

## **4 The Proposed Scheme**

### **4.1 Introduction**

- 4.1.1 This chapter provides a description of the proposed Scheme, including information on the design and layout of the proposed Scheme, the procurement process, and methods and outline programme for construction (subject to completion of the statutory procedures).
- 4.1.2 The design elements for the proposed Scheme and the potential construction methods described in this chapter provide the basis against which the environmental impacts of the proposed Scheme have been identified and assessed. The mitigation to address these impacts is reported in this Environmental Statement (ES). This aligns to the Stage 3 level of engineering design as defined in the Design Manual for Roads and Bridges (DMRB).
- 4.1.3 The chapter is supported by Appendix A4.1 (Construction Information) and the following figures, which are cross referenced where relevant:
- Figure 4.1 (The Proposed Scheme);
  - Figure 2.1 (Traffic Flows Location Plan Base Year/Do-Minimum) (accompanies Chapter 2: Need for the Proposed Scheme); and
  - Figure 2.2 (Traffic Flows Location Plan Do-Something) (accompanies Chapter 2: Need for the Proposed Scheme).

### **4.2 Scheme Procurement**

- 4.2.1 For the purposes of reporting it is assumed that the proposed Scheme would be procured by means of a Design and Build (D&B) contract. Under the terms of this contract, the contractor will undertake both the detailed design and construction of the proposed Scheme. Upon completion of the proposed Scheme, responsibility for operating and maintaining the A96 Aberdeen to Inverness Trunk Road and local roads would remain with the Scottish Ministers and The Highland Council, respectively.
- 4.2.2 Under a D&B contract, a specimen (outline) design is prepared for the proposed Scheme by Transport Scotland. Bidders in the D&B procurement process are provided with the specimen design for their information during the bidding process. Following a successful bid process the appointed contractor produces a detailed design for the proposed Scheme, which they may choose to refine and optimise further from the bid stage design. Such optimisation must be in accordance with the relevant statutory documents approved for the proposed Scheme, which includes this ES and the constraints imposed by the ES, the Schedule of Environmental Commitments (which contains the mitigation identified through the Environmental Impact Assessment (EIA) process), statutory Orders and any specific criteria set within the contract documents.

### **4.3 Sustainable Development Policy**

- 4.3.1 Consideration of sustainable development issues forms an important element of all activities undertaken in the project's life cycle, including:
- project design and appraisal;
  - tender evaluation;
  - construction;
  - maintenance; and
  - operation (and decommissioning).
- 4.3.2 Table 4.1 sets out the Sustainability Objectives that have been developed for the wider A96 Dualling Programme between Inverness and Aberdeen. These objectives have been considered within the project design development and assessment reported within this ES.

**Table 4.1: A96 Dualling Programme Sustainability Objectives**

| Topic   | Objective   |
|---|---|
| Connectivity  | Improve the operation of the A96 and inter-urban connectivity between the cities of Inverness and Aberdeen and their city regions through: <ul style="list-style-type: none"> <li>reduced journey times;</li> <li>improve journey time reliability; and</li> <li>reduced conflicts between local and strategic journeys.</li> </ul> |
| Performance/ People   | To improve safety for motorised and Non-Motorised Users (NMUs) through: <ul style="list-style-type: none"> <li>reduced accident rates and severity; and</li> <li>reduced driver stress</li> </ul>   |
| Supporting Sustainable Economic Growth                            | Provide opportunities to grow the regional economies on the corridor through: <ul style="list-style-type: none"> <li>improved access to the wider strategic transport network; and</li> <li>enhanced access to jobs and services</li> </ul>   |
| Inclusivity, Sustainable Procurement and Supply Chain Development | Deliver sustainable procurement through seeking cost-effective, sustainable choices which improve the economic, social and environmental wellbeing of Scotland.   |
| Education, Employment and Professional Development                | Support opportunities for increased education and professional development at all levels and create a legacy of skills.   |
| Sustainable, Public and Active Transport                          | Support the development of sustainable communities and improving health and well-being by facilitating integration with public and active transport options.  |
| Improving Environmental Quality                                   | Designing to meet the needs of the local communities and the natural and historic environment.  |
| Ensuring Efficient Resource Use                                   | Optimising resource use through the programme lifecycle.  |
| Resilience  | Delivering resilient road infrastructure.   |
| Climate Change  | Minimise carbon emissions associated with construction.   |

## 4.4 Proposed Scheme Design

4.4.1 The proposed Scheme has been developed through an iterative process, considering advice from a wide range of environmental and engineering specialists, as well as consultation with statutory and non-statutory consultees, including affected landowners, to determine their requirements or suggestions and gather feedback in relation to the developing proposals. Further details of the consultations which have been undertaken are provided in Chapter 6 (Consultation and Scoping). Where appropriate, changes to the proposed Scheme design have been made following these consultations with the more significant of these detailed in Chapter 3 (Consideration of Alternatives).

