21 Schedule of Environmental Commitments

21.1 Introduction

21.1.1 As described throughout this ES, the design of the proposed scheme has been progressed taking account of identified environmental constraints and considerations, enabling avoidance or reduction of potential environmental impacts where practicable. This chapter summarises the additional mitigation measures identified in the ES, which are considered necessary to avoid; reduce; or offset potential impacts.

21.1.2 The purpose of the following Schedule of Environmental Commitments is to collate mitigation measures, both for ease of reference and for use by the Contractor. These mitigation measures are those identified within Chapters 8-18 of this ES (Table 21.2 to 21.11), as well as four overarching mitigation items (Table 21.1). A description, location, and purpose of each mitigation item is given. The tables also state whether consultation or approval with a consultee is required.

21.1.3 The timing of mitigation varies and may be a design requirement, or implemented prior to construction, during construction and/or during operation of the proposed scheme. The stated mitigation measures have been identified through the EIA process, and whilst some of these are also necessary to achieve separate legislative compliance (e.g. protected species licences), they are included as they still encompass mitigation commitments of this ES.

Table 21.1: General Standard Construction Mitigation

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
Standard A9 Mitigation					
SMC-S1	Throughout proposed scheme	Pre-Construction & Construction	A Construction Environmental Management Plan (CEMP) will be prepared by the Contractor. The CEMP will set out how the Contractor intends to operate the construction site, including construction-related mitigation measures identified below in Tables 21.2 to 21.11. The relevant section(s) of the CEMP will be in place prior to the start of construction work. The CEMP will include, but not be limited to, subsidiary plans relating to: agricultural soils, geology and land contamination; surface water and groundwater (including a Flood Response and Pollution Incident Response Plan); ecology (including specific Species and Habitat Management Plans); landscape, cultural heritage, air quality and noise and vibration.	To provide a framework for the implementation of construction activities in accordance with the environmental commitments and mitigation measures in the ES. It will be developed and evolve to avoid, reduce or mitigate construction impacts on the environment and the surrounding community.	Refer to Tables 21.2-21.11
SMC-S2	Throughout proposed scheme	Pre-Construction & Construction	Prior to construction an Environmental Coordinator and team of suitably qualified Environmental Clerk of Works (EnvCoW) (i.e. professionally qualified in a relevant environmental discipline) will be appointed by the Contractor. The EnvCoW(s) will report to the Environmental Coordinator and be present on site, as required, during the construction period to monitor the implementation of the mitigation measures identified and ensure that activities are carried out in such a manner to prevent or reduce impacts on the environment.	To monitor the implementation of the mitigation measures identified and ensure that activities are carried out in such a manner to prevent or reduce impacts on the environment.	Approval by Transport Scotland
SMC-S3	Throughout proposed scheme	Pre-Construction & Construction	Throughout the construction period the Contractor will, as required, contribute towards the overall communications strategy for the A9 Dualling Programme. As part of this the Contractor will appoint a Community Liaison Officer and liaison team who will: • liaise with the following: relevant local authorities; other statutory bodies and regulatory authorities; community councils and relevant community groups; and businesses and residents in local communities affected by the construction works; • notify occupiers of nearby properties a minimum of two weeks in advance of the nature and anticipated duration of planned construction works that may affect them; • support the production of project communications such as the project website and newsletters; and • establish a dedicated freephone telephone helpline together with a dedicated email address and postal address for enquiries and complaints during the construction phase. The relevant contact numbers, email and postal addresses will as a minimum be displayed on signs around the construction site and will be published on the project website. Enquiries and complaints will be logged in a register and appropriate action will be taken in response to any complaints.	To inform stakeholders and consultees throughout the construction period.	Consultation with the relevant local authorities, other statutory bodies and regulatory authorities, community councils and relevant community groups, and businesses and residents in local communities affected by the construction works

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
Standard A9 Mitigation					
SMC-S4	Throughout proposed scheme	Construction	The Contractor will ensure that all site workers receive adequate training relevant to their role prior to working on the construction site, including specific environmental project inductions and 'toolbox talks' as required.	To ensure site workers are aware of best practice construction methods, mitigation measures and how they are implemented.	None required

Table 21.2: People and Communities – Community and Private Assets

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
Standard A9 Mitigation					
SMC-CP1	Throughout proposed scheme	Pre-Construction & Construction	Access to/from residential, commercial and industrial and agricultural, forestry and sporting assets will be maintained throughout the construction period by means of signed diversions, where necessary. The estimated duration and location of these diversions will be communicated to affected parties a minimum of two weeks in advance before they are put in place.	To maintain access to/from residential, commercial and industrial and agricultural, forestry and sporting assets.	None required
SMC-CP2	Throughout proposed scheme	Construction & Operation/Post-Construction	Existing access arrangements to agricultural and forestry land outwith the land made available (LMA) boundary will not be prevented by the construction works during or post construction, unless alternative access is provided.	To maintain access to/from residential, commercial and agricultural/forestry land.	None required
SMC-CP3	Throughout proposed scheme	Pre-Construction	Consultation with affected landowners and occupiers will be undertaken on the location and timing of planned construction works to reduce disturbance, as far as practicable, taking into account the overall construction programme.	To reduce disturbance on affected landowners.	Consultation with affected landowners and occupiers
SMC-CP4	All agricultural land	Pre-Construction	Notice of intention to commence construction work will be provided to owners and occupiers of agricultural land adjacent to the proposed scheme before works commence.	To ensure owners and occupiers of agricultural land adjacent to the proposed scheme are informed of the intention to commence construction work prior to works commencing.	None required
SMC-CP5	All agricultural land	Construction	Where practicable, temporary construction compounds that are required outwith the LMA boundary will not be sited on prime agricultural land or on areas of woodland and forestry.	To reduce potential impacts arising from temporary construction compounds on prime agricultural land or on areas of woodland and forestry.	None required

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
SMC-CP6	All agricultural land	Construction & Operation/Post-Construction	Where appropriate, temporary fences will be provided during construction for the health and safety of the public and animals. Fencing of working areas will be to a standard adequate for excluding any livestock kept on adjoining land. Access by non-authorised personnel will not be permitted, unless prior permission is granted by the Principal Contractor(s).	For the health and safety of the public and animals and to prevent unauthorised site access.	None required
SMC-CP7	All agricultural land	Construction	Where boundary features (e.g. fences, walls and hedges) require temporary or permanent alteration to allow construction, these will be reinstated with appropriate materials to provide a secure boundary.	To provide a secure boundary and reduce disruption to agriculture.	None required
SMC-CP8	Throughout proposed scheme	Construction	Soil resources will be managed in accordance with the 'Construction Code of Practice for the Sustainable Use of Soils on Construction Sites' (Defra, 2009). This will include the careful excavation, storage and replacement of topsoil and subsoil.	To ensure that soil mitigation measures are fully implemented and soil resources are protected.	None required
SMC-CP9	All agricultural land	Construction	Reasonable precautions will be taken during construction to avoid the spreading of soil-borne pests and diseases; animal and crop diseases; tree pests and diseases; and invasive species. A biosecurity protocol will be developed by the Contractor in consultation with the Animal and Plant Health Agency, the Scottish Government's Environment and Forestry Directorate and the Scottish Government's Agriculture, Food and Rural Communities Directorate, taking cognisance of relevant UK and Scottish Government biosecurity guidance.	To avoid the spreading of soil-borne pests and diseases; animal and crop diseases; tree pests and diseases; and invasive species.	Consultation with the Animal and Plant Health Agency, the Scottish Government's Environment and Forestry Directorate and the Scottish Government's Agriculture, Food and Rural Communities Directorate
SMC-CP10	Throughout proposed scheme	Pre-Construction	Pre-construction drainage surveys will be undertaken to reduce the likelihood of damage or disturbance to field and forestry drainage systems during construction. Where required, the integrity of the drainage system will be secured in advance of construction. Repairing and reinstatement of drains affected by construction will be agreed with the landowner / occupier to ensure that land capability is maintained and the risk of flooding is not exacerbated.	To reduce the likelihood of damage or disturbance to field and forestry drainage systems during construction.	Consultation with affected landowners and occupiers
SMC-CP11	Throughout proposed scheme	Pre-Construction	Water supplies for livestock will be identified pre-construction and where supplies are lost or access is compromised by any construction works, temporary and / or permanent alternative supplies will be provided as agreed with the landowner/occupier.	To reduce disruption to landowners/occupiers.	Consultation with affected landowners and occupiers
SMC-CP12	Throughout proposed scheme	Post-Construction/ Operation	LMA that is declared surplus following completion of construction of the proposed scheme (including redundant road pavement and/or access tracks) will be offered back to former owners or their successors in accordance with the Crichel Down Rules.	To return surplus land to former owners or their successors in accordance with the Crichel Down Rules.	Consultation with affected landowners and occupiers
SMC-CP13	Throughout proposed scheme	Construction	Where there are sporting or fishing rights adjacent to the working area, reasonable endeavours will be taken to minimise interference with enjoyment of them while recognising the primary objective to maintain a safe working environment for both contractors and users of the land and water.	To reduce interference or enjoyment of sport/fishing while maintaining a safe working environment for both contractors and users of the land and water.	None required

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
SMC-CP14	Throughout proposed scheme	Pre-Construction	Where stands of trees are to be affected an arboricultural and/or windthrow assessment will be undertaken pre-construction. Tree surgery and/or felling will be carried out as necessary to ensure the safety of land and infrastructure.	To address safety risk to land within the proposed scheme and reduce impacts to forestry.	None required
SMC-CP15	Throughout proposed scheme	Post-Construction/ Operation	On completion of works, any land required temporarily for construction works will be reinstated as far as practicable.	To ensure appropriate restoration of land following completion of proposed scheme.	None required
Project Specific Mitigation					
P04-CP16	Throughout proposed scheme	Construction	Consideration would be given by Transport Scotland to the replacement of existing roadside signage on the proposed scheme for certain businesses whose access has changed and whose business is particularly dependent upon vehicular movements from the A9.	To reduce disruption to businesses where access arrangements have changed as a result of the proposed scheme.	None required
P04-CP17	Flood compensatory storage areas and graded out embankments	Post-Construction /Operation	Where areas of land within the CPO are identified as being surplus and having the potential to be returned to agriculture following construction of the proposed scheme, for example some flood mitigation areas and graded out embankment slopes, these shall be offered back to the former owner for return to agricultural/forestry use following imposition of appropriate burdens by Transport Scotland.	To reduce disruption to landowners/occupiers, minimise permanent land-take and reduce agricultural impacts.	Consultation with affected landowners and occupiers
P04-CP18	All agricultural land	Construction	Where field access points require permanent alteration as a result of construction, alternative field access will be provided in consultation with the land owner/occupier. Where recessed field access from local roads is identified as being required, this shall be provided.	To reduce disruption to landowners/occupiers.	Consultation with affected landowners and occupiers
P04-CP19	All forestry	Pre-Construction	Where individual stands of trees and woodland compartments will be affected, and risk of windthrow or damage to root protection areas has been identified as a safety risk to land within the proposed scheme, appropriate mitigation will be applied to address safety risk to land within the proposed scheme. Any felling to create a windfirm edge or stabilise trees will take account of potential ecological, landscape and visual impacts and designed where feasible to maximise ecological, landscape and visual opportunities.	To address safety risk to land within the proposed scheme and reduce impacts to forestry and maximise ecological, landscape and visual opportunities.	None required
P04-CP20	All forestry	Pre-Construction	Where individual stands of trees and woodland compartments will be affected, and where there are no windthrow or landscape/visual issues, a tree protection plan will be prepared and tree felling restricted to that necessary to allow the safe construction and operation of the proposed scheme.	To allow the safe construction and operation of the proposed scheme while protecting trees.	None required
P04-CP21	Forestry areas throughout proposed scheme	Pre-Construction	Tree felling will be avoided where possible in areas of woodland identified as having the potential to be retained for landscape and visual purposes (areas to be retained identified in Figure 13.5), taking cognisance of the tree protection plan and/or windthrow assessment.	To reduce landscape and/or visual impacts.	None required

