – Clephanton – Cawdor – Nairn Road.

U1017 junction and C1013 junction

- 2.3.40 This is a right-left staggered junction featuring a ghost island right turn lane and a diverge taper left turn lane in both directions. The U1017 Wester Glackton – Balcroy – Kilvarrock – Cawdor Road provides access to Loch Flemington, south of the existing A96, and the C1013 Gollanfield Road provides access to Gollanfield, north of the existing A96. There is a westbound bus lay-by approximately 50m to the west of the junction.

Direct Accesses and Field Accesses

- 2.3.41 Twenty-three direct accesses to the existing A96 have been identified within this section of the study area. In addition, 33 field accesses have been identified.
- 2.3.42 Morayhill access is a ghost island T-junction with a nearside diverging taper, providing access to the Norbord timber processing facility on the north side of the existing A96. Longitudinal hatched ladder markings commence at the U1008 junction and continue to this access.

Structures

- 2.3.43 Along this section of the existing A96 there are 2 bridges and 7 culverts. The bridges on this section of the existing A96 cross watercourses. The Transport Scotland SERIS database has been used to inform this section of the Report in relation to the condition of the existing structures.

Bridges

- 2.3.44 A summary of the existing bridges is provided in Table 2.6 below. A more detailed description of each structure follows this table.

Table 2.6: Existing Bridges

| Reference | Name | General Dimensions | | Comments |
|-----------|--------------|----------------------------|------------|---|
| | | Span Lengths | Deck Width | |
| A96 570 | Scretan Burn | 3.1m on skew of 33 degrees | 24m | Single span reinforced concrete slab deck |
| A96 560 | Morayston | 4.5m square | 15.3m | Single span masonry arch |

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Scretan Burn (Reference No. A96 570)

- 2.3.45 Located approximately 500m east of Inverness Retail Park junction, the Scretan Burn structure carries the existing A96 over Scretan Burn. It was constructed circa 1967 and comprises a single span simply supported reinforced concrete slab deck. The end supports comprise full height reinforced concrete propped abutments on spread foundations. Scretan Burn passes below the existing A96 on a skew of approximately 33 degrees with a clear skew span of 3.1m. The carriageway is of constant width of 7.3m between kerbs. A 1.8m wide grass verge and 1.5m wide footway are provided over the structure on the north side and a 2.0m wide footway and 0.8m wide grass verge are provided on the south side. No hard strips are provided. The minimum available headroom through the structure is 1.8m. Vehicle containment comprises a corrugated steel safety barrier on the north side with a post and wire fence on the south side.
- 2.3.46 The most recent General and Principal Inspections (2010 and 2008 respectively) identified that the structure was in reasonable condition with generally only minor defects. A single category 3 defect was identified in relation to the occurrence of scour undermining a downstream wingwall foundation. A subsequent inspection found no sign of scour.
- 2.3.47 The cross section of this structure does not meet the current standards required for a single carriageway. The carriageway width of 7.3m between kerbs does not meet the requirement of 9.3m, but the overall verge width is greater than the minimum required.
- 2.3.48 The vehicle containment over the structure does not comply with current standards as it is of insufficient length on approach and exit from the structure on the north side, and of insufficient containment on the south side.
- 2.3.49 The structure is recorded as being designed to accommodate full HA loading and 45 units of HB loading. Assessment records indicate an assessed load carrying capacity of full BD 21/01 assessment live loading and 45 units of HB loading.

Morayston (Reference No. A96 560)

- 2.3.50 Located approximately 1km east of the junction with the B9039 Newton – Castle Stuart – Ardersier Road, Morayston carries the existing single carriageway A96 over Rough Burn. The original structure, which was constructed in 1850 and subsequently widened to the north and south at a date unknown, comprises a single square span concrete block arch 2.5m long on the north side, a central 7.8m long masonry arch and a 4.9m long concrete block arch on the south side. The end supports comprise mass concrete gravity abutments on spread foundations. The structure passes over the Rough Burn with a clear square span of 4.5m. The carriageway is of constant width of 9.5m between kerbs. A 3.1m wide surfaced verge and 1.45m wide surfaced verge are provided over the structure on the north and south sides respectively. The minimum available headroom through the structure is 2.25m at the crown of the arch. Vehicle containment comprises non-standard masonry parapets approximately 1.1m high on each side of the deck.
- 2.3.51 The most recent General and Principal Inspections (2010 and 2012 respectively) identified that the structure was in very good condition with no defects of note. No category 3 or 4 defects were identified.
- 2.3.52 The cross section of this structure does not meet the current standards required for a single carriageway. The carriageway width of 9.5m between kerbs meets the requirement of 9.3m, but the verge widths are below standard.
- 2.3.53 The parapet containment over the structure does not comply with current standards as it is masonry and does not include an approach barrier on the north side.

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2.3.54 The design loading for the structure is unknown. Assessment records indicate an assessed load carrying capacity of full BD 21/01 assessment live loading and 45 units of HB loading.

Culverts

2.3.55 The seven culverts located between Inverness and Gollanfield are as follows:

- A96 560 C84 Milton 2;
- A96 560 C80 Milton Burn;
- A96 560 C19 Newton Burn;
- A96 550 C81 Kerrowaird;
- A96 550 C77 Tornagrain;
- A96 550 C62 Mid Coul; and
- A96 550 C40 Drumine Burn.

2.3.56 It should be noted that the A96 560 C80 Milton Burn has been undergoing monitoring of cracks in the soffit of the stone slabs forming the central portion of the deck of this structure. No deterioration or movement of the cracks has been identified since installation of the movement gauges in 2006.

2.3.57 It should be noted that the 2010 Principal Inspection of A96 560 C62 Mid Coul identified an urgent requirement to install pedestrian fencing around the headwalls in accordance with BA 48/93 of the DMRB. However, this defect does not affect the structural integrity of the culvert.

2.3.58 No category 3 or 4 defects other than those noted above affect these minor structures.

Retaining Walls

2.3.59 There are no retaining walls within this section of this scheme.

Roadside Features

Lay-Bys

2.3.60 The existing A96 between Inverness and Gollanfield has been assessed to determine the lay-by provision along the route. In total there are thirteen lay-bys, five of which are in the eastbound direction and six in the westbound direction. These are shown on drawings B1557601/EXI/0001 and 0002 (Volume 2) Each lay-by has been categorised as Type A, Type B or Bus Lay-By in accordance with TD 69/07 of the DMRB.

2.3.61 Travelling from west to east between Inverness and Gollanfield, the approximate location, direction and type of lay-by are described in Table 2.7:

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Table 2.7: Lay-by Location and Type for Inverness to Gollanfield

| Approximate Location | Lay-By Type | Direction |
|-------------------------------------|-------------|-----------|
| 110m east of C1032 western junction | Type B | Eastbound |
| Adjacent to U1136 junction | Bus Lay-By | Westbound |
| Adjacent to U1136 junction | Bus Lay-By | Eastbound |
| 160m west of C1032 eastern junction | Type B | Westbound |
| 480m east of B9039 junction | Type A | Westbound |
| Adjacent to C1024 junction | Bus Lay-By | Westbound |
| Opposite C1024 junction | Bus Lay-By | Eastbound |
| Adjacent to Culblair Farm access | Bus Lay-By | Eastbound |
| Opposite Culblair Farm access | Bus Lay-By | Westbound |
| 65m west of B9006 southern junction | Bus Lay-By | Westbound |
| 25m west of B9006 southern junction | Bus Lay-By | Eastbound |
| 50m west of C1013 junction | Bus Lay-By | Westbound |
| 50m east of C1013 junction | Bus Lay-By | Eastbound |

Lighting

- 2.3.62 Street lighting is provided in the verge of the existing A96 from the start of the scheme extents to 50m east of C1032 western junction. Further lighting is provided in the verge and on the physical islands of the C1017 junction, which is the roundabout providing access to Inverness Airport.

Vehicle Restraint System

- 2.3.63 Vehicle Restraint System (VRS), or safety barrier, is provided at various points along the existing A96 within this section of the study area to prevent errant vehicles from hitting hazards. Table 2.8 shows the approximate locations of the VRS, its length, and the hazard.

Table 2.8: VRS between Inverness and Gollanfield

| Approximate Location | Verge | Length | Hazard |
|--|-----------------|--------|------------------------|
| Dualled approach to Inverness Retail Park junction | Central reserve | 120m | Traffic |
| Eastbound approach to Inverness Retail Park junction | South | 75m | Advance Direction Sign |
| East of Ashton Farm access | North | 40m | Watercourse |
| Westbound approach to Barn Church Road roundabout | North | 70m | Embankment |
| 250m East of Mid Coul roundabout | North and south | 50m | Watercourse |
| 700m East of Culblair Farm access | South | 200m | Embankment |

Signage

- 2.3.64 The majority of signs are written in English only, however, there are a number of signs at the C1017 junction (Inverness Airport roundabout) that are in both English and Gaelic (bi-lingual signs). No variable message signs are present within this section of the existing A96.

