3 Consideration of Alternatives

3.1 Introduction

3.1.1 This chapter describes the various stages of route option evaluation that have been undertaken during the development of the proposed Scheme, both in terms of traffic, economic and engineering feasibility, and the environmental assessment of route options. The chapter summarises the following:

- previous work commissioned by Transport Scotland and others relating to the dualling of the A96 between Inverness and Nairn, including a bypass of Nairn;
- an overview of the Design Manual for Roads and Bridges (DMRB) assessment work undertaken in the selection of the preferred option; and
- design development of the preferred option.

3.1.2 The chapter is supported by the following figure, which is cross referenced where relevant:

- Figure 3.1 (DMRB Stage 2 Route Options).

3.1.3 In May 2015 Transport Scotland appointed Jacobs to undertake the DMRB Stage 3 assessment for the proposed Scheme, following completion of the DMRB Stage 2 Scheme Assessment Report (Jacobs 2014) and announcement of the preferred option in October 2014. Further information on the DMRB Stage 2 assessment is provided in Section 3.3 (DMRB Stage 2 Options Appraisal).

3.2 A96 Corridor and Options Studies

3.2.1 Prior to the DMRB Stage 2 assessment a number of studies were undertaken that considered issues associated with the improvement of the existing transport network between Inverness and Nairn. Further details on these are provided below, which gives an overview of the alternatives that were considered in terms of both the A96 corridor and route options.

A96 Inverness to the Airport, Scottish Transport Appraisal Guidance (STAG) Assessment (Scott Wilson 2006)

3.2.2 This report detailed the findings of a STAG assessment of potential transport improvement options within the A96 corridor between Raigmore Interchange and Inverness Airport. Five options were taken forward to the detailed appraisal stage including:

- Provision of a new dual carriageway from Inverness Retail and Business Park roundabout to Smithton roundabout, incorporating improved at-grade junction arrangements.
- Provision of a new dual carriageway from Inverness Retail and Business Park roundabout to the Inverness Airport roundabout at Mid Coul.
- Provision of dual carriageway incorporating bus lanes between Inverness Retail and Business Park roundabout and the Smithton roundabout, with an increased number of bus services and including a Park and Ride facility between Smithton roundabout and Inverness Airport.
- Provision of a new rail halt at Inverness Airport, with an increased number of train services and including a Park and Ride facility.
- Provision of improved pedestrian footpaths and cycleways along the A96 Aberdeen to Inverness Trunk Road, incorporating safe facilities to cross the A96.

3.2.3 The conclusions of the report proposed a series of measures including in the short-term dualling of the A96 to Smithton, providing bus lanes and enhancing pedestrian/cyclist facilities, and in the medium-term dualling of the A96 between Smithton and Mid Coul and providing a new rail halt.

The A96 Growth Corridor Development Framework (The Highland Council 2007)

3.2.4 This planning framework was approved by The Highland Council in September 2007 and formed supplementary planning guidance until the adoption of the Highland-wide Local Development Plan in April 2012 (The Highland Council 2012) and the subsequent Inner Moray Firth Local Development Plan (The Highland Council 2015). It was developed in consultation with local stakeholders and included a line for the dualled A96 between Inverness and Nairn and two indicative lines for the Nairn bypass. The section up to Nairn was mainly on the line of the existing A96, with an offline section around the development proposals at Tornagrain. The Nairn bypass options both commenced at Drumdivan and crossed the River Nairn at Howford, re-joining the A96 at Auchnacloich either via Crook or Blackpark. It is important to note that the indicative lines of the A96 dualling and the Nairn bypass were not subject to an engineering or environmental assessment. They were focused solely on planning development growth and the framework highlights that the precise route of the A96 dualling is to be determined.

A96 Dualling to the Airport, DMRB Stage 2 Assessment (Atkins 2008)

3.2.5 This report detailed the findings of a DMRB Stage 2 assessment of route options to dual the A96 between Raigmore Interchange and Inverness Airport. The route corridor was sub divided into three sections, A B and C. Section A went from Raigmore Interchange to Smithton roundabout; Section B ran from Smithton roundabout to Newton of Petty and Section C started at Newton of Petty, running through to Mid Coul roundabout. Within each section a number of potential route options were selected following consideration of the existing conditions and constraints. Each route option was concurrent with the next section in order to provide a complete dualling route from Raigmore Interchange to the Mid Coul roundabout. No final recommendations of a preferred option are provided within the report.