4.4.2 An overview of the proposed Scheme design assessed within this ES is shown on Figure 4.1.

## 4.5 Traffic Conditions

4.5.1 The existing A96 between Inverness and Hardmuir (to the east of Auldearn) is mainly a rural single carriageway road with an Annual Average Traffic Level (AADT) between 9,000 and 26,000 vehicles per day based on 2014 observed data. It is also worth noting that the AADT between Raigmore Interchange and Seafield roundabout, prior to the start of the dualling works, as taken from the observed data is 30,400 vehicles per day.

4.5.2 Local traffic information was gathered through a combination of observed 12-hour Junction Turning Counts (JTCs) and Automatic Traffic Counts (ATCs) to produce traffic demand matrices representative of traffic conditions for the existing road network.

4.5.3 The modelled AADT traffic levels for the base year (2014) and the assessed Opening year (2021) and the assessed Design year (2036) for the 'Do Minimum' (without the proposed Scheme) are shown on Figure 2.1 which accompanies Chapter 2 (Need for the Proposed Scheme).

- 4.5.4 The assessed AADT traffic levels for the Opening year of the proposed Scheme (2021) and the assessed Design year (2036) for the 'Do Something' (with proposed Scheme) are shown on Figure 2.2 which accompanies Chapter 2 (Need for the Proposed Scheme).

## **4.6 Outline of the Proposed Scheme**

### **Proposed Scheme Description**

- 4.6.1 The proposed Scheme comprises approximately 31km of new dual carriageway, with six grade separated junctions and required local road connections. The proposed Scheme starts approximately 850m east of the Raigmore Interchange at the Seafield roundabout and continues in a north-easterly direction to Hardmuir, 3.5km to the east of Auldearn. At the eastern extent of the proposed Scheme at Hardmuir, the dual carriageway terminates by tying into the existing A96 single carriageway in accordance with design standards.
- 4.6.2 The proposed Scheme is a Category 7A all-purpose dual carriageway with design speed of 120kph, in accordance with DMRB Volume 6, Section 1, Part 1, TD9/93 – Amendment No 1: Highway Link Design (Highways Agency, Scottish Executive Development Department, The National Assembly for Wales and The Department for Regional Development Northern Ireland 2002). This is the highest category of all-purpose road with grade separated junctions. Access to the proposed Scheme is only permitted via grade separated junctions.
- 4.6.3 The dual carriageway provision has been designed in accordance with DMRB Volume 6, Section 1, Part 2, TD27/05: Cross-Sections and Headrooms for a Dual 2 Lane Rural All-Purpose (D2AP) carriageway (Highways Agency, Scottish Executive, Welsh Assembly Government and The Department for Regional Development Northern Ireland 2005). The standard dual carriageway cross-sections are summarised in this chapter.
- 4.6.4 On completion of the proposed Scheme the existing A96 would be de-trunked and re-classified as a local road to maintain local access.
- 4.6.5 The following paragraphs provide a detailed overview of the main works elements associated with the proposed Scheme and these are shown on Figure 4.1. References are made to chainage (shortened to 'ch', for example ch1500), which is a reference to the number of metres along the proposed Scheme, from west to east.
- 4.6.6 The proposed Scheme is shown on Ordnance Survey (OS) based figures for this ES, provided as multiple sheets (a, b, c et seq.) at either 1:50,000, 1:25,000, 1:15,000, 1:10,000 or 1:5,000 scale depending on the study area considered within each of the environmental subject areas.

### A96 Junction Provision

- 4.6.7 There are six grade-separated junctions provided as part of the proposed Scheme at Smithton, Balloch, Mid Coul, Brackley, Nairn West and Nairn East:
- The existing Smithton roundabout would be expanded to create a fully grade separated junction. The existing A96 alignment and the Smithton roundabout are proposed to be retained, with a second roundabout located to the south in order to create a dumbbell layout. The proposed dual carriageway would pass between the two roundabouts via an underbridge with the roundabouts being connected below. This junction would provide full access to and from the proposed dual carriageway and Barn Church Road (C1032).
  - At the Balloch Junction the existing A96 single carriageway is proposed to be diverted to a new roundabout located to the north of the proposed dual carriageway. This would be connected in a dumbbell arrangement to a second roundabout south of the proposed dual carriageway which would connect to Barn Church Road (C1032) accessing Balloch and a private access to Balmachree Farm. The proposed dual carriageway would pass between the two roundabouts via an underbridge with the roundabouts being connected underneath. This junction would provide full access to and from the proposed dual carriageway, the existing A96 single carriageway and Barn Church Road (C1032).

- The Mid Coul Junction would be constructed on the existing Kerrowgair – Croy Road (C1017), providing full access to and from Inverness Airport and the proposed railway station at Dalcross. The two new roundabouts would be located predominantly on the line of the existing Kerrowgair – Croy Road (C1017), which would be raised to allow the proposed dual carriageway to pass under the local road.
- The Brackley Junction is proposed to be located at the existing A96/B9006 junction. The B9006 Millburn Roundabout – Culcabock – Castle Hill – Culloden Moor – Croy - Gollanfield – Fort George Road would be realigned over the proposed dual carriageway. This junction would provide full access to and from the proposed dual carriageway and the B9006. The realigned existing A96 and slip roads would connect to the realigned B9006 via give way junctions.
- The Nairn West Junction is proposed to be constructed within part of the previously worked Blackcastle quarry area. The north roundabout would connect to the existing A96 single carriageway towards Nairn and McDermotts Road (U2218). The south roundabout would provide access to land and property at Cockhill and North Kildrummie Farm.
- The Nairn East Junction is proposed to be located where the proposed dual carriageway crosses the existing A96 single carriageway between Nairn and Auldearn forming a dumbbell junction arrangement. This junction would provide full access to and from the proposed dual carriageway and the existing single carriageway into Nairn, including towards the A939 Tomintoul – Granttown on Spey – Nairn Road as well as connecting to the B9111 Auchnacloch – Auldearn Road for access to the east side of Auldearn.

