22. Schedule of Environmental Commitments

22.1 Introduction

22.1.1 As described throughout this Environmental Impact Assessment Report (EIAR), 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 and effects, where practicable, such that measures to mitigate these impacts and effects are embedded in the design (embedded mitigation as described in Chapter 3: Overview of Assessment Process). This chapter (Chapter 21: Schedule of Environmental Commitments) sets out the standard and project specific mitigation measures identified in Chapters 8-20 of this EIAR which are considered necessary to further avoid; reduce; or offset potential impacts and which are additional to those already identified as embedded in the design.

22.1.2 The purpose of the following Schedule of Environmental Commitments is to collate these standard and project specific mitigation measures, referred to as Mitigation Items, both for ease of reference and for use by the Contractor. Standard mitigation measures are a set of standard mitigation commitments that have been developed across the A9 Dualling programme which are being implemented on all the A9 Dualling projects. Project specific mitigation commitments are those identified as part of the EIA process for the proposed scheme being assessed. The standard mitigation commitments and the project specific mitigation measures comprise essential mitigation measures (as defined and further discussed in Chapter 3: Overview of Assessment Process).

22.1.3 The essential mitigation measures comprise the four overarching Mitigation Items for the A9 Dualling set out in Table 22.1 (SMC-S1 to SMC-S4) as well as both the environmental topic standard Mitigation Items (also prefixed with SMC) and project specific Mitigation Items (prefixed with P02) identified within Chapters 8-20, and as listed in Tables 22.2 to 22.13. A description, location, and purpose of each Mitigation Item is given. The tables also state whether consultation or approval with a consultee and monitoring measures is required.

22.1.4 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 Items comprise those identified through the EIA process for the proposed scheme, some of which are necessary to achieve separate legislative compliance.

Table 22.1: General Standard Construction Mitigation

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/ Objective	Specific Consultation or Approval Required	Monitoring Measure
SMC-S1	Throughout proposed scheme	Pre-Construction Construction	Advanced works Contractor Main Contractor	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 in this Table 22.1 and in Tables 22.2 to 22.13 (Chapter 22: Schedule of Environmental Commitments). 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 land (including a specific Soil Management Plan), geology and land contamination; surface water and groundwater (including a Flood Response and Pollution Incident Response Plan); ecology (Ecological Management Plan which will include specific Species Management Plans (SMP) and Habitat Management Plans (HMPs)); landscape, cultural heritage, air quality, biosecurity 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 EIARS. It will be developed and evolve to avoid, reduce or mitigate construction impacts on the environment and the surrounding community.	Consultation with the relevant local authorities, other statutory bodies and regulatory authorities (Refer to Tables 22.1-22.13).	The CEMP will be refined and updated during the construction stage and finalised at the end of construction to support future management and operation.
SMC-S2	Throughout proposed scheme	Pre-Construction Construction	Advanced works Contractor Main Contractor	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 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.	The EnvCoW will be required to report on the implementation of mitigation measures on a monthly basis.

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/ Objective	Specific Consultation or Approval Required	Monitoring Measure
SMC-S3	Throughout proposed scheme	Pre-Construction Construction	Advanced works Contractor Main Contractor	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 supported by a liaison team as necessary 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 ensure that consultees and members of the public are kept informed on the progress of the proposed scheme and to efficiently address any queries or concerns raised.	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.	Via supervision requirements outlined in Contract Documents.
SMC-S4	Throughout proposed scheme	Construction	Main Contractor	The Contractor will ensure that all site workers receive adequate environmental training relevant to their role prior to working on the construction site, including specific environmental project inductions and 'toolbox talks' on best practice construction methods as appropriate.	To ensure site workers are aware of best practice construction methods, mitigation measures and how they are implemented.	None required	Via supervision requirements outlined in Contract Documents.

Table 22.2: Air Quality

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required	Monitoring Measure
Standard Mitigation							
SMC-AQ1	Throughout proposed scheme	Construction	Main Contractor	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.	Perth & Kinross Council	Via supervision requirements outlined in Contract Documents.
SMC-AQ2	Throughout proposed scheme	Construction	Main Contractor	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.	Perth & Kinross Council	Via supervision requirements outlined in Contract Documents.
Specific Mitigation							
P02-AQ1	North Zone (ch5700-8400), Central Zone (ch3500-5700, Dunkeld & Birnam Station Zone (ch3200-3500), South Zone(ch576-3200)	Construction	Main Contractor	In relation to Communications, the following items will be implemented: ▪ Develop and implement a stakeholder communications plan that includes community engagement before work commences on site. ▪ Display the name and contact details of person(s) accountable for air quality and dust issues on the site boundary. This may be the environment manager/engineer or the site manager. ▪ Display the head or regional office contact information. ▪ Develop and implement a Dust Management Plan (DMP) which may include measures to control other emissions, approved by the Local Authority. The level of detail will depend on the risk and should include as a minimum the highly recommended measures. The desirable measures should be included as appropriate for the site in question**.	To manage any uncontrolled dust impacts on and off-site.	Perth & Kinross Council	Via supervision requirements outlined in Contract Documents.

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required	Monitoring Measure
	*Not required- North Zone. **Desirable for North Zone.						
P02-AQ2	North Zone (ch5700-8400), Central Zone (ch3500-5700, Dunkeld & Birnam Station Zone (ch3200-3500), South Zone (ch576-3200) *Not required- North Zone.	Construction	Main Contractor	In relation to Site Management, the following items will be implemented: ▪ Record all dust and air quality complaints, identify cause(s), and take appropriate measures to reduce emissions in a timely manner, and record the measures taken. ▪ Make the complaints log available to the local authority when asked. ▪ Record any exceptional incidents that cause dust/air emissions, either onsite or offsite, and the action taken to resolve the situation in the logbook. Review measures accordingly. ▪ Hold regular liaison meetings with other high risk construction sites within 250m of the site boundary, to ensure plans are coordinated and dust and particulate matter emissions are minimised. It is important to understand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes*.	To ensure dust emissions are minimised and the controls implemented are managed.	Perth & Kinross Council	Via supervision requirements outlined in Contract Documents.
P02-AQ3	North Zone (ch5700-8400), Central Zone (ch3500-5700, Dunkeld & Birnam Station Zone (ch3200-3500), South Zone (ch576-3200) **Desirable for North Zone.	Construction	Main Contractor	In relation to Monitoring, the following items will be implemented: ▪ Undertake daily on/off site inspections, at nearby receptors (including roads) to monitor dust, record inspection results, and make the log available to the local authority when asked. This should include regular dust soiling checks of surfaces such as street furniture, cars and window sills within 100m of site boundary should be undertaken, with cleaning to be provided if necessary, and make the complaints log available to the local authority when asked**. ▪ Carry out regular site inspections to monitor compliance with the DMP, record inspection results, and make an inspection log available to the local authority when asked. ▪ Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions.	To reduce the risk of dust impacts off-site.	Perth & Kinross Council	Via supervision requirements outlined in Contract Documents.