Inverness Trunk Link Road, East Link Summary Status (The Highland Council 2009)

3.2.6 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. A preferred option was identified for the eastern section, 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.

A9, A96 Inverness, Nairn Strategic Corridor Options Study: DMRB Stage 1 Route Options Assessment - Existing Conditions Report (Atkins 2010a)

3.2.7 This report provided information relating to the engineering conditions of the existing road network between the A9 at Inshes and the A96 east of Nairn. It is focused on the existing network, and therefore no discussion of transport improvement options is included.

A9, A96 Inverness, Nairn Strategic Corridor Options Study: Environmental and Planning Constraints - Preliminary Assessment (Atkins 2010b)

3.2.8 This report presented an assessment of the existing environment and environmental constraints within the study area. It provided the environmental context for route option evaluation, but no discussion of transport improvement options is included.

A9, A96 Inverness, Nairn Strategic Corridor Options Study: Geotechnical Preliminary Sources Study Report (Atkins 2010c)

3.2.9 This report presented the findings of an assessment of the existing ground conditions, and although it discussed transport improvement options, it did so in relation to the extent of ground investigation potentially required for the different route options.

Highland-wide Local Development Plan (The Highland Council 2012)

3.2.10 This includes the indicative line of the Nairn bypass that re-joins the A96 at Auchnacloich via Blackpark, which was first published in the 2007 A96 Growth Corridor Framework (The Highland Council 2007) (paragraph 3.2.4). The Plan states that *'all proposed new roads are indicative and are subject to detailed consideration by Transport Scotland'* (The Highland Council 2012, page 52).

3.3 DMRB Stage 2 Options Appraisal

DMRB Stage 2 (2010 to 2012)

3.3.1 Transport Scotland commissioned Jacobs in 2010 to undertake a DMRB Stage 2 route options assessment 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 results were documented in a series of assessment tables, which from an environmental perspective included the consideration of land use and community, landscape and visual, water quality and flood risk, cultural heritage and habitats and biodiversity. This information was used within the decision-making process to identify a number of feasible route options for further investigation. These were presented at a public exhibition in February 2012, along with The Highland Council's emerging Local Development Plan proposals.

DMRB Stage 2 (2012 to 2014)

3.3.2 Following the commitment in the Infrastructure Investment Plan (Scottish Government 2011) to upgrade the A96 between Inverness and Aberdeen to dual carriageway, the route options developed as part of the initial DMRB Stage 2 assessment (paragraph 3.3.1) were re-assessed and additional route options were developed to provide a free-flow alignment and to accommodate the future extension of the dual carriageway to the east, towards Aberdeen.

3.3.3 At this stage of assessment the route options were considered in two distinct sections; a section from Inverness to Gollanfield, and a section known as the Nairn Bypass.

3.3.4 For the section between Inverness and Gollanfield, the route options presented at the public exhibition in February 2012 were developed to provide four route options designated as Options 1A to 1D. These included online and offline sections each with an additional variant, not previously considered, to the south of Morayston House, known as the Morayston Variant (MV). These were designated as Options 1A (MV) to 1D (MV) and resulted in eight route options overall. Each route option had a proposed grade separate junction at Smithton, Newton, Mid Coul and Brackley.

3.3.5 For the Nairn Bypass section, the commitment to upgrade the A96 to dual carriageway with grade separated junctions resulted in greater changes to the route options previously presented at public exhibition in February 2012. The single carriageway route options were upgraded and the design speed was increased from 100kph to 120kph due to the change in road category, resulting in an increase to the desirable minimum horizontal radii. Further route options were also developed and an option sifting workshop was held in March 2013 to review potential dual carriageway route options for the Nairn bypass and to remove those options that were potentially less feasible and/or desirable to progress to the full DMRB Stage 2 assessment.