Table 21.3: People and Communities – All Travellers

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
Standard A9 Mitigation					
SMC-AT1	Throughout proposed scheme	Construction	The construction programme will minimise the length of closures or restrictions of access for NMUs as far as reasonably practicable	To minimise length of closures or restrictions of access for NMUs.	None required
SMC-AT2	Throughout proposed scheme	Construction	Where practicable, temporary diversion routes and/or assisted crossings will be provided to maintain safe access for NMUs throughout the construction works. Any closure or re-routing of routes used by NMUs will take cognisance of the 'Roads for All: Good Practice Guides for Roads' (Transport Scotland, 2013). These will be agreed in advance with the relevant local authorities and will be clearly indicated with signage as appropriate.	To maintain safe access for NMUs throughout the construction works.	Any closures will be agreed with Transport Scotland (Rights of Way), CNPA and/or PKC (local and core paths).
SMC-AT3	Throughout proposed scheme	Pre-Construction	In consultation with the relevant Roads Authority and public transport provider, bus stops affected by the works will be relocated safely with a safe access route provided for NMUs.	To maintain access to Public Transport facilities.	Consultation with the relevant Roads Authority and public transport provider
SMC-AT4	Throughout proposed scheme	Construction	The Contractor will produce a traffic management plan that will include measures to avoid or reduce disruption to the road traffic, and in accordance with the Traffic Signs Manual (Department of Transport, 2009). The plan will include consideration of the timing of works, the location of haul roads to reduce site traffic on the public roads and a well maintained traffic management system with sweeping of roads to reduce construction debris on the carriageway.	To avoid or reduce disruption to the road traffic.	None required
SMC-AT5	Throughout proposed scheme	Construction	Reasonable precautions will be taken by the Contractor to avoid or reduce road closures. One lane in each direction will be provided for A9 traffic during peak hours (Mon to Fri) except in exceptional circumstances and for closures which are pre-approved by Transport Scotland e.g. those required during blasting.	To avoid or reduce road closures and resulting disruptions to traffic.	Approval required from Transport Scotland in the event of required A9 lane closures.
SMC-AT6	Throughout proposed scheme	Construction	Road diversions will be clearly indicated with road markings and signage as appropriate. Any road closures will be notified in advance through road signage and appropriate signage will be provided for the duration of the closure. The Contractor will also be responsible for identifying any notable changes in patterns of road network use during construction, where such changes may cause significant disruption elsewhere (such as drivers re-routing away from the A9), and will review and update traffic management provisions as appropriate in discussion with Transport Scotland.	To reduce disruption to the road users.	None required
SMC-AT7	Throughout proposed scheme	Construction	Appropriate lighting will be provided during any necessary night-time working, taking into account the requirements of **Mitigation Items SMC-E10** and **SMC-LV4.**	To mitigate potential impacts on driver stress such as fear of potential accidents due to inadequate lighting provision.	None required
SMC-AT8	NMU facilities	Construction	Access for NMUs will be maintained and improved in accordance with the following principles: • The requirements of the Equality Act 2010 and 'Roads for All: Good Practice Guides for Roads' (Transport Scotland, 2013) shall be incorporated into the proposed scheme wherever practicable; e.g. any bridges, ramps or footpaths will not present potential	To maintain access for NMUs and provide appropriate facilities based on use and improve access for NMUs.	None required

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
			barriers to disabled people such as the gradient or surfacing. • NMU access shall be provided in accordance with the objectives set out in the A9 Dualling NMU Access Strategy (Transport Scotland, 2016). • Surfacing of any new paths including alongside roads will be considered on a case by case basis, taking into account factors such as safety, the type of user and should comply with current standards. • Safety of paths will be considered in accordance with the outcome of the Road Restraints Risk Assessment Process and may require provision of barriers. • New cycleways/footpaths will use non-frost susceptible materials to reduce risk of degradation.		
n/a (note)	*n/a*	*n/a*	*Further to the above, the mitigation items detailed in Table 21.7 (Landscape and Visual), Table 21.9 (Air Quality) and Table 21.10 (Noise and Vibration) will reduce the adverse amenity impacts on NMU and vehicle travellers during construction.*	*To reduce the adverse amenity impacts on NMU and vehicle travellers during construction.*	*n/a*
Project Specific Mitigation					
P04-AT9	Path 72 / Crossing Point 4 (Figure 9.2)	Post-Construction /Operation	New signage will be provided to direct NMUs (pedestrians, cyclists and equestrians) to underpass.	To direct NMUs to underpass.	None required
P04-AT10	Path 95 and Path 96 (Figure 9.2)	Post-Construction/ Operation	New signage will be provided to direct NMUs from A924 to Tay Forest Park (Craigower).	To direct NMUs from A924 to Tay Forest Park (Craigower).	None required
P04-AT11	Path 95 and Path 96 (Figure 9.2)	Post-Construction/ Operation	A cycle gutter will be provided alongside new steps.	To facilitate access for cyclists.	None required

Table 21.4: Geology, Soils, Contaminated Land and Groundwater

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
Standard A9 Mitigation					
SMC-G1	Throughout proposed scheme	Pre-Construction	Prior to construction, consultation will be undertaken with the relevant local authorities (and SEPA as required) regarding works in relation to land affected by contamination to support the obligations set out in 'Planning Advice Note 33: Development of Contaminated Land' (Scottish Government, 2000). Any remedial action undertaken in relation to land affected by contamination will be carried out under the appropriate remediation licencing.	To reduce impacts from contaminated land sources.	Consultation with PKC (and SEPA as required).

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
SMC-G2	Throughout proposed scheme	Pre-Construction	Prior to construction and where potential contamination has been identified, further site investigations sufficient to determine the extent and type of contaminants present will be undertaken, as necessary, to inform identification of appropriate construction methods and any additional mitigation.	To determine the extent and type of contaminants present and to inform identification of appropriate construction methods and any additional mitigation.	None required
SMC-G3	Throughout proposed scheme	Pre-Construction & Construction	Prior to construction, appropriate health and safety and waste management procedures for working with potentially contaminated soils will be established. Waste management procedures will take into account inter alia: Waste Management Licence Regulations 1994 (as amended by Waste Management Licensing Amendment (Scotland) Regulations 2003), HSE Guideline Note MS13 Asbestos 1988 and the Health and Safety Commission Approved Code of Practice and Guidance Note. These procedures will be implemented as appropriate during construction.	To ensure appropriate health and safety and waste management procedures for working with potentially contaminated soils are followed.	None required
SMC-G4	Throughout proposed scheme	Construction & Post-Construction/ Operation	Risks to construction and maintenance staff working with/near contaminated land will be mitigated by the implementation of Mitigation Item G3 in combination with the adoption of appropriate systems of work, including personal protective equipment (PPE) as a last resort. In the event that unrecorded contamination is encountered, works should be stopped and the working procedures reassessed to confirm the working methods remain appropriate.	To reduce impacts from contaminated land sources and confirm the safety of construction and maintenance staff.	None required
SMC-G5	Throughout proposed scheme	Construction	Appropriate training will be provided for personnel involved in earthworks activities to enable implementation of a watching brief to identify presence of previously unidentified contamination.	To identify potential presence of previously unidentified contamination.	None required
SMC-G6	Throughout proposed scheme	Pre-Construction & Construction	Where required, landowner consultation and site visits will be undertaken to confirm the location and network of septic tanks. Where septic tanks are located within the LMA they will be relocated and/or rebuilt subject to discussion and agreement with the affected landowner(s).	To mitigate the loss of any septic tanks.	Approval from landowners
SMC-G7	Throughout proposed scheme	Construction	To prevent cross contamination and pollution from piling works undertaken in areas of land affected by contamination, the Contractor will develop a Piling Risk Assessment and adhere to appropriate guidance including the 'Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention, National Groundwater and Contaminated Land Centre Report NC/99/77'.	To prevent cross contamination and pollution from piling works undertaken in areas of land affected by contamination.	None required
SMC-G8	Throughout proposed scheme	Construction	Prior to disposal, soils will be assessed in line with the 'Waste Classification: Guidance on the Classification and Assessment of Waste' (Technical Guidance WM3) (Natural Resources Wales, SEPA, Northern Ireland Environment Agency, Environment Agency, May 2015) to determine whether they are hazardous or non-hazardous.	To determine whether disposed soils are hazardous or non-hazardous.	None required

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
SMC-G9	Throughout proposed scheme	Pre-Construction	To maximise the reuse of site-won materials on-site (and minimise the need for disposal of waste in line with the principles of the "Waste Hierarchy") whilst ensuring that no risks are posed to human health nor the water environment a soil reuse assessment will be undertaken prior to construction. The soil reuse assessment will identify any potential risks posed to both human health and the water environment from potentially contaminated soils reused throughout the scheme.	To identify any potential risks posed to human health and the water environment. In addition, this mitigation item would maximise re-use of site-won materials on-site and minimise the need for disposal of waste in line with the principles of the "Waste Hierarchy" through re-use of excavation arisings (refer to Mitigation Item M3).	None required
SMC-G10	Throughout proposed scheme	Construction	Where peat is encountered during construction, it will be excavated, stored and re-used if possible, taking cognisance of 'Development on Peatland: Guidance on the Assessment of Peat Volumes, Reuse of Excavated Peat and the Minimisation of Waste' (Scottish Renewables and SEPA, 2012) and The Waste Management Licensing (Scotland) Regulations 2011. This will be captured in a Peat Management Plan that will be developed by the Contractor.	To comply with relevant waste management practices under The Waste Management Licensing (Scotland) Regulations 2011 and reduce impacts on peatlands.	Consultation with SEPA
SMC-G11	Throughout proposed scheme	Pre-Construction & Construction	Where concrete materials are proposed to be used, appropriate guidance such as 'Building Research Establishment (BRE) SD1:2005' and 'British Standard (BS) BS8500' should be followed to ensure that ground conditions are appropriate for the use of concrete at each given location.	To ensure that ground conditions are appropriate for the use of concrete at each given location.	None required
SMC-G12	Throughout proposed scheme	Pre-Construction, Construction & Post-Construction/ Operation	Where potential pollutant pathways for ground gas have been identified, a ground gas monitoring programme will be developed prior to construction in adherence to 'CIRIA 665 Assessing Risks Posed by Hazardous Ground Gases to Buildings'. This will include an assessment of gassing issues following receipt of additional ground gas monitoring results at selected boreholes. Appropriate working methods will be developed and adopted during below ground site construction works (including piling works and excavations). This should include as a minimum, gas monitoring undertaken prior to any entry into excavations, confined spaces or below ground structures and use of PPE as a last resort. If significant ground gas issues are identified during construction, further post construction monitoring will be undertaken and/or appropriate gas protection measures will be incorporated into the final design.	To mitigate against potential impacts on human health during construction and Off-Site Receptors (Local residents, transient traffic (foot, road and rail traffic) in the surrounding area) due to ground gas.	None required
SMC-G13	Throughout proposed scheme	Construction	Unless it can be demonstrated by the Contractor via a Quantitative Risk Assessment that no water quality impacts will occur due to leaching from SuDS retention ponds and detention basins, operational SuDS features will be lined. Any potential water quality impacts due to leaching from SuDS features will be addressed through the CAR process.	To mitigate against potential impacts on water quality due to leaching from SuDS features.	SEPA

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
SMC-G14	Throughout proposed scheme	Construction	Storage of excavated soils and made ground will be minimised on site (spatially and in duration) and all storage areas will be appropriately lined, with adequate drainage management in place. This is to ensure that no polluted water percolates into the ground or contaminated run-off is generated.	To ensure that no polluted water percolates into the ground or contaminated run-off is generated.	None required
SMC-G15	Throughout proposed scheme	Pre-Construction	Risk assessments will be undertaken before explosives can be used on site to minimise or control the impact of blasting on bedrock geology.	To minimise or control the impact of blasting on bedrock geology.	None required
n/a (note)	*n/a*	*n/a*	*Further to the above, the implementation of Mitigation Items W1, W3, W4, W6 to W10 and W12 (as detailed in Chapter 11: Road Drainage and the Water Environment) and the measures detailed in Chapter 16 (Air Quality).*	*To mitigate the water pollution risk to groundwater and avoid the creation of a statutory nuisance associated with dust and air pollution when working with contaminated land.*	*n/a*
Project Specific Mitigation					
P04-G16	Throughout proposed scheme	Design & Pre-Construction	Upon completion of the landslide risk assessment associated with alluvial or river terrace deposits highlighted in Chapter 10 (Geology, Soils and Groundwater) paragraph 10.4.15, any mitigation required will be incorporated into the detailed design by the Contractor	To mitigate against potential landslide risk associated with alluvial or river terrace deposits.	None required
P04-G17	Throughout proposed scheme	Design & Pre-Construction	Requirements for protection measures against risk of future instability associated with slopes located above the proposed new earthworks (Chapter 10: Geology, Soils and Groundwater, paragraph 10.4.15), e.g. catch fences along the crest of new cuttings, to be determined by the Contractor during detailed design.	To mitigate against risk of future instability associated with sloped located above the proposed new earthworks.	None required
P04-G18	Throughout proposed scheme	Construction	On completion of construction of the new rock slopes, the cut face will be inspected by a suitably qualified and experienced engineering geologist to assess the stability and to add any further remedial measures required	To determine stability of new rock slopes and requirement for further remedial measures	None required
P04-G19	Throughout proposed scheme	Construction	During construction, liaison will be required between the Contractor and SNH/BGS /Transport Scotland to agree measures to enhance the rock cuttings. Further potential enhancement measures have been discussed with SNH and BGS and may include: 'Signature' blocks of rock excavated during the formation of new cuts to be taken off site and used for educational purposes, e.g. at enhanced lay-bys.	To enhance the new rock cuttings.	SNH and BGS
P04-G20	Throughout proposed scheme	Construction	During construction, liaison will be required between the Contractor and SNH/BGS /Transport Scotland to agree measures to enhance the rock cuttings. Further potential enhancement measures have been discussed with SNH and BGS and may include providing the BGS and SNH with the opportunity to survey and document the new rock exposures during and immediately following construction for the purposes of updating their geological mapping records.	To enable BGS and SNH to update their geological mapping records.	SNH and BGS

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
P04-G21	Throughout proposed scheme	Pre-Construction	Additional groundwater quality investigations will be undertaken in areas of cuttings intercepting the water table, where necessary. This will be the basis for a risk assessment to be carried out, including assessment of risks from migration of groundwater. Where required, water treatment will be put in place prior to discharge.	To inform a ground improvement risk assessment.	None required
P04-G22	Throughout proposed scheme	Construction, Post-Construction/ Operation	Twelve cuttings and widenings and three detention basins are expected to intercept groundwater as per Table 10.13. The potential volume of groundwater drainage would be considered in the context of potential groundwater abstraction CAR licences prior to works commencing.	Compliance with CAR licensing to protect the water environment.	Approval required from SEPA
P04-G23	C1, C3, CS1 and CS7	Pre-Construction	Additional GI is required in vicinity of cuttings C1, C3, CS1 and CS7 to confirm the conclusions of the initial settlement assessment.	To confirm the ground conditions and the outcome of the differential settlement assessment	None required
P04-G24	Throughout proposed scheme	Construction	Groundwater intercepted by cuttings may need to be treated prior to being discharged, as there was evidence of elevated cadmium, mercury, selenium, ammoniacal nitrogen and hydrocarbons in some sampled boreholes	Protection of the Water Environment.	Consultation with SEPA
P04-G25	Private Water Supplies: PK-PWS11 and PK-PWS12 (Figure 10.1)	Construction	PWS identified as potentially at risk (PK-PWS11 and PK-PWS12) will be monitored. Should a significant adverse impact on a PWS be confirmed, an alternative source of water will be provided. To this effect, the Contractor will be required to prepare a supply-specific monitoring plan and mitigation strategy in communication with affected land owners and in consultation with SEPA.	To safeguard private water supplies.	Inform land owners of monitoring results and consult over alternative source of water if applicable. Consultation with SEPA
P04-G26	Throughout proposed scheme	Construction	PWS pipe networks identified at potential risk (PK-PWS4 and PK-PWS5) will be protected during construction by the Contractor. This will be achieved by the Contractor confirming the exact location of the pipeline by digging and incorporating protective measures to ensure that the infrastructure does not get damaged during construction and in the long term by the proposed scheme.	To safeguard the pipe network.	None required

Table 21.5: Road Drainage and the Water Environment
For details of the Water Features (WF) locations in Table 21.5, refer to Chapter 11 (Road Drainage and the Water Environment) and Figure 11.1.