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required	Monitoring Measure
P02-AQ4	North Zone (ch5700-8400), Central Zone (ch3500-5700, Dunkeld & Birnam Station Zone (ch3200-3500), South Zone (ch576-3200). **Desirable for North Zone.	Construction	Main Contractor	In relation to preparing and maintaining the site, the following items will be implemented: ▪ Plan site layout so that machinery and dust/odour causing activities are located away from receptors, as far as is possible. ▪ Erect solid screens or barriers around dusty activities or the site boundary that are at least as high as any stockpiles on site. ▪ Fully enclose specific operations where there is a high potential for dust production and the site is active for an extensive period**. ▪ Avoid site runoff of water or mud. ▪ Remove materials that have a potential to produce dust from site as soon as possible, unless being re-used on-site. If they are being re-used on-site, cover, seed or fence stockpiles to prevent wind whipping.	To reduce dust impacts on and off site.	Perth & Kinross Council	Via supervision requirements outlined in Contract Documents.
P02-AQ5	North Zone (ch5700-8400), Central Zone (ch3500-5700, Dunkeld & Birnam Station Zone (ch3200-3500), South Zone (ch576-3200) *Not required-North Zone.	Construction	Main Contractor	In relation to operating vehicle/machinery and sustainable travel, the following items will be implemented: ▪ Ensure all vehicles switch off engines when stationary - no idling vehicles. ▪ Avoid the use of diesel- or petrol-powered generators and use mains electricity or battery powered equipment where practicable. ▪ Produce a Construction Logistics Plan to manage the sustainable delivery of goods and materials*. ▪ Implement a Travel Plan that supports and encourages sustainable travel (public transport, cycling, walking, and car-sharing).	To minimise emissions to air from construction related vehicles.	Perth & Kinross Council	Via supervision requirements outlined in Contract Documents.
P02-AQ6	North Zone (ch5700-8400), Central Zone (ch3500-5700, Dunkeld & Birnam	Construction	Main Contractor	In relation to operations, the following items will be implemented: ▪ Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction, e.g. suitable local exhaust ventilation systems. ▪ Use enclosed chutes and conveyors and covered skips. ▪ Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate.	To minimise emissions to air.	Perth & Kinross Council	Via supervision requirements outlined in Contract Documents.

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required	Monitoring Measure
	Station Zone (ch3200-3500), South Zone (ch576-3200)						
P02-AQ7	North Zone (ch5700-8400), Central Zone (ch3500-5700, Dunkeld & Birnam Station Zone (ch3200-3500), South Zone (ch576-3200)	Construction	Main Contractor	In relation to waste management, the following items will be implemented: ▪ Avoid bonfires and burning of waste materials.	To minimise emissions to air.	Perth & Kinross Council	Via supervision requirements outlined in Contract Documents.
P02-AQ8	North Zone (ch5700-8400), Central Zone (ch3500-5700, Dunkeld & Birnam Station Zone (ch3200-3500), South Zone (ch576-3200)	Construction - Demolition	Main Contractor	In relation to demolition, the following items will be implemented: ▪ Soft strip inside buildings before demolition (retaining walls and windows in the rest of the building where possible, to provide a screen against dust). ▪ Ensure effective water suppression is used during demolition operations. Handheld sprays are more effective than hoses attached to equipment as the water can be directed to where it is needed. In addition, high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground. ▪ Avoid explosive blasting, using appropriate manual or mechanical alternatives. ▪ Bag and remove any biological debris or damp down such material before demolition.	To reduce and control emissions of dust during demolition activities.	Perth & Kinross Council	Via supervision requirements outlined in Contract Documents.
P02-AQ9	North Zone (ch5700-8400), Central Zone (ch3500-5700, Dunkeld & Birnam	Construction - Earthworks	Main Contractor	In relation to earthworks, the following items will be implemented: ▪ Re-vegetate earthworks and exposed areas / soil stockpiles to stabilize surfaces as soon as practicable*. ▪ Use Hessian, mulches or trackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable*. ▪ Only remove the cover in small areas during work and not all at once *.	To reduce dust emissions during earthworks activities.	Perth & Kinross Council	Via supervision requirements outlined in Contract Documents.

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required	Monitoring Measure
	Station Zone (ch3200-3500), South Zone (ch576-3200) *Not required- North Zone.						
P02-AQ10	North Zone (ch5700-8400), Central Zone (ch3500-5700, Dunkeld & Birnam Station Zone (ch3200-3500), South Zone (ch576-3200) *Not required- North Zone. **Desirable for North Zone.	Construction	Main Contractor	In relation to construction, the following items will be implemented: ▪ Avoid scabbling (roughening of concrete surfaces) if possible**. ▪ Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emissions control systems to prevent escape of material and overfilling during delivery*.	To reduce dust emissions during construction activities.	Perth & Kinross Council	Via supervision requirements outlined in Contract Documents.
P02-AQ11	North Zone (ch5700-8400), Central Zone (ch3500-5700, Dunkeld & Birnam Station Zone (ch3200-3500), South Zone (ch576-3200)	Construction	Main Contractor	In relation to trackout, the following items will be implemented: ▪ Avoid dry sweeping of large areas**. ▪ Record all inspections of haul routes and any subsequent action in a site log book**. ▪ Install hard surfaced haul routes, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and regularly cleaned*. ▪ Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits*. ▪ Access gates to be located at least 10m from receptors where possible*.	To reduce potential for dust from public roads.	Perth & Kinross Council	Via supervision requirements outlined in Contract Documents.

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required	Monitoring Measure
	*Not required- North Zone. ** Desirable for North Zone.						

Table 22.3: Cultural Heritage

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required	Monitoring Measure
Standard Mitigation							
SMC-CH1	Throughout the proposed scheme	Construction	Main Contractor	The Main 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 cultural heritage resources found during construction.	Perth & Kinross Heritage Trust (PKHT), Transport Scotland's Historic Environment Advisor.	Publication of the results of the implemented mitigation and submission of the archive to the appropriate repository.
Specific Mitigation							
P02-CH02	Dunkeld And Birnam Station, Goods Yard (Asset 832), Ladywell Enclosure (Asset 941), the possible enclosures, pit-like anomalies, sub-circular anomalies identified by archaeological geophysical survey in Geophysical Survey Area P02_05 (Asset 960) and the possible enclosure in Geophysical Survey Area P02_03 (Asset 962)	Pre-construction	Main Contractor/ Archaeological Advance Works Contractor	Archaeological Trial Trenching.	To inform the scope and scale of archaeological excavation.	PKHT and Transport Scotland's Historic Environment Advisor.	▪ Submission of report(s) on the results of the archaeological trial trenching to the PKHER and NRHE. ▪ Submission of ordered archives to an appropriate repository.