Local Road Changes

4.6.8 Local roads would be upgraded as necessary to maintain access from the existing road network to the proposed dual carriageway via the proposed grade separated junctions. Local road diversions and improvements are detailed in Table 4.3.

**Table 4.3: Local Road Diversions and Improvements**

| Local Road  | Chainage (ch)      | Diversion or Improvement  |
|---|--------------------|---|
| Milton Road (U1136)   | ch2750             | Milton Road (U1136) stopped up for vehicular traffic at existing A96 with alternative access provided from Barn Church Road (C1032).                          |
| Stratton Lodge Road (U1058)   | ch2000 to ch2800   |   |
| Dalcross Station Road (C1020)   | ch9600             | Local road diversion over the proposed dual carriageway between Petty Church and Dalcross Station cottages.   |
| Kerrowgair – Croy Road (C1017)  | ch10550            | Local road diversion over the proposed dual carriageway at Mid Coul Junction.   |
| Milton of Breachlich Road (U1025)   | ch13700 to ch14000 | Local road diversion and improved junction with the existing B9006 due to the closure of the existing at grade junction with the existing A96.                |
| B9006 Millburn Roundabout – Culcabock – Castle Hill – Culloden Moor – Croy - Gollanfield – Fort George Road   | ch14100            | Local road diversion over the proposed dual carriageway at Brackley Junction.   |
| Gollanfield Road (C1013)  | ch15300            | Local road diversion over the proposed dual carriageway to maintain local access to Gollanfield and Lochside with local road connection to Brackley junction. |
| Wester Glackton – Balcroy – Kilravock – Cawdor Road (U1017)   | ch15200            | Upgraded access onto the re-aligned section of Loch Flemington Road (U1351).  |
| McDermotts Road (U2218)   | ch17900            | Local unclassified road incorporating a new approach arm with the Nairn West Junction north roundabout.   |
| Delnies – Kildrummie – Howford Road (C1163) to B9091 Croy - Clephanton - Kildrummie - Nairn Road              | ch18900 to ch21900 | Local road diversion running parallel to the north side of the proposed dual carriageway at Balnaspirach.   |
| B9091 Croy - Clephanton - Kildrummie - Nairn Road to B9090 Loch Flemington – Clephanton – Cawdor – Nairn Road | ch20800 to ch22000 | Local road diversion providing a link to the south of the proposed dual carriageway.  |

| Local Road   | Chainage (ch)      | Diversion or Improvement   |
|--|--------------------|--|
| Moss-side – Mosshall – Broadley Road (C1170)             | ch21850 to ch22200 | Local road diversion incorporating upgraded junctions at the B9091 and B9090.  |
| B9090 Loch Flemington – Clephanton – Cawdor – Nairn Road | ch22100            | Local road diversion over the proposed dual carriageway to the south of Broadley.  |
| Househill – Raitloan – Howford Road (C1175)              | ch22850            | Local road diversion beneath the proposed dual carriageway south of Crook.   |
| A939 Tomintoul – Grantown on Spey – Nairn Road           | ch23800            | Local road diversion over the proposed dual carriageway to the south of Househill.   |
| B9111 Auchnacloch – Auldearn Road                        | ch25720            | Local road diversion beneath the proposed dual carriageway at Nairn East Junction.   |
| Auldearn – Station – Drum Road (C1172)                   | ch27350            | Local road diversion beneath the proposed dual carriageway north of Auldearn.  |
| Penick Road (U3164)                                      | ch27400 to ch29500 | Local unclassified road incorporating an upgraded access onto the Auldearn – Station – Drum Road (C1172) to the west and with the de-trunked section of the A96 to the east at Hardmuir. |
| Ellands – Hardmuir – Boghole Road (U3036)                | ch30900            | Local unclassified road incorporating an upgraded access onto the re-aligned de-trunked section of the A96 at the eastern extent of the proposed Scheme.                                 |

#### Access to Land and Properties

4.6.9 A number of properties, including farms, are located in the vicinity of the proposed Scheme. Since there would be no direct access to land or properties directly from the proposed dual carriageway the following new means of access are included in the proposed Scheme:

- Seafield Access (ch1100);
- Ashton Farm Access (ch1150);
- Balmacree Access (ch5350);
- High Wood Access (ch8600);
- Mid Coul Cottages Access (ch10550);
- Culblair Farm Access (ch10800);
- Polfaden Access (ch13400);
- Easter Glackton (ch16500)
- Cockhill Access (ch17600);
- North Kildrummie Farm Access (ch18850);
- Balnaspirach Access (ch20500);
- Broadley Farm Access (ch22250);
- Blackpark Farm Access (ch23850);
- Courage Steading Access (ch28900);
- Wester Hardmuir Wood Access (ch29800 and ch29950); and
- Hardmuir of Boath Access (ch30150).

