4 The Proposed Scheme

4.1 Introduction

4.1.1 This chapter provides a description of the Design Manual for Roads and Bridges (DMRB) Stage 3 design of the A9/A96 Inshes to Smithton scheme (hereafter referred to as the proposed scheme) as assessed and reported in this Environmental Impact Assessment Report (EIAR). This includes a summary of the likely methods and programme for its construction (subject to completion of the statutory procedures), with background also provided on the anticipated procurement process.

4.1.2 This chapter is supported by Appendix A4.1 (Construction Information) and the following figures:

- Figure 4.1 (The Proposed Scheme);
- Figure 2.1 (Traffic Flows Location Plan Base Year/Do-Minimum) (accompanies Chapter 2: Need for the Scheme); and
- Figure 2.2 (Traffic Flows Location Plan Base Year/Do-Something) (accompanies Chapter 2: Need for the Scheme).

4.2 Background

Scheme Procurement

4.2.1 It is likely that the proposed scheme would be procured by means of a Design and Build (D&B) contract. Under the terms of the contract, the contractor would undertake both the detailed design and construction of the proposed scheme. Upon completion of the proposed scheme, the operation and maintenance of the new single carriageway road between Inshes and Smithton would be the responsibility of The Highland Council and incorporated into the Council's existing roads maintenance scheme. The A9 southbound lane gain and slip roads would be operated and maintained as part of the A9 Perth – Inverness Trunk Road (hereafter referred to as the A9) under the maintenance contract in place at that time.

4.2.2 Under a D&B type contract, a specimen (outline) design is prepared for the proposed scheme by Transport Scotland. Bidders in the D&B process are provided with the specimen design for their information during the process. Following a successful bid process, the appointed contractor(s) produce a detailed design for the proposed scheme. The appointed contractor(s) can optimise this as the detailed design is developed. Such optimisation must be within the constraints imposed by the EIAR including the Schedule of Environmental Commitments (Chapter 20) which contains the mitigation measures identified through the Environmental Impact Assessment (EIA) process, Statutory Orders (such as land acquisition) and any specific limits set within the contract documents. Design changes through optimisation are subject to environmental review to ensure that any residual impacts would not be greater than those reported to ensure that the detailed design is implemented in compliance with this EIAR.

Sustainable Development

4.2.3 The basis for Government policy on sustainable resource management and sustainable procurement in Scotland was set out in the Scottish Government's Sustainable Development Strategy - Choosing our Future (Scottish Executive 2005). This includes a number of principles and commitments, particularly with regards to the public sector acting as exemplars in sustainable development objectives, through improving the resource efficiency of its operations.

4.2.4 Consideration of sustainable development principles forms an important element of all activities undertaken in the life-span of the proposed scheme, including project design and appraisal, tender evaluation, construction, maintenance and operation (including decommissioning).

4.2.5 The proposed scheme includes the following examples of environmental principles of particular relevance to sustainable development:

- promote local / sustainable sourcing of materials;
- promote sustainable design and innovation to reduce material consumption;
- avoid and minimise waste generation;
- maximise re-use of material resources and use of recycled materials; and
- promote more sustainable modes of transport (public transport, non-motorised user (NMU) provision).

4.2.6 The outcomes in relation to sustainability will be taken into account by Transport Scotland during the progression of the proposed scheme.

4.2.7 The contractor should consider sustainability throughout the construction of the project and use best practice guidance for managing sustainability effectively within the contract.

4.3 Proposed Scheme Design

4.3.1 As outlined in Chapter 3 (Alternatives Considered), the preferred option for the proposed scheme was identified following the DMRB Stage 2 assessment, which included an assessment of the potential environmental constraints associated with each route option.

4.3.2 Throughout the design development of the proposed scheme, consultation has been undertaken with statutory consultees and non-statutory consultees (including landowners) that may potentially be affected by the proposed scheme. The feedback received from these consultations has been used to inform the DMRB Stage 3 design, with measures implemented, where reasonable and practicable, to address specific areas of concern. Further information regarding the consultation process is provided in Chapter 6 (Consultation and Scoping), with a summary of consultation responses and how these have been addressed provided in Appendix A6.1.

4.3.3 The environmental constraints and issues identified in DMRB Stage 2 have significantly informed route development, described in Chapter 3 (Alternatives Considered). The DMRB Stage 3 design has been developed iteratively, taking into account the recommendations of environmental specialists, engineering reasons and constraints, information sourced from the consultation process, and the results from the traffic, structural, geotechnical and drainage studies.