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required	Monitoring Measure
P02-CH03	Dunkeld And Birnam Station, Goods Yard (Asset 832), Ladywell Enclosure (Asset 941), the possible enclosures, pit-like anomalies, sub-circular anomalies identified by archaeologic al geophysical survey in Geophysical Survey Area P02_05 (Asset 960) and the possible enclosure in Geophysical Survey Area P02_03 (Asset 962)	Pre-construction	Main Contractor/ Archaeological Advance Works Contractor	Archaeological Excavation.	To make a record of archaeological remains.	PKHT and Transport Scotland's Historic Environment Advisor.	▪ Submission of report(s) on the results of the archaeological excavation to the PKHER and NRHE and publication commensurate with the value of the archaeological remains affected. ▪ Submission of ordered archives to an appropriate repository.
P02-CH04	Dunkeld and Birnam Station, including Footbridge (Asset 26), Auchlou, Inver (Asset 793) and Inver Wood, Bridge (Asset 931)	Pre-construction	Main Contractor/ Archaeological Advance Works Contractor	Historic Building Record (Detailed) in accordance with ALGAO: Scotland's Historic Building Recording Guidance (ALGAO: Scotland, 2013).	To make a record of the historic buildings.	PKHT, Transport Scotland's Historic Environment Advisor, HES and PKC.	▪ Submission of report(s) on the results of the historic building recording to the PKHER and NRHE. ▪ Submission of ordered archives to an appropriate repository.

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required	Monitoring Measure
P02-CH05	Dunkeld and Birnam Station Signal Box (Asset 16) and Birnam Conservation Area (Asset 44)	Pre-construction	Main Contractor/ Archaeological Advance Works Contractor	A photographic record to document each cultural heritage resource in their existing setting prior to construction. This will include the preparation of a report on the results of the survey and preparation and submission of an ordered archive.	To record the setting of these historic buildings.	PKHT and Transport Scotland's Historic Environment Advisor.	▪ Submission of report(s) on the results of the photographic to the PKHER and NRHE. ▪ Submission of ordered archives to an appropriate repository.
P02-CH06	Dunkeld and Birnam Station, including Footbridge (Asset 26) Dunkeld And Birnam Station and Goods Yard (Asset 832)	Construction	Main Contractor	Interpretation boards presenting interpretive information will be installed at suitable publicly accessible locations within the proposed CPO.	To enhance people's understanding of, and their engagement with, Dunkeld and Birnam Station, including Footbridge (Asset 26) and Dunkeld And Birnam Station, Goods Yard (Asset 832).	PKHT, PKC, HES and Transport Scotland's Historic Environment Advisor.	Installation of the agreed interpretation boards.
P02-CH07	Murthly Castle GDL (HLT 14)	Pre-construction	Main Contractor/ Archaeological Advance Works Contractor	Photographic survey in accordance with the guidance provided in Understanding the Archaeology of Landscapes: A Guide to Good Recording Practice (Second Edition) (Historic England 2017).	To record the Key Landscape Features, Key Views and Sightlines and Historic Views affected by the construction and operation of the proposed scheme.	PKHT and Transport Scotland's Historic Environment Advisor.	▪ Submission of report(s) on the results of the photographic survey to the PKHER and NRHE. ▪ Submission of ordered archives to an appropriate repository.

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required	Monitoring Measure
P02-CH08	Murthly Castle GDL (HLT 14)	Pre-construction	Main Contractor/ Archaeological Advance Works Contractor	A Level 3 landscape survey, in accordance with Understanding the Archaeology of Landscapes: A Guide to Good Recording Practice (Second Edition) (Historic England, 2017).	To record the Special Features affected by the construction of the proposed scheme.	PKHT and Transport Scotland's Historic Environment Advisor.	▪ Submission of report(s) on the results of the Level 3 landscape survey to the PKHER and NRHE. ▪ Submission of ordered archives to an appropriate repository.
P02-CH09	Murthly Castle GDL (HLT 14)	Construction	Main Contractor	Interpretation boards presenting interpretive information on Murthly Castle GDL (HLT 14) will be installed at suitable publicly accessible locations within the CPO within the GDL at the end of the construction period.	To enhance people's understanding of, and their engagement with Murthly Castle GDL (HLT 14).	PKHT, PKC, HES and Transport Scotland's Historic Environment Advisor.	Installation of the agreed interpretation boards.

Table 22.4: Landscape and Visual

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/ Objective	Specific Consultation or Approval Required	Monitoring Measure
Standard Mitigation							
SMC-LV1	Throughout proposed scheme	Pre-Construction Construction	Main Contractor Advance Works Contractor	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, re-seeding 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	None required
SMC-LV2	Throughout proposed scheme	Pre-Construction Construction	Main Contractor Advance Works Contractor	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	None required
SMC-LV3	Throughout proposed scheme	Construction	Main Contractor	Construction sites will be kept tidy (e.g. free of litter and debris)	To reduce visual impact of construction sites.	None required	None required
SMC-LV4	Throughout proposed scheme	Construction	Main Contractor	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 shall be kept to the minimum necessary for security and safety.	To reduce light pollution/glare during night-time working.	None required	None required
SMC-LV5	Throughout proposed scheme	Construction	Main Contractor	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 450 mm prior to topsoiling and planting. Proposed planting areas in existing arable and pasture land, not subject to construction activity, shall be ripped to 600 mm to alleviate compaction.	To protect soil quality for the purposes of landscape planting.	None required	None required
SMC-LV6	Throughout proposed scheme	Construction	Main Contractor	The construction shall 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 limit vegetation loss as far as practicable.	None required	None required
SMC-LV7	Throughout proposed scheme	Pre-Construction	Main Contractor	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 protect existing trees and shrubs unaffected by the proposed scheme.	None required	None required