4.6.10 In addition, there would be a number of new turning heads and field accesses at various locations and also access tracks to each of the proposed Sustainable Drainage System e.g. Basins and Pond (hereafter referred to as SUDS).

### **Non-Motorised User (NMU) Provision**

- 4.6.11 Facilities for Non-Motorised Users (NMUs), which includes pedestrians, equestrians and cyclists, are an integral feature of the proposed Scheme with provision of approximately 30km of new shared use path and also links and access to the existing path network from the proposed new shared use path. Further details are given in Chapter 16 (People and Communities: Effects on All Travellers).
- 4.6.12 The proposed facilities for NMUs would include a new shared use path from the Seafield roundabout at the western end of the proposed Scheme to the Nairn West junction at Blackcastle. From the Nairn West Junction there would be a shared use path along the existing A96 into Nairn to Easter Delnies connecting to the existing path infrastructure and a second path link adjacent to local roads around the south of Nairn with a crossing of the River Nairn and connecting to the National Cycle Network at the Househill – Raitloan – Howford Road (C1175) at Crook.
- 4.6.13 The path between Nairn and Auldearn would be maintained along the southern side of the B9111 Auchnacloch – Auldearn Road under the proposed dual carriageway maintaining connectivity for local communities.

### **Key Structures**

- 4.6.14 There are a number of new structures included within the proposed Scheme and these include 25 principal structures and 24 new culverts where the proposed Scheme crosses local watercourses. The key structures not associated with the new grade-separated junctions are described below.

#### PS03: Kerrowaird Underbridge (ch8500)

- 4.6.15 A structure is proposed to carry the new dual carriageway over the existing A96 at Kerrowaird. A single span structure is envisaged with a span of approximately 34m and a minimum 1m high parapet over the structure on each side. The structure could comprise a precast concrete or a steel composite deck, supported on a concrete substructure.

#### PS07: A96 Gollanfield Rail Bridge (ch16260)

- 4.6.16 A structure is proposed to carry the proposed dual carriageway over the Aberdeen to Inverness Railway Line. A single span structure is envisaged with a span of approximately 15.5m and a minimum 1.5m high parapet. This would accommodate a future doubling of the existing single line track. The structure could comprise a precast concrete deck supported on a reinforced concrete substructure. The structure is likely to span across the railway at a skew angle of approximately 20 degrees.

#### PS12: Moss-side A96 Rail Bridge (ch19455)

- 4.6.17 A structure is proposed to carry the proposed dual carriageway over the Aberdeen to Inverness Railway Line. A single span structure is envisaged with a span of approximately 16m and a minimum 1.5m high parapet. The structure could comprise a precast concrete deck supported on reinforced concrete substructure. The structure is likely to span across the railway at a skew angle of approximately 20 degrees.

#### PS12A: Moss-side C1163 Rail Bridge (ch19565 side road (SR))

- 4.6.18 A structure is proposed to carry the realigned Delnies – Kildrummie – Howford Road (C1163) over the Aberdeen to Inverness Railway Line. A single span portal type structure is envisaged with a span of approximately 16m. This would accommodate a future doubling of the existing single line track. The structure could comprise precast concrete beams supported on a cast in situ reinforced concrete substructure. A minimum 1.5m high parapet would be provided over the structure on each side.

PS14: River Nairn Underbridge (ch22440)

- 4.6.19 A structure is proposed to carry the proposed dual carriageway over the River Nairn. A three span steel composite bridge deck is envisaged supported on a reinforced concrete substructure. A new path link would be provided adjacent to the east abutment to connect the existing core path along the east bank of the river below the bridge. A 1m high parapet would be provided over the structure on the south side and a 1.4m high parapet would be provided over the structure on the north side.

PS19: Hardmuir Overbridge No.1 (ch28975)

- 4.6.20 A structure is proposed to carry the realigned existing A96 over the new dual carriageway. A single span structure is proposed with precast concrete beam and slab deck supported on a reinforced concrete substructure. A 1m high parapet would be provided over the structure on each side.

**Earthworks**

Cuttings and Embankments

- 4.6.21 The height of the proposed Scheme varies with sections on embankment, in cutting or close to existing ground level. Substantial embankments or cuttings are likely at the following locations along the proposed Scheme. These are shown in Table 4.4 and Table 4.5.