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
Standard A9 Mitigation					
SMC-W1	Throughout proposed scheme	Design, Pre-Construction & Construction	In relation to authorisations under CAR, the Contractor will be required to provide a detailed Construction Method Statement which will include proposed mitigation measures for specific activities including any requirements identified through the pre-CAR application consultation process.	To mitigate construction impacts on the water environment.	CAR applications require approval from SEPA
SMC-W2	Throughout proposed scheme	Pre-Construction & Construction	In relation to flood risk the Contractor will implement the following mitigation measures during construction: • The Flood Response Plan (as part of the CEMP, refer to **Mitigation Item SMC-S1** in Table 21.1 of Chapter 21 (Schedule of Environmental Commitments)) will set out the following mitigation measures to be implemented when working within the functional floodplain (defined here as the 0.5% AEP (200-year) flood extent): ➢ Routinely check the MET office Weather Warnings and the SEPA Floodline alert service for potential storm events (or snow melt), flood alerts and warnings relevant to the area of the construction works. ➢ During periods of heavy rainfall or extended periods of wet weather (in the immediate locality or wider river catchment) river levels will be monitored using, for example, SEPA Water Level Data when available/visual inspection of water features. The Contractor will assess any change from base flow condition and be familiar with the normal dry weather flow conditions for the water feature, and be familiar with the likely hydrological response of the water feature to heavy rainfall (in terms of time to peak, likely flood extents) and windows of opportunity to respond should river levels rise. ➢ Should flooding be predicted, works close or within the water features will be immediately withdrawn (if practicable) from high risk areas (defined as: within the channel or within the bankfull channel zone - usually the 50% (2-year) AEP flood extent). Works will retreat to above the 10% AEP (10-year) flood extent) with monitoring and alerts for further mobilisation outside the functional floodplain should river levels continue to rise. • Plant and materials will be stored in areas outside the functional floodplain where practicable, with the aim for temporary construction works to be resistant or resilient to flooding impacts, to minimise/prevent movement or damage during potential flooding events. Where this is not possible, agreement will be required from the Environmental Clerk of Works (EnvCoW). • Stockpiling of material within the functional floodplain, if unavoidable, will be carefully controlled with limits to the extent of stockpiling within an area, to prevent compartmentalisation of the floodplain, and stockpiles will be located >10m from watercourse banks. • Temporary drainage systems will be implemented to alleviate localised surface water flood risk and prevent obstruction of existing surface runoff pathways. Where practicable, temporary haul routes will be located outside of the functional floodplain.	To reduce the risk of flooding impacts on construction works.	None required

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
SMC-W3	Throughout proposed scheme	Pre-Construction, Construction & Post-Construction/ Operation	The Contractor will implement appropriate controls for construction site runoff and sedimentation including: • avoiding unnecessary stockpiling of materials and exposure of bare surfaces, limiting topsoil stripping and phasing stripping to areas where bulk earthworks are immediately programmed; • installation of temporary drainage systems/SuDS (or equivalent) including pre-earthworks drainage; • pre-earthworks drainage/SuDS with appropriate outfalls to be in place prior to any earthworks activities; • treatment facilities to be scheduled prior to any works which may generate site run-off and sedimentation, to allow settlement and treatment of any pollutants contained in site runoff and to control the rate of flow before water is discharged into a receiving watercourse; • the adoption of silt fences, check dams, settlement lagoons, soakaways and other sediment trap structures as appropriate; • the maintenance and regrading of haulage route surfaces where issues are encountered with the breakdown of the existing surface and generation of fine sediment; • provision of wheel washes at appropriate locations (in terms of proposed construction activities) and >10m from water features; • protecting soil stockpiles using bunds, silt fencing and peripheral cut-off ditches, and location of stockpiles at distances of >10m; and • restoration of bare surfaces (seeding and planting) throughout the construction period as soon as possible after the work has been completed.	To implement appropriate controls for site runoff and sedimentation and reduce impacts on the water environment.	Where required, temporary discharge consents to be obtained from SEPA through the Water Environment (Controlled Activities) (Scotland) Regulations 2011 (as amended).
SMC-W4	Throughout proposed scheme	Pre-Construction & Construction	In relation to in-channel working, the Contractor will adhere to GPP/PPGs (SEPA, 2006-2017) and other good practice guidance (Table 11.1), and implement appropriate measures which will include, but may not be limited to: • undertaking in-channel works during low flow periods (i.e. when flows are at or below the mean average) as far as reasonably practicable to reduce the potential for sediment release and scour; • no in-channel working during the salmonid spawning seasons unless permitted within any CAR licence; • minimise length of channel disturbed and size of working corridor, with use of silt fences or bunds where appropriate to prevent sediment being washed into water feature; • limit the removal of vegetation from the riparian corridor, and retaining vegetated buffer zone wherever reasonably practicable; and • limit the amount of tracking adjacent to watercourses and avoid creation of new flow paths between exposed areas and new or existing channels.	To reduce impacts on the water environment during in-channel working.	Method statements for any in-channel working require approval by SEPA
SMC-W5	Throughout proposed scheme	Construction	Where channel realignment is necessary the Contractor will adhere to good practice guidance (Table 11.1) and implement appropriate measures which will include, but may not be limited to: • Once a new channel is constructed, the flow should, where practicable, be diverted from	To reduce impacts on the water environment where channel realignment is proposed.	Consultation with SEPA

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
			the existing channel to the new course under normal/low flow conditions; • diverting flow to a new channel should be timed to avoid forecast heavy rainfall events at the location and higher up in the catchment (the optimum time will be the spring and early summer months to allow vegetation establishment to help stabilise the new channel banks); • with offline realignments, the flow will be diverted with a steady release of water into the newly constructed realignment to avoid entrainment of fine sediment or erosion of the new channel; and • any proposed channel realignment works will be supervised by a suitably qualified geomorphologist.		
SMC-W6	Throughout proposed scheme	Construction	In relation to refuelling and storage of fuels the Contractor will adhere to GPP/PPGs (SEPA, 2006-2017) and other good practice guidance (Table 11.1), and implement appropriate measures which will include, but may not be limited to: • only designated trained and competent operatives will be authorised to refuel plant; • refuelling will be undertaken at designated refuelling areas (e.g. on hardstanding, with spill kits available, and >10m from water features) where practicable; • appropriate measures will be adopted to avoid spillages (refer to Mitigation Item W7); and • compliance with the Pollution Incident Control Plan (refer to Mitigation Item S1).	To avoid spillages and reduce impacts on the water environment in relation to refuelling.	None required
SMC-W7	Throughout proposed scheme	Construction	In relation to oil/fuel leaks and spillages the Contractor will adhere to GPP/PPGs (SEPA, 2006-2017) and other good practice guidance (Table 11.1), and implement appropriate measures which will include, but may not be limited to: • stationary plant will be fitted with drip trays and emptied regularly; • plant machinery will be regularly inspected for leaks with maintenance as required; • spillage kits will be stored at key locations on-site and detailed within the Construction Environmental Management Plan (CEMP) (refer to Mitigation Item S1); and • construction activities will comply with the Pollution Incident Control Plan (refer to Mitigation Item S1).	To reduce impacts on the water environment in relation to oil/fuel leaks and spillages.	None required
SMC-W8	Throughout proposed scheme	Construction	In relation to chemical storage, handling and reuse the Contractor will adhere to GPP/PPGs (SEPA, 2006-2017) and other good practice guidance (Table 11.1), and implement appropriate measures which will include, but may not be limited to: • chemical, fuel and oil storage will be undertaken within a site compound, which will be located on stable ground at a low risk of flooding and >10m from any watercourse; • chemical, fuel and oil stores will be locked and sited on an impervious base within a secured bund with 110% of the storage capacity; and • pesticides, including herbicides, will only be used if there are no alternative practicable measures, and will be used in accordance with CAR requirements, the manufacturer's instructions and application rates.	To reduce impacts on the water environment in relation to chemical storage, handling and reuse.	None required
SMC-W9	Throughout proposed scheme	Construction	In relation to concrete, cement and grout the Contractor will adhere to GPP/PPGs (SEPA, 2006-2017) and other good practice guidance (Table 11.1), and implement appropriate	To reduce impacts on the water environment in relation to concrete, cement	Permission required from Scottish Water

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
			measures which will include, but may not be limited to: • concrete mixing and washing areas will be: ➢ be located more than 10m from any water bodies; ➢ have settlement and re-circulation systems for water reuse; and ➢ have a contained area for washing out and cleaning of concrete batching plant or ready-mix lorries. • wash-water will not be discharged to the water environment and will be disposed of appropriately either to the foul sewer (with permission from Scottish Water), or through containment and disposal to an authorised site; • where concrete pouring is required within a channel, a dry working area will be created; • where concrete pouring is required within 10m of a water feature or over a water feature, appropriate protection will be put in place to prevent spills entering the channel (e.g. isolation of working area, protective sheeting); and • quick settling products (cement, concrete and grout) will be used for structures that are in or near to watercourses.	and grout.	
SMC-W10	Site Compound/ Facilities	Construction	Sewage from site facilities will be disposed of appropriately either to foul sewer (with the permission of Scottish Water) or appropriate treatment and discharge agreed with SEPA in advance of construction in accordance with 'PPG04 Treatment and Disposal of Sewage' (SEPA, 2003 – 2013).	To ensure sewage from site facilities is disposed of appropriately.	Permission required from Scottish Water for disposal to foul sewer or SEPA, in advance of construction, for appropriate treatment and discharge to a watercourse
SMC-W11	Throughout proposed scheme	Construction	In relation to service diversions and to avoid damage to existing services from excavations and ground penetration, including temporary severance of public and private water supplies through damage to infrastructure, the Contractor will: • locate and map all private or public water supply assets and other service infrastructure prior to construction; • take measures to prevent damage to services and to avoid pollution during service diversions, excavations and ground works; and • provide a temporary alternative water supply (e.g. bottled or tankered) if services are to be disrupted or diverted by the works.	To mitigate service diversions and disruptions from excavations and ground penetration.	Consultation with SEPA
SMC-W12	Throughout proposed scheme	Construction	For works within areas identified as potentially containing contaminated land and sediment the Contractor will reduce the risk of surface water pollution to an acceptably low level through: • further site investigation to determine the level of contamination prior to construction beginning; • the installation of temporary treatment facilities to enable removal of pollutants from surface waters; and • adoption of mitigation measures relating to contaminated land as outlined in Chapter 10 (Geology, Soils, Contaminated Land and Groundwater).	To reduce risk of surface water pollution from areas identified as potentially contaminated land to an acceptably low level.	Details of any temporary treatment measures to be agreed with SEPA prior to commencement of construction

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
SMC-W13	Throughout proposed scheme	Design	In relation to bank reinforcement, design principles and mitigation measures will adhere to good practice (SEPA, 2008a), which will include, but may not be limited to: • non-engineering solutions and green engineering (e.g. vegetation, geotextile matting) to be the preference during options appraisal; • requirements for grey engineering to control/prevent scour (e.g. rock armour, rip-rap, gabion baskets) to be minimised; and • post project appraisal to identify if there are issues that can be investigated and addressed at an early stage.	To reduce impacts of constructing bank reinforcements on the water environment.	Consultation with SEPA
SMC-W14	Throughout proposed scheme	Design	In relation to outfalls, specimen and detailed design will ensure compliance to good practice (e.g. CIRIA, 2015b; The Highways Agency et al., 2004; SEPA, 2008b), which will include, but may not be limited to: • directing each outfall downstream to minimise impacts to flow patterns; • avoiding projecting the outfall into the watercourse channel; • avoid installation of outfalls at locations of known historical channel migration; • avoid positioning in flow convergence zones or where there is evidence of active bank erosion/instability; • directing an outfall away from the banks of a river to minimise any potential risk of erosion (particularly on the opposite bank); • minimising the size/extent of the outfall headwall where possible to reduce the potential impact on the banks; and • post project appraisal to identify if there are issues that can be investigated and addressed at an early stage.	To reduce impacts of outfalls on the water environment.	Consultation with SEPA
SMC-W15	Throughout proposed scheme	Design	In relation to watercourse crossings, specimen and detailed design will ensure compliance with good practice (SEPA, 2010b), which will include, but may not be limited to: • Detailed design will mitigate flood risk impacts through appropriate hydraulic design of culvert structures. Flood risk will be assessed against the 0.5%AEP (200-year) plus an allowance for climate change design flood event. Detailed design will mitigate any loss of flood plain storage volume, where required, by appropriate provision of compensatory storage. Where culvert extension is not practicable or presents adverse impact on the water environment, appropriately designed replacement culverts may be installed. • Detailed design will mitigate impacts on the water environment through appropriate design of culvert structures and watercourse modifications (e.g. realignments) with respect to fluvial geomorphology, and both riparian and aquatic ecology. • Detailed design of culverts and associated watercourse modifications shall incorporate wherever practical: ➢ adherence to design standards and good practice guidance (Table 11.1); ➢ allowance for the appropriate conveyance of water and sediment for a range of flows (including at low flow conditions); ➢ maintenance of the existing channel gradient to avoid erosion at the head (upstream) or tail (downstream) end of a culvert; ➢ avoidance of reduction of watercourse length through shortening of watercourse	To reduce impacts of culverts on the water environment.	Consultation with SEPA