4.4 Traffic Conditions

4.4.1 The existing A96 Aberdeen – Inverness Trunk Road between Smithton Roundabout and Raigmore Interchange has a two-way Annual Average Weekday Traffic (AAWT) level of approximately 36,500 vehicles per day based on 2018 Junction Turning Counts (JTC). The AAWT on the A9 north of Raigmore Interchange is approximately 35,100 vehicles per day, based on 2018 Automatic Traffic Counts (ATC). The ATC on the A9 to the south of Raigmore was not operational in 2018, meaning no observed traffic count information is available at this location. Observed data has been calculated for this location using ATC01008, which is situated on the A9 between Raigmore and Longman, and JTC 10, which counted the merge and diverge flows at Raigmore Interchange. The approximate AADT on the A9 South of Raigmore is 30,200. The most notable AADTs for the local road network are C1032 Barn Church Road (11,500 vehicles per day) and B9006 Culloden Road to the east of the A9 (12,900 vehicles per day).

4.4.2 Forecast traffic composition and speeds were derived from the Moray Firth Traffic Model (MFTM), the version of the traffic model being used for the DMRB Stage 3 assessment of the proposed scheme. Further details on the MFTM are outlined in Chapter 2 (Need for the Scheme).

4.4.3 The traffic modelling is intended to assess the impact of interventions by comparing the intervention scenario (Do-Something) with a Do-Minimum scenario, outlined on Figure 2.1 and Figure 2.2, which accompany Chapter 2 (Need for the Scheme).

4.4.4 As noted in Chapter 5 (Overview of Assessment Process) the traffic modelling takes into account several key local developments for the Do-Minimum (without the proposed scheme). Including these developments in the traffic modelling constitutes a robust assessment in the EIAR, as the worst-case scenario in terms of traffic numbers is represented more accurately.

4.5 Outline of the Proposed Scheme

Proposed Scheme Description

4.5.1 The details of the proposed scheme described below are shown on Figure 4.1. The proposed scheme comprises approximately 3.2km of new single carriageway (mainline and side roads), to improve the road network between the existing A9 and A96.

4.5.2 The proposed scheme comprises:

- a lane gain/lane drop arrangement on the A9 southbound carriageway, forming a third lane between Raigmore Interchange and Inshes junction;
- two at-grade roundabouts;
- local road diversions, the provision of new means of access and access for maintenance purposes;
- two principal structures comprising one crossing of the A9 and one of the Highland Main Line Railway;
- 12 culverts, including ten culvert crossings and two flood relief culverts;
- the provision of approximately 7.3km of new paths for pedestrians and cyclists (referred to as Non-Motorised Users or NMUs) and which have been developed collaboratively with The Highland Council to complement the Inverness East Development Brief; and
- utility works.

4.5.3 The proposed scheme would commence to the west of the A9, with a new overbridge running parallel and to the south of the existing Inshes Overbridge (P01), which would be provided to accommodate two lanes of traffic in each direction of travel. The proposed scheme would connect to The Highland Council's Inshes Junction Improvements – Phase 2 to the west of the new overbridge. A lane gain/lane drop arrangement on the A9 southbound carriageway between Raigmore Interchange and Inshes Junction would be included as part of the proposed scheme.

4.5.4 The wide single carriageway element of the proposed scheme would commence at the existing junction between the U1058 Caulfield Road North and the B9006 Culloden Road. This section of road would be widened for approximately 300m to two lanes in a southbound direction and one lane in a northbound direction. North of the proposed Cradlehall Roundabout a new single carriageway would be provided travelling in a north-easterly direction to a new roundabout in the vicinity of Cradlehall.

4.5.5 The proposed Cradlehall Roundabout would be a four-arm roundabout connecting the proposed scheme to the local road network. The access to Inverness Campus and the U5096 Castlehill Distributor Road would be locally realigned. The proposed scheme would cross over the Highland Main Line Railway via a new overbridge (PS03) and pass to the east of the Scheduled Monument 'Ashton Farm Cottages, ring ditch 415m SW and pit circles 460m WSW of' (hereafter known as the Scheduled Monument).

4.5.6 The proposed Eastfield Way Roundabout would be a four-arm roundabout and provide a connection to the Inverness Retail and Business Park, as well as a field access to the east. The proposed scheme would then continue to the east of Ashton Farm and tie into the proposed grade separated A96 Smithton Junction, to be delivered as part of the A96 Dualling Inverness to Nairn (including Nairn Bypass) scheme.