**Table 4.4: Location of Proposed Earthworks along the Proposed Dual Carriageway**

| Chainage (ch)      | Embankment/Cutting | Details   |
|--------------------|--------------------|---|
| ch1550 to ch2300   | Embankment         | Approximately 9m in height at Smithton Junction.  |
| ch4750 to ch5250   | Embankment         | Approximately 7m in height at Balloch Junction.   |
| ch6450 to ch7050   | Embankment         | Approximately 12m in height past Newton of Petty.   |
| ch7700 to ch8750   | Embankment         | Approximately 16m in height between Morayston and Kerrowaird.   |
| ch9050 to ch9200   | Embankment         | Approximately 6m in height past Kerrowaird.   |
| ch16100 to ch16500 | Embankment         | Approximately 7m in height over the Aberdeen to Inverness Railway Line at Gollanfield.  |
| ch17100 to ch17500 | Cutting            | Approximately 10m in depth at Blackcastle.  |
| ch18500 to ch19750 | Embankment         | Approximately 10m in height between Drumdivan and Meikle Kildrummie including crossing of the Aberdeen to Inverness Railway Line. |
| ch23000 to ch23200 | Embankment         | Approximately 6m in height past Crook.  |
| ch24000 to ch24700 | Cutting            | Approximately 10m in depth at Blackpark.  |
| ch25500 to ch26300 | Embankment         | Approximately 10m in height at Nairn East Junction.   |
| ch27700 to ch28200 | Cutting            | Approximately 6m in depth through Penick.   |
| ch29800 to ch30500 | Cutting            | Approximately 9m in depth through Wester Hardmuir Wood.   |

**Table 4.5: Location of Proposed Earthworks at Local Roads**

| Chainage (ch) | Embankment/Cutting | Road Classification/Name  | Details  |
|---------------|--------------------|---|--|
| ch9600        | Embankment         | Dalcross Station Road (C1020)   | Approximately 9m in height as it rises over the dual carriageway alignment.                              |
| ch14100       | Embankment         | B9006 Millburn Roundabout – Culcabock – Castle Hill – Culloden Moor – Croy - Gollanfield – Fort George Road | Approximately 9m in height at Brackley Junction as it rises to pass over the dual carriageway alignment. |
| ch15300       | Embankment         | Gollanfield Road (C1013)  | Approximately 6m as it rises to pass over the dual carriageway alignment.                                |

| Chainage (ch)      | Embankment/Cutting | Road Classification/Name                       | Details   |
|--------------------|--------------------|--|---|
| ch17950            | Embankment         | PS10: Nairn West Junction Overbridge           | Approximately 10m in height between the roundabouts as it rises to pass over the dual carriageway alignment.  |
| ch19500 to ch19700 | Embankment         | Delnies – Kildrummie – Howford Road (C1163)    | 200m long embankment, roughly 6m high as it passes over the Aberdeen to Inverness Railway Line and merges parallel to the dual carriageway alignment. |
| ch22870            | Cutting            | Househill – Raitloan – Howford Road (C1175)    | Approximately 6m deep as it passes under the dual carriageway alignment.  |
| ch23840            | Embankment         | A939 Tomintoul – Grantown on Spey – Nairn Road | Approximately 7m in height as it rises to pass over the dual carriageway alignment.   |
| ch25730            | Cutting            | B9111 Auchnacloch – Auldearn Road              | Approximately 6m deep before passing under the dual carriageway alignment.  |
| ch27360            | Cutting            | C1172 Auldearn – Station – Drum Road           | Approximately 8m deep as it passes under the dual carriageway alignment.  |
| ch29000            | Embankment         | Realigned existing A96                         | Approximately 10m high as it rises to pass over the dual carriageway alignment.   |

- 4.6.22 Cuttings and embankments are likely to require engineering slopes of 1 in 2.5 or 1 in 3. This is dependent on the contractor's choice of materials and construction methods. There would be locations where landscape and visual mitigation would require the grading out of slopes, rounding of the tops and bottoms of slopes or screening by way of earth mounds (false cuttings or bunds) to provide a fit with the surrounding landscape and screen against views of the road. Further details of the landscape mitigation proposals are provided in Chapter 9 (Landscape) and Chapter 10 (Visual).

#### Earthworks Balance

- 4.6.23 A summary of the estimated earthworks quantities for construction of the proposed Scheme is provided below with further details of material use and management of waste during construction provided in Chapter 17 (Materials). The export quantity is material that is considered unsuitable to be re-used as engineering fill and is taken off-site.
- 4.6.24 As a result of the many environmental and engineering constraints, the road alignment is formed on embankment of varying heights for the majority its length. The bulk fill quantities required for the formation of the embankments are shown in Table 4.6:

**Table 4.6: Estimated Earthworks Volumes**

| Cut/Fill                       | Volume (m <sup>3</sup> ) |
|--------------------------------|--------------------------|
| Total Acceptable Cut Available | 2.365 million            |
| Total Fill Required            | 5.162 million            |
| Net Total Fill Import Required | 2.887 million            |

## **4.7 Proposed Scheme Design Details**

### **Road Widths**

- 4.7.1 Road carriageway cross sections are provided in accordance with DMRB Volume 6, Section 1, Part 2, TD27/05 Cross Sections and Headrooms (Highways Agency, Scottish Executive, Welsh Assembly Government and The Department for Regional Development Northern Ireland 2005). Local roads and accesses have been designed in accordance with local council guidance, Road and Transport Guidelines for New Developments (The Highland Council 2013). Carriageway widths

are shown in Table 4.7. Verge and central reserve widening may be required at various locations to achieve the necessary sight line requirements for the design.