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Rest Areas

- 2.3.65 There are no official signed services within the study area, however the “Highland Food Stop” is located adjacent to the westbound running lane of the existing A96 at Brackley; it is accessed via the B9006 Junction.

Non-Motorised User Provision

Footpaths

- 2.3.66 Table 2.9 below describes the footpaths and footways which are within the immediate vicinity of the existing A96 between Inverness and Gollanfield. In total, 12 routes have been identified.

Table 2.9: Footpaths/Footways between Inverness and Gollanfield

| Path Name | Description |
|--|---|
| Core Path IN08.24 | A 2km track joining the old A96 adjacent to the shoreline to the existing A96. |
| Core Path IN08.23 | A 2km surfaced road travelling from Longman to Milton via the old A96. |
| Core Path IN08.30 | A 0.3km track connecting the old A96 to the existing A96 at Seafield. |
| Core Path IN08.10 | A 1.5km track connecting the existing A96 to Caulfield Road via the Ashton Farm access track. |
| Core Path IN08.05 | A 0.6km track connecting the existing A96 to Culloden via Milton of Culloden Smallholdings. |
| Core Path IN08.21 | A 0.2km surfaced path connecting the existing A96 to Culloden via Allanfearn. |
| Core Path IN08.32 | A 1.3km track connecting the existing A96 to High Wood via Balmachree. |
| Core Path IN08.16 | A 0.9km surfaced path connecting Barn Church Road to Caulfield Road. |
| Raigmore to Barn Church Road west junction | A 3m wide, 1.8km long combined footway/cycleway in the westbound verge from the Raigmore Interchange to the east side of the C1032 western junction where it joins with a narrow footway on the eastbound side. |
| Barn Church Road west junction to Milton of Culloden | A 1km narrow footway in the eastbound verge from the C1032 western junction to the properties adjacent to the existing A96 at Milton of Culloden. |
| Tornagrain to Petty Church | A 350m footway linking the bus stop to the west of the C1024 junction at Tornagrain to the C1020 junction at Petty Church. |
| Gollanfield crossroads | A 300m footway connecting the C1013 and U1017 to the westbound and eastbound bus stops on the A96. |

- 2.3.67 The Core Paths are discussed in Part 3, Chapter 15 (All Travellers) of this report.

Cyclepaths

- 2.3.68 In addition to pedestrians, cyclists have a legal right to use Core Paths. The shared use footway/cycleway between the A9/A96 Raigmore Interchange and C1032 western junction and the shared use footway/cycleway around the roundabout at the C1017 junction are the only cycleways adjacent to the A96 carriageway within the study area. However, the existing A96 is not classed as a special road, and cyclists may legally use this route.

Bridleways

- 2.3.69 In addition to pedestrians and cyclists, equestrians have a legal right to use Core Paths. No other bridleways have been identified within the study area. However, the existing A96 is not

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classed as a special road, and horse riders and horse drawn vehicles may legally use this route.

Drainage

- 2.3.70 Road drainage on the existing A96 between Inverness and Gollanfield varies with surface water run-off along sections of the road either draining naturally into the adjacent land or being directed positively to outfall into the nearest watercourses via shallow ditches, gullies and pipes or filter drains.
- 2.3.71 The majority of the junctions along the existing A96 have kerbed edges with channel gullies likely connecting directly into carrier drains.

Public Utilities

- 2.3.72 Public utilities have been identified and key utilities are shown on Drawings B1557601/EXI/0005 and 0006 (Volume 2).

Telecoms

- 2.3.73 Underground BT cables run adjacent to the existing A96 between Inverness and Gollanfield and adjacent to many of the existing major local roads. These local road cables connect to the cable adjacent to the existing A96 at the junctions.
- 2.3.74 Many individual underground and overground cables connect to these mainline cables, serving small settlements and residential properties. A THUS telecommunications cable also runs adjacent to the existing A96 from the C1032 eastern junction to the eastern limit of the study area.

Gas

- 2.3.75 An intermediate pressure gas pipe is located adjacent to the existing A96 between Inverness and Tornagrain. A local high pressure gas pipe runs adjacent to the Aberdeen to Inverness Railway Line to the north of the existing A96 between Inverness and Milton of Culloden before crossing the existing A96 at Milton of Culloden. The local high pressure gas pipe then travels in a generally easterly direction, and sits to the south of the existing A96.
- 2.3.76 There are also several shorter pipelines that branch off the major pipelines, described above, to serve small settlements and residential properties.

Electricity

- 2.3.77 Scottish and Southern Energy's 132kV, 33kV and 11kV cables are present both overground and underground throughout the study area. Cables do not run adjacent to the existing A96 carriageway for any significant periods and cables cross both under and over the existing carriageway at several locations between Inverness and Gollanfield.

Water Supply and Sewerage

- 2.3.78 There are several water supply pipes across the study area including a water main which runs adjacent to the existing A96 between Inverness and Culloden, and another main runs adjacent to the trunk road between Upper Cullernie Farm and Brackley. There are also several mains which cross the existing A96 and tributaries which branch from the mainline pipes, providing water to small communities and isolated residential properties.
- 2.3.79 The sewage works at Milton of Culloden acts as a focal point for all foul pipes in the west of the scheme with foul pipes crossing the existing A96 on four occasions in the vicinity of the sewage works, connecting local areas of population with the plant. Despite a further

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crossing at Tornagrain there are few sewerage utilities present at the eastern end of this section.

- 2.3.80 A number of private water supplies (PWS) have been identified within the study area and these are discussed in Part 3, Chapter 12 (Geology and Soils) of this report and shown on Figures 12.1 to 12.9 (Volume 3).

Government Pipeline and Storage System

- 2.3.81 A government pipeline runs east from Inverness through the study area, sitting adjacent to the existing A96 between Inverness and Milton of Culloden and the C1032 eastern junction and Tornagrain. The pipeline also passes beneath the existing A96 at Milton of Culloden.

Bus Services

- 2.3.82 Bus services which use the existing A96 between Inverness and Nairn include services 5, 5A, 5C, 10, 10A, X10, 11, 11A, 35 and 35A, operated by Stagecoach. These routes utilise the A96, the C1032 Barn Church Road through Culloden, the B9039 Newton – Castle Stuart – Ardersier Road, the B9092 Ardersier – Nairn Road, and the C1017 Kerrowgair – Croy Road to access Inverness Airport.

- 2.3.83 The Highland Council provides school bus services for Culloden Academy, Nairn Academy, Auldearn Primary, Ardersier Primary, Balloch Primary and Croy Primary. It is understood that these services utilise the following roads:

- A96 Aberdeen – Inverness Trunk Road;
- B9039 Newton – Castle Stuart – Ardersier Road;
- B9006 Millburn Roundabout – Culcabock – Castle Hill – Culloden Moor – Croy – Gollanfield – Fort George Road; and
- U1347 Allanfearn – Alturlie Road.

2.4 Existing Road Network – Gollanfield to Hardmuir (Nairn Bypass)

- 2.4.1 This section describes the existing A96 Aberdeen – Inverness Trunk Road from Gollanfield, through Nairn, to Hardmuir. Following construction of the Nairn Bypass, it is intended that the existing A96 through Nairn will be de-trunked.

Route Description

- 2.4.2 From the C1013 junction at Gollanfield, the existing A96 travels north-east for 6km, passing several junctions and accesses, crossing the Aberdeen to Inverness Railway Line and travelling through Blackcastle and Delnies Wood, to the B9092 junction, at Delnies. At the B9092 junction the route turns east through Tradespark, towards Nairn for 2.3km, before continuing north-east through Nairn. The existing A96 travels for approximately 1km through a residential area of Nairn to the Nairn Roundabout where it turns south-west. The route continues on this course through Nairn, crossing the River Nairn and under the Aberdeen to Inverness Railway Line.

- 2.4.3 Leaving Nairn, the existing A96 continues south-east for approximately 2.5km, passing to the north of Auldearn. The route continues north-east adjacent to Wester Hardmuir Wood and agricultural land to the eastern extents of the scheme.

Speed Limits

- 2.4.4 The existing A96 between Gollanfield and Hardmuir, excluding through Nairn, is subject to the national speed limit. The speed limit through Nairn is 30mph with 40mph buffer zones on

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both the west and east approaches to the town. From west to east, the 40mph buffer zone begins 1.2km east of the B9092 junction and continues for 850m into Nairn. Leaving Nairn to the east, the speed limit increases from 30mph to 40mph 200m east of the A939 Grantown on Spey – Nairn Road. The eastern 40mph buffer zone continues for 500m and ends 900m east of the B9111 Auchnacloch – Auldearn Road junction.