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/ Objective	Specific Consultation or Approval Required	Monitoring Measure
n/a (note)	*n/a*	*n/a*	*Main Contractor Advance Works Contractor*	*Further to the above, Mitigation items SMC-E7 and SMC-E8 (as detailed in Chapter 12: Biodiversity) will be implemented to protect vegetation which is identified to be retained.*	*To protect vegetation which is identified to be retained.*	*n/a*	*n/a*
Specific Mitigation							
P02-LV8	Throughout proposed scheme	Construction	Main Contractor	<u>Earthworks</u> Earthworks proposals will aim to minimise the impact of cuttings and embankment slopes and to allow integration of the road with surrounding land through: ▪ use of retaining walls or engineered slopes with native climbing plants where appropriate to avoid extensive cuttings into hill slopes or large embankments that 'chase the slope' and increase the disturbance of the landscape; ▪ where soil nailed cutting slopes are required on soft-faced slopes, slopes will be fully vegetated to reduce visual impacts. The soil nail heads will be recessed with mesh and nail heads/plates concealed from view. The design will include for sufficient topsoil depths to support the proposed planting and seeding, which will establish to cover the nail heads and any mesh that may be required; ▪ 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; ▪ 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 bridges by smoothing out transitions; ▪ rounding off top and bottom of cuttings and embankments; ▪ varying gradients along and across the length of the slopes; and ▪ modification of earthworks around SuDS features 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. To minimise impacts on The Special Qualities of the River Tay (Dunkeld) National Scenic Area).	Consultation with NatureScot, and Historic Environment Scotland (for works within Murthly Castle GDL)	None required
P02-LV9	Throughout proposed scheme	Pre-Construction Construction	Main Contractor Advance Works Contractor	<u>SuDS Features: Ponds, Wetlands, Basins, Swales and Geo-Cellular Storage Areas</u> The initial design of the SuDS has been developed by drainage engineers in collaboration with landscape architects, ecologists, and hydrologists to take advantage of opportunities for improved amenity and biodiversity in addition to meeting the requirements for attenuation and treatment of runoff. The proposed SuDS features include ponds, basins and swales (as shown indicatively on Figure 10.6). The design will be refined further to integrate them into the landscape and maximise their amenity and biodiversity value at each specific location. As necessary to meet runoff treatment and water quality requirements, and where SuDS features are likely to be visible at close range, and where it is considered that they would fit well with the surrounding landscape and provide benefits to wildlife, ponds/basins have been proposed. In other locations, where ponds/basins would be out of character or unlikely to offer opportunities to enhance visual amenity or biodiversity or where ponds/basins are not required for runoff treatment requirements, swales are proposed.	To mitigate visual impact of SuDS features and to enhance their visual amenity and wildlife value. To minimise impacts on The Special Qualities of the River Tay (Dunkeld) National Scenic Area.	Consultation with NatureScot	Planting will be monitored for a minimum of five years after construction with annual replacement of any failed planting with stock of a suitable age to achieve full establishment and the required level of mitigation/impact reduction by summer

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/ Objective	Specific Consultation or Approval Required	Monitoring Measure
				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 should comply with Appendix A10.7 (SuDS Design Principles) and include the following: ▪ where practicable they are sited within naturally low areas and designed to look as natural as possible; ▪ permanently wet 'scrapes' will be incorporated into SuDS basins to enhance their visual amenity and biodiversity value; ▪ 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, 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; and ▪ the margins of SuDS ponds/wetlands and base of SuDS basins will be planted with native 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. Further details of the approach to the design of SuDS features together with examples are provided in Appendix A10.7 (SuDS Design Principles).			15 years after opening.
P02-LV10	Throughout proposed scheme	Construction	Main Contractor	<u>Compensatory Flood Storage Areas</u> Compensatory Flood Storage Areas have the potential to be visually intrusive and alter the character of the landscape. Where practicable they will be returned to their former land cover/land use so that they blend in with the surrounding landscape. The use of retaining walls and 'hard' structures will be avoided and earthwork slopes slackened where practicable, to integrate with the surrounding landform.	To reduce impacts on both landscape and visual receptors (including impacts on The Special Qualities of the River Tay (Dunkeld) National Scenic Area).	Consultation with NatureScot	None required
P02-LV11	Throughout proposed scheme	Construction	Main Contractor	<u>Noise Barriers</u> Noise barriers have the potential to be visually intrusive when viewed from the existing A9 and surrounding properties. Where possible, earth bunding will be used to provide noise attenuation to reduce potential impacts on landscape character and visual amenity. The location of the proposed noise barrier (ch1240 - ch1340) is shown on Figure 10.6. Under the Design and Build type contract for the proposed scheme, the detailed design of the noise mitigation measures will be undertaken by the Contractor responsible for the works.	To reduce impacts on both landscape and visual receptors (including impacts on The Special Qualities of the	Consultation with NatureScot	None required

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/ Objective	Specific Consultation or Approval Required	Monitoring Measure
					River Tay (Dunkeld) National Scenic Area).		
P02-LV12	Throughout proposed scheme	Construction	Main Contractor	<u>Structures</u> The design of structures, such as bridges along the length of the proposed scheme and aspects of the landscape design, has been informed by specialist aesthetic advice and design meetings to reduce impacts on both landscape and visual receptors. Mitigation will include measures such as natural stone cladding, patterned or relief finish to sections of retaining wall and for bridges, carefully integrated abutments and/or refinement of the design process to achieve slender, elegant and well-proportioned structures. <u>Signage</u> The location, size and design of variable message, advanced direction and tourist information signs along the length of the proposed scheme and just beyond its extents, is largely dictated by road design standards. However, in some instances there may be scope to adjust the location to reduce their impact on the surrounding landscape. This will be undertaken at the detailed design stage and where practicable proposed new signs will be sited in areas of cutting and adjoining woodland to screen them from the surrounding landscape. Where practicable, the use of lattice supports to the signage will be avoided.	To reduce impacts on both landscape and visual receptors (including impacts on The Special Qualities of the River Tay (Dunkeld) National Scenic Area and Murthly Castle GDL).	Consultation with NatureScot	None required
P02-LV13	Throughout proposed scheme	Pre-Construction Construction	Main Contractor Advance Works Contractor	Retention of existing trees and vegetation wherever possible and incorporation with new planting proposals.	To retain existing trees and vegetation wherever possible. To minimise impacts on The Special Qualities of the River Tay (Dunkeld) National Scenic Area.	Consultation with NatureScot	None required
P02-LV14	Throughout proposed scheme	Construction	Main Contractor	Planting to replace trees lost during construction, particularly in areas designated as ancient woodland.	To replace trees lost during construction and mitigate impacts on landscape character. To mitigate impacts on visual receptors.	Consultation with NatureScot	Planting will 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

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/ Objective	Specific Consultation or Approval Required	Monitoring Measure
					To reduce impacts on The Special Qualities of the River Tay (Dunkeld) National Scenic Area.		reduction by summer 15 years after opening.
P02-LV15	Throughout proposed scheme	Construction	Main Contractor	Enhancement of biodiversity through use of native species, providing new wildlife habitats and complementing existing adjacent habitats. Planting proposals have been developed in consultation with ecology specialists. Refer to Chapter 12 (Biodiversity). In addition to following the general objective of enhancing biodiversity through the landscape mitigation, more detailed habitat creation proposals are provided in Chapter 12 (Biodiversity).	To provide new wildlife habitats, connectivity with existing woodland and complement existing adjacent habitats.	Consultation with NatureScot	Refer to P02-LV14
P02-LV16	Throughout proposed scheme	Construction	Main Contractor	Planting of woodland at junctions and bridges to help assimilate these elements into the surrounding landscape.	To help assimilate these elements into the surrounding landscape. To reduce impacts on The Special Qualities of the River Tay (Dunkeld) National Scenic Area.	Consultation with NatureScot	Refer to P02-LV14
P02-LV17	Throughout proposed scheme	Construction	Main Contractor	Planting and, where space is limited, woven wattle fencing with native climbing plants to provide screening to reduce visual impacts of the road, structures and vehicle headlights.	To provide visual screening and to reduce impacts on The Special Qualities of the River Tay (Dunkeld) National Scenic Area.	Consultation with NatureScot	Refer to P02-LV14
P02-LV18	Throughout proposed scheme	Construction	Main Contractor	Use of severed field corners and landlocked areas for new planting as appropriate.	To replace trees lost during construction, and to improve landscape integration.	Consultation with NatureScot	Refer to P02-LV14