**Table 4.7: Carriageway Widths**

| Road Standard  | Detail          | Width (m)  | Design Standard                                    |
|--|-----------------|------------|--|
| Dual carriageway alignment with two lanes in each direction    | Verge           | 2.5        | Design Manual for Roads and Bridges                |
|  | Hard Strip      | 1.0        |  |
|  | Carriageway     | 7.3        |  |
|  | Hard Strip      | 1.0        |  |
|  | Central Reserve | 2.5        |  |
|  | Hard Strip      | 1.0        |  |
|  | Carriageway     | 7.3        |  |
|  | Hard Strip      | 1.0        |  |
|  | Verge           | 2.5        |  |
| A-Class road with one lane in each direction                   | Verge           | 2.0        | Road and Transport Guidelines for New Developments |
|  | Carriageway     | 6.0        |  |
| B-Class road with one lane in each direction                   | Verge           | 2.0        |  |
|  | Carriageway     | 6.0        |  |
| C-Class road with one lane in each direction                   | Verge           | 2.0        |  |
|  | Carriageway     | 3.3 to 7.3 |  |
| Unclassified road including a single lane and passing places   | Verge           | 2.0        |  |
|  | Carriageway     | 3.3 to 6.0 |  |
| Private Access road including a single lane and passing places | Verge           | 2.0        |  |
|  | Carriageway     | 3.3 to 5.5 |  |

### **Fencing and Environmental Barriers**

#### Fencing

4.7.2 To secure the land area acquired for the implementation of the proposed Scheme, temporary fencing would be erected prior to the commencement of construction, where necessary. Whilst much of the agricultural land bounding the proposed Scheme is arable in nature, a requirement for stock-proofing may be necessary in some areas.

4.7.3 On completion of the works, any permanent fencing required to denote the permanent road boundary would generally be a timber post and rail fence but is subject to agreement with the landowner.

#### Environmental Barriers

4.7.4 Environmental barriers may be required to reduce the potential impacts of the proposed Scheme at specific locations. Where the requirement has been identified within this ES, environmental barriers would be incorporated. This may include ecological fencing required to provide protection for wildlife by preventing access onto the dual carriageway. The requirements for ecological fencing are given in Chapter 11 (Habitats and Biodiversity). Mitigation has also been identified to reduce impacts to residential properties from traffic-related noise. This may be through provision of environmental barriers or earth mounds (false cuttings or bunds). The requirements for noise mitigation measures are provided in Chapter 8 (Noise and Vibration).

### **Drainage Design and Watercourse Crossings**

4.7.5 The proposed drainage design and proposals for watercourse crossings take into consideration the Water Environment (Controlled Activities) Regulations 2011 (CAR). The watercourse crossings and drainage design have been discussed with the Scottish Environment Protection Agency (SEPA) in

the context of CAR requirements. The contractor would apply for licenses for all design and construction activities affecting watercourses, including engineering works (culverts and bridges) and discharges (outfalls, attenuation and treatment) in accordance with the Regulations.

Drainage Design and Flood Risk

- 4.7.6 The drainage design for the proposed Scheme has been developed in accordance with SUDS guidance and through consultation with SEPA and The Highland Council. The drainage system makes use of combined surface and groundwater filter drains to provide most of the carriageway drainage. Exceptions to this include kerbed areas, such as junctions and bridge decks where gullies would be used to collect surface water.
- 4.7.7 Pre-earthworks drainage consisting of shallow filter drains or ditches would be used to collect run-off from adjacent land and field drains. A number of likely outfall locations have been identified; these are described in more detail in Chapter 13 (Road Drainage and the Water Environment). This chapter also defines potential effects on the water environment and the mitigation measures required to prevent, reduce or offset these effects in accordance with the EIA Regulations.

Watercourse Crossings

- 4.7.8 Wherever possible, watercourses are maintained along their existing line. However, some localised watercourse realignments would be required. The length of these has been minimised so that as much as possible of the existing watercourses are retained. Culverts or bridges would be provided where necessary to take existing watercourses under new roads and access tracks. The proposed watercourse crossing structures described in this ES have been selected based on achieving a balance between environmental, engineering and economic factors.
- 4.7.9 The detailed design of watercourse crossing structures would be undertaken by the appointed contractor and would require suitable provision for flood flows and ecological and geomorphological mitigation, and be in compliance with the environmental commitments detailed in this ES. Specific reference should be made to Chapter 13 (Road Drainage and the Water Environment) and Chapter 11 (Habitats and Biodiversity).
- 4.7.10 The requirement for a watercourse realignment or new crossing has been identified at the locations detailed in Table 4.8.