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
			planform; ➢ minimisation of culvert length; ➢ close alignment of the culvert with the existing water feature; ➢ depressing the invert of culverts to allow for formation of a more natural bed (embedment of the culvert invert to a depth of at least 0.15m to 0.3m); and ➢ roughening of culvert inverts to help reduce water velocities. • post project appraisal to identify if there are issues that can be investigated and addressed at an early stage.		
SMC-W16	Throughout proposed scheme	Design & Construction	In relation to channel realignments, specimen and detailed design will ensure compliance with good practice (Table 11.1), which will include, but may not be limited to: • minimising the length of the realignment, with the existing gradient maintained where possible; • design of the realignment in accordance with channel type and gradient; • if required, low flow channels or other design features to reduce the potential for siltation and provide an opportunity to improve the geomorphology of the water feature; • realignments designs will be led by a suitably qualified geomorphologist; • where realignments result in an increase or decrease of channel gradient, the following principles will be applied: ➢ an increased gradient within the channel (resulting in higher stream energies) will require mitigation in the form of energy dissipation, which could include the creation of a step-pool sequence; boulder bed-checks; plunge pools at culvert outlets; and/or; increased sinuosity; and ➢ a decrease in gradient within the channel will require mitigation in the form of the construction of a low flow channel to minimise the impacts on locally varying low flow conditions and reduce the risk of siltation of the channel. • post project appraisal to identify if there are issues that can be investigated and addressed at an early stage.	To reduce impacts of channel realignment on the water environment.	Consultation with SEPA
SMC-W17	Throughout proposed scheme	Design & Construction	In relation to SuDS, the following mitigation measures will be implemented: • where required, authorisations for the road drainage discharge under CAR would be obtained from SEPA; • detailed design to adhere to design standards and good practice guidance (Table 11.1), including The SuDS Manual (CIRIA, 2015b) and SuDS for Roads (SCOTS, 2010); • for each drainage run, a minimum of two levels of SuDS treatment within a 'treatment train' (see Table 11.18 for further details) to limit the volume of discharge and risk to water quality; • management of vegetation within ponds and drains through grass cutting, pruning of any marginal or aquatic vegetation (as appropriate to the SuDS component) and removal of any nuisance plants, especially trees; • SuDS retention ponds will be designed with an impermeable liner to maintain a body of standing water and provide treatment volume;	To reduce impacts of drainage discharges on the water environment.	Where required, authorisation for the road drainage discharge under CAR 2011 (as amended) would be obtained from SEPA

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
			• inspect inlets, outlets, banksides, structures and pipework for any blockage and/or structural damage and remediate where appropriate; and • regular inspection and removal of accumulated sediment, litter and debris from inlets, outlets, drains and ponds to avoid sub-optimal operation of SuDS; and • adherence to the maintenance plans specific to each SuDS component type as detailed within The SuDS Manual (CIRIA, 2015b).		
Project Specific Mitigation					
P04-W18	Throughout proposed scheme	Pre-construction	Measures to control sources of suspected sediment and other contaminants will be set out within a site specific Sediment Management and Pollution Prevention Plan (or similar such document), that will be submitted to SEPA for approval prior to construction. Specific measures would include, but would not be limited to: • Soil stripping schedule and plans which show how the works will be phased to avoid unnecessary stockpiling of materials and exposure of bare surfaces. • Minimisation of soil stripping and bank disturbance activities. Frequent use of weather forecasts should be made to inform the timing of specific activities. • Rapid restoration of areas of exposed ground, including implementing reseeding plans during the growing season (spring to autumn). Geotextiles, mulch and the roughening of exposed ground would be adopted where reseeding cannot be rapidly undertaken. • Plans showing the location and proposed protection (bunds or silt fencing) for stockpiles, which on this project would be located outwith the 0.5% AEP (200 year) functional floodplain at a distance of >50m from any water features and over stable and flat ground (as far as reasonably practicable). • Minimisation in the extent, length and gradient of drainage ditches, and erosion control measures within the ditches to include lining and check dams. • Use of an appropriate grade of material on temporary haul routes that would be clean, washed, have a limited fines content and would be durable under heavy trafficking; this may require the importing of appropriate material if the on-site sources are assessed as being inadequate. • Frequent monitoring of the performance of haul routes, and maintenance and regrading where issues are identified. • Use of biodegradable fuels, oils and chemicals on site, as far as reasonably practicable. If flocculants are considered necessary to aid settlement of fine suspended solids, such as clay particles, only natural organic flocculants would be used for surface water treatment, if a requirement is identified, and permission from SEPA for the use of such chemicals would be sought at an early stage prior to construction. • An increased protection buffer distance of 50m from any surface water feature would be applied to all handling, storage and use of oils, fuels and chemicals (including concrete batching), as far as reasonably practicable. • Protocols would be developed for ceasing or reducing construction activities during periods of high rainfall to reduce the risks of erosion, sedimentation and pollution.	To control sources of suspected sediment and other contaminants.	Approval required from SEPA for any required use of flocculants.
P04-W19	Throughout	Pre-construction	Specific measures to remove suspended sediment and other contaminants from	To reduce impacts from	Approval of the Surface

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
	proposed scheme		construction runoff will be included within a site specific Surface Water Management Plan (or similar such document) that would be approved by SEPA prior to construction. Specific measures would include, but would not be limited to: • Provision of temporary drainage measures during construction which would take consideration of the phasing of works, topography, land available for treatment of surface water and the location of surface water features. • Construction runoff would be discharged to land via temporary treatment measures (e.g. settlement ponds and/or soakaways) at frequent intervals along the working corridor to prevent unmanageable volumes of untreated runoff collecting at a single location. • Prior to the completion of operational SuDS, drainage will not directly enter water bodies but be directed over vegetation or vegetated channels to attenuate flow and treat sediment loads and pollutants and a filter strip (10m minimum where practicable) will be provided between any drainage discharges and watercourses. Daily inspections of buffer strips will be undertaken during periods of high rainfall to ensure surface flow pathways do not develop. • For instances where the levels of fine sediment and volume of surface water cannot be treated using conventional methods, including where topography or land available is a constraint, an alternative treatment procedure may be used which would include: the use of portable settlement tanks, flocculants and dynamic separators. This 'emergency' treatment procedure would be put in place and agreed with SEPA prior to construction, so it can be enacted rapidly when issues are identified. • Settlement features would be sized appropriately to accommodate the maximum volume of run-off that would be reasonably expected to occur on any occasion during the period of construction (as to be agreed with SEPA). • All features associated with the temporary drainage system, including settlement ponds, settlement tanks, ditches and silt traps, would be maintained in a good state of repair by the Contractor.	suspended sediment and other contaminants on the water environment.	Water Management Plans is required from SEPA
P04-W20	Throughout proposed scheme	Pre-construction	To measure the effectiveness of implemented mitigation measures in protecting downstream water quality and aquatic ecological interests, monitoring protocols during the construction phase will be developed within a site specific Water Quality Monitoring Plan, which will be submitted to SEPA for approval prior to construction. This would include, but would not be limited to: • Appointment of a suitably qualified Hydrological Clerk of Works (HCoW), who will review the scheduling of earthworks, storage of materials, implementation of drainage and surface water treatment measures, and undertake monitoring of water quality. The HCoW will be provided with the authority to stop works and implement remedial action with immediate effect. • Water quality monitoring one year prior to construction, during construction and one-year post construction. The monitoring regime to include monthly laboratory analysis, visual inspections and real time monitoring. • Water quality criteria and standards to be achieved for all site discharges during construction, and sampling locations, to be agreed in consultation with SEPA and SNH. The contractor will ensure compliance with these standards through the adoption of	To measure the effectiveness of implemented mitigation measures in protecting downstream water quality and aquatic ecological interests.	Approval of the Water Quality Monitoring Plan is required from SEPA

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
			standard mitigation (Table 11.18) and **Mitigation Items P04-W18 and P04-W19.** • Real-time monitoring of electrical conductivity and turbidity to detect suspended solid concentrations in exceedance of baseline levels. An automated alert system would alert the HCoW and site staff of any pollution incidents, informing where further sampling is required to confirm compliance with the limits agreed with SEPA, and allow remedial actions to be implemented at specific locations.		
P04-W21	Throughout proposed scheme	Pre-construction & Construction	Construction drainage systems/SuDS will be implemented prior to any significant earthworks to control/attenuate runoff during construction. Regular maintenance of construction SuDS and associated outfalls will be undertaken to ensure the basins are not susceptible to flood damage, and that flood risk is not increased locally during construction. In advance of extreme flood events (e.g. 0.5% AEP (200-year) + CC event), in stream working areas would be evacuated and allowed to flood to prevent any increases in flood levels from constriction of flows.	To control/attenuation of runoff during construction.	Consultation with SEPA
P04-W22	WF59 WF60 WF61 WF63	Construction	New culverts/artificial channels will be constructed prior to the decommissioning of the existing culvert and commencement of construction activities. Flows will be steadily released into the newly constructed realignment, and erosion protection measures will be put in place, to avoid sedimentation and erosion of the new channel.	To reduce impacts of in-channel structures on the water environment.	None required.
P04-W23	WF70	Construction	During periods of higher flows, the establishment of a dry working area may be necessary for the construction of the Tummel Underbridge for temporary support systems that would be located within the main channel but outwith the wetted perimeter of the River Tummel (WF70). Any pumping or abstraction from the dry working area would require adequate treatment as per the standards detailed under **Mitigation Item P04-W19**. The temporary support system for the Tummel Underbridge will include for scour protection to prevent localised morphological adjustment. The extent of scour protection will be minimised where possible and soft-engineering techniques employed to avoid the additional need for bed and bank removal/disturbance. Following completion of the works, the natural morphology will be reinstated to its existing baseline state under the supervision of a geomorphologist. The tracking of machinery along the banks will be avoided to reduce the potential for erosion. Appropriate sediment management measures will be implemented throughout construction. A rapid evacuation plan would be required including daily weather updates and a response plan to ensure that in the event of rising water levels, plant and personnel can rapidly vacate in-channel working areas.	To reduces impacts of in-channel works on the water environment.	None required.
P04-W24	WF59 WF60 WF61 WF70	Design & Construction	To reduce the impact on flood risk from the proposed scheme to properties in Dalshian, the following measures will be adopted within a flood alleviation strategy: • Extension of existing culverts for WF59/WF60/WF61; • Diverting flows from WF59 and WF60 into WF61; • Construction of a new artificial channel to connect WF61 to the River Tummel (WF70); • Abandonment of existing culvert through field between A9 and River Tummel; • 1.2m diameter culvert with flap valve to be located at the confluence of WF61 and WF70; • 1.2m diameter flood relief culvert adjacent to WF61; and	To protect properties at risk of flooding.	None required.

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
			• Providing a flood alleviation zone between the A9 southbound slip road from Pitlochry and the Highland Mainline Railway. Refer to Appendix 11.3 (Flood Risk Assessment) for further detail.		
P04-W25	WF63	Design	WF63, which is currently culverted under the proposed location of SuDS pond D2, is to be realigned into a new culvert/artificial channel to accommodate the proposed scheme. The existing culvert will be decommissioned. Refer to Appendix 11.3 (Flood Risk Assessment) for further detail	To accommodate the proposed scheme.	None required.
P04-W26	WF64	Design	Cascade design to be formed of natural boulder step-pools with the extent of reinforcement minimised as far as practicable, as well as re-using existing channel substrate.	To reduce the risk of erosion, replicate the natural bed and improve functionality of the watercourse.	None required.
P04-W27	WF66	Design	Natural design of channel, with re-grading and replanting to mimic existing riparian vegetation.	To replicate the natural bed and improve the functionality of the watercourse.	None required.
P04-W28	WF68	Design	Re-grade channel downstream to tie in with the culvert outlet and remove existing knickpoint. A scour pool or naturalised step-pool design should be adopted.	To reduce the risk of erosion.	None required.
P04-W29	WF69	Design	Grade culvert under the mainline to remove drop at the outlet; this may require a step-pool sequence within the culvert or re-grading downstream to tie in with the existing channel.	To reduce the risk of erosion.	None required.
P04-W30	WF71	Construction & Post-Construction/ Operation	Additional planting along retained water feature channel (west of mainline widening) to mitigate for loss of vegetated riparian corridor.	To improve the functionality of the watercourse.	None required.
P04-W31	WF74	Design	Management of surface water through collection of water runoff and channelling the flow into the culvert to ensure the downstream channel is not deprived of flow.	To mitigate the risk of dewatering of the watercourse.	None required.
P04-W32	WF76	Design	Incorporate a stepped sequence into the culvert or a low flow channel to mimic the existing gradient change and cross-section. Appropriate re-grading of the upstream and downstream channel at the inlet and outlet to protect against scour and change in gradients (natural cascade design).	To reduce the risk of erosion, replicate the natural bed and improve functionality of the watercourse.	None required.
P04-W33	WF70	Design	Detailed design of outfall from SuDS basin C to the River Tummel to include re-instatement/repair of existing failing bank reinforcement (gabion baskets) and appropriate tie in with the outfall wing-walls.	To reduce the risk of erosion.	None required.
P04-W34	WF70 WF75 WF76 WF77	Design	Operational SuDS: Treatment Train 1 comprising filter drains and a retention pond (wet). The calculated treatment efficiencies are provided in Appendix A11.6 (Water Quality). These calculations have been used in the Step 3 routine run-off calculations. The Treatment Train will be adopted for drainage runs C, D2, G, H and I,	To provide runoff treatment and protect the watercourse.	None required.
P04-W35	WF57 WF70	Design and Post-Construction/	Operational SuDS: Treatment Train 2 comprising filter drains and a hydrodynamic vortex separator (HVS). The calculated treatment efficiencies are provided in Appendix A11.6 (Water Quality). These calculations have been used in the Step 3 routine run-off	To provide runoff treatment and protect the watercourse.	None required.