Geometric Design Standards

- 2.4.5 An assessment of the existing horizontal alignment of the existing A96 through the high-speed sections of the study area was carried out based on Ordnance Survey mapping data. Horizontal curves were compared to TD 9/93 of the DMRB to identify Departures from Standard. The minimum Stopping Sight Distance (SSD) for each curve was estimated based on the Ordnance Survey MasterMap data. The vertical alignment of the existing carriageway has not been assessed due to the limited accuracy of the topographical information at this stage in the design and assessment process. Therefore the SSD considers horizontal sight lines only and this is a limitation of the assessment of the existing carriageway. Priority junctions and accesses along the existing A96 through the high-speed sections of the study area have been assessed for key standards in accordance with TD 42/95 of the DMRB.
- 2.4.6 The assessment of existing geometric standards is a limited assessment process of the existing road and will not identify every Departure. It does however provide a broad measure of the geometric standard of the existing road.
- 2.4.7 Based on its Layout Constraint (Lc) and Alignment Constraint (Ac), measured based on TD 9/93 of the DMRB, the existing A96 to the east and west of Nairn has a design speed of 100kph. The assessment has identified that the rural sections of the existing A96 within the extent of the proposed Nairn Bypass has several Departures based on current standards required for a single carriageway (S2) of design speed 100kph.
- 2.4.8 The noted Departures from Standard, based on current design standards, along this section of trunk road, from west to east, are as follows:

Trunk Road Alignment, Stopping Sight Distance (SSD) and Verge Width

- 2.4.9 The radii and stopping sight distances of the curves was checked against Table 3 of TD 9/93 of the DMRB. The section of the existing A96 that passes through Nairn has not been assessed.
- The horizontal curvature between Wester Hardmuir Farm and Hardmuir is approximately 240m with SSD of 100m and no apparent verge widening. This is a four-step relaxation of horizontal curvature for a 100kph design speed and a three-step relaxation of SSD. This combination of relaxations is a Departure from Standard under current design standards.

Junction Provision

- 2.4.10 TD 42/95 provides guidance on the geometric design of major/minor priority junctions. There are five main areas which junctions should comply:
- Where no provision is made for large goods vehicles, it is recommended that the minimum circular corner radius at simple junctions should be 10m in rural areas.
 - Drivers approaching a major/minor priority junction along the major road approaches shall be able to see the minor road entry from a distance corresponding to the Desirable Minimum SSD for the design speed of the major road, as described in TD 9/93.
 - Drivers approaching from the minor road shall have unobstructed visibility of the junction from a distance corresponding to the Desirable Minimum SSD for the design speed of the minor road, as described in TD 9/93.

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- From a point 15m back along the centreline of the minor road measured from the continuation of the line of the nearside edge of the running carriageway of the major road (not from the continuation of the back of the major road hardstrip if this is present), an approaching driver shall be able to see clearly the junction form, and those peripheral elements of the junction layout.
- From a point on the minor road, 9m from the nearside edge of the running carriageway of the major road, an approaching driver shall be able to see clearly points to the left and right on the nearer edge of the major road running carriageway at a distance of 215m (for a major road design speed of 100kph), measured from its intersection with the centreline of the minor road.

2.4.11 Table 2.10 gives the results of the assessment of the major/minor priority junctions with the derestricted sections of the existing A96 between Gollanfield and Hardmuir. Junctions within the urban area have not been assessed. Most private accesses have not been included in this assessment, although Cockhill access, Courage Steading access, and Hardmuir access are included as they each provide access to a number of properties.

Table 2.10: Summary of Existing Junction Standards

| Junction | Compliance to TD 42/95 Standards | | | | |
|--------------------------|----------------------------------|-----------|-----------|----------------|---------------|
| | Radius | Major SSD | Minor SSD | 15m Visibility | 9m Visibility |
| U1029 junction | x | ✓ | ✓ | ✓ | x |
| Cockhill access | x | ✓ | x | ✓ | x |
| U2218 junction | ✓ | ✓ | ✓ | ✓ | ✓ |
| C1163 southern junction | ✓ | ✓ | ✓ | ✓ | ✓ |
| C1163 northern junction | x | ✓ | x | ✓ | x |
| B9092 junction | ✓ | ✓ | x | ✓ | ✓ |
| U2997 junction | x | ✓ | x | ✓ | x |
| B9111 western junction | ✓ | ✓ | x | ✓ | ✓ |
| C1172 junction | x | ✓ | x | ✓ | x |
| B9111 eastern junction | ✓ | ✓ | ✓ | ✓ | ✓ |
| U2959 junction | x | ✓ | x | ✓ | x |
| Courage Steading access | x | ✓ | ✓ | ✓ | x |
| U3164 junction | x | x | ✓ | ✓ | ✓ |
| Hardmuir of Boath access | x | ✓ | ✓ | ✓ | x |
| U3036 junction | x | ✓ | ✓ | x | x |

2.4.12 Twelve of the fifteen junctions and accesses in Table 2.10 have at least one element that is substandard with only three junctions complying with current DMRB standards.

Traffic Conditions

Existing Traffic Patterns

2.4.13 The traffic volume data for the section of the existing A96 which the Nairn Bypass is proposed to replace is summarised below in Table 2.11.

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Table 2.11: Automatic Traffic Counter for Nairn Bypass Section

| Location | AADT | AM Peak Hour Flow | PM Peak Hour Flow |
|--------------------------|-------|-------------------|-------------------|
| A96 Gollanfield to Nairn | 12646 | 1014 | 1133 |
| A96 Nairn to Hardmuir | 9428 | 733 | 849 |

- 2.4.14 Traffic volumes to the west of Nairn are greater than traffic volumes to the east of Nairn, and continue the trend of reducing traffic volumes heading east from Inverness.

Road Accidents

- 2.4.15 An analysis of personal injury accident data between 1 January 2008 and 31 December 2012 was carried out to assess current road safety conditions and to analyse and compare current conditions with national trends. Personal injury accidents are classified as fatal, serious and slight dependent on the most severely injured casualty.
- 2.4.16 Drawing B1557601/EXI/0004 (Volume 2) shows the location and severity of personal injury accidents during the 5 year period. Fatal accidents (red) are recorded where the level of injuries sustained cause death within 30 days of the accident. Serious accidents (blue) are recorded where a casualty is detained in hospital or sustains fractures, concussion, severe cuts or where death occurs 30 or more days after the accident. Slight accidents (green) are recorded when a casualty sustains a sprain, bruise or slight cut.
- 2.4.17 In total, there have been 42 accidents on this section of the existing A96 between 2008 and 2012 none of which were fatal, six were serious and the remaining 36 were slight in severity. Also, it is evident that the majority of accidents occur in the proximity of junctions.
- 2.4.18 25 of the accidents occurred within either the 40mph or 30 mph speed limit, with the remaining 17 occurring on a national speed limit section.
- 2.4.19 National accident rates express the number of personal injury accidents per million vehicle kilometres (PIA/MVkm). The rate is dependent on the road type and quality. The current national personal injury accident rate, as defined in DMRB Volume 15, Part 6 Chapter 5, Table 6/5/2, for link and junction accidents combined on modern rural single carriageway roads without hardstrips is 0.293 PIA/MVkm, and the national rate on modern urban single carriageway roads is 0.844. Table 2.12 shows the PIA/MVkm for this section. All defined parts have a PIA/MVkm which is lower than the national average of 0.293 PIA/MVkm on rural roads and 0.844PIA/MVkm on urban roads.

Table 2.12: Personal Injury Accidents per Million Vehicle Kilometres (PIA/MVkm) for the existing A96 between Gollanfield and Hardmuir (excluding the section of A96 within Nairn)

| Location | A96 Gollanfield to Nairn | A96 in Nairn | A96 Nairn to Hardmuir |
|----------------------------|--------------------------|--------------|-----------------------|
| Link Length (km) | 6.0 | 3.7 | 6.1 |
| Number of Injury accidents | 11 | 25 | 6 |
| AADT | 12600 | 14800 | 9400 |
| PIA/MVkm | 0.08 | 0.25 | 0.06 |

Road Pavement Condition Summary

- 2.4.20 A desk study was undertaken to determine the existing pavement construction and pavement condition between Gollanfield and Hardmuir, including Nairn. The information used in the desk study was obtained from the Scottish Executive Road Information System (SERIS), which is a database maintained by Transport Scotland which is used to log and predict the current condition of the trunk road network in Scotland.
- 2.4.21 Analysis from SERIS indicates that for this section of the existing A96, the pavement is of fully flexible construction and the bituminous layer varies in depth, with the mean bituminous

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layer depth being 231mm. SERIS does not contain information on the granular layer depth of the existing A96 so this information has not been included in this section of the report. It should be noted that a sense check was performed on the data obtained from SERIS and all results perceived to be outside a realistic range of between 100mm and 500mm were discounted.

- 2.4.22 The residual life of this section of the existing A96 has also been determined from SERIS. Table 2.13 details the percentage length and actual length of the existing A96 which falls within five defined ranges of residual life.

Table 2.13: Range of Pavement Residual Life

| Residual Life (years) | % Length of Section | Length of Section (km) |
|-----------------------|---------------------|------------------------|
| <5 | 12% | 2006 |
| 5-9 | 8% | 1302 |
| 10-14 | 9% | 1469 |
| 15-19 | 19% | 3005 |
| >19 | 52% | 8486 |

- 2.4.23 From Table 2.13, 71% of the section has a residual life of 15 years or more with 12% approaching critical condition of less than five years residual life.