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/ Objective	Specific Consultation or Approval Required	Monitoring Measure
P02-LV19	Throughout proposed scheme	Construction	Main Contractor	Proposed planting mixes will be based on native species, proven by established presence within the local area and adapted to local conditions. The planting will be monitored for a minimum of five years after construction with annual replacement of any failed planting with stock of a suitable age to achieve full establishment and the required level of mitigation/impact reduction by summer 15 years after opening. National Vegetation Classification (NVC), which is used to describe and categorise the vegetation covering land in Great Britain, will inform the selection of plant species. The following NVC woodland types have been identified as being appropriate for the proposed scheme: ▪ W4 birch woodland with purple moor-grass; ▪ W6 alder woodland with common nettle; ▪ W7 alder – ash woodland with yellow pimpernel; ▪ W8 lowland mixed broadleaved woodland with dog's mercury; ▪ W9 upland mixed broadleaved woodland with dog's mercury; ▪ W11 upland oak – birch woodland with bluebell/wild hyacinth; ▪ W17 upland oak – birch woodland with blaeberry; and ▪ W18 Scots pine woodland with heather. Localised variations of these communities, and appropriate sub - communities, will be required to fit with specific site conditions. Appropriate understorey and ground-cover planting will be included with the woodland. Young stock is generally easier to establish and will therefore be predominant in mixes, with a smaller proportion of woodland mixes (typically 5-10%) comprising feathered trees. An increased percentage of feathered trees will be used for initial effect in specific locations, for example close to visual receptors where early screening is required and at locations where there is a need to help integrate structures into the landscape. Planting will also assist integration with the local landscape character by using species mixes and planting patterns typical of the local landscape. This will also enhance the experience of travelling along the proposed scheme by creating views of a variety of woodland types. Details of the typical planting structure are shown on Figure 10.8. This takes account of aspects such as natural woodland characteristics typical in the locality, designed landscape features and other requirements such as avoiding creation of tree canopies close to the road. Tailored mixes of woodland with commitment to long term maintenance will be required to enable the overarching vision for any woodland proposed as part of the mitigation of effects on the NSA Special Landscape Qualities to be realised more effectively in the short to medium term. A commitment to consult with NatureScot on the contract documents, including planting design, will help to achieve this. More specific details for each type of planting are specified below. In total, it is estimated that approximately 42.78ha of woodland (of which 29.02ha is verified AWI woodland) will be lost during construction of the proposed scheme. 51.18ha of new woodland planting is proposed (of which 34.58ha will be for AWI woodland compensation).	To assist integration with the local landscape character. To reduce impacts on The Special Qualities of the River Tay (Dunkeld) National Scenic Area by using species mixes and planting patterns identified within the NSA.	Consultation with NatureScot and Historic Environment Scotland (for works within Murthly Castle GDL)	Refer to P02-LV14

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/ Objective	Specific Consultation or Approval Required	Monitoring Measure
				Broadleaved Woodland Planting Proposed broadleaved woodland planting will comprise of a mix of sizes of plants such as feathered trees, whips and transplants to create a multi-layered woodland that will be dominated by native broadleaved trees, with oak/ash as the principal climax community. This reflects surrounding broadleaved woodlands. Broadleaved woodland planting proposals are derived from canopy compositions of NVC dry-land woodlands. These woodlands are generally classified based on the acidity of the soil, with oak/birch woodland on acidic and mesotrophic soils (neither very acidic nor very alkaline) and mixed broadleaved woodland on more base-rich (calcium-rich) and free-draining soils. The NVC classification for these types of woodland is often derived from differences in the ground and shrub layer rather than the canopy composition, therefore the planting proposals are designed to develop into broad types of broadleaved woodland, rather than distinct NVC communities. A typical species mix to be used for broadleaved woodland would include pedunculate oak (20%) and silver birch (15%) with smaller proportions of alder, wych elm, rowan, aspen, crab apple, holly, elder, wild cherry and guelder-rose. *Mixed Woodland Planting* Proposed Mixed Woodland planting for visual screening purposes, will comprise plants which range in size from feathered trees to whips and transplants. This will aim to create multi-layered woodland with a balanced mix of native deciduous and coniferous trees, including understorey. The balance between deciduous and evergreen species will be varied to achieve year-round screening and reflect existing woodland local to the various sections of the proposed scheme. The coniferous species within the mixed woodland will be predominantly Scots pine, with smaller proportions of yew and juniper, reflecting surrounding woodlands and providing a strong evergreen framework and a habitat for red squirrels. A typical species mix to be used for Mixed Woodland will include Scots pine, downy birch and pedunculate oak with smaller proportions of sessile oak, alder, wych elm, holly, aspen, silver birch, grey willow, hazel, blackthorn, bird cherry and rowan. *Riparian Woodland Planting* Riparian Woodland is to be planted adjacent to watercourses and proposed SuDS features and in other areas along flood plains. It will comprise a mix of sizes of plants such as feathered trees, whips and transplants using wetland species such as birch, willow and alder. A typical species mix to be used for Riparian Woodland would include downy birch, aspen and hazel with smaller proportions of alder, white willow, eared willow, goat willow and grey willow. *Scrub Planting* Proposed scrub planting will comprise native species of local provenance creating a dense medium height canopy. This mix will be used in areas where a lower height plant cover is more appropriate than the taller woodland mixes.			

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/ Objective	Specific Consultation or Approval Required	Monitoring Measure
				A typical species mix to be used for scrub will include hawthorn, blackthorn, juniper and wild cherry with smaller proportions of blaeberry, heather, bell heather, guelder-rose, dog-rose and elder. *Individual Standard Trees* Groups of individual trees and tree lines will comprise appropriately sized trees in informal or formal groupings to reflect the character of existing landscapes, mitigate for lost landscape features, maintain habitat connectivity and provide screening or to filter views of the proposed scheme. Typical species to be used will include Scots pine, silver birch, rowan, wych elm and pedunculate oak. *Planting within Murthly Castle GDL* Proposed trees and shrubs to be planted within/ adjoining Murthly Castle GDL may include non-native species to integrate with the character of the historic landscape and will be developed in consultation with HES and NatureScot.			
P02-LV20	Throughout proposed scheme	Construction	Main Contractor	<u>Grass and Wildflower Seeding</u> For all disturbed soft areas and road verges, different seed mixes will be used, dependent on location and use, as suggested below: ▪ Species-rich Visibility Splay Mix: suited 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 will require minimal maintenance. Example wildflower species of local provenance, which will provide an added benefit of a nectar rich plant source, 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. ▪ Species Rich Central Reserve Herbaceous Mix: 100% wildflower mix tolerant of traffic and salt spray comprising low-growing native species such as common bird's-foot trefoil, wild thyme, common rock-rose, selfheal, and kidney vetch to be sown within widened sections of the central reserve. ▪ 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 providing an invertebrate food or structural plant and will be selected appropriate to local conditions at detailed design stage, may include greater bird's-foot trefoil, common knapweed, devil's-bit scabious, sneezewort, meadowsweet and lesser spearwort. ▪ Woodland Species Rich Grassland Mix: a low-maintenance wildflower and grass mix suited for establishment in newly planted woodland areas to help suppress weed growth and develop diverse woodland ground flora. Example species include ransoms,	To ensure seed mixes are appropriate and suited to locations. To assist integration with the local landscape character. To reduce impacts on The Special Qualities of the River Tay (Dunkeld) National Scenic Area.	Consultation with NatureScot	Species composition of species-rich grassland areas will be monitored for a minimum of five years after construction.