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
	WF75	Operation	calculations. The Treatment Train will be adopted for drainage runs A, B, D1, E and F. To fulfil regulatory requirements, HVS systems will be designed to allow effective maintenance and removal of accumulated pollutants, and will have undergone testing in line with British Water's "Code of Practice – Assessment of Manufactured Treatment Devices Designed to Treat Surface Water Runoff" (British Water, undated).		
P04-W36	WF70	Design	Operational SuDS: Treatment Train 1 comprising filter strip and filter drains. The calculated treatment efficiencies are provided in Appendix A11.6 (Water Quality). These calculations have been used in the Step 3 routine run-off calculations. The Treatment Train will be adopted for drainage runs B.	To provide runoff treatment and protect the watercourse.	None required.

Table 21.6: Ecology and Nature Conservation

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
Standard A9 Mitigation					
SMC-E1	Throughout proposed scheme	Pre-Construction	Pre-construction surveys will be undertaken to verify and, where required, update the baseline ecological conditions set out in the ES. The scope of the pre-construction surveys will be confirmed with SNH prior to them being undertaken.	To update the baseline ecological conditions set out in the ES.	SNH
SMC-E2	Throughout proposed scheme	Pre-Construction	Prior to construction a suitably qualified (or team of suitably qualified) Ecological Clerk of Works (ECoW) will be appointed and will be responsible for implementation of the Ecological Management Plan. The ECoW will: • provide ecological advice over the entire construction programme; • undertake or oversee pre-construction surveys for protected species in the areas affected by the proposed scheme; and ensure mitigation measures are implemented to avoid and reduce impacts on ecological features; and • monitor the implementation of the mitigation measures during the construction phase to ensure compliance with protected species legislation and commitments within the ES. The ECoW will be a member of the Chartered Institute of Ecology and Environmental Management (CIEEM) and will have previous experience in similar ECoW roles. All ECoWs will be approved by Transport Scotland to be appropriately qualified for the role and compliance will be monitored by the employer's ecologist. The ECoW will be appointed in advance of the main construction programme commencing to ensure pre-construction surveys are undertaken and any advance mitigation measures required are implemented.	To ensure the implementation of the Ecological Management Plan.	Consultation with the relevant salmon fisheries board.
SMC-E3	At watercourses throughout proposed scheme	Construction	Noise and vibration will be minimised by working back from the river bank where possible or working within a dry area to avoid implications to fish such as behavioural changes e.g. avoidance of areas or physical damage e.g. to hearing. In addition, soft–start techniques will be applied to piling work procedures to enable sensitive species to evacuate the area.	To protect fish species from noise and vibration.	None required.

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
SMC-E4	At watercourses throughout proposed scheme	Construction	Where areas are required to be temporarily de-watered to permit construction activities, fish will be removed by means of electrofishing and relocated prior to de-watering (SFCC, 2007).	To protect fish species during de-watering of watercourse sections and in-stream works.	CAR Licence approved by SEPA
SMC-E5	At watercourses throughout proposed scheme	Construction	Water flow/passage will be sufficiently maintained to permit movement of all fish species past areas of de-watering and/or significant alteration of water movement during any construction works within the watercourses. Suitable temporary channels or gravity-fed flumes/pipes may be implemented so that movement between areas of habitat can be maintained. Where any over pumping is required, screens will be used to prevent fish from entering pumps.	To protect fish species during de-watering of watercourse sections and in-stream works.	CAR Licence approved by SEPA
SMC-E6	Throughout proposed scheme	Pre-Construction	The Contractor will obtain and comply with the requirements of any protected species derogation licences in respect of works necessary to construct the proposed scheme that are likely to breach applicable conservation legislation necessary to construct the project. Licensing may be for the UK and/or European protected species.	To comply with conservation legislation.	SNH
SMC-E7	Throughout proposed scheme	Pre-Construction Construction	Tree felling and vegetation clearance to be minimised as far as practicable and undertaken outside the core bird nesting season (01 March to 31 August) to avoid damage or destruction of occupied nests or harm to breeding birds. If this cannot be achieved, works within the core bird nesting season will require an inspection of vegetation to be cleared for nesting birds by a suitably qualified ecologist no more than 24 hours prior to any works being undertaken. If any nesting birds are identified during the survey, they will be left in situ for their entire nesting period until the young birds have fledged. Alternative approaches to the work will need to be proposed e.g. leaving an exclusion zone around the nest to avoid disturbance. All cleared vegetation will be rendered unsuitable for nesting birds, for example, by covering or chipping depending on the end purpose of the vegetation, or will be removed from the works area.	To protect habitat and fauna during bird nesting season.	None required
SMC-E8	Throughout proposed scheme	Pre-Construction Construction	Any tree felling will be carried out by experienced contractors to reduce direct mortality of protected species according to agreed felling methods between contractors and the ECoW.	To protect fauna during removal of habitat.	None required
SMC-E9	Throughout proposed scheme	Pre-Construction Construction Post-Construction	Plant and personnel will be constrained to a prescribed working corridor through the use of, where practicable, temporary barriers to minimise the damage to habitats and potential direct mortality and disturbance to animals located within and adjacent to the proposed scheme working corridor.	To protect habitats and fauna.	None required

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
SMC-E10	Throughout proposed scheme	Construction	A construction lighting plan and method statement will be developed by the Contractor. The plan, as part of the Species Protection Plans, will detail specific mitigation requirements and taking into account guidance on lighting (e.g. Bat Conservation Trust (2009), and Institution of Lighting Professionals (2011) and The Royal Commission on Environmental Pollution (2009)). The construction lighting design will take into account the need to avoid illuminating sensitive fish and mammal (e.g. for bats, otter and badger) habitats in locations such as: adjacent to watercourses; along woodland edges; and, where there is known activity identified through pre-construction ecological surveys (refer to **Mitigation Item SMC-E1**). Where this is not possible the Contractor will agree any exceptions with SNH.	To protect sensitive mammal habitats from illumination.	Exceptions to be agreed with SNH
SMC-E11	Throughout proposed scheme	Construction	During construction trees will be protected in line with guidelines provided in 'BS 5837 Trees in relation to Construction' (British Standards Institute, 2012). This includes the following: • establishment of Root Protection Areas (RPA); • protective fencing will be erected around the RPA to reduce risks associated with vehicles trafficking over roots system or beneath canopies; • selective removal of lower branches of trees to reduce risk of damage by construction plant and vehicles; • prevent soil compaction measures; and • maintain vegetation buffer strips (where practicable).	To comply with guidelines provided in 'BS 5837 Trees in relation to Construction' (British Standards Institute, 2012).	None required
SMC-E12	Throughout proposed scheme	Construction Post-Construction	Planting will be undertaken to replace any trees that were intended to be retained which are felled or die as a result of construction works. The size, species and location of replacement trees will be approved by Transport Scotland and other relevant stakeholders.	Replacement of trees lost that were intended to be retained.	Transport Scotland and other relevant stakeholders
SMC-E13	Throughout proposed scheme	Construction	Trenches, holes and pits will be kept covered at night or provide a means of escape for mammals that may become entrapped. Gates to compound areas will be designed to prevent mammals from gaining access and will be closed at night.	To avoid mammals becoming entrapped in and around compound areas during construction.	None required
SMC-E14	Throughout proposed scheme	Construction	Temporary mammal-resistant fencing will be provided around construction compounds following a specification agreed through consultation with Transport Scotland.	To avoid mammals becoming entrapped in and around compound areas during construction.	Transport Scotland
SMC-E15	Throughout proposed scheme	Construction	The Contractor will describe within the CEMP (**Mitigation Item SMC-E1**) the strategy to be implemented for the appropriate treatment of invasive, non-native species (INNS). The strategy will set out appropriate construction, handling, treatment and disposal procedures to prevent the spread of INNS in line with recognised best practice.	To prevent the spread of INNS.	None required
n/a (note)	Throughout proposed scheme	Construction	*Further to the above, the mitigation detailed in Table 21.5 (Road Drainage and the Water Environment), Table 21.7 (Landscape and Visual), Table 21.9 (Air Quality) and Table 21.10 (Noise and Vibration) will be implemented to protect aquatic and terrestrial habitats and species.*	*To protect aquatic and terrestrial habitats and species.*	*n/a*

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
Project Specific Mitigation					
P04-E16	ch500 (drainage outfall) ch930 (SuDS outfall) ch4220 (drainage outfall) ch4350 (SuDS outfalls)	Construction Post-Construction	Existing bed material will be stored and kept clean. Bed material will be reinstated where appropriate to ensure that the habitat is returned to a similar state.	To mitigate alteration of riverbed habitat in the River Tay SAC.	None required.
P04-E17	ch400-ch600 ch850 ch950 ch850-ch930 ch930 ch930-ch1050 ch1030 ch4240 ch4240-ch4340 ch4320-ch4340 ch4330	Post-Construction	Areas of terrestrial non-qualifying habitat within the River Tay SAC boundary required temporarily for construction activities will be returned to their former habitat type (largely riparian grass vegetation and areas of woodland), by the Contractor. This will be done using species appropriate to the local environment and of local provenance. Seeding and planting of bare ground areas will be undertaken as soon as possible after the completion of construction works. Appropriate measures, such as the use of geo-textile matting, will be put in place should vegetation establishment be delayed, to prevent sediment entering watercourses.	To mitigate temporary loss of terrestrial River Tay SAC habitat.	None required.
P04-E18	At watercourses throughout proposed scheme	Construction	In-stream works will be undertaken between July and mid-October inclusive to avoid the most sensitive period for FWPM spawning and fish at these locations. In-stream works will comply with SEPA Good Practice Guidance – Temporary Construction Methods (WAT-SG-29) (SEPA, 2009).	To mitigate effects of de-watering of watercourse sections and in-stream works during construction on: Atlantic salmon; brook, river and sea lamprey; brown/sea trout; European eel; and FWPM.	None required.
P04-E19	Locations included in confidential Appendix A12.3	Pre-Construction Construction	An ECoW will be present on site prior to and during potentially sensitive works (e.g. installation/removal of in-channel structures) to continually monitor conditions. Toolbox talks with contractors on environmental sensitivities and implementation of mitigation will be conducted. The ECoW will regularly inspect pollution controls and site compounds as appropriate. An agreed working area will be established prior to the start of works which will avoid FWPM.	To mitigate effects of construction activities on FWPM.	None required.

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
P04-E20	Locations included in confidential Appendix A12.3	Pre-Construction Construction	A Silt Control Management Plan (SCMP) will be developed and implemented which will include the following measures: • appropriate controls for construction site runoff and sedimentation **(Mitigation Item SMC-W3)**; • regular inspection and monitoring of receiving water features; • oils and fuels will be stored appropriately and spill response will follow best practice **(Mitigation Item SMC-W7)**; • if flocculants are considered necessary to aid in settlement of fine suspended solids, such as clay particles, the chemicals used must first be approved by SEPA **(Mitigation Item P04-W18)**; and any other appropriate measures required following consultation or licencing discussions with SEPA.	To mitigate effects of fine sediment and other contaminant runoff during construction on FWPM.	SEPA
P04-E21	Locations included in confidential Appendix A12.3	Pre-Construction Construction	A temporary barrier, such as a silt curtain, will be placed around the location(s) of known FWPM prior to the installation and during removal of any dry works area. This barrier will be regularly checked by the ECoW and repaired or replaced as required.	To mitigate effects of fine sediment from construction activities on FWPM.	None required.
P04-E22	Locations included in confidential Appendix A12.3	Pre-Construction Construction	Suspended solids concentration will be monitored by the ECoW on at least a weekly basis during construction works. Samples will be taken from a fixed location and analysed by a UK Accreditation Service accredited laboratory. The Contractor will monitor the weather and river level (as published by SEPA) conditions to assess the potential for high flows or spate events during sensitive works. Where high flows are anticipated, works will be avoided in the first instance. If this is not possible, the ECoW will conduct spot-checks of sediment levels at least once per day. These mitigation measures will be implemented in conjunction with measures outlined in **Mitigation Item SMC-W2** and all works will comply with a Water Quality Monitoring Plan (**Mitigation Item P04-W20**).	To mitigate effects of increased sediment loading from high flows on FWPM.	None required.
P04-E23	Locations included in confidential Appendix A12.3	Pre-Construction Construction	Where sediments exceed safe thresholds for FWPM an emergency action plan detailing how mussels will be protected, rapid installation of temporary barriers or temporary removal of FWPM (under licence) for example, will be enacted. Where fine sediment has infiltrated the substrate or sediment loading is persistent, temporary translocation of FWPM may be required and will follow guidelines for translocation as outlined in Killeen and Moorkens (2016).	To mitigate effects of an accidental fine sediment release on FWPM.	None required.
P04-E24	Locations included in confidential Appendix A12.3	Pre-Construction Construction	A Mitigation Strategy (including Emergency Action Plan (EAP)) for FWPM will be developed prior to works commencing. As a part of this plan, all suitable habitat in the area around in-stream works and bankside vegetation clearance will be re-surveyed, which will include a photographic record, prior to works commencing to confirm the presence of FWPM. Upon discovery of any FWPM, all works that could affect the FWPM will immediately cease and mitigation measures detailed in the Mitigation Strategy will be implemented. Works will not begin until the measures have been implemented and SNH has been consulted.	To mitigate effects of in-stream works and removal of bankside vegetation (trees) during construction on FWPM.	SNH