4.5.7 Details of the vertical and horizontal alignment of the proposed scheme are provided in the plan and profile drawings, Figures 3.1 to 3.3 of the A9/A96 Inshes to Smithton DMRB Stage 3 Scheme Assessment Report (Jacobs 2019).

4.5.8 The following sections 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 ch250), which is a reference to the number of metres along the proposed scheme, from west to east.

4.5.9 Within the assessment, the section of the proposed scheme to the east of the A9 is split into 'links' for ease of reference. These 'links' are shown on Figure 4.1 and are described as follows:

- Culloden Road to Cradlehall Roundabout (Link 1: ch0 to ch306);
- Cradlehall Roundabout to Eastfield Way Roundabout (Link 2: ch0 to ch644);
- Eastfield Way Roundabout to Inverness Retail and Business Park (Link 3: ch0 to ch693);
- Eastfield Way Roundabout to Smithton Junction (Link 4: ch0 to ch1113); and
- Cradlehall Roundabout to Inverness Campus (Link 5: ch0 to ch289).
- Castlehill Road Tie-in (Link 6: ch0 to ch208).

4.5.10 The lane gain/lane drop arrangement on the southbound carriageway of the A9 is described in the assessment and shown on Figure 4.1 as the A9 southbound lane gain/lane drop.

4.5.11 The proposed addition to the existing Inshes Overbridge (PS01) is described in the assessment as proposed Inshes Overbridge (PS02) and is shown on Figure 4.1 by this name.

4.5.12 For the figures accompanying this EIAR, the proposed scheme is shown on Ordnance Survey (OS) based figures at different scales, depending on the study area considered within each of the environmental subject areas.

Junctions

4.5.13 As part of the A96 Dualling Inverness to Nairn (including Nairn Bypass) scheme, the existing Smithton roundabout would be replaced by a fully grade separated junction. The proposed A96 Smithton Junction would provide full access to and from the proposed A96 dual carriageway and C1032 Barn Church Road.

Proposed New Links / Side Roads

4.5.14 The proposed Cradlehall Roundabout would be a four-arm roundabout connecting the scheme to U1058 Caulfield Road North to the south and to the east (to join U5096 Castlehill Distributor Road), to Inverness Campus to the west and continuing along the alignment of the proposed scheme to the north.

4.5.15 The proposed Eastfield Way Roundabout would be a four-arm roundabout and provide a connection to the Inverness Retail and Business Park to the west, a field access to the east, and would continue along the alignment of the proposed scheme to the north towards proposed A96 Smithton Junction.

4.5.16 The 'links' to and from and between Cradlehall Roundabout and Eastfield Way Roundabout are described in paragraph 4.5.8 above.

Local Road Changes

4.5.17 Local roads would be upgraded as necessary to maintain access from the existing road network to the proposed scheme. Local road diversions and improvements are detailed in Table 4.1.

Table 4.1 Local Road Diversions and Improvements

Local Road	Diversion or Improvement
Caulfield Road North (U1058)	Caulfield Road North (U1058) from its junction with the B9006 Culloden Road to the existing Inverness Campus access would be improved with a widened carriageway. From its existing Inverness Campus access to its junction with the Castlehill Distributor Road (U5096) it would be stopped up. A new side road would divert the existing route of Caulfield Road North (U1058) to the proposed Cradlehall Roundabout, where it would junction with the Castlehill Distributor Road (U5096) and a new Inverness Campus access. The existing junction of the north-eastern section of U1058 Caulfield Road North, between Castlehill Distributor Road (U5096) and Caulfield Road (U1124), would be improved.
Castlehill Distributor Road (U5096)	Castlehill Distributor Road (U5096), from its existing south-west junction with Caulfield Road North (U1058), would be extended with new carriageway to a new junction, at the proposed Cradlehall Roundabout, with the section of Caulfield Road North (U1058) junctioning with the B9006 Culloden Road.
B9006 Culloden Road	The carriageway immediately adjacent to the B9006 Culloden Road junction with the Inverness Campus and the A9 Southbound slip road would be improved to allow connection with the proposed Inshes Overbridge (PS02).
Eastfield Way (U2820)	The existing junction between Eastfield Way (U2820) and the Inverness Retail and Business Park service access road would be improved to allow connection of the proposed link between Eastfield Way Roundabout and the Inverness Retail and Business Park (Link 3).