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/ Objective	Specific Consultation or Approval Required	Monitoring Measure
				bluebell, germander speedwell, wood sage, common dog-violet and wood meadow grass.			
P02-LV21	Throughout proposed scheme	Construction	Main Contractor	<u>Proposed Planting relating to Road Users</u> Planting will be applied within the road corridor to enhance the experience of travelling along the proposed scheme by maintaining important open views and creating views to a variety of woodland types. The species composition of such planting will take account of aspects such as natural woodland characteristics typical in the locality and designed landscape features.	To enhance road users' experience of travelling along the proposed scheme. To reduce impacts on The Special Qualities of the River Tay (Dunkeld) National Scenic Area.	Consultation with NatureScot	Refer to P02-LV14
P02-LV22	Throughout proposed scheme	Construction	Main Contractor	<u>Lighting</u> Lighting would be required for safety reasons at the proposed new Dunkeld Junction Roundabout, the Dunkeld & Birnam Station Replacement Car Park and Pedestrian Underpass and the River Braan Bridge Underpass. The proposed scheme will avoid excessive and obtrusive lighting through the appropriate selection, location and arrangement of lighting elements to achieve the necessary safety standards of useful light, while minimising intrusiveness in the form of spillage, glare and reflection. Refer to Chapter 14 (Visual) for further details of mitigation measures necessary to reduce the landscape and visual impacts of the proposed lighting.	To reduce the landscape and visual impacts of the proposed lighting.	Consultation with NatureScot	None required
P02-LV23	Murthly Castle GDL approximate ch200-450	Construction	Main Contractor	<u>Murthly Estate Western Drive structural reinforcement</u> Realignment of the Murthly Estate Western Drive and planting of new avenue of heavy standard trees within a widened verge to provide a continuation of the remaining section of historic cedar avenue, reinforce the historic landscape pattern and strengthen the landscape structure of the Murthly Estate.	To reduce the landscape impacts on Murthly Castle GDL.	Consultation with HES and NatureScot.	Refer to P02-LV14
P02-LV24	Birnam Junction approximate ch1700-2350	Construction	Main Contractor	<u>Birnam Junction Landscape and Bridge Design</u> Design of the new B867 bridge under the A9 and associated exposed rock cuttings to form a welcoming and dramatic 'gateway' to Birnam. The bridge will be designed with quarter-height abutments and with raking piers to minimise the depth of the bridge beams. The slopes beneath the bridge will comprise natural rock outcrops where possible, supplemented as necessary with naturalistic constructed rock clad slopes. Areas of native mixed woodland will be planted around the new junction to help integrate the roads and bridge into the surrounding landscape. The SuDS wetland south of the new junction will be designed (in accordance with Mitigation Item P02-LV9) to appear as a visually attractive natural waterbody with the surrounding earthwork slopes graded out to integrate with the surrounding landform. Views to the SuDS from the A9, junction slip and link roads, realigned B897 and active travel routes will be framed by areas of mixed, broadleaved and riparian woodland planting.	To reduce impacts on The Special Qualities of the River Tay (Dunkeld) National Scenic Area and Murthly Castle GDL and enhance arrival/gateway to the Highlands/ Birnam and Dunkeld for road	Consultation with NatureScot and HES.	Refer to P02-LV14

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/ Objective	Specific Consultation or Approval Required	Monitoring Measure
					and active travel route users.		
P02-LV25	Dunkeld & Birnam Station and environs, approximate ch3230-3450	Contract preparation Construction	Main Contractor	<u>Architectural and Townscape Design of new Dunkeld & Birnam Station Access, Dunkeld & Birnam Station Replacement Car Park and associated Structures</u> *Contract Documents* The main contract documents will include general arrangement drawings and specifications for all architectural elements and structures associated with the station, underpass and carpark. *Detailed Architectural Design* A conservation architect (as a minimum Accredited by the Royal Incorporation of Architects in Scotland as competent in working in the historic built environment) will be employed to contribute to and inform the detailed architectural design of all alterations and new built elements associated with the category A-listed Dunkeld & Birnam Station including built elements adjoining the station carpark, the station underpass, and lift shaft buildings on the station platforms. *Dunkeld & Birnam Station Replacement Car Park* High quality paving materials and street furniture to complement Birnam Conservation Area will be used in the replacement car park. The areas beneath the entrance canopy and the adjacent footway will be paved with high quality paving material to be agreed with consultees. Lighting will be designed to complement the street lighting within Birnam Conservation Area, while minimising intrusiveness in the form of spillage, glare and reflection. The replacement car park will be designed to incorporate tree planting areas where practicable and sloped tree and shrub planting areas will extend from the carpark footway to meet the eastern and western sections of the retaining wall. The replacement car park will incorporate a totem, circa 5m high incorporating a British Rail logo, visible from the northern end of Station Road. *Retaining Walls and Station Underpass Entrance Canopy* The retaining wall on the north side of the replacement car park will be kept to the minimum practicable height and finished to match the retaining wall at the A9 verge (detailed below). A retaining wall with a parapet extending 2m above A9 verge level clad in natural whinstone rubble with a precast concrete cope with curved profile and lime mortar pointing, all in keeping with the masonry of Dunkeld & Birnam Station. The wall and parapet will be constructed between approximate mainline ch3280 and ch3380. A dressed ashlar band aligned with the top of the cantilevered canopy will be incorporated into the face of the	To ensure delivery of a specific design solution agreed with stakeholders. To reduce townscape and visual impacts of the proposed scheme and integrate it into the Birnam Conservation Area. To strengthen the physical connection between Dunkeld & Birnam Station and Birnam. To screen traffic on the A9 from Birnam, whilst allowing the station building to be from along Station Road. To strengthen the visual connection between Dunkeld & Birnam Station and Birnam. To reduce the visual impact of traffic on the A9	Consultation with HES, PKC, Network Rail, rail operators, NatureScot and community group(s). Samples/ technical details of finishing materials to be submitted to HES and PKC for approval.	Refer to P02-LV14