3.3.6 At the west end of the Nairn Bypass section, a free-flowing alignment and grade separated junction replaced the original at-grade roundabout and alignments were considered through Delnies Wood, Blackcastle Quarry and Blar nam Fiadh peat bog, to the south of the Aberdeen to Inverness Railway Line.

3.3.7 In order to inform the assessment of the alignment through Blar nam Fiadh a ground investigation using a peat probe was undertaken in March 2013. This established that peat was present over a length of 1.6km of the proposed route option with peat thicknesses highly variable up to a maximum recorded depth of 6.9m. The presence of peat of this depth presents a greater degree of engineering difficulty in relation to constructability and related impacts when compared to other options. While the advantages of the Blar nam Fiadh route were recognised, this option was not

taken forward to the DMRB Stage 2 route option selection process due to the increased construction cost and environmental impacts, and the engineering risks due to proximity of the live Aberdeen to Inverness Railway Line and the peat bog.

3.3.8 There were two potential crossing points over the River Nairn; the northern crossing was at Broadley, and the southern crossing was close to the existing bridge at Howford. The original Nairn Bypass section route 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 route options should be extended to Hardmuir to the east of Auldearn. As a result, four possible alignments were considered past Auldearn; online past Auldearn, offline to the north of Auldearn, offline to the south of Newmill and offline to the north of Newmill.

3.3.9 Not every combination of the alignments referred to in paragraphs 3.3.5 to 3.3.8 was feasible, and as a result nine route options were considered designated as Options 2A to 2I. All route options had a junction to the west of Nairn (Nairn West Junction). Route options to the north of Auldearn had a junction with the existing A96 between Nairn and Auldearn (Nairn East Junction) and route options to the south of Auldearn had a junction with the A939 (A939 Junction) as well as the tie-in with the existing A96 to the east of Auldearn (Nairn East Junction).

3.3.10 As part of Transport Scotland's rolling programme of regular engagement, public exhibitions were held in November 2013 where the eight Inverness to Gollanfield route options and nine Nairn Bypass route options were presented and feedback sought. Public feedback was received during the consultation period which ended on 31 January 2014. As a result of the feedback received, the route options were refined at the following locations; Milton of Culloden South, Blackcastle Quarry, Balnaspirach and between Auldearn and Hardmuir. The refined route options were presented at Community Council Forums on 28 and 29 May 2014 and published on the Transport Scotland website. The route options were then assessed as part of the DMRB Stage 2 assessment (Jacobs 2014).

3.3.11 The line of the route options considered as part of the DMRB Stage 2 are shown on Figure 3.1, with full details of the route options provided in the DMRB Stage 2 Scheme Assessment Report (Jacobs 2014).

Assessment Summary and Recommendation

3.3.12 The route options were assessed as part of the DMRB Stage 2 assessment, with the outcomes reviewed at a 'Value for Money' workshop held on 7 May 2014. Full details of the assessment and the outcomes of the workshop are detailed in the DMRB Stage 2 Scheme Assessment Report (Jacobs 2014).

3.3.13 Part 3 of the DMRB Stage 2 Scheme Assessment Report (Jacobs 2014) set out the environmental factors to be taken into account in the selection of a preferred option and identified the environmental advantages, disadvantages and constraints associated with the alternative route options. Overall, the environmental assessment concluded that there were no potential impacts so significant that any route option would be discounted on the basis of any individual environmental criteria, and there was no one route option that was identified as being substantially and materially better than the other. The assessment identified differences between the route options at individual environmental topic level, which fed into the preferred option identification.

3.3.14 A summary of the assessment along with the preferred option that was selected is provided below for both the Inverness to Gollanfield and Nairn Bypass sections.

<u>Inverness to Gollanfield</u>

3.3.15 The preferred option for the Inverness to Gollanfield section was Option 1C (MV) because:

- it was generally offline with fewer impacts on accesses from the existing A96;
- the extent of the construction work was less than the other route options resulting in reduced material volumes and reduced costs;

- it could be constructed with less disruption or impact to road users and the local community;
- safety benefits would occur on the existing A96 for both motorised and non-motorised users (NMUs) due to reduction in traffic;
- it had the lowest estimated scheme cost;
- it avoided the demolition of one property at Mid Coul and the acquisition of two properties at Allanfearn; and
- it avoided impacts on the development capacity at Inverness Airport and Tornagrain.