Junctions

- 2.4.24 There are twelve junctions on the existing A96 within the rural sections between Gollanfield and Hardmuir. These are shown on Drawings B1557601/EXI/0001 and 0002 (Volume 2) and described from west to east below:

U1029 junction

- 2.4.25 This is a simple T-junction providing access to Tomhommie along the U1029 Tomhommie – Ballinreich – Balnagowan Road, north of the existing A96. The U1029 is a single lane carriageway and the road width at this junction does not permit two-way traffic to pass. The junction is situated 1.8km east of the C1013 junction.

U2218 junction

- 2.4.26 The U2218 junction provides access to Port of Ardersier along the U2218 McDermotts Road. This T-junction features a ghost island right turn lane for westbound traffic and nearside diverging and merging tapers for eastbound traffic, of a similar length to those found on a dual carriageway. There is a give way at the end of the diverge taper. There are no physical islands between the U2218 and the existing A96. The junction is situated 1.3km west of the C1163 southern junction.

C1163 northern junction and C1163 southern junction.

- 2.4.27 The C1163 Delnies – Kildrummie – Howford Road links to the B9091 Croy – Clephanton – Kildrummie – Nairn Road south of the existing A96. The C1163 to the north is a single lane carriageway linking to the B9092 Ardersier – Nairn Road and has been designed as an access, as it has no junction bellmouths and features a dropped kerb over the footway. The south side of the junction features a ghost island right turn lane for eastbound traffic and westbound traffic is assisted by a diverge lane with a give way at the end. Bus lay-bys are located immediately adjacent to the north and south junctions. Illuminated keep left bollards are present on the physical approach island on the south side.

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B9092 junction

- 2.4.28 The B9092 junction provides access to Ardersier via a T-junction with a ghost island right turn lane for westbound traffic. The junction is on the outside of a bend with the B9092 Ardersier – Nairn Road approaching from the west at a skew angle and turns sharply on approach to the junction in order for the B9092 to be perpendicular to the existing A96.

U2997 junction and B9111 western junction

- 2.4.29 This is a left/right staggered junction providing access to rural properties north of the existing A96 via the U2997 Waterloo – Eastertown – Inshoch Road and to the west side of Auldearn via the B9111 Auchnacloch – Auldearn Road. Ghost island right turn lanes are provided for both the U2997 and B9111 junctions.

C1172 junction

- 2.4.30 This is a simple T-junction connecting to the C1172 Auldearn – Station – Drum Road, which provides access to Boath House Hotel and continues north. The junction is situated 600m west of B9111 eastern junction.

B9111 eastern junction and U2959 junction

- 2.4.31 This is a right/left staggered junction providing access to the east side of Auldearn to the south of the existing A96 via the B9111 Auchnacloch – Auldearn Road, and the properties at Broombank, north of the existing A96 via the U2959 Broombank Road. The B9111 eastern junction incorporates a taper along the major road to allow for the swept path of large vehicles when turning left onto the existing A96. The street lighting from the B9111 extends to the junction and there is a channelising island including illuminated keep left bollards. The U2959 junction is a smaller junction with no 'Give Way' sign or road markings. The footway on the B9111 extends through the staggered junction to the U2959 with dropped kerbs on the existing A96.

U3164 junction

- 2.4.32 A simple T-junction providing access to properties to the north of the existing A96 via the U3164 Penick Road. There is a lay-by adjacent to the junction on the eastbound side and another lay-by opposite the junction on the westbound side.

U3036 junction

- 2.4.33 This is a simple T-junction providing access to the local road network to the north of the existing A96 via the U3036 Ellands – Hardmuir – Boghole Road. There is a lay-by adjacent to the junction on the eastbound side. This junction is at the eastern limit of the scheme extents.

Direct Accesses and Field Accesses

- 2.4.34 Twenty-four accesses to the existing A96 have been identified within this section of the study area. In addition, sixteen field accesses have been identified.

- 2.4.35 The following three private accesses each provide access to a small group of houses.

Cockhill access

- 2.4.36 This is a simple access providing access to Cockhill, south of the existing A96. The access is situated 2.3km east of the U1029 junction.

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Courage Steading access

- 2.4.37 This is a simple access providing access to Courage Steading, south of the existing A96. The access is situated 1.3km east of the B9111 eastern junction.

Hardmuir of Boath access

- 2.4.38 This is a simple access providing access to Hardmuir of Boath, south of the existing A96. There is a bus shelter adjacent to the access on the south side of the existing A96, and a bus lay-by opposite it on the north side of the existing A96. The access is situated 2.4km east of the B9111 eastern junction.

Structures

- 2.4.39 There are five bridges, three culverts and one retaining wall along this section of the existing A96.
- 2.4.40 The bridges on this section of the existing A96 cross rail lines and watercourses. The Transport Scotland SERIS database has been used to inform this section in relation to the condition of existing structures.

Bridges

- 2.4.41 A summary of the existing bridges is provided in Table 2.14 below. A more detailed description of each structure follows this table.

Table 2.14: Existing Bridges

| Reference | Name | General Dimensions | | Comments |
|-----------|---------------------------|------------------------------|------------|---|
| | | Span Lengths | Deck Width | |
| A96 550 | Gollanfield Rail | 9.62m on skew of 45 degrees | 64m | Single span precast beam and concrete infill deck |
| A96 540 | Nairn River | 8.8m, 12.0m and 16.3m square | 11.8m | Three span masonry arch |
| A96 530 | New Nairn Rail Overbridge | 13m on skew of 36 degrees | 14.9m | Single span steel plate girder |
| A96 528 | Auldearn Burn | 3.1m on skew of 33 degrees | 24m | Reinforced concrete box |
| A96 526 | Auchnacloch Underpass | 3.9m on skew of 8 degrees | 25.5m | Corrugated steel buried structure |

Gollanfield Rail (Reference No. A96 550)

- 2.4.42 Located 2.0km east of the B9006 northern junction, the Gollanfield Rail structure carries the existing A96 over the Aberdeen to Inverness Railway Line. It was constructed circa 1975 and comprises a single span simply supported precast pretensioned beam and concrete infill deck. The end supports comprise full height concrete cantilever abutments. It is not known whether the foundations comprise spread foundations or piles. The structure has a skew of 45 degrees with a clear skew span of 9.62m. The carriageway is of constant width of 7.3m between kerbs. A 2m wide raised verge is provided on the each side of the carriageway. No hard strips are provided, but ladder markings with red surfacing are provided between the running lanes. The minimum available headroom to the track below is 4.7m. In-situ reinforced concrete parapets 1.5m high of P6 containment with steeply copes are provided over the structure parallel to the existing A96 carriageway. In addition, P5 containment metal post and rail pedestrian parapets are provided at each end of the deck over the railway.

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- 2.4.43 The most recent General and Principal Inspections (2012 and 2008 respectively) state that the structure is generally in a good condition with only minor defects. No category 3 or 4 defects were identified.
- 2.4.44 The cross section of this structure does not meet the current standards required for a single carriageway. The width between kerbs of 7.3m does not meet the requirement of 9.3m for a rural single carriageway in accordance with TD 27/05 of the DMRB and the overall width between parapets at 11.3m is less than current standards.
- 2.4.45 The parapet containment over the structure complies with current standards. However, the connection of the approach safety barrier to the concrete parapet is non-standard.
- 2.4.46 The structure is recorded as being designed to accommodate full HA loading and 45 units of HB loading. Assessment records indicate an assessed load carrying capacity of full BD 21/01 assessment live loading and 45 units of HB loading.

Nairn River (Reference No. A96 540)

- 2.4.47 Located in the centre of the town of Nairn, the structure carries the existing A96 over the River Nairn. It was constructed circa 1803 and partially destroyed in the great flood of 1829, rebuilt soon afterwards and again in 1868 and widened and strengthened in 1936. It comprises three spans of masonry arch construction. The intermediate supports comprise masonry faced solid wall piers and the end supports comprise masonry faced full height cantilever abutments, all on mass concrete spread footings on rock. The structure is square with spans of 8.8m, 12.0m and 16.3m from east to west. The deck is approximately 11.8m wide and includes 2 no footpaths approximately 2m wide. The available navigation headroom to the river below is 7.2m. Vehicle containment comprises non-standard masonry parapets approximately 0.85m high on each side of the deck with metal hand railings on top.
- 2.4.48 The most recent General Inspection (2011) indicates that the structure is generally in a good condition. The carriageway drainage is recorded in the General Inspection as causing staining to the east span and is recorded as a category 3 defect. However, this defect does not affect the structural integrity of the structure.
- 2.4.49 The cross section of this structure does not meet the current standards required for a single carriageway. The carriageway width of approximately 7.8m exceeds the requirement of 7.3m for an urban single carriageway in accordance with TD 27/05 of the DMRB.
- 2.4.50 The parapet containment over the structure does not comply with current standards.
- 2.4.51 There is no record of the loading for which the structure was originally designed. Assessment records indicate an assessed load carrying capacity of full BD 21/01 assessment live loading and 39 units of HB loading.