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
P04-E25	Locations included in confidential Appendix A12.3	Pre-Construction Construction	Bankside vegetation to be retained in confirmed FWPM locations. Where removal is essential, trees are to be pollarded, retaining as much height and as many overhanging branches as possible. Where this is not possible, removal will be by cutting trees down rather than extraction. FWPM will be protected during any pollarding or cutting of trees, for example through careful placing of robust mesh cages over the mussels. The ECoW will be present on site during any pollarding or cutting of trees.	To mitigate effects of removal of bankside vegetation (trees) during construction on FWPM.	Consultation with SNH
P04-E26	Locations included in confidential Appendix A12.3	Post-Construction	Bankside vegetation to be reinstated as soon as possible upon completion of construction.	To mitigate effects of removal of bankside vegetation (trees) during construction on FWPM.	None required.
P04-E27	Watercourses throughout proposed scheme	Construction	Construction compounds, storage areas, temporary access tracks etc. (except for culvert, bridge and outfall works) will be at least 10m from watercourse banks.	To mitigate direct mortality of otter.	None required.
P04-E28	Suitable habitat throughout proposed scheme (Figures 12.3, 12.7 and 12.8)	Construction	Severance and fragmentation of habitat used by otter, badger, beaver, pine marten and red squirrel will be reduced during construction by retention of commuting routes, for example constructing culverts with mammal provision and dry mammal underpasses early in the construction process. To the west of Clunie Underbridge a temporary diversion of the footpath may be required during construction. If the diversion is required, a mandatory setback of a minimum 5m of vegetation protection from the shoreline to the location of any footway diversion will be implemented. In addition, beyond the 5m setback, removal of vegetation will be minimised, and any trees removed will be replanted.	To mitigate disturbance and fragmentation of otter, badger, beaver, pine marten and red squirrel caused by construction-related activities.	None required.
P04-E29	Locations included in confidential Appendix A12.3 and Figure 12.8	Construction	Measures to minimise disturbance of an EPS will be undertaken as follows: • Piling/drilling will not be undertaken within 100m of an otter resting site, where practicable; • directional and/or cowled lighting to prevent light-spill and angle light away from all lying-up sites and areas of otter activity; • provision of temporary screening to create dark areas around lying-up sites where construction lighting would result in light spillage on the sites, that cannot be controlled through the use of directional lights; and • lighting for night-time works at the Tummel and Clunie Underbridges will ensure that dark areas along at least one bank/bankside of the River Tummel and Loch Faskally are maintained, using angled or shielded lighting, together with under-bridge screening as necessary.	To mitigate disturbance of otter caused by construction related activities. Measure will also indirectly mitigate potential barrier effect on fish by allowing migration at night along one bank.	Not required.
P04-E30	Suitable habitat throughout proposed scheme (Figures 12.4 and 12.5)	Construction	Severance of bat habitat will be reduced during construction by retention of commuting routes through culverts and underpasses, such that movement between areas of habitat is maintained.	To retain commuting routes for bats through culverts and underpasses.	None required.

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
P04-E31	Suitable woodland habitat throughout proposed scheme (Figure 12.8)	Pre-Construction Construction	No more than three weeks prior to the commencement of site clearance, and again at least two days prior to clearance, pre-construction surveys will be undertaken to identify active pine marten dens and red squirrel dreys.	To mitigate direct mortality of pine marten and red squirrel.	None required
P04-E32	Suitable woodland habitat throughout proposed scheme (Figure 12.8)	Pre-Construction Construction	Exclusion zones will be marked around dens/dreys. Exclusion zones will be to the following distances: • pine marten: 100m for breeding dens and 30m for non-breeding dens; and • red squirrel: 30m for breeding dreys and 5m for non-breeding dreys.	To mitigate direct mortality of pine marten and red squirrel	None required.
P04-E33	Suitable woodland habitat throughout proposed scheme (Figure 12.8)	Pre-Construction Construction	Site clearance affecting pine marten and red squirrel habitat should be timed to avoid breeding seasons (March to June inclusive for pine marten and February to September inclusive for red squirrel).	To mitigate direct mortality of pine marten and red squirrel.	None required.
P04-E34	Reptile habitat throughout proposed scheme (Figure 12.9)	Pre-Construction	The following measures will be adhered to by the Contractor prior to vegetation clearance of reptile habitat: • phased strimming of favourable reptile habitat will take place during hibernation season (November to February inclusive) following fingertip searches when necessary and under the direction of an ECoW; and • soil stripping and removal of potential hibernacula, including but not limited to drystone walls, dense tussocks of grass and log piles, will take place outwith hibernation season.	To mitigate potential direct mortality of reptiles.	None required.
P04-E35	Watercourses throughout proposed scheme	Pre-Construction	New structures (and extended structures where possible) and outfalls will be designed to minimise changes to current flow rates and velocities and in accordance with the following guidance: • SEPA Good Practice Guide for Bank Protection Rivers and Lochs (WAT-SG-23) (SEPA, 2008a); • SEPA Good Practice Guide for River Crossings (WAT-SG-25) (SEPA, 2010); • CIRIA Culvert Design and Operation Guide (C689) (CIRIA, 2010); and • SEPA Good Practice Guide for Intakes and Outfalls (WAT-SG-28) (SEPA, 2008b).	To mitigate the loss and alteration of aquatic habitat to accommodate the proposed scheme.	None required.
P04-E36	Throughout proposed scheme	Operation	To prevent pollution of water features from road run-off during operation, SEPA PPG / GPP 1, 5, 6, 21, 22 and 26 (SEPA, 2003; 2017) will be abided by.	To protect the water environment and freshwater ecology.	None required.

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
P04-E37	Candidate sites for woodland compensation are shown on Figure 12.14	Construction & Operation	Candidate sites for woodland compensation planting have been identified. The sites identified are those which currently do not have tree cover but which, when planted with appropriate native woodland species, maximise the biodiversity benefit of the planting; maintain connectivity or reconnect existing AWI sites; and maximise opportunities to maintain functionality of local ancient woodland communities within the route corridor, thus reducing ancient woodland fragmentation in the landscape. Compensation planting will include the following: • species mixes that will reflect native woodland mixes to replace non-native plantations and maximise biodiversity benefit; • the retrieval, storage and deployment methods of ancient woodland soil that will be re-used to maintain fungal and invertebrate biodiversity and provide a seed bank to promote the re-establishment of ancient woodland ground flora (see **Mitigation Item SMC-LV5** for more details); • management will be undertaken in AWI woodland that is to be retained which will include the retention of dead and fallen wood; • monitoring and management strategies, which will include maintenance and replacement of the planting, including missing and damaged trees, or those that are failing to make satisfactory growth during operation of the proposed scheme; and • management strategies that will be undertaken in ancient woodland that is to be retained which will include the retention of dead and fallen wood.	To mitigate for the functions and importance of the woodland in respect of habitat connectivity and carrying capacity for other species.	None required.
P04-E38	Throughout proposed scheme (Figure 13.5)	Construction & Operation	The loss of woodland will be replaced through landscape and ecological planting, additional to compensation planting for ancient woodland loss, as shown on Figure 13.5.	To mitigate the loss of woodland.	None required.
P04-E39	Throughout proposed scheme (Figure 13.5)	Construction & Operation	The loss of areas identified as otter habitat will be replaced through woodland and riparian planting as shown on Figure 13.5.	To mitigate the loss of otter foraging habitat and fragmentation of connecting habitats.	None required.
P04-E40	The locations of crossing points are shown on Figure 13.5	Construction & Operation	Fragmentation of habitat will be reduced during operation by retention of commuting routes through creation of suitable crossing points, including dry mammal underpasses, so movement between areas of habitat can be maintained.	To mitigate potential direct mortality of otter and badger.	None required.
P04-E41	The location of mammal fencing is shown on Figure 13.5	Construction & Operation	Mammal fencing will be provided to prevent access onto the road and will be positioned in such a way that mammals will be directed to safe crossing points. Fencing will follow SNH guidance, Otters and Development and Badgers and Development.	To mitigate potential direct mortality of otter and badger.	None required.
P04-E42	Throughout proposed scheme (Figure 13.5)	Construction & Operation	The landscape and ecological mitigation planting design (Figure 13.5) will be followed to encourage use of crossing points.	To mitigate potential direct mortality of otter and badger.	None required.

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
P04-E43	Throughout proposed scheme (Figure 13.5)	Construction & Operation	The loss of areas identified as badger habitat will be replaced through the landscape and ecological mitigation planting design (Figure 13.5).	To mitigate the loss of badger setts and foraging habitat under the footprint of the proposed scheme.	None required.
P04-E44	Throughout proposed scheme (Figure 13.5)	Operation	Fragmentation of habitat will be reduced during operation by retention of commuting routes and minimising operational lighting at crossing points used by bats so movement between areas of habitat can be maintained.	To mitigate potential direct mortality of bats.	None required.
P04-E45	Throughout proposed scheme (Figure 13.5)	Operation	Habitat loss and fragmentation of existing habitat will be mitigated by woodland retention and landscape planting as shown on Figure 13.5. This will include: • landscape planting around SuDS basins to create suitable habitat for foraging bats which will encourage higher flight lines to prevent vehicle collisions; and • landscape planting and woodland retention designed to encourage use of crossing points, including culverts suitable for passage by mammals and dry mammal underpasses, so movement between areas of habitat can be maintained.	To mitigate bat habitat loss, fragmentation of habitat for commuting and reduced availability of foraging resources under the footprint of the proposed scheme.	None required.
P04-E46	Woodland habitat identified for erection of bat boxes and landscape planting is shown on Figure 13.5.	Operation	The loss of bat roost trees and individual trees identified as having high bat potential will be mitigated by the provision of bat boxes designed for trees, for example Schwegler 1FF and 2F boxes. Three bat boxes will be provided as mitigation for each roost tree or high potential roost tree lost under the footprint of the proposed scheme. Bat boxes will be monitored post tree felling to determine uptake and success reported to SNH and Transport Scotland.	To mitigate the loss of roosts and potential roost habitat under the footprint of the proposed scheme.	None required.
P04-E47	ch4300 (Clunie Bridge) Woodland habitat identified for erection of interim bat boxes is shown on Figure 13.5.	Operation	The loss of roosts within structures will be mitigated by the provision of bat boxes designed for external surfaces of structures. Bat boxes, for example Schwegler 1FQ, 1WQ and 2FE bat boxes, will be mounted on the abutments/piers (depending on construction) of the new structure across Loch Faskally. During construction of the new structure across Loch Faskally, bat boxes will be erected in the surrounding habitat to replace the lost roost in the interim.	To mitigate the loss of roosts and potential roost habitat under the footprint of the proposed scheme.	None required.
P04-E48	Woodland habitat identified for erection of interim bat boxes, and a proposed location for a bat building are shown on Figure 13.5.	Operation	The loss of roosts in buildings will be mitigated by the provision of compensation habitat which will incorporate bat boxes and a purpose-built bat building. The replacement building will be located in close proximity to the roost building(s) lost and will contain like for like qualities suitable for the species of bats. Where possible, the replacement building should be in place prior to the destruction of the roosts in buildings.	To mitigate the loss of roosts and potential roost habitat under the footprint of the proposed scheme.	None required.

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
P04-E49	Throughout proposed scheme (Figure 13.5)	Operation	The loss of breeding bird habitat will be replaced through the landscape planting design. The design has incorporated a variety of breeding bird habitats including the planting of woodland, scrub, hedgerow and species rich grassland.	To mitigate the loss of suitable breeding habitat, which could result in reduced breeding success, under the footprint of the proposed scheme.	None required.
P04-E50	Throughout proposed scheme (Figure 13.5)	Operation	The loss of areas identified as pine marten and red squirrel habitat will be replaced through the landscape planting design, including woodland planting. Trees of different age and species composition will be planted, for example Scots pine, birch and alder, and incorporated into Habitat Management Plans.	To mitigate the loss of and fragmentation of pine marten and red squirrel habitat under the footprint of the proposed scheme.	None required.
P04-E51	Woodland habitat identified for erection of replacement breeding and nest boxes is shown on Figure 13.5	Operation	Each lost pine marten den will be replaced by a breeding box. The replacement breeding boxes will be: • erected and positioned under direction of an ECoW prior to tree felling; • erected in suitable areas of pine marten woodland habitat; and • monitored post-tree-felling to determine uptake and success reported to SNH and Transport Scotland.	To mitigate the loss of and fragmentation of pine marten and red squirrel habitat under the footprint of the proposed scheme.	None required.
P04-E52	Woodland habitat identified for erection of replacement breeding and nest boxes is shown on Figure 13.5	Operation	Each lost drey will be replaced by a red squirrel nest box. The replacement nest boxes will be: • erected and positioned under direction of an ECoW prior to tree felling; • erected in suitable areas of red squirrel woodland habitat; and • monitored post tree felling to determine uptake and success reported to SNH and Transport Scotland.	To mitigate the loss of and fragmentation of pine marten and red squirrel habitat under the footprint of the proposed scheme.	None required.