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/ Objective	Specific Consultation or Approval Required	Monitoring Measure
				retaining wall to the west of the station canopy with the words DUNKELD AND BIRNAM carved in letters in a font/style to Network Rail's approval. The area outside the entrance to the new underpass and either side of the underpass will include a mono pitched canopy cantilevered approximately 3.4m from the face of the retaining wall and with a minimum soffit height of 2.7m, extending west to be clearly visible from Station Road an Murthly Terrace, and east to approximate mainline ch3340.The pitch angle of the canopy will be the same as that of the existing station's platform canopy, except where the front edge of the canopy will be curved up to form a shallow arch 'eyebrow' at the underpass entrance, to match with the vaulted form of the underpass. The canopy will be supported by stainless steel columns and finished in standing seam zinc and downpipes will be concealed internally above the roof soffit and directed vertically to the below ground drainage within a 'chased' section of the retaining wall stonework. *Pedestrian Underpass* A generous and welcoming underpass will provide access from the replacement station car park to the station platforms. The underpass to platform 1 will have a with a minimum width of 5m and height of 3m and the continuation to platform 2 a minimum width of 2.5m and height of 2.5m. The underpass will contain no blind corners. The ceiling of the underpass will be vaulted/curved, light in colour and with high quality concealed LED uplighting to wash the ceiling with light and reduce the sense of enclosure. The underpass walls will be generally clad in a large format through-coloured sandstone effect porcelain tiles with a series of large integrated interpretive/artistic elements, (appropriate to the Dunkeld/Birnam area) to enhance the experience of walking through the underpass. *Lift/Stair Cores* The lift/stair core to Platform 1 will have a minimum plan dimension of approximately 7.5m x 9.5m and will be sited a minimum of 4m from the platform edge. The above platform enclosure housing the lift/ stair core will have a roof pitched at approximately 40 degrees with scale sufficient to enclose the lift overrun. The massing of the pitched roof will reflect the geometry and scale of the existing station's gabled elements. The above platform enclosure housing the lift/stair core to Platform 2 will utilise a similar basic layout and lift as for Platform 1, but with an east-west orientated roof with a split pitch, facilitating a clerestory window to the south. The minimum plan dimension of the lift/stair core will be approximately 7.5m x 9.5m orientated to minimise intrusion into the steep bank and woodland south of the station. The massing of the enclosure will reflect the geometry and scale of the existing station and signal box. The design of both lift/stair core buildings will maximise daylight entering the underpass below, whilst seeking to minimise the overall area of glazing. Aesthetically, the massing, materials selections and forms must directly reference the existing A Listed Station building, canopy and signal box.	and provide a transition between the eastern and western ends of the retaining wall and the A9 roadside planting. To reduce the visual and townscape impact of the new station carpark and vehicles. To assist in the maintaining the future occupation/use and hence the long term preservation of Dunkeld & Birnam Station Category A Listed Building.		

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/ Objective	Specific Consultation or Approval Required	Monitoring Measure
				The envelope for both buildings will be formed principally in natural whinstone rubble. With further areas in lightweight panels, exposed steelwork and glazed elements where required. The roof finish will be zinc standing seam, incorporating a concealed gutters to the perimeter. *Station Vehicular Access and Parking* Provision of vehicular access and parking spaces at Birnam Glen close to the Station building. *Shrub Planting* Native shrub planting to replace the existing shrub planting that would be removed as a result of the proposed temporary construction haul route associated with the construction of the Pedestrian Underpass.			
P02-LV26	Dunkeld Junction Roundabout	Construction	Main Contractor	<u>Dunkeld Junction Gateway to the Highlands Feature Landscape</u> Gateway to the Highlands landscape design incorporating land art and native tree and ground cover planting within Dunkeld Junction Roundabout, designed to frame views north towards the hills to the north.	To enhance arrival at Dunkeld and Birnam/gateway to the Highlands for road users.	Consultation with TS, NatureScot, PKC	Refer to P02-LV14
P02-LV27	River Braan Flood Relief Culverts ch4450-4580	Construction	Main Contractor	<u>Design of River Braan Flood Relief Culverts</u> Riparian woodland, species rich grassland, scattered scrub, individual trees and hedgerow west of River Braan crossing to include planting to screen flood culverts where possible.	To screen views of the flood culverts and reduce impacts on visual amenity.	Consultation with NatureScot	Refer to P02-LV14

Table 22.5: Biodiversity

Mitigation	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/ Objective	Specific Consultation or Approval Required	Monitoring Measure
Standard Mitigation							
SMC-E1	Throughout proposed scheme	Pre-Construction	Advance works Contractor Main Contractor	Pre-construction surveys will be undertaken to verify and, where required, update the baseline ecological conditions set out in the EIAR. The scope of the pre-construction surveys will be confirmed with NatureScot and Transport Scotland prior to them being undertaken.	To update the baseline ecological conditions set out in the EIAR.	NatureScot and Transport Scotland	n/a
SMC-E2	Throughout proposed scheme	Pre-Construction	Advance works Contractor Main Contractor	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 EIAR and HRA. 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.	NatureScot, as required	An Employer's ecologist will check that the Contractor's ECoW is suitably qualified to undertake their role and will audit the contractual obligations with regards to the ecological safeguarding and ecological mitigation requirements. The Ecological Management Plan (see SMC-S1) will be refined and updated during the construction stage and finalised at the end of construction to support future management and operation
SMC-E3	At watercourses throughout proposed scheme	Construction	Advance works Contractor Main Contractor	Noise and vibration will be minimised by working within a dry area or working back from the riverbank where possible, to avoid disturbance, hearing damage or behaviour changes to fish. In addition, soft-start techniques will be applied to piling work procedures to enable mobile sensitive receptors to evacuate the area.	To protect fish species from noise, vibration and light spill.	None	The ECoW will monitor compliance throughout works.
SMC-E4	At watercourses throughout proposed scheme	Construction	Advance works Contractor Main Contractor	Where areas are required to be temporarily dewatered to permit construction activities, fish will be removed by experienced and qualified personnel by means of electrofishing and relocated prior to dewatering.	To protect fish species during de-watering of watercourse sections and in-stream works.	CAR Licence approved by SEPA	The ECoW will monitor compliance throughout works.