New Nairn Rail Overbridge (Reference No. A96 530)

- 2.4.52 Located to the south east of the town of Nairn, the structure carries the single track Aberdeen to Inverness Railway Line over the existing A96. It was constructed circa 1992 and comprises a single span of steel plate through girder construction. The masonry faced end supports are supported on mass concrete on rock. The structure has a skew of approximately 36 degrees and the skew span length is 13m. The deck is 14.9m wide. The minimum available headroom to the existing A96 below is 5.9m. Steel parapets are mounted on the edge girders of the structure. The structure is owned and maintained by Network Rail. No inspection records are available for this structure. There is no record of the design loading or of an assessment of load carrying capacity of this rail over road structure.

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Auldearn Burn (Reference No. A96 528)

- 2.4.53 Located approximately 250m west of the B9111 western junction, the structure carries the existing A96 over the Auldearn Burn. It was constructed circa 1960 and comprises a reinforced concrete box type structure. The structure passes below the existing A96 on a skew of approximately 33 degrees and the internal span length is approximately 3m. The road over the structure comprises a carriageway approximately 8.46m wide with a grassed verge approximately 2.3m wide on the north side and a stone filled drainage trench approximately 2.1m wide and 1.5m wide surfaced footway on the south side. The minimum available headroom through the structure is 3.2m. Vehicle containment comprises a corrugated steel safety barrier in each verge whilst pedestrian protection comprises a timber post and rail fence on the north side and a metal pedestrian guardrail on the south side.
- 2.4.54 The most recent General Inspection (2011) indicates that the structure is generally in a good condition. The safety fencing over the structure is noted as being too low and of insufficient length on the approaches to the structure and is recorded as a category 3 defect. However, this defect does not affect the structural integrity of the structure.
- 2.4.55 The carriageway width of approximately 8.46m does not meet the current requirement of 9.3m for a rural single carriageway in accordance with TD 27/05 of the DMRB. Lengthening of the structure will be required to achieve the current cross section standard for a single carriageway.
- 2.4.56 The structure is recorded as being designed to accommodate full HA loading and 37.5 units of HB loading. Assessment records indicate an assessed load carrying capacity of full BD 21/01 assessment live loading. No HB loading is available.

Auchnacloch Underpass (Reference No. A96 526)

- 2.4.57 Located in the vicinity of the B9111 western junction, the structure carries the existing A96 over a farm access track. It was constructed circa 1987 and comprises a corrugated steel buried structure. The structure passes below the existing A96 on a skew of approximately 8 degrees and the internal span length is approximately 3.9m. The road over the structure comprises a carriageway approximately 10.85m wide with a grassed verge approximately 4m wide on the north side and a grassed verge approximately 3.7m wide on the south side. The available headroom through the structure is 3.69m. Vehicle containment comprises an un-tensioned corrugated steel safety barrier on each side whilst pedestrian protection comprises a timber post and rail fence on each side.
- 2.4.58 The most recent General and Principal Inspections (2010 and 2012 respectively) indicate that the structure is generally in a good condition. The safety fencing over the structure is noted as being too low and is recorded as a category 3 defect. However, this defect does not affect the structural integrity of the structure.
- 2.4.59 The cross section of this structure exceeds current standards required for a single carriageway due to carriageway widening to accommodate a right turn lane at the junction with the B9111 Auchnacloch – Auldearn Road to the west. The structure would not require to be widened to achieve the current cross section standard for a single carriageway.
- 2.4.60 The structure is recorded as being designed to accommodate full HA loading and 45 units of HB loading. No assessment records are available to indicate an assessed load carrying capacity.

Culverts

- 2.4.61 The three culverts located on the existing A96 within this section of the study area are as follows:

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- A96 540 C28 Alton Burn;
- A96 520 C85 Boath Burn; and
- A96 520 C75 Broombank Burn

2.4.62 It should be noted that the 2010 Principal Inspection of A96 520 C85 Boath Burn identified giant hogweed as being present adjacent to the structure.

2.4.63 It should be noted that the 2010 General Inspection of A96 520 C75 Broombank Burn identified that pedestrian fencing was missing to the headwalls and that giant hogweed was present adjacent to the structure.

2.4.64 No other category 3 or 4 defects other than those noted above affect these minor structures.

Retaining Walls

2.4.65 The retaining wall located on the existing A96 is the A96 530 W85 Nairn which is supporting the existing A96 on the south side, 50m east of the River Nairn structure.

2.4.66 It should be noted that both the 2010 Principal Inspection and 2012 General Inspection of A96 530 W85 Nairn retaining wall identified that the height of the masonry parapet on top of the wall was less than 1m high and therefore provided insufficient protection to pedestrians. However, this defect does not affect the structural integrity of the wall.

2.4.67 No other category 3 or 4 defects other than those noted above affect this structure.

Roadside Features

Lay-Bys

2.4.68 This section of the existing A96 has been assessed to determine the existing lay-by provision along the route. In total 18 lay-bys have been identified, eight of which are in the westbound direction and ten are in the eastbound direction. Each lay-by has been categorised as either Type A, Type B or Bus Lay-By in accordance with TD 69/07 of the DMRB.

2.4.69 Travelling west to east from Gollanfield to the eastern extents of the scheme on the existing A96, the approximate location, direction and type of lay-by are described in Table 2.15 below:

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Table 2.15: Location and Type of Lay-Bys - Gollanfield to Hardmuir

| Approximate Location | Lay-By Type | Direction |
|---|-------------------|-----------|
| Adjacent to the C1163 southern junction | Bus Lay-By | Westbound |
| Opposite the C1163 southern junction | Bus Lay-By | Eastbound |
| 160m east of Easter Delnies Farm access | Type B | Eastbound |
| 125m west of Tradespark Road in Nairn | Bus Lay-By | Eastbound |
| 50m west of Tradespark Road in Nairn | Bus Lay-By | Westbound |
| 20m west of Duncan Drive in Nairn | Bus Lay-By | Westbound |
| Opposite Duncan Drive in Nairn | Bus Lay-By | Eastbound |
| Opposite Beech Avenue in Nairn | Bus Lay-By | Eastbound |
| Opposite Fraser Park in Nairn | Bus Lay-By | Westbound |
| Opposite Albert Street in Nairn | School Bus Lay-By | Westbound |
| 170m west of Auchnacloch access | Type B | Eastbound |
| 800m east of B9111 western junction | Type B | Westbound |
| 550m east of B9111 eastern junction | Type B | Eastbound |
| Adjacent to U3164 junction | Type B | Eastbound |
| Opposite U3164 junction | Type B | Westbound |
| 160m east of U3164 junction | Type A | Westbound |
| Opposite Hardmuir of Boath access | Bus Lay-By | Eastbound |
| Adjacent to the U3036 junction | Type B | Eastbound |

Lighting

- 2.4.70 On this section of the existing A96 street lighting is provided through the town of Nairn. The lighting on the B9111 Auchnacloch – Auldearn Road extends to the B9111 eastern junction.

Vehicle Restraint System

- 2.4.71 Vehicle Restraint System (VRS), or safety barrier, is provided at various points along the existing A96 within this section of the study area to prevent errant vehicles from hitting hazards. Table 2.16 shows the approximate locations of the VRS, its length, and the hazard.

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Table 2.16: VRS between Inverness and Gollanfield

| Approximate Location | Verge | Length | Hazard |
|--|-----------------|--------|--------------|
| 2.0km east of C1013 junction | North and south | 700m | Railway line |
| 130m east of Tom Semple Road in Nairn | North | 80m | VRS sign |
| Adjacent to the B9111 western junction | North and south | 35m | Underpass |
| 1.2km east of the B9111 western junction | North and south | 80m | Watercourse |
| Eastbound approach to B9111 eastern junction | North | 300m | Watercourse |
| Westbound approach to B9111 eastern junction | South | 250m | Watercourse |
| Westbound approach to U2959 junction | North | 120m | Embankment |
| In front of Courage Cottage | South | 50m | Embankment |
| Westbound approach to U3164 junction | North and south | 100m | Embankment |

Signage

- 2.4.72 On this section of the existing A96, one variable message sign is provided in the north verge, 130m east of the Tom Semple Road junction in Nairn.

Rest Areas

- 2.4.73 Currently, there are no rest areas on this section of the existing A96, but there are parking areas available within Nairn associated with retail facilities.

Non-Motorised User Provision

Footways

- 2.4.74 Table 2.17 describes the footpaths and footways which are within the immediate vicinity of this section of the existing A96.