Table 21.7: Landscape and Visual

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
Standard A9 Mitigation					
SMC-LV1	Throughout proposed scheme	Construction	The construction programme will be kept to the minimum practicable time to reduce the duration of any landscape and visual impacts and areas will be cleared for construction as close as possible to works commencing and topsoiling, reseeding and planting shall be undertaken as soon as practicable after sections of work are complete.	To reduce the duration of any landscape and visual impacts	None required
SMC-LV2	Throughout proposed scheme	Pre-Construction & Construction	As far as practicable, construction plant and materials storage areas will be appropriately sited to minimise their landscape and visual impact.	To reduce landscape and visual impact of plant and material storage areas.	None required
SMC-LV3	Throughout proposed scheme	Construction	Construction sites will be kept tidy (e.g. free of litter and debris).	To reduce visual impact of construction sites	None required
SMC-LV4	Throughout proposed scheme	Construction	Work during hours of darkness will be avoided as far as practicable, and where necessary, directed lighting will be used to minimise light pollution/glare. Lighting levels will be kept to the minimum necessary for security and safety.	To reduce light pollution/glare during night-time working.	None required
SMC-LV5	Throughout proposed scheme	Construction	To protect soil quality for the purposes of landscape planting, the following measures will be implemented: • Uncontaminated topsoil for re-use shall be stored in un-compacted mounds no more than 2m in height, and stored separately from subsoil material. Topsoil stripped from areas designated as Ancient Woodland shall be stored separately to all other topsoil and sub-soil material, in un-compacted mounds no more than 2 m in height. • Stripped topsoil shall be used in areas of the same proposed vegetation type to utilise the existing natural seed bank. • Subsoil in planting areas shall be replaced after construction and ripped to a minimum of 450mm prior to topsoiling and planting. • Proposed planting areas in existing arable and pasture land, not subject to construction activity, shall be ripped to 600mm to alleviate compaction.	To protect soil quality for the purposes of landscape planting.	None required
SMC-LV6	Throughout proposed scheme	Construction	The construction will be managed such that the loss of any existing woodland, scrub, heath, mire, grassland vegetation, marshland, swamps and isolated trees and shrubs not affected by the permanent works is minimised.	To minimise vegetation loss as far as practicable.	None required
SMC-LV7	Throughout proposed scheme	Pre-Construction	All existing trees and shrubs not affected by the construction of the permanent works shall be fenced off with a suitable type of temporary fencing in accordance with BS5837. Fencing shall extend to the drip line of the tree canopies (unless otherwise agreed by an arboricultural advisor), and shall be erected prior to any construction activities in that area and shall remain for the entire period of construction in that area.	To fence off any areas of unaffected trees and shrubs by the proposed scheme.	None required
n/a (note)	n/a	n/a	*Further to the above, **Mitigation Items SMC-E7** and **SMC-E8** (as detailed in Table 6: Ecology and Nature Conservation) will be implemented to protect vegetation which is identified to be retained.*	*To protect vegetation which is identified to be retained.*	*n/a*

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
Project Specific Mitigation					
P04-LV8	Throughout proposed scheme	Design, Pre-Construction & Construction	Earthworks design will aim to minimise the impact of cuttings and embankment slopes and to allow integration of the proposed scheme with surrounding land through: • use of retaining walls or engineered slopes where appropriate to avoid extensive cuttings into hill slopes or large embankments that 'chase the slope' and increase the disturbance of the landscape (for example at Creag na Ciche, ch5300 to ch6000, Figure 13.5d); • where rock cuttings are required, create rock formations with irregular faces of varied height, angle and form to reflect the structure of the local bedrock (anticipated between ch4850 and ch6000, mainly on the southbound side). The construction of new rock slopes is seen as an opportunity to enhance the existing landscape, providing new exposures of geological interest. Refer to Chapter 10 (Geology, Soils Contaminated Land and Groundwater) for further details; • sensitive grading and profiling of all earthworks where possible to improve integration with the surrounding landform, modifying embankment and cutting slopes to reflect and tie smoothly into existing natural landform and to allow land to be returned to its previous use where appropriate; • softening changes in slope at junctions and overbridges by smoothing out transitions; • rounding off top and bottom of cuttings and embankments; • varying gradients along and across the length of slopes; and • modification of SuDS earthworks in order to improve integration with surrounding landform.	To reduce the impact of cuttings and embankment slopes and to allow integration of the proposed scheme with surrounding land.	None required

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
P04-LV9	Throughout proposed scheme	Design Pre-Construction & Construction	SuDS features required as part of the drainage system of the proposed scheme provide the opportunity to create new beneficial features within the landscape and habitat for wildlife. Their design shall comply with Appendix A13.6 (SuDS Design Principles) and include the following: • • Where practicable SuDS features should be sited within naturally low areas and designed to look as natural as possible. • • Their earthworks will be designed to integrate naturalistically with the surrounding landform. Abrupt changes in slope, sharp angles and steep side slopes will generally be avoided. • • Boundary fencing, where required around SuDS features, will be designed to be as unobtrusive as possible. • • Planting of native tree and shrub species will help screen proposed fencing, outfall and inlet structures, enhance wildlife habitat and provide visual interest. • • Open ground in the areas around proposed SuDS features will be seeded with native grasses and wildflowers or heathland vegetation, as appropriate, to provide added wildlife habitat and visual interest. • • The margins of SuDS features will be planted with native aquatic, emergent and marginal plant species (e.g. greater bird's-foot trefoil, yellow iris, white water-lily, purple-loosestrife and meadowsweet) to help integrate them with the surrounding landscape and enhance their visual amenity and wildlife value). Refer to Appendix A13.6 (SuDS Design Principles).	To mitigate visual intrusion of SuDS features and to enhance their visual amenity and wildlife value.	None required
P04-LV10	Throughout proposed scheme	Pre-Construction & Construction	Where practicable noise screening shall be in the form of earth bunding and in keeping with the landscape character. The proposals shall aim assist integration with the surrounding landform through: • rounding off at the top and bottom of bunds; • grading out the back slope where possible; and • planting the bunds to marry with surrounding vegetation whilst assisting to reduce potential visual impacts. Where earth bunding is not a practicable option, where practicable noise barriers shall be in the form of drystone walling to integrate with the surrounding landscape character. Where the height of noise barriers precludes the use of bunding or drystone walling and noise fencing is required and where appropriate to the surrounding landscape character, tree, scrub and/or climbing vegetation shall be planted in order to help screen it from the proposed scheme and nearby properties	To reduce noise impacts at properties where noise mitigation is required at detailed design stage.	None required

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
P04-LV11	Structures throughout proposed scheme	Design, Construction	The design of structures, such as bridges and retaining walls along the length of the proposed scheme and aspects of the landscape design, would be informed by specialist aesthetic advice in order to reduce impacts on both landscape and visual receptors. While the measures to be adopted would be confirmed at the detailed design stage, mitigation could include use of natural stone-type wall finishes and stone aprons beneath underbridges and NMU underpasses, a patterned or relief finish to sections of retaining wall and for bridges, refinement of the design process in order to achieve slender, elegant and well-proportioned structures. A natural stone-type finish is proposed for the Rob Roy Way Underpass.	To reduce impacts on both landscape and visual receptors	None required
P04-LV12	Throughout proposed scheme	Pre-Construction & Construction	Retention of existing trees and vegetation and incorporation with new planting proposals. Trees only to be removed where demonstrated that this is required for construction or for safety.	To retain existing trees and vegetation wherever possible.	None required
P04-LV13	Throughout proposed scheme	Pre-Construction & Construction	Planting to replace trees lost during construction of the proposed scheme, including areas designated as ancient woodland.	To mitigate impacts of felling and woodland loss.	SNH to be consulted on development of contract documents.
P04-LV14	Throughout proposed scheme	Pre-Construction & Construction	Planting proposals shall be through the use of native species in order to enhance biodiversity, providing new wildlife habitats, connectivity with existing woodland and complementing existing adjacent habitats.	To provide new wildlife habitats, connectivity with existing woodland and complement existing adjacent habitats.	SNH to be consulted on development of contract documents.
P04-LV15	Throughout proposed scheme	Pre-Construction & Construction	Planting at junctions and bridges to help assimilate the landform and structures into the surrounding landscape.	To assimilate junctions and bridges into the surrounding landscape.	SNH to be consulted on development of contract documents.
P04-LV16	Throughout proposed scheme	Pre-Construction & Construction	Planting to provide screening to reduce visual impacts of the proposed scheme and traffic.	To provide screening and reduce visual impacts of the road, structures and vehicle headlights.	None required
P04-LV17	Throughout proposed scheme	Pre-Construction & Construction	Use of severed field corners and landlocked areas for landscape mitigation.	To reduce impacts on agriculture operations.	None required
P04-LV18	Throughout proposed scheme	Pre-Construction & Construction	Proposed planting mixes shall be based on native species, proven by established presence within the area and adapted to local conditions and planting would be monitored for a minimum of five years after construction with annual replacement of any failed planting with stock of a suitable age so as to achieve full establishment and the required level of mitigation / impact reduction by summer 15 years after opening.	To ensure planting mixes are appropriate and in-keeping with local area.	Agreement with SNH

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
P04-LV19	Throughout proposed scheme	Design, Pre-Construction & Construction	For disturbed soft areas and road verges, different seed mixes will be used, dependent on location and use as suggested below: • Visibility Splay Mix: for use in road verges and other areas where grass needs to be kept short for forward visibility, being low-maintenance, fast-establishing and tolerant of traffic and salt spray. • Species-rich Grassland Mix: suited for use in all other areas disturbed by construction works, consisting of a mixture of native, non-invasive grasses and wildflower species to reflect locally occurring semi-natural flora. As well as enhancing biodiversity and visual interest along the proposed scheme, this type of grassland would require minimal maintenance. Example wild flower species of local provenance, which would have the added benefit of being a nectar rich plant, include common bird's-foot trefoil, greater bird's-foot trefoil, devil's-bit scabious, wild thyme, meadow buttercup and oxeye daisy. Appropriate mixes could be neutral, calcareous, dry, wet, highland or lowland and should be developed further for the specific location and conditions at detailed design stage. • Wetland Grassland Mix: suited for use in SuDS and areas around culverts that are likely to experience wet conditions. Example species of local provenance, which would have the added benefit of being an invertebrate food or structural plant, include greater bird's-foot trefoil, common knapweed, devil's-bit scabious, sneezewort, meadowsweet and lesser spearwort.	To ensure seed mixes are appropriate and suited to locations.	None required
P04-LV20	Throughout proposed scheme	Pre-Construction & Construction	Planting will be applied within the road corridor in order to enhance the experience of travelling along the proposed scheme by maintaining important open views and creating views of a variety of woodland types. The species composition of such planting would take account of aspects such as natural woodland characteristics typical in the locality and designed landscape features.	To enhance the experience of travelling along the proposed scheme.	None required
P04-LV21	Throughout proposed scheme	Pre-Construction & Construction	To limit 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 on the proposed scheme. This form of lighting, known as Full Cut Off lighting, directs light of appropriate strength where it is needed and controls the unwanted dispersion of obtrusive artificial light by eliminating the emission of light upwards. This choice of luminaire also enables maximum spacing between lighting columns and ensures that the minimum amount of lighting is used, without compromising safety. Special attention will be given to minimise the landscape and visual impacts of the lighting columns and fixings and to prevent unnecessary light spill. Light Emitting Diodes (LEDs) or similar providing a directional light source with minimal light spillage shall be used and consideration shall be given to use of low height flat beam lighting fixtures. Consideration will also be given to meeting light mitigation requirements by installing passive lighting in the form of reflective road markings and signage wherever possible	To reduce the landscape and visual impacts of lighting	None required

Table 21.8: Cultural Heritage

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
Standard A9 Mitigation					
SMC-CH1	Throughout proposed scheme	Construction	The Contractor will consult with the relevant local authority and Transport Scotland's historic environment advisor should any archaeological or cultural heritage finds or sites be discovered or revealed during construction to enable appropriate measures to be implemented to mitigate potential impacts.	To enable appropriate mitigation measures to be implemented to mitigate impacts on assets found during construction.	Perth and Kinross Heritage Trust and Transport Scotland's cultural heritage advisor. HES if mitigation includes Scheduled Monument, Category A Listed Building, Historic Battlefield or Garden & Designed Landscape
Project Specific Mitigation					
P04-CH2	Refer to description	Pre-Construction	A programme of invasive archaeological evaluation by archaeological trial trenching targeted on both known archaeological remains and areas of high and low archaeological potential shown on Figures 15.3 a-e, will be undertaken prior to construction.	To make a permanent record of any affected archaeological remains.	Consultation with Perth and Kinross Heritage Trust and Transport Scotland's cultural heritage advisor.
P04-CH3	Refer to description	Pre-Construction	Following on from the archaeological evaluation by archaeological trial trenching, archaeological excavation would be undertaken in advance of construction to provide a permanent record of any affected archaeological remains identified by archaeological geophysical survey at Dunfallandy (Asset 792).	To make a permanent record of any affected archaeological remains.	Consultation with Perth and Kinross Heritage Trust and Transport Scotland's cultural heritage advisor.
P04-CH4	Throughout proposed scheme	Pre-Construction & Construction	Make a permanent record of any affected previously unknown archaeological remains; specific measures to be determined in consultation with Perth and Kinross Heritage Trust and Transport Scotland's cultural heritage advisor and h may include strip, map and sample of remains.	To make a permanent record of any affected previously unknown archaeological remains.	Consultation with Perth and Kinross Heritage Trust and Transport Scotland's cultural heritage advisor.
P04-CH5	Refer to description	Construction	Archaeological recording during construction ('watching brief'). Locations of where archaeological watching brief will take place are included in Appendix A15.3 and comprise: Asset 270: Littleton of Fonab Farmstead and Lime Kiln (Site of); Asset 289: Bank (Earthwork) Port-Na-Craig; and Asset 301: Balmore Lime Kiln (Site of) (2).	To make a permanent record of any affected known and unknown archaeological remains.	Consultation with Perth and Kinross Heritage Trust, Transport Scotland's cultural heritage advisor.
P04-CH6	Refer to description	Pre-Construction	Port-Na-Craig House, including Walled Garden, Gate Piers and Gates, Foss Road (Asset 288) will be securely fenced off along the southern boundary of the Walled Garden contiguous to the carriageway, using Heras-type fencing, for the duration of construction activity in the vicinity, and will be identified on the Construction Environmental Management Plan in order to avoid accidental damage (**Mitigation Item SMC-S1**).	To avoid accidental damage to specific cultural heritage assets	Consultation with Perth and Kinross Heritage Trust and Transport Scotland's cultural heritage advisor.
P04-CH7	Throughout proposed scheme	Pre-Construction & Construction	To ensure adherence to good practice guidance, all cultural heritage mitigation will be undertaken in accordance with relevant guidance provided by the Chartered Institute for Archaeologists, HES and Historic England, and a Written Scheme of Investigation that will be agreed with Perth & Kinross Heritage Trust and Transport Scotland's historic	To avoid accidental damage to specific cultural heritage assets	Consultation with Perth and Kinross Heritage Trust and Transport Scotland's cultural heritage advisor.