3.3.16 In relation to the environmental assessment Option 1C (MV) was expected to have some of the lowest impacts in relation to habitats and biodiversity, geology and soils, effects of all travellers (e.g. path network), resource use and waste, residential and commercial assets and development land. However, there were potential impacts in relation to noise, landscape and visual, the water environment, cultural heritage and impacts on agricultural land, which would be taken forward for consideration within the DMRB Stage 3 assessment.

Nairn Bypass

3.3.17 The preferred option for the Nairn Bypass section was Option 2E because:

- the River Nairn crossing at Broadley was shorter and of lower cost;
- it required the lowest volume of necessary imported material;
- it could be constructed with less disruption or impact during construction to road users and the local community as it was further away from the existing A96 and the communities at the west of Nairn and Auldearn;
- it offered safety benefits from reduced traffic in Nairn and benefits to public transport and active travel;
- it had the lowest estimated scheme cost; and
- the location of the junctions provided opportunities to grow the regional economy through improved access to the wider strategic transport network. The Nairn West Junction located at Blackcastle Quarry maintained direct access to Port of Ardersier, and the Nairn East Junction located between Nairn and Auldearn provided more strategic access onto the wider road network than the route options which were located to the south of Auldearn.

3.3.18 In relation to the environmental assessment Option 2E was expected to have some of the lowest impacts in relation to noise, geology and soils, water quality, materials, residential and commercial assets and development land. It also avoided impacts at Delnies Wood relating to the woodland habitat and the path network and had one of the lowest impacts on the Alton Burn flood plain. However, there were potential impacts in relation to landscape and visual, habitats and biodiversity, cultural heritage and agricultural land, which would be taken forward for consideration within the DMRB Stage 3 assessment.

3.3.19 A series of public exhibitions were held on 3, 6 and 7 October 2014 in order to present the DMRB Stage 2 preferred option to the public. These exhibitions provided the opportunity for the public to comment on the preferred option and enabled Transport Scotland to take account of important feedback as the design development progressed. The consultation period following the exhibitions closed on 28 November 2014 and Transport Scotland addressed the main themes raised during the consultation in a Frequently Asked Questions document that was issued in early February 2015 (Transport Scotland 2015).

3.4 Post DMRB Stage 2: Proposed Scheme Design Options

3.4.1 Options 1C (MV) and 2E were taken forward to DMRB Stage 3 and have been subject to ongoing design development informed by a range of considerations, including landowner and other stakeholder consultations (including a Meet the Team event in August 2015 and drop-in sessions in February 2016) and the environmental assessment. The proposed Scheme which is subject to the

DMRB Stage 3 assessment is described in Chapter 4 (The Proposed Scheme). The more significant areas of design development and the alternatives considered following the announcement of the preferred option in October 2014 are described below.

Milton of Culloden South Access

3.4.2 Access to the residential properties and agricultural land at Milton of Culloden Smallholdings is currently taken from the existing A96. The proposed Scheme development considered a number of alternative access arrangements for vehicles and non-motorised users (NMUs). In order to maintain the current access from the existing A96 for vehicles, the proposed dual carriageway embankment would be required to be raised substantially higher with greater impact on land, property and other physical features, and this solution was not preferred.

3.4.3 Two alternative options were developed and presented for public consultation. The first option comprised an underpass at Milton of Culloden South suitable for NMUs and the reinstatement of the former length of Stratton Lodge Road (U1058) to the north-west of the properties at Walker Crescent in Culloden to provide vehicle access to Milton of Culloden Smallholdings from Barn Church Road (C1032). The second option comprised a new overbridge for vehicles and NMUs at Allanfearn with links to the existing road and path network. This option would have cut across additional areas of agricultural land and changed the location of the existing connection for NMUs. On balance, it was considered that the assessment outcomes supported the first option.

Gollanfield Rail Bridge

3.4.4 The Gollanfield Rail Bridge carries the existing A96 over the single track Aberdeen to Inverness Railway Line. Transport Scotland and Network Rail are progressing the Aberdeen to Inverness (A2I) Enhancements Project for the line and there is the aspiration to reinstate double track to some or all of the line in a future phase of the project. The existing structure is a constraint to future double track provision and any new structure is required to provide sufficient clearance for electrification.