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Table 2.17: Footpaths/footways within the vicinity of this section of the A96

| Path Name | Description |
|-------------------------|--|
| Core Path NA05.15 | A 1.9km circuit through Delnies Wood. |
| Core path NA04.17 | A 0.4km track connecting core path NA04.02 and core path NA04.18 at Firhall. |
| Core Path NA04.16 | A 1.3km path connecting Jubilee Bridge to Firhall along the west bank of the River Nairn. |
| Core Path NA04.13 | A 4.8km earth track travelling in a circular route at Delnies. |
| Core Path NA04.12 | A 0.9km gravel track which connects the existing A96 to the coastline through Easter Delnies. |
| Core Path NA04.11 | A 0.5km gravel path connecting the existing A96 to Moss Side. |
| Core Path NA04.09 | A 1.5km gravel and earth path that travels from the existing A96 to the coastline. |
| Core Path NA04.08 | A 0.3km gravel path that travels through Tradespark Wood. |
| Core Path NA04.07 | A 2.5km surfaced path travelling adjacent to the existing A96 and the B9111 between Nairn and Auldearn. |
| Core Path NA04.04 | A 5.5km path which runs adjacent to the east bank of the River Nairn south of Howford. |
| Core Path NA04.03 | A 1.4km path that runs adjacent to the east bank of the River Nairn between Firhall Bridge and Howford Bridge. |
| Core Path NA04.02 | A 2.6km surfaced and gravel path that travels adjacent to the east bank of the River Nairn between the Harbour and Firhall Bridge. |
| Core Path NA01.01 | A 1.1km path connects Auldearn to Newmill. |
| Delnies to Nairn | A 0.9km footway in the westbound verge between Delnies and the speed limit change at Nairn. |
| Nairn footways | There is a footway in the westbound verge throughout Nairn linking the Delnies to Nairn footway and the NA04.07 Core Path. There is an intermittent footway in the eastbound verge throughout Nairn. |
| Boath House to Auldearn | The path crosses the existing A96, linking Boath House with Auldearn. |
| Broombank to Auldearn | The path crosses the existing A96, linking Broombank with Auldearn. |

2.4.75 The Core Paths are discussed in Part 3, Chapter 15 (All Travellers) of this report.

Cyclepaths

2.4.76 National Cycle Network Route 1 Dover – Shetland crosses the existing A96 on the River Nairn crossing within the town of Nairn. In addition to pedestrians, cyclists have a legal right to use Core Paths. The existing A96 is not classed as a special road, and cyclists may legally use this route.

Bridleways

2.4.77 In addition to pedestrians and cyclists, equestrians have a legal right to use Core Paths. No other bridleways have been identified within the study area. However, the existing A96 is not classed as a special road, and horse riders and horse drawn vehicles may legally use this route.

Drainage

2.4.78 Road drainage on this section of the existing A96 varies with surface water run-off along sections of the road, either draining naturally into the adjacent land or being directed

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positively to outfall into the nearest watercourses via shallow ditches, gullies and pipes or filter drains.

- 2.4.79 The majority of junctions have kerbed edges with channel gullies likely connecting directly into carrier drains. Throughout Nairn, the existing A96 is kerbed with gullies.

Public Utilities

- 2.4.80 Public utilities have been identified and key utilities are shown on Drawings B1557601/EXI/0005 and 0006 (Volume 2).

Telecoms

- 2.4.81 BT underground cables run adjacent to this section of the existing A96 from Gollanfield until Auldearn where the cable travels adjacent to the B9111 Auchnacloch – Auldearn Road, before re-joining the existing A96 at the B9111 eastern junction. BT cables also run adjacent to many of the major local roads; these cables connect to the mainline cable in the vicinity of the junctions with the A96. A THUS telecommunications cable also runs adjacent to the existing A96 from the C1032 eastern junction to the eastern limit of the study area.

Gas

- 2.4.82 Gas utilities are generally centred around Nairn and Auldearn in this section of the existing A96. There are no pipes to the west of Nairn. Through Nairn itself, low pressure gas pipes run adjacent to the existing A96 intermittently. Between Nairn and Auldearn a medium pressure gas pipe crosses the existing A96 on three occasions. There is a high pressure gas main to the south of Nairn.

Electricity

- 2.4.83 Scottish and Southern Energy's 132kV, 33kV and 11kV cables are located both overground and underground throughout the study area. The cables do not run adjacent to the existing A96 for any significant periods however cables do cross both over and under the trunk road on numerous occasions.

Water Supply and Sewerage

- 2.4.84 There are several water supply pipes across the study area, one of which runs adjacent to the existing A96 through the town of Nairn. The majority of water pipes are concentrated within Nairn and water pipes pass under the existing A96 on a number of occasions.
- 2.4.85 Foul pipes are concentrated around Nairn and Auldearn with little provision in rural areas. The pipes run adjacent to the existing A96 intermittently and also cross the trunk road on numerous occasions throughout this section of the study area.
- 2.4.86 A number of private water supplies (PWS) have been identified within the study area and these are discussed in Part 3, Chapter 12 (Geology and Soils) of this report and shown on Figures 12.1 to 12.9 (Volume 3).

Government Pipeline and Storage System

- 2.4.87 A government pipeline runs around the south of Nairn and crosses under the existing A96 near the B9111 western junction.

Bus Services

- 2.4.88 Bus services which use the existing A96 through Nairn include the 10, 10A, X10, 11, 11A, 35 and 35A operated by Stagecoach. All of these routes use only the existing A96 through this

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section of the study area, except for the 11A which also uses the B9092 Ardersier – Nairn Road.

2.4.89 The Highland Council provides school bus services for Culloden Academy, Nairn Academy, Auldearn Primary, Ardersier Primary, Balloch Primary and Croy Primary. It is understood that these services utilise the following roads:

- Existing A96 Aberdeen – Inverness Trunk Road;
- B9006 Millburn Roundabout – Culcabock – Castle Hill – Culloden Moor – Croy – Gollanfield – Fort George Road;
- B9092 Ardersier – Nairn Road;
- A939 Tomintoul – Grantown on Spey – Nairn Road;
- B9111 Auchnacloch – Auldearn Road;
- B9101 Auldearn – Cawdor Road;
- C1171 Auldearn – Moyness Road;
- C1163 Delnies – Kildrummie – Howford Road; and
- U3164 Penick Road.

3 Description of Route Options

3.1 Introduction

3.1.1 This chapter provides a description of the route options assessed within this DMRB Stage 2 Scheme Assessment Report.

3.2 Route Option Development

3.2.1 Route options were developed and assessed in 2010 and 2011 for upgrading the A96 between Inverness and Nairn to dual carriageway (with at-grade junctions) and a single carriageway bypass of Nairn. The assessment findings were documented in a series of assessment tables, and this information was then used as the basis of a decision-making process to identify a number of feasible routes worthy of further investigation. These options were presented at public exhibition in February 2012.

3.2.2 Following the commitment by the Scottish Government to upgrade the A96 to dual carriageway with grade separated junctions, the options were re-assessed and additional options developed to provide a free-flow alignment and to accommodate the future extension of the dual carriageway to the east, towards Aberdeen.

3.2.3 For the original dual carriageway section between Inverness and Gollanfield the route options being considered in this DMRB Stage 2 Scheme Assessment Report, described in section 3.3 below, were directly developed from the options presented at public exhibition in February 2012 with an additional variant, not previously considered, to the south of Morayston House between Newton and Kerrowaird.

3.2.4 For the Nairn Bypass, the change to dual carriageway standard with grade separated junctions due to the commitment to upgrade the A96 between Inverness and Aberdeen to dual carriageway resulted in greater changes to the options previously presented at public exhibition in February 2012. Those single carriageway options were upgraded and the design speed was increased from 100kph to 120kph due to the change in road category. As a consequence, the desirable minimum horizontal radii were increased. At the west end of the Nairn Bypass, a free-flowing alignment and grade separated junction replaced the original at-grade roundabout and options were considered through Delnies Wood and Blackcastle Quarry.

3.2.5 The original Nairn Bypass options ended at an at-grade roundabout between Nairn and Auldearn. It was recognised that in order to accommodate future extension of the dual carriageway east, towards Aberdeen, the Nairn Bypass options should be extended to Hardmuir Toll, some 3km east of Auldearn. This allowed consideration of options for the Nairn Bypass in combination with A96 dualling past Auldearn. As a result, four possible routes were considered past Auldearn.

3.2.6 Public exhibitions were held in November 2013 where the eight Inverness to Gollanfield options and nine Nairn Bypass options were presented. Public feedback was received during the consultation period which ended on 31 January 2014. As a result of the feedback received, the options were refined at the following locations: Milton of Culloden South, Blackcastle Quarry, Balnaspirach and between Auldearn and Hardmuir. The refined options were presented at Community Council Forums on 28/29 May 2014 and published on the Transport Scotland website. These are the options presented and assessed in this report.