Access to Land and Properties

4.5.18 A number of properties, including farms, are located in the vicinity of the proposed scheme. The residential areas of Culloden, Smithton, Cradlehall and Inshes would experience a change in access/travel distance as a result of the proposed scheme. Further details are provided in Chapter 15 (People and Communities: Community and Private Assets).

4.5.19 In addition, there would be a number of new field accesses at various locations, and new access tracks to each of the proposed SuDS.

Non-Motorised User Provisions

4.5.20 Facilities for Non-Motorised Users (NMUs), which includes pedestrians, equestrians and cyclists, are an integral feature of the proposed scheme. These include:

- A NMU shared use facility adjacent to the northbound and southbound carriageway of the S2 single carriageway element of the proposed scheme.
- Link 3 of the proposed scheme incorporates a dedicated cycleway and a pedestrian footway adjacent to the westbound carriageway, and a pedestrian footway adjacent to the eastbound carriageway.
- A new NMU link south of the Eastfield Way Roundabout, Drumrosach Bridge NMU Link, descending from road level on the embankment, to provide a grade-separated crossing underneath the proposed scheme and run adjacent to the Highland Main Line Railway, tying into the existing railway overbridge at the Inverness Campus.
- A new NMU route at Link 5 replacing the pedestrian footway from U1058 Caulfield Road North to the Inverness Campus which would be severed as a result of the proposed scheme.

4.5.21 Further details on provisions for NMUs are provided in Chapter 16 (People and Communities: All Travellers).

Key Structures

4.5.22 There are a number of new structures included within the proposed scheme and these include two principal structures and eight new culverts where the proposed scheme crosses local watercourses. One culvert replacement, one culvert extension, and two flood relief culverts will also be provided as part of the proposed scheme and are described further in Chapter 13 (Road Drainage and the Water Environment). The key structures are described below.

PS02 Proposed Inshes Overbridge (ch840 of A9 southbound lane gain/lane drop)

4.5.23 A new overbridge running parallel and to the south of the existing Inshes Overbridge (PS01) would be provided, which would have two westbound lanes. The existing Inshes Overbridge (PS01) along with the new overbridge would therefore accommodate two lanes of traffic in each direction of travel. A two-span structure is envisaged (to match the existing structure alongside) with a western span of approximately 14.5m and a varying eastern span of approximately 16.7m to 20.9m. The structure would comprise precast prestressed concrete beams with an insitu concrete deck slab supported on cast insitu concrete abutments and a central leaf pier. A 1m high parapet would be provided over the structure on the north side and a 1.4m high parapet would be provided over the structure on the south side. The structure would span the A9 Perth - Inverness Trunk Road at a skew angle of approximately 22 degrees at the west abutment and intermediate pier and approximately 38 degrees at the east abutment. The skew would be greater at the east abutment, which would be positioned to provide the required sightline to the junction with B9006 Culloden Road.

PS03 Cradlehall Railway Bridge (ch415 of Link 2)

4.5.24 A structure would be provided to carry the proposed S2 single carriageway over the Highland Main Line Railway. A single span structure is envisaged with a span of approximately 24.5m. The structure would comprise precast prestressed concrete beams with an insitu concrete deck slab supported on cast insitu concrete abutments. A minimum clearance of 5.35m is required to the railway below. A 1.8m high H4a parapet would be provided over the structure on each side. The structure would span the railway at a skew angle of approximately 40 degrees.

Earthworks

Cuttings and Embankments

4.5.25 The height of the proposed scheme varies with sections on embankment, in cutting or close to existing ground level, these are summarised in Table 4.2.

Table 4.2: Location of Earthworks Along the Proposed Scheme

Link/Chainage (ch)	Embankment/Cutting	Details
A9 Southbound Lane Gain/Drop	Cutting	Approximately 1.25m deep along existing slope adjacent to carriageway for length of lane gain
PS02 Proposed Inshes Overbridge	Embankment	Approximate height ranging from 1.2m to 5m.
Link 1 ch0 to ch185	Embankment/Cutting	Approximately 1m in height / depth.
Link 1 ch185 to ch306	Embankment	Approximately 2m in height.
Link 2 ch0 to ch644	Embankment	Approximate height ranging from 2.5m to 8.4m.
Link 3 ch0 to ch693	Embankment	Approximate height ranging from 0.5m to 2m.
Link 4 ch0 to ch250	Embankment	Approximate height ranging from 0.5m to 2m.
Link 4 ch250 to ch600	Embankment/Ground Level	Generally at ground level with intermittent embankment heights of up to approximately 1m.
Link 4 ch600 to ch1113	Embankment/Ground Level	Generally on embankment with intermittent sections at ground level. Approximate height ranging from 1.5m to 4m.
Link 5 ch80 to ch260	Embankment	Approximate height ranging from 0.5m to 3.5m.
Castlehill Road Tie-in	Embankment	Approximate height ranging from 1m to 2m.