3.4.5 The proposed Scheme development for the Gollanfield Rail Bridge considered whether the existing structure should be retained to carry one carriageway or be demolished. It also considered the form, size and location of any new structure. The option assessment concluded that a new dual carriageway structure, with sufficient clearance for future electrified double track provision, should be constructed to the south of the existing structure. Following completion of the proposed structure the existing structure would be demolished.

Skene Park – Blackpark – Russell's Wood

3.4.6 Following the announcement of the preferred option in October 2014, feedback was received from affected landowners with regard to the resulting severance, the negative impact on farm operations and local access issues for the section through Skene Park, Blackpark and Russell's Wood. Alternative options to the north and south of the DMRB Stage 2 preferred option were considered with a view to reducing the effects of severance, by more closely following field boundaries, to examine if an alternative alignment at this location would give a better overall balanced scheme assessment outcome.

3.4.7 The two alternative alignments were compared to the DMRB Stage 2 preferred option under each of the relevant DMRB assessment topics and the key differences between these alignments were summarised. On balance it was considered that the assessment outcomes supported the alternative southern alignment. The assessment concluded that there was an improvement in relation to the severance impacts on Blackpark Farm and Russell's Wood, the proximity to residential receptors and an improvement in the earthworks balance, although the alignment was longer and was estimated to have a cost increase.

3.4.8 Following the public exhibitions in February 2016 and following further consultation with the owners of Skene Park Farm, Kinnudie Farm and Blackpark Farm, further refinement of the developed preferred option was considered. The alignment was refined to better balance the proximity to each residential receptor at Skene Park, Blackpark and Kinnudie Farms and was realigned slightly

further north and lowered through Blackpark to screen the road in cutting. The current alignment is considered to provide many of the same benefits in principle as the alignment presented to the public at exhibitions in February 2016, whilst improving the balance of potential impacts on the main receptors.

Nairn East Junction

3.4.9 The Nairn East Junction connects the proposed dual carriageway to the existing road network connecting into Nairn and Auldearn. The DMRB Stage 2 preferred option Nairn East Junction arrangement had an extensive footprint with works potentially liable to flood risk from the Auldearn Burn.

3.4.10 The design development considered alternative forms of this junction in order to address the potential flood risk and better maintain connectivity between Nairn and Auldearn, particularly for NMUs, by maintaining the existing B9111 Auchnacloich – Auldearn Road under the dual carriageway including the off-carriageway path. The revised design took the form of a standard diamond arrangement of slip roads and dumbbell roundabouts on the existing A96. The consequence of this was to address the potential flood risk and raise the level of the dual carriageway through this section on embankment to pass over the B9111 Auchnacloich – Auldearn Road and the existing A96, maintaining the connectivity for NMUs in this area.

Penick – Courage – Hardmuir

3.4.11 Following the announcement of the preferred option in October 2014, feedback was received from affected landowners with regard to the resulting land acquisition, the visual impact of the dual carriageway in the vicinity of Courage and local access issues for Hardmuir, Hardmuir of Boath and Hardmuir Croft. Alternative options were considered in order to reduce the height of the dual carriageway in the vicinity of Courage and optimise the overall earthworks and structures design for this section of the proposed Scheme.

3.4.12 The option which emerged from this assessment was one which lowered the dual carriageway alignment past Courage and through Wester Hardmuir Wood, increasing the earthworks cuttings and reducing the embankment. It included realignment of the existing A96 at Courage on an overbridge above the dual carriageway and an additional overbridge at Hardmuir to maintain local access to the existing A96 at this point and avoid a lengthy alternative access track.

3.4.13 The assessment concluded that this option provided an improvement in relation to the access issues for Hardmuir and the visual impact at Courage.

3.5 References

Atkins (2008). A96 Dualling to the Airport, DMRB Stage 2 Assessment.

Atkins (2010a). A9, A96 Inverness, Nairn Strategic Corridor Options Study: DMRB Stage 1 Route Options Assessment - Existing Conditions Report.

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