3.2.7 The scheme is described in two parts: Inverness to Gollanfield and the Nairn Bypass.

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3.3 Inverness to Gollanfield

- 3.3.1 The scheme starts at the roundabout for Inverness Retail Park and generally follows the existing A96 corridor to Gollanfield, west of the existing A96 bridge over the Aberdeen to Inverness Railway Line, covering a distance of approximately 14km. Access to and from the A96 dual carriageway would be at grade separated junctions only and no other direct access onto the dual carriageway is proposed.
- 3.3.2 All route options follow the same line between the roundabout for Inverness Retail Park and Stratton and between Brackley and Gollanfield. Two options have been considered between Stratton and Newton, and two options have been considered between Kerrowaird and Brackley. Combined, these give four options, which have been designated 1A to 1D. For each of these options, a variant to the south of Morayston has been considered. These Morayston Variants have been designated 1A (MV) to 1D (MV). This results in eight possible route option combinations between Inverness Retail Park and Gollanfield.
- 3.3.3 The route options are shown on drawing B1557601/OPT/0001 (Volume 2). It should be noted that these are preliminary designs and the preferred option is subject to change in future design stages (including alignment, and junction layout and location). The preferred option will be developed further during the future Stage 3 assessment, including considering feedback from stakeholder, landowner and public consultations.

Inverness Retail Park Roundabout to Stratton

- 3.3.4 Immediately east of the roundabout for Inverness Retail Park, the route options progress Offline to the south of the existing A96, rising on an embankment to cross the western end of Barn Church Road at the proposed grade-separated Smithton Junction. The existing A96 would be retained for local access and would connect to the proposed Smithton Junction.

Stratton to Newton

1A, 1A (MV), 1B, 1B (MV)

- 3.3.5 These route options re-join the line of the existing A96 from Milton of Culloden to Allanfearn. From Allanfearn to Newton the route passes south of the Aberdeen to Inverness Railway Line and north of the existing A96.
- 3.3.6 Newton Junction A is a grade separated junction on the line of route options 1A and 1B which connects to the eastern end of Barn Church Road and the existing A96 single-carriageway for local access. Newton Junction C serves 1A (MV) and 1B (MV) and is further east than Newton Junction A, connecting to the existing A96 and the B9039.

1C, 1C (MV), 1D, 1D (MV)

- 3.3.7 These routes remain south of the existing A96 between Stratton and Newton passing north of properties at Milton of Culloden South and south of Allanfearn. A grade separated junction at Newton (Newton Junction B) provides a connection with the existing A96 and the eastern end of Barn Church Road.

Newton to Kerrowaird

1A, 1B, 1C, 1D

- 3.3.8 These routes closely follow the corridor of the existing A96 but are Offline immediately south of it. The existing A96 single-carriageway would be retained as a local road.

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1A (MV), 1B (MV), 1C (MV), 1D (MV)

- 3.3.9 Due to the constraints of residential and commercial properties along the existing A96 corridor past Morayston, the Morayston Variant is Offline to the south of Morayston. Due to the rising topography, these routes climb to a high point immediately south of Morayston. The existing A96 would be retained as a local road.

Kerrowaird to Brackley

1A, 1A (MV), 1C, 1C (MV)

- 3.3.10 At Kerrowaird, these routes cross the existing A96 and pass through the northern part of Tornagrain Wood, close to the Aberdeen to Inverness Railway Line. Mid Coul Junction A provides access to Mid Coul and the existing A96 to the south, and Inverness Airport to the north via the existing bridge over the railway. East of the junction, the route continues close to the railway before swinging south to re-join the existing A96 corridor before Brackley.

1B, 1B (MV), 1D, 1D (MV)

- 3.3.11 At Kerrowaird, these routes also cross the existing A96, but pass through Tornagrain Wood along the current A96 corridor with a sections of online widening between Tornagrain and Brackley. Past the areas of online widening, new local roads are provided to connect the remaining sections of the existing A96. Mid Coul Junction B is at the location of the existing airport roundabout on the A96, and connects to the airport and the new local road that replaces the A96 single carriageway.

Brackley to Gollanfield

- 3.3.12 All route options are online from west of Brackley to Gollanfield.
- 3.3.13 Brackley Junction is at the approximate location of the existing staggered Brackley junction providing access to the B9006 to the north and B9090 to the south.

Summary

- 3.3.14 Table 3.1 gives an overview of the components of each route option for Inverness to Gollanfield.

Table 3.1: Inverness to Gollanfield route option description summary

| Route Option | Stratton to Newton | Newton to Kerrowaird | Kerrowaird to Brackley |
|--------------|--------------------|----------------------|------------------------|
| 1A | Offline to north | Online | Offline to north |
| 1A (MV) | Offline to north | Offline to south | Offline to north |
| 1B | Offline to north | Online | Online |
| 1B (MV) | Offline to north | Offline to south | Online |
| 1C | Offline to south | Online | Offline to north |
| 1C (MV) | Offline to south | Offline to south | Offline to north |
| 1D | Offline to south | Online | Online |
| 1D (MV) | Offline to south | Offline to south | Online |

3.4 The Nairn Bypass

- 3.4.1 This section of the route provides a bypass to the south of Nairn. To the west, it connects to the previous section at Gollanfield, and to the east it passes the village of Auldearn and all options continue to a common tie-in point west of the junction for the U3036 Ellands – Hardmuir – Boghole Road. The section is approximately 16km long. Access to and from the

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A96 dual carriageway would be at grade separated junctions only and no other direct access onto the dual carriageway is proposed.

- 3.4.2 All route options begin with online widening of the long straight section of the existing A96 from Gollanfield. Some routes leave the line of the existing A96 near Blackcastle, while others continue to Delnies Wood. There are two potential crossing points over the River Nairn: the northern crossing is at Broadley, and the southern crossing is close to the existing bridge at Howford. At the east, there are four alignments under consideration past Auldearn: to the north; online; south through Bognafuaran Wood but north Newmill; or further south, south of Bognafuaran Wood and south of Newmill. Not every combination of these is feasible, and nine route options have been considered: 2A to 2I.
- 3.4.3 The route options are shown on drawing B1557601/OPT/0002 (Volume 2). It should be noted that these are preliminary designs and the preferred option is subject to change in future design stages (including alignment, and junction layout and location). The preferred option will be developed further during the future Stage 3 assessment, including considering feedback from stakeholder, landowner and public consultations.

West of Nairn

2A, 2B, 2C, 2D

- 3.4.4 These route options follow the existing A96 to Delnies Wood. As these route options depart from the existing A96, there is a grade-separated junction, Nairn West Junction A, to connect to the local road network, including the existing A96 to access the west side of Nairn. The route options pass through Delnies Wood towards the Aberdeen to Inverness Railway Line. After crossing over the railway, 2A, 2B, and 2C continue west towards the northern River Nairn crossing point at Broadley, and 2D runs south-west to the southern River Nairn crossing point at Howford.

2E, 2F, 2G, 2H, 2I

- 3.4.5 These route options depart from the existing A96 corridor at Blackcastle and pass through the Blackcastle sand and gravel quarry. A grade-separated junction, Nairn West Junction B, is located within the quarry and connects to the existing A96 for access into Nairn and the U2218 to Port of Ardersier. These routes also pass over the Aberdeen to Inverness Railway Line and then run east. 2E, 2F and 2G continue eastwards to the northern River Nairn crossing point at Broadley, and 2H and 2I swing south-east to the southern River Nairn crossing point at Howford.

River Nairn Crossing

2A, 2B, 2C, 2E, 2F, 2G

- 3.4.6 There are two sub-options at the northern River Nairn crossing point; 2A, 2B and 2C, approach from the north-west, while 2E, 2F and 2G approach from the west. After crossing the river, 2A and 2B swing north-east while 2C runs to the east. Similarly, east of the River Nairn, 2E and 2F curve to the north-east while 2G continues eastwards.

2D, 2H, 2I

- 3.4.7 While 2D crosses the Aberdeen to Inverness Railway Line at a different point than 2H and 2I, they converge before the River Nairn crossing. The southern River Nairn crossing is in a south-east direction, and all three options head east after the river crossing. Beyond Foynesfield, 2D and 2I proceed eastwards south of Auldearn and 2H swings north-east towards the east of Auldearn.

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East of Nairn

2A, 2E, 2H

- 3.4.8 2A and 2E approach the existing A96 from the northern River Nairn crossing, and 2H approaches from the southern, and they converge south of the existing A96. They all connect with the existing A96 and the B9111 between Nairn and Auldearn with a grade separated junction. Nairn East Junction A serves 2A and 2E and Nairn East Junction C serves 2H. Both junctions have a similar layout, with only minor variations to the slip roads, connecting to the existing A96 in both directions and the B9111 to the south-east, serving Auldearn and the east side of Nairn. These route options pass north of Auldearn through Bogside of Boath and Penick before crossing the line of the existing A96 at Courage and following an alignment parallel to and slightly to the south of the existing A96.

2B, 2F

- 3.4.9 2B and 2F follow the same corridor as 2A and 2E from the northern River Nairn crossing to Auchnacloch followed by a short online length of dualling along the existing A96 through its current corridor immediately north of Auldearn. A grade separated junction, Nairn East Junction B, provides access to Nairn via the existing A96, and Auldearn via the B9111. These route options continue to the eastern extent of the scheme following a line parallel to and slightly to the south of the existing A96.