4.5.26 Cuttings and embankments are likely to require engineering slopes of 1 in 2, 1 in 2.5, or 1 in 3. This is dependent on the height of the cutting or embankment, as well as 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 Quantities

4.5.27 A summary of the estimated earthworks quantities for construction of the proposed scheme is provided in Table 4.3, with further details of material use and management of waste during construction provided in Chapter 17 (Materials). It has been assumed that all cut material excavated would be used, therefore the export of excess, unusable, materials would not be required.

Table 4.3: Estimated Earthworks Volumes

Earthworks	Approximate Volume (m^3)
Estimated Import	214,987
Estimated Export	0

4.6 Proposed Scheme Design Details

Fencing and Environmental Barriers

Fencing

4.6.1 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.

4.6.2 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

4.6.3 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 EIAR, environmental barriers would be incorporated. This may include ecological fencing required to provide protection for wildlife by preventing access onto the carriageway. The requirements for ecological fencing are given in Chapter 11 (Ecology and Nature Conservation).

Drainage Design and Watercourse Crossings

4.6.4 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 licences 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

4.6.5 The drainage design for the proposed scheme has been developed in accordance with SuDS guidance as detailed in Table 13.1 of Chapter 13 (Road Drainage and the Water Environment), and through consultation with SEPA and The Highland Council. The drainage system makes use of gullies adjacent to the carriageway used to collect surface water outfalling to swales and/or SuDS basins to treat the water and provide attenuation.

4.6.6 Pre-earthworks drainage would likely take the form of ditches, constructed at the top of cuttings and the base of embankments where surface water and sub-surface pathways from adjoining land would flow towards the proposed scheme or other receptors, thus intercepting the flow. 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.

Watercourse Crossings

4.6.7 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. A culvert or bridge would be provided where necessary to take existing watercourses under new roads and access tracks. The proposed watercourse crossing structures described in this EIAR have been selected based on achieving a balance between environmental, engineering and economic factors.

4.6.8 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, while complying with the environmental commitments detailed in this EIAR. Specific reference should be made to Chapter 13 (Road Drainage and the Water Environment) and Chapter 11 (Ecology and Nature Conservation).

4.6.9 The requirement for new watercourse crossings has been identified at the locations detailed in Table 4.4.

Table 4.4: Location of New Watercourse Crossing

Structure		Approximate Chainage (m)
Culverts		
C01	Scretan Burn Culvert No1 (SWF04)	ch150 of Link 2
C02	Scretan Burn Tributary Culvert No 1 (SWF05)	ch550 of Link 2
C03	Scretan Burn Tributary Culvert No 2 (SWF05)	ch550 of Link 3
C04	Scretan Burn Culvert No 2 (SWF04)	ch300 of Link 3
C05	Beechwood Burn Culvert No 1 (SWF03)	ch50 of Link 3
C06	Cairnlaw Burn Culvert No 1 (SWF08)	ch75 of Link 4
C07	Cairnlaw Burn Culvert No 2 (SWF08)	ch850 of Link 4
C08	Scretan Burn Culvert No 3 (SWF04)	ch25 of Eastfield Way Roundabout to Drumrosach Bridge NMU Link
C09	Beechwood Burn Culvert No 2 (SWF03)	ch10 of Link 1
C10	Beechwood Burn Culvert No 3 (SWF03)	ch650 of A9 southbound lane gain/lane drop

4.6.10 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. This condition is in accordance with Scottish Planning Policy (SPP) and supported by the Flood Risk Drainage Impact Assessment Supplementary Guidance (The Highland Council 2013) and DMRB HA107/04 (Highways Agency, Scottish Executive, Welsh Assembly Government, The Department for Regional Development Northern Ireland 2004) which outline developments should be free from unacceptable flood risk and avoid the functional floodplain where possible. SEPA's Technical Flood Risk Guidance for Stakeholders (SEPA 2015) states 0.5% AEP (200-year) peak flow estimates should be increased by 20% to account for the impacts of climate change.

Traffic Signs, Road Markings and Lighting

Traffic Signs and Road Markings

4.6.11 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.