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
			environment advisor.		
P04-CH8	Throughout proposed scheme	Pre-Construction & Construction	To ensure appropriate reporting and dissemination of the results, all cultural heritage mitigation will include a programme of assessment, reporting, analysis, publication and dissemination of results commensurate with the value of the archaeological remains, historic buildings and historic landscapes affected. This will include the preparation of reports which will be submitted to the Perth & Kinross Historic Environment Record and the National Record of the Historic Environment, along with ordered archives which will be submitted to an appropriate repository.	To make a permanent record of any affected previously unknown archaeological remains.	Consultation with Perth and Kinross Heritage Trust and Transport Scotland's cultural heritage advisor.

Table 21.9: Air Quality

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
Standard A9 Mitigation					
SMC-AQ1	Throughout proposed scheme	Construction	In relation to minimising fugitive dust emissions from earthworks, material storage and concrete batching the following mitigation items will be implemented: • stockpiles and mounds will be at a suitable angle of repose to prevent material slippage, will be enclosed or securely sheeted, and/or kept damped as necessary during dry weather; • the surfaces of any long-term stockpiles which give rise to a risk of dust or air pollution will be covered with appropriate sheeting or will be treated to stabilise the surfaces; • mixing of large quantities of concrete will be carried out only in enclosed or shielded areas; • all handling areas will be maintained in a dust free state as far as is practicable with sprinklers and hoses used to prevent dust escaping from the site boundaries; and • procedures will be established so that the site is regularly inspected for spillage of dusty or potentially dusty materials and any such spillage would be dealt with promptly where necessary to prevent dust nuisance.	To reduce fugitive dust emissions from earthworks, material storage and concrete batching.	None required
SMC-AQ2	Throughout proposed scheme	Construction	In relation to minimising dust from vehicle movements within the site the following mitigation items will be implemented: • the Contractor will employ appropriate measures, such as covering materials deliveries or loads entering and leaving the construction site by a fixed cover or sheeting appropriately fixed and suitable for the purposes of preventing materials and dust spillage; • where unsurfaced routes are identified as creating dust emissions during periods of dry weather, surfaces will be regularly dampened down using water bowsers; and • appropriate speed limits will be established and enforced over all unmade surfaces.	To reduce dust from vehicle movements.	None required
SMC-AQ3	Throughout proposed	Construction	In relation to appropriate cleaning of public roads the following mitigation items will be	To reduce potential of dust	Approval required from the

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
	scheme		implemented: • wheel washing facilities will be installed as required and heavy vehicles will be required to use the facilities prior to leaving the site; • subject to approval from the Roads Authority, public roads immediately outside the site entrance will be cleaned using vacuum sweeper brushes and other specialised road cleaning equipment as necessary to maintain an appropriate state of cleanliness; and • roads and footpaths adjacent to the proposed scheme will be cleaned, with damping if necessary.	from public roads	Roads Authority

Table 21.10: Noise and Vibration

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
Standard A9 Mitigation					
SMC-NV1	Throughout proposed scheme	Pre-Construction & Construction	A scheme of noise and vibration monitoring will be agreed with the Environmental Health Officer of Perth & Kinross Council, and noise and vibration limits will be contained within the Construction Environmental Management Plan (refer to (**Mitigation Item SMC-S1**). The contractor will be required to develop and implement a Noise and Vibration Management Plan to meet these requirements.	To predict the noise and vibration levels during the construction of the proposed scheme. It will include the design of receptor specific mitigation, over and above the standard mitigation detailed in NV2, where required.	PKC and CNPA Environmental Health Officers
SMC-NV2	Throughout proposed scheme	Pre-Construction & Construction	Best Practicable Means will be used to limit the level of noise to which operators and others in the vicinity of site operations would be exposed. This includes the following: • the hours of working will be planned and account will be taken of the effects of noise upon persons in areas surrounding site operations and upon persons working on site, taking into account the nature of land use in the areas concerned, the duration of work and the likely consequence of any lengthening of work periods; • any work outside of normal working hours will be agreed with the relevant local authority; • where reasonably practicable, quiet working methods will be employed, including use of the most suitable plant, reasonable hours of working for noisy operations, and economy and speed of operations; • permanent noise mitigation measures such as acoustic screens and earthwork bunds are to be constructed as early as practical; • noise will be controlled at source, for example, by modification of existing plant/equipment, its use and location and ensuring maintenance of all noise-generating equipment; • the spread of noise will be limited, i.e. by distance between source and receiver and/or screening;	To reduce, as far as practicable, the level of noise to which operators and others in the vicinity of site operations would be exposed.	None required

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
			• on-site noise levels will be monitored regularly, particularly if changes in machinery or project designs are introduced, by a suitably qualified person appointed specifically for the purpose. A method of noise measurement would be agreed with the local authority prior to the commencement of site works; • on those parts of a site where high levels of noise are likely to be a hazard to persons working on the site, prominent warning notices will be displayed and, where necessary, ear protectors will be provided; • proper use of plant with respect to minimising noise emissions and regular maintenance in line with plant manuals; • where practicable, vehicles and mechanical plant used for the purpose of the works will be fitted with effective exhaust silencers and will be maintained in good, efficient working order; • where appropriate, inherently quiet plant will be selected. All major compressors will be 'sound reduced' models fitted with properly lined and sealed acoustic covers which will be kept closed whenever the machines are in use and all ancillary pneumatic percussive tools will be fitted with mufflers or silencers of the type recommended by the manufacturers; • machines in intermittent use will be shut down in the intervening periods between work or throttled down to a minimum; • all ancillary plant such as generators, compressors and pumps will be positioned so as to cause minimum noise disturbance. If necessary, acoustic barriers or enclosures will be provided; and • adherence to the codes of practice for construction working and piling given in British Standard 'BS 5228:2009+A1:2014' and the guidance given therein minimising noise emissions from the site.		
n/a (note)			*In addition to the above, mitigation item S3 will also mitigate potential for noise disturbance through the overall communications strategy for the A9 Dualling Programme and appointed Community Liaison Officer and liaison team.*		
Project Specific Mitigation					
P04-NV3	Southern end of proposed scheme (ch-580 - ch0) as shown on Figure 17.9	Construction	Application of Low Noise Road Surface (LNRS) to existing A9 carriageways from the ch0 for 580m south of ch0. The exceedance of the noise mitigation criteria at the properties is due to traffic flow increases on the A9. This noise sensitive receptor (NSR) does not benefit from the introduction of LNRS for the proposed scheme as it lies further to the west.	To reduce potential noise impacts at residential properties	None required
P04-NV4	ch120 – ch320 as shown on Figure 17.9	Construction	A 0.8m high, 203m long drystone wall, earth bund or a close boarded timber fence (or a combination thereof) will be erected. For any noise barrier fences these would need to be of a minimum mass per unit area of 15kg/m2 with no holes or gaps. Timber fences will be overlapped to allow for shrinkage.	To reduce potential noise impacts at residential properties	None required
P04-NV5	ch.6600 – ch6750 as shown on	Construction	A 0.5m high, 144m long drystone wall, earth bund or a close boarded timber fence (or a combination thereof) will be erected. For any noise barrier fences these would need to be of a minimum mass per unit area of 15kg/m2 with no holes or gaps. Timber fences will be	To reduce potential noise impacts at residential	None required

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
	Figure 17.9		overlapped to allow for shrinkage.		
P04-NV6	Northern end of proposed scheme (ch6900 for 620m) as shown on Figure 17.9	Construction	Application of Low Noise Road Surface (LNRS) to existing A9 carriageways from the ch6900 for 620m north. The exceedance of the noise mitigation criteria at the properties is due to traffic flow increases on the A9. This noise sensitive receptor (NSR) does not benefit from the introduction of LNRS for the proposed scheme as it lies further to the west	To reduce potential noise impacts at residential	None required

Table 21.11: Materials

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
Standard A9 Mitigation					
SMC-M1	Throughout proposed scheme	Pre-Construction & Construction	Prior to construction a Site Waste Management Plan (SWMP) will be developed as part of the CEMP (see **Mitigation Item SMC-S1**) to set out how all construction phase materials will be managed and it will be updated regularly during the construction of the proposed scheme. The SWMP will identify, prior to the start of construction works, the types and likely quantities of wastes that may be generated and it will set out, in an auditable manner, how waste will be reduced, re-used, managed and disposed of in accordance with relevant Zero Waste Scotland Guidance. The SWMP will include specific materials management and soil management plans developed under voluntary and industry regulated Codes of Practice including: • Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (DEFRA, 2009); • Land Remediation and Waste Management Guidelines (SEPA, 2009); and • Promoting the Sustainable Reuse of Greenfield Soils in Construction (SEPA, 2010). Appropriate waste minimisation and associated KPI targets will also be included.	To set out how all construction phase materials will be managed.	Consultation with SEPA
SMC-M2	Throughout proposed scheme	Pre-Construction & Construction	The Contractor will comply with all relevant waste legislation in relation to waste handling, storage, transport and disposal (e.g. The Waste Framework Directive) and consultation with SEPA for advice on waste practices, licences and exemptions where appropriate.	To ensure waste handling, storage, transport and disposal is compliant with all relevant waste legislation.	Consultation with SEPA
SMC-M3	Throughout proposed scheme	Pre-Construction, Construction & Post-Construction/ Operation	The Contractor will apply the principles of the 'Waste Hierarchy' (Prevention, Preparing for Re-use, Recycling, Other Recovery, Disposal) to minimise waste generation, maximise re-use of site-won materials on-site and minimise the need for disposal of waste. Where re-use is not possible within the proposed scheme, alternative re-use and recycling options will be sought off-site with disposal the final option, with clear justification of options provided.	To reduce waste generation, maximise re-use of site-won materials on-site and reduce the need for disposal of waste.	None required

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required
SMC-M4	Throughout proposed scheme	Pre-Construction Construction Post-Construction/ Operation	The Contractor will implement Zero Waste Scotland's Design for Resource Efficient Construction Principles.	To make the best use of materials, over the lifecycle of the proposed scheme's built assets, to reduce embodied carbon emissions	None required
SMC-M5	Throughout proposed scheme	Pre-Construction Construction	The key material elements (i.e. aggregates, asphalt, cement, precast concrete products, ready-mixed concrete and steel) used within the proposed scheme shall be specified to be responsibly sourced.	To reduce impacts associated with the extraction and manufacture of materials.	None required
SMC-M6	Throughout proposed scheme	Pre-Construction Construction	All timber and timber products shall be sourced from independently verifiable legal and sustainable sources.	To reduce impacts associated with the extraction and manufacture of materials.	None required
SMC-M7	Throughout proposed scheme	Pre-Construction Construction	Alternatives to primary aggregates shall be investigated, including opportunities to use recycled or secondary aggregates in the construction of the proposed scheme; either sourced from construction, demolition and excavation waste obtained on-site or off-site; or secondary aggregates obtained from a non-construction or post-consumer or industrial by-product source.	To reduce impacts associated with the extraction, manufacture and transport of materials and to reduce waste generation, maximise re-use of site-won materials on-site and reduce the need for disposal of waste.	None required
n/a (note)	*n/a*	*n/a*	*Further to the above, the following mitigation items detailed in Table 21.2 (Community and Private Assets), Table 21.4 (Geology, Soils and Contaminated Land), Table 21.5 (Road Drainage and the Water Environment) and Table 21.9 (Air Quality) will be implemented to ensure the appropriate management and handling of materials:* ***SMC-CP8, SMC-G3, SMC-G8, SMC-G9, SMC-G10, SMC-G14, SMC-W2, SMC-W6*** *to* ***SMC-W10, SMC-AQ1*** *and* ***SMC-AQ2****.*	*To ensure the appropriate management and handling of materials:*	*n/a*