2C, 2G

- 3.4.10 After the northern River Nairn crossing, these two route options run east and connect with the local road network at A939 Junction A, which serves the east of Nairn and timber and whisky industries to the south. Traffic travelling between Inverness and Auldearn would also use this junction and the B9101. East of the junction with the A939, these route options continue eastwards through the southern part of the Auldearn Battlefield. Near Kinstearry House, they curve north-east to tie-in with the existing A96 east of Auldearn. Nairn East Junction D connects to the existing A96 to serve Auldearn, but only connects with the proposed dual carriageway with east-facing slips for traffic travelling between Forres and Auldearn. These route options continue to the eastern extent of the scheme following an alignment parallel to and slightly to the south of the existing A96.

2D, 2I

- 3.4.11 2D and 2I run further south than 2C and 2G, from the southern River Nairn crossing, and avoid the Auldearn Battlefield. They also have a junction with the A939, designated A939 Junction B, at the existing staggered junction of the A939 and the B9101, to serve the east side of Nairn, the A939 to the south, and Inverness to Auldearn traffic. These converge with 2C and 2G near Kinstearry House and then follow the same alignment and junction strategy.

Summary

- 3.4.12 Table 3.2 gives an overview of the components of each route option for the Nairn Bypass.

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Table 3.2: Nairn Bypass route option description summary

| Route Option | West | River Crossing | East |
|--------------|--------------------|-------------------------|------------------------------|
| 2A | Delnies Wood | Northern River Crossing | North of Auldearn |
| 2B | Delnies Wood | Northern River Crossing | Online past Auldearn |
| 2C | Delnies Wood | Northern River Crossing | Between Auldearn and Newmill |
| 2D | Delnies Wood | Southern River Crossing | South of Newmill |
| 2E | Blackcastle Quarry | Northern River Crossing | North of Auldearn |
| 2F | Blackcastle Quarry | Northern River Crossing | Online past Auldearn |
| 2G | Blackcastle Quarry | Northern River Crossing | Between Auldearn and Newmill |
| 2H | Blackcastle Quarry | Southern River Crossing | North of Auldearn |
| 2I | Blackcastle Quarry | Southern River Crossing | South of Newmill |

3.5 Do-Minimum Scenario

3.5.1 The Do-Minimum Scenario comprises the Do-Minimum interventions included within the Moray Firth Transport Model (MFTM) which are listed below:

- Modifications to B9006 Millburn Roundabout – Culcabock – Castle Hill – Culloden Moor – Croy – Gollanfield – Fort George Road, including the introduction of a new arm to the Culloden Road / A9 slip road junction to serve the new Beechwood Campus;
- New Dalcross railway station;
- A new circular bus service linking Dalcross railway station and Inverness airport;
- A new Inverness to Nairn rail service (serving Dalcross Railway station);
- The replacement of Inshes roundabout with a signal controlled junction including left turn bypass lanes;
- Full signalisation of Longman Roundabout including associated works on the A82; and
- Completion of the western end of the B8082 Inverness Southern Distributor Road, with a crossing of the River Ness and Caledonian Canal.

3.5.2 There are no Trunk Road interventions included within the study area of the MFTM.

3.6 Cost Estimates

3.6.1 Initial scheme cost estimates have been prepared for each route option under consideration. The quantifiable items of the works have been measured and a cost per unit has been applied based on rates from similar schemes.

3.6.2 Other works elements have been assessed as a percentage of the total works costs. The percentage allowances are described below.

3.6.3 Preliminaries have been quantified as a percentage of the total Works costs. This is in line with other, similar schemes. Percentage allowances have also been made at a scheme level for items such as contingency and optimism bias. The percentage allowances are described below.

3.6.4 The base cost estimate is the sum of:

- Preparation costs;
- Advance works costs;
- Works costs;
- Contingency;

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- Economies of scale;
 - Public utilities costs; and
 - Employer issued ITS equipment costs.
- 3.6.5 Following the production of the base cost estimate, adjustments are required for the excess of construction cost inflation over general inflation, for risk and for optimism bias, as set out in STAG¹:
- Construction Cost Inflation (STAG paragraph 9.5.2) – No adjustment at this stage;
 - Risk (STAG paragraph 13.2) – A quantified risk allowance is included as described in paragraphs 3.6.21 and 3.6.22; and
 - Optimism Bias (STAG paragraph 13.3.3) of 25% has been agreed by the project team based on the requirements of the Treasury Green Book and Transport Scotland's guidance in the Network Evaluation from Surveys and Assignment (NESA) manual for a DMRB Stage 2 assessment roads cost factor.
- 3.6.6 The estimated base cost, de-trunking costs, Part I compensation costs, quantified risk allowance, and optimism bias are added to give a scheme total for each option.
- 3.6.7 Unit prices and percentage allowances have been derived from cost estimates used on similar schemes. The estimate is in Pounds Sterling (£) using rates indexed up to Quarter 1 2014. Different index factors were used for different aspects of construction: general, earthworks, pavement and structures. The index factors were taken from Construction Tender Price Indices calculated by the Building Cost Information Service (BCIS).
- 3.6.8 Location factors have not directly been applied to the cost estimate, though the rates have been sourced from schemes of a similar size and location.
- 3.6.9 The District Valuer has provided an initial estimate of land acquisition and compensation costs for each route option.
- 3.6.10 Some elements of the cost estimate have been calculated as a percentage of the total construction costs. These allowances have been mainly based upon knowledge from other projects and from industry guidance.
- 3.6.11 The preparation costs have been estimated by combining allowances for land acquisition, design and supervision, geotechnical and topographical surveys and for a potential public local inquiry. An allowance has been made for ecological and archaeological advance works such as pre-construction surveys.
- 3.6.12 Preliminaries are calculated as 17% of overall base construction costs.
- 3.6.13 Kerbs, footways and paved areas are taken as 3% of the cost of junctions and side roads. No kerbs or footways are to be provided on the dual carriageway.
- 3.6.14 Traffic signs and road markings are calculated as 2% of overall costs of other road items.
- 3.6.15 Environmental mitigation and landscaping is estimated as 2% of overall costs of other road and structures items.

¹ Scottish Transport Appraisal Guidance, available at <http://www.transportscotland.gov.uk/scottish-transport-appraisal-guidance-stag>

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- 3.6.16 Accommodation works are assumed as 3% of overall costs of other road items (derived by experience on other schemes).
- 3.6.17 A contingency of 15% was added to the construction costs to cover detailed items which have not been designed or allowed for elsewhere in the cost estimate, such as Police Observation Platforms, emergency lay-bys, contaminated land or NMU links.
- 3.6.18 Due to the large scale of this project, a 10% deduction was included to reasonably allow for economies of scale. The quantified risk register includes a risk that this will not transpire.
- 3.6.19 The cost estimate is based on the following assumptions:
- Adequate labour and plant are available throughout the construction period;
 - A source of acceptable fill material can be found within a reasonable distance of the scheme;
 - Access to the site is available on or before the contract start date and continues to be available throughout the contract period; and
 - Public utility diversions will be complete before the works contract begins.
- 3.6.20 The cost estimate does not include for the following:
- Future inflation as the cost estimate has been prepared at Quarter 1 2014 prices;
 - Financing or other charges;
 - Legal fees;
 - Temporary roads;
 - Contractor Risks based on contract and procurement; and
 - Value Added Tax.
- 3.6.21 The risks to the project have been identified in a risk register. For the significant financial risks, a probability of occurring, minimum, most likely, and maximum cost have been quantified. While most risks are threats of increased costs, some are opportunities for reduced costs. A simulation based on the Monte Carlo method was carried out for each route option to generate a quantified risk allowance.
- 3.6.22 Two of the most significant cost risks identified to the project are the occurrence of areas of soft ground and a change to the earthworks import rate.
- 3.6.23 The scheme cost estimate for each route option is provided in Tables 3.3 and 3.4, at Quarter 1 2014 prices.

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**Table 3.3: Scheme Cost Estimate Summary
Inverness to Gollanfield**

| Inverness to Gollanfield Route Option | Scheme Cost Estimate (Excluding VAT) Q1 2014 |
|---------------------------------------|--|
| 1A | £206.6M |
| 1A (MV) | £200.4M |
| 1B | £212.5M |
| 1B (MV) | £216.1M |
| 1C | £198.4M |
| 1C (MV) | £192.0M |
| 1D | £201.8M |
| 1D (MV) | £208.3M |

**Table 3.4: Scheme Cost Estimate Summary
Nairn Bypass**

| Nairn Bypass Route Option | Scheme Cost Estimate (Excluding VAT) Q1 2014 |
|---------------------------|--|
| 2A | £224.8M |
| 2B | £224.8M |
| 2C | £237.0M |
| 2D | £240.2M |
| 2E | £202.4M |
| 2F | £204.3M |
| 2G | £214.4M |
| 2H | £239.1M |
| 2I | £225.8M |

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INVERNESS TO NAIRN

(incl. Nairn Bypass)

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