Lighting

4.6.12 Temporary site lighting during construction would be required as follows:

- at the contractor's compounds for security and safe movement of staff during winter mornings and evenings;
- along temporary access roads;
- at locations where there is currently no lighting, but lighting is required as a safety measure under temporary traffic management (e.g. at carriageway crossovers, contraflows etc); and
- for night time activities or winter afternoon activities.

4.6.13 The design of the proposed scheme seeks to reduce or avoid excessive, unnecessary and obtrusive lighting by appropriate selection, location and arrangement of lighting elements, while adhering to the necessary safety and design standards.

4.6.14 To minimise light pollution from the proposed street lights, Light Emitting Diodes (LEDs) or similar which can be dynamically controlled according to traffic flows would be utilised. LEDs would also be used to prevent unnecessary glare or light spill from proposed lighting columns and fixtures. Further details are provided in Chapter 10 (Visual). The use of LEDs would improve sustainability within the proposed scheme by providing a significant reduction in energy use and carbon emission (based on the 25 year life span of an LED).

4.7 Construction Methods and Programme

4.7.1 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 EIAR are provided in Appendix A4.1 (Construction Information).

Outline Construction Programme

4.7.2 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 4.5.

Table 4.5: Outline Construction Programme

Indicative Duration	Construction Activities
3 – 4 months	Advance Works – some environmental mitigation works may be required a year or more in advance of the main construction works. Site Establishment Fencing Site Clearance
15 – 20 months	Main Works Temporary Works Environmental Mitigation – landscaping and ecological mitigation may be later in the construction period.

Typical Construction Activities

4.7.3 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 4.6.

Table 4.6: Typical Construction Activities

Section	Construction Activities
Advance Works	Where required, environmental mitigation to be implemented in advance of the main construction contract. Advance services diversions. Archaeological investigations and excavations.
Roadworks (Main and Temporary)	Site establishment and plant compounds at strategic locations. Temporary and permanent fencing. Site clearance. Temporary and permanent surface water outfalls. Service diversions. Topsoil stripping and storage. Pre-earthworks drainage. Earthworks (cuttings and embankments). Environmental bunds and landscaping. Drainage, service ducts and chambers. Mammal tunnels. Topsoil spreading, seeding and turfing. Pavement construction. Roadwork finishes including safety barriers, signs, road markings. Accommodation works.
Structures	Construction of proposed Inshes Overbridge (P02) and Cradlehall Railway Bridge (P03). Construction of river crossings. Culvert construction.
Environmental	Earthworks mitigation. Landscape and ecological mitigation planting.
Maintenance	Temporary works to facilitate bridge construction. Temporary carriageway to maintain traffic flows where roads are narrow or are affected by construction of the proposed scheme. Narrow lanes, contraflows or lane/road closures. River or stream diversions to facilitate culvert construction. Temporary balancing ponds at drainage outfalls.

Construction Compounds

4.7.4 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 in 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 outwith the CPO for related activities such as temporary access routes/haul roads.

4.7.5 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

4.7.6 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.

4.7.7 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.

4.7.8 Further information on environmental mitigation is provided within each assessment chapter and summarised in Chapter 20 (Schedule of Environmental Commitments).

Land Acquisition

4.7.9 All construction work would take place within the limit of the land made available (LMA) to the contractor as defined within the contract documents. Construction compounds may be outwith this land. The LMA 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 acquired by the Scottish Minsters 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.

4.7.10 The land to be compulsorily 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.

4.7.11 As outlined in paragraph 4.7.4, the contractor may wish to utilise other areas of land not covered by the CPO, and if required 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 EIAR.

4.8 References

Reports and Documents

Jacobs (2019) A9/A96 Inshes to Smithton: Scheme Assessment Report.

Highways Agency, Scottish Executive, Welsh Assembly Government, The Department for Regional Development Northern Ireland (2004). Design Manual for Roads and Bridges, Volume 4, Section 2, Part 7 (HA 107/04): Design of Outfall and Culvert Details. Available at: http://www.standardsforhighways.co.uk/ha/standards/dmrb/vol4/section2/ha10704.pdf

The Highland Council (2013). Flood Risk Drainage Impact Assessment Supplementary Guidance

Scottish Executive (2005). Choosing our Future: Scotland's Sustainable Development Strategy. Available at: https://www2.gov.scot/Publications/2005/12/1493902/39032 [Accessed 6 March 2019]

SEPA (2015). Technical Flood Risk Guidance for Stakeholders (Reference: SS-NFR-P-002).

EU Directives and National Legislation

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