**Table 4.8: Location of Watercourse Realignment or New Crossing**

| Chainage    | Watercourse Realignment / New Crossing  |
|-------------|---|
| ch1250      | Realignment of Scretan Burn and culvert crossing.                                 |
| ch1750      | Realignment of Cairnlaw Burn and culvert crossing.                                |
| ch2280      | Realignment of Cairnlaw Burn and culvert crossing.                                |
| ch2535      | Realignment of Kenneth's Black Well and new culvert crossing.                     |
| ch2765 (SR) | Realignment of Kenneth's Black Well and four new culvert crossing                 |
| ch3230      | Realignment of Allanfean Drain and new culvert crossing.                          |
| ch4745      | Realignment of Fiddler's Burn and new culvert crossing.                           |
| ch6320      | New culvert crossing at Tributary of Rough Burn.                                  |
| ch7525      | Realignment of Rough Burn and new culvert crossing.                               |
| ch8890      | New culvert crossing at unnamed burn between Castle Stuart and Tornagrain.        |
| ch9330      | New culvert crossing at unnamed burn between Castle Stuart and Tornagrain.        |
| ch9435      | New culvert crossing at unnamed burn between Castle Stuart and Tornagrain.        |
| ch10200     | New culvert crossing to convey the tributary of Ardersier Burn.                   |
| ch11300     | New culvert crossing to convey the drains at Culblair.                            |
| ch12615     | Realignment of the indirect tributary of Ardersier Burn and new culvert crossing. |
| ch12700     | Realignment of the indirect tributary of Ardersier Burn and new culvert crossing. |

| Chainage | Watercourse Realignment / New Crossing                                      |
|----------|---|
| ch17010  | New culvert crossing to convey Balnagowan Burn.                             |
| ch17150  | New culvert crossing to convey Balnagowan Burn under Cockhill field access. |
| ch19610  | New culvert crossing to convey Alton Burn.                                  |
| ch23405  | New culvert crossing to convey indirect tributary of River Nairn.           |
| ch26695  | Short realignment of Auldearn Burn and new culvert crossing.                |

- 4.7.11 The design of the watercourse crossings would accommodate at least 0.5% annual probability flood (the 1 in 200 year flood) for all permanent drainage infrastructure with consideration of the potential effects of climate change in accordance with SEPA recommendations.

### **Traffic Signs, Road Markings and Lighting**

#### Traffic Signs and Road Markings

- 4.7.12 The traffic signs and road markings for the proposed Scheme would be prepared to the relevant legislation and design standards. The detailed design would be undertaken by the appointed contractor, and subject to compliance with the contract documents. As part of the design process, the contractor would consult Transport Scotland and the local roads authority.
- 4.7.13 Two Variable message signs (VMS) would be included in the proposed Scheme. As they are substantial structures they are considered within the landscape and visual assessment reported within Chapter 9 (Landscape) and Chapter 10 (Visual).

#### Lighting

- 4.7.14 In accordance with relevant design standards the proposed Scheme would include road lighting at each of the grade separated junctions and for the main dual carriageway between ch850 and ch2970. The road lighting at each of the grade separated junctions extends to the slip roads and local road approaches to roundabouts or priority junctions with the local road. In addition, the existing network of road lighting would remain on Barn Church Road (C1032) and on the existing A96 and Kerrowgair – Croy Road (C1017) in the vicinity of Mid Coul Junction. The functionality of the installed lighting would allow for dimmable and remote control for future energy reduction and to support government objectives to reduce carbon emissions, pollution of the night sky and to reduce impacts on the rural landscape where this can be achieved safely and effectively.
- 4.7.15 Once the proposed Scheme is completed an assessment would be undertaken to determine whether there is justification to remove the existing street lighting on the existing A96 which would remain as a local road between Seafeld and the Smithton north roundabout.

## **4.8 Construction Methods and Programme**

- 4.8.1 This section provides a brief outline of the envisaged construction programme and typical construction activities. Typical construction methods for these activities and the assumptions made for the purposes of this ES are provided in Appendix A4.1 (Construction Information).
- 4.8.2 It is anticipated that construction would not commence before 2019 (subject to completion of statutory procedures) and the overall construction period is expected to be between 36 and 48 months. The construction duration is likely to be most influenced by the required earthworks operation. Embankment construction, particularly at the western end of the proposed Scheme would have a significant programme influence. Suitable allowance for settlement and surcharge periods may be required. A timescale for each element of the works is difficult to determine precisely as this would be determined by the date of commencement of the works, and the construction methods employed by the contractor.

### Outline Construction Programme

4.8.3 In order to assist the EIA process the approximate duration of construction activities has been estimated. An outline of the potential timing of the overall works (subject to completion of the statutory procedures) is provided in Table 4.9.

**Table 4.9: Outline Construction Programme**

| Year         | Construction Activities  |
|--------------|--|
| 2019         | Advance Works – some environmental mitigation works may be required a year or more in advance of the main construction works.<br>Site Establishment<br>Fencing<br>Site Clearance |
| 2019 to 2022 | Main Works<br>Temporary Works<br>Environmental Mitigation – landscaping and ecological mitigation may be later in the construction period.                                       |
| 2022 Onwards | Maintenance  |

### Typical Construction Activities

4.8.4 The key elements of the construction works have been broken down to facilitate the assessment of environmental effects. The construction activities associated with the proposed Scheme are outlined in Table 4.10.

**Table 4.10: Typical Construction Activities**

| Section         | Construction Activities   |
|-----------------|---|
| Advance Works   | <ul style="list-style-type: none"> <li>Where required, environmental mitigation to be implemented in advance of the main construction contract.</li> <li>Advance services diversions.</li> <li>Building demolitions.</li> <li>Archaeological investigations and excavations.</li> </ul>   |
| Roadworks       | <ul style="list-style-type: none"> <li>Site establishment and plant compounds at strategic locations.</li> <li>Temporary and permanent fencing.</li> <li>Site clearance and demolition.</li> <li>Temporary and permanent surface water outfalls.</li> <li>Service diversions.</li> <li>Topsoil stripping and storage.</li> <li>Pre-earthworks drainage.</li> <li>Earthworks (cuttings and embankments).</li> <li>Environmental bunds and landscaping.</li> <li>Drainage, service ducts and chambers.</li> <li>Mammal tunnels.</li> <li>Topsoil spreading, seeding and turfing.</li> <li>Pavement construction.</li> <li>Roadwork finishes including safety barriers, signs, road markings.</li> <li>Accommodation works.</li> </ul> |
| Structures      | <ul style="list-style-type: none"> <li>Construction of river crossings.</li> <li>Bridge construction.</li> <li>Culvert construction.</li> <li>Retaining wall construction.</li> </ul>   |
| Environmental   | <ul style="list-style-type: none"> <li>Earthworks mitigation.</li> <li>Landscape and ecological mitigation planting.</li> </ul>   |
| Temporary Works | <ul style="list-style-type: none"> <li>Temporary works to facilitate bridge construction.</li> <li>Temporary carriageway to maintain traffic flows where roads are narrow or are affected by construction of the proposed scheme.</li> <li>Narrow lanes, contraflows or lane/road closures.</li> <li>River or stream diversions to facilitate culvert construction.</li> <li>Temporary balancing ponds at drainage outfalls.</li> </ul>   |

| Section     | Construction Activities   |
|-------------|---|
| Maintenance | <ul style="list-style-type: none"> <li>• Landscaping maintenance.</li> <li>• Pavement rehabilitation and other routine maintenance and defects repair works</li> <li>• Winter maintenance.</li> </ul> |

Construction Compounds

- 4.8.5 The proposed Scheme is to be promoted under the Roads (Scotland) Act 1984. The contractor may wish to acquire additional land for construction compounds outside the land identified on the Compulsory Purchase Order (CPO). In this case, a separate planning application or a number of planning applications for construction compounds may be required. This would also apply to any other land that may be required beyond the CPO for related activities such as temporary access routes/haul roads.
- 4.8.6 The construction compounds would provide toilet facilities, mess facilities, and parking for office based staff and site operatives. In addition, stores and workshop areas (located within or near the compounds) would be provided for the construction phase.

Environmental Mitigation

- 4.8.7 The contractor would be required to implement all relevant environmental mitigation measures at the appropriate time. These would include a range of measures to avoid or reduce construction and operational effects.
- 4.8.8 Where possible, environmental mitigation would be constructed as soon as practical. This is likely for elements such as earthworks mitigation which are integral to the main engineering road design. Earthworks side slopes and verges would be top soiled and seeded as early as possible to minimise the risk of sediment runoff affecting the carriageway drainage system and the potential risk of pollution to watercourses. Planting works and ecological habitat creation areas are seasonally dependent and these may be left until later in the construction period following completion of the main works. Where necessary, noise barriers or bunds may be constructed early to mitigate specific construction noise impacts that are identified in advance. Other noise mitigation measures would be constructed later in the construction period.
- 4.8.9 Further information on environmental mitigation is provided within each assessment chapter and summarised in Chapter 20 (Schedule of Environmental Commitments).

Land Acquisition

- 4.8.10 All construction work would take place within the limit of the land made available to the contractor as defined within the contract documents. Construction compounds may be out with this land. The land made available would include some or all of the land acquired under CPO, land to which the Scottish Ministers already has ownership of or access to, or other areas the contractor has acquired by agreement to facilitate construction of the works. Certain areas of the land compulsorily purchased may not be made available to the contractor, for example where severance has made a small parcel of land unviable, this area of land may be purchased, but may not require any construction work on it.
- 4.8.11 The land to be acquired for the proposed Scheme includes land necessary to construct, operate and maintain the proposed Scheme and associated infrastructure and to undertake essential environmental mitigation measures.
- 4.8.12 The contractor may wish to utilise other areas of land not covered by the CPO. In such an instance, the contractor would have to secure the use of these areas by agreement and through separate planning applications, where appropriate. As the location of these areas is currently unknown, it is not possible to include an assessment of the effects of them within this ES.

## **4.9 References**

### **Reports and Documents**

Highways Agency, Scottish Executive Development Department, The National Assembly for Wales and the Department for Regional Development Northern Ireland (2002). Design Manual for Roads and Bridges Volume 6, Section 1, Part 1, TD9/93 - Amendment No 1: Highway Link Design.

Highways Agency, Scottish Executive, Welsh Assembly Government and the Department for Regional Development Northern Ireland (2005). Design Manual for Roads and Bridges Volume 6, Section 1, Part 2, Cross-sections and Headrooms.

The Highland Council (2013). Roads and Transport Guidelines for New Developments.

### **EU Directives and National Legislation**

Town and Country Planning (Environmental Impact Assessment) (Scotland) Regulations 2011, SI2011/139.

Roads (Scotland) Act (1984).

Water Environment (Controlled Activities) (Scotland) Regulations (2011).