Mitigation	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/ Objective	Specific Consultation or Approval Required	Monitoring Measure
SMC-E5	At watercourses throughout proposed scheme	Construction	Advance works Contractor Main Contractor	Water flow/passage will be maintained during any construction works within the watercourses to permit the movement of all fish species past areas of dewatering and/changing hydrology during any in-stream construction works. Suitable temporary channels may be implemented to maintain habitat connectivity. 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	The ECoW will monitor compliance throughout works.
SMC-E6	Throughout proposed scheme	Pre-Construction Construction	Advance works Contractor Main Contractor	The Contractor will obtain and comply with the requirements of any protected species derogation licences in respect of works that have the potential to breach all applicable conservation legislation. Licensing may be for UK and/or European protected species.	To comply with conservation legislation.	NatureScot, as required	Licence returns will be submitted to NatureScot in line with conditions set out in the licence and detailed in CEMP.
SMC-E7	Throughout proposed scheme	Pre-Construction Construction	Advance works Contractor Main Contractor	Tree felling and vegetation clearance to be minimised as far as practicable and undertaken outside the core bird nesting season (1 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	The ECoW will monitor active nests to establish when they are no longer active. The ECoW will advise on-site or task specific mitigation to avoid (where legally required) or minimise disturbance to breeding birds.
SMC-E8	Throughout proposed scheme	Pre-Construction Construction	Advance works Contractor Main Contractor	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	The ECoW will advise on-site or task specific mitigation to avoid (where legally required) or minimise disturbance to protected species.
SMC-E9	Throughout proposed scheme	Construction	Advance works Contractor Main Contractor	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	The ECoW will monitor compliance throughout works.

Mitigation	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/ Objective	Specific Consultation or Approval Required	Monitoring Measure
SMC-E10	Throughout proposed scheme	Construction	Advance works Contractor Main Contractor	A construction lighting plan and method statement will be developed by the Contractor. The plan, which will form part of the CEMP (Mitigation Item SMC-S1), will be referred to in the SMPs. The SMPs will detail the specific mitigation requirements relating to protected species and habitats from the plan, which will take into account guidance on lighting (e.g. Institution of Lighting Professionals (2018, 2020), Bat Conservation Trust and Institution of Lighting Professionals (2023) 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 NatureScot.	To protect sensitive mammal habitats from illumination.	NatureScot, as required	The ECoW will monitor compliance throughout works.
SMC-E11	Throughout proposed scheme	Construction	Advance works Contractor Main Contractor	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 root systems 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	Via supervision requirements outlined in Contract Documents
SMC-E12	Throughout proposed scheme	Construction Operation	Main Contractor Road Operating Company	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 are to be retained.	Transport Scotland and other relevant stakeholders.	Via supervision requirements outlined in Contract Documents. Planting/ regrowth will be monitored to ensure success as specified in the EMP.
SMC-E13	Throughout proposed scheme	Construction	Advance works Contractor Main Contractor	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 sensitively 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	The ECoW will monitor compliance throughout works.
SMC-E14	Throughout proposed scheme	Construction	Advance works Contractor Main Contractor	Temporary mammal-resistant fencing will be provided around construction compounds where protected mammal species are known to be present; fencing will follow a specification agreed through consultation with Transport Scotland.	To avoid mammals becoming entrapped in and around compound areas during construction.	Transport Scotland	The ECoW will monitor compliance throughout works.

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SMC-E15	Throughout proposed scheme	Construction	Advance works Contractor Main Contractor	The Contractor will describe within the CEMP (Mitigation Item SMC-S1) the biosecurity strategy to be implemented for the appropriate treatment of 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	Ongoing monitoring of compliance throughout works.
Specific Mitigation							
P02-E16	River Tay and watercourses throughout the proposed scheme	Construction Operation	Main Contractor Road Operating Company	Mitigation for temporary loss of habitat (aquatic and terrestrial) within the SAC will be delivered through adherence of **Mitigation Items SMC-W1, SMC-W3**, **SMC-W4 and SMC-LV1**, and specifically the following measures: ▪ terrestrial SAC areas temporarily required for construction will be returned to their former habitat type using species appropriate to the local environment and of local provenance; ▪ seeding and planting of bare ground areas within the SAC 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 into place should vegetation establishment be delayed, preventing erosion of terrestrial SAC habitats and sediment entering nearby watercourses; and ▪ natural bed material within river will be retained and replaced on completion of construction works.	To mitigate temporary loss of terrestrial River Tay SAC habitat, and to mitigate alteration of riverbed habitat in the River Tay SAC and other watercourses within the proposed scheme.	NatureScot, as required.	The ECoW will monitor compliance throughout works.
P02-E17	Refer to Figure 10.6 for locations and extent of planting.	Construction	Main Contractor	The areas around SuDS, and within verges/central reserves where practicable, will be seeded with a species-rich mix of native grasses and wildflowers, as appropriate, to provide additional biodiversity benefits. The margins of SuDS ponds/basins and swales will be planted with native emergent and marginal plant species, and the species-rich grassland mixes will consist of native, non-invasive grasses and wildflower species, to enhance biodiversity, for example by planting species that are favoured by invertebrates as food.	To mitigate for habitat loss and to promote additional biodiversity benefits.	None	The ECoW will monitor compliance throughout works.
P02-E18	Refer to Figure 10.6 for locations and extent of planting.	Pre-Construction Construction Operation	Designer Advance works Contractor Main Contractor Road Operating Company	Sites for compensatory woodland planting have been identified to maximise the biodiversity benefit of the planting, maintain connectivity or reconnect existing AWI sites, and to maximise opportunities to maintain functionality of local ancient woodland communities throughout the route corridor. These sites include the 'off-site' mitigation areas at Muir of Thorn and Gelly Wood.	To compensate for ancient woodland loss.	None	The ECoW will monitor compliance throughout works. Planting/ regrowth will be monitored to ensure success as specified in the EMP.
P02-E19	For locations see Appendix A12.4 (Confidential Biodiversity Resources)	Pre-Construction Construction	Advance works Contractor Main Contractor	No works will be undertaken without a licence in place from NatureScot if they will destroy a roost or cause temporary or permanent exclusion of bats from a roost, or if there is likely to be disturbance which could cause a bat to abandon a roost either temporarily or permanently. A destruction and/or a disturbance licence for works affecting confirmed roosts will be required prior to commencement.	To mitigate for disturbance to/loss of bat roosts.	NatureScot, as required.	The ECoW will monitor compliance throughout works. Licence returns will be submitted to NatureScot in line with conditions set

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							out in the licence and detailed in CEMP.
P02-E20	For locations see Appendix A12.4 (Confidential Biodiversity Resources)	Pre-Construction Construction	Advance works Contractor Main Contractor	A bat licenced ecologist will supervise any works for which a development licence for bats is required in accordance with the conditions of the development licence. All works and mitigation, including the exclusion of bats from confirmed bat roosts, will be undertaken in accordance with the development licence as agreed with NatureScot. It is anticipated such development licences will only allow exclusions to be fitted between April and October and be in place for a minimum of 14 days prior to demolition; once the 14-day period has finished, the roosts will be permanently blocked and/or destroyed.	To mitigate for disturbance to/loss of bat roosts.	NatureScot, as required.	The ECoW will monitor compliance throughout works. Licence returns will be submitted to NatureScot in line with conditions set out in the licence and detailed in CEMP.
P02-E21	For locations see Appendix A12.4 (Confidential Biodiversity Resources)	Pre-Construction Construction	Advance works Contractor Main Contractor	It is anticipated development licences for buildings, structures and trees containing confirmed bat roosts will require to follow sensitive demolition/felling methods agreed in advance with NatureScot. Where an ECoW or bat licenced ecologist determines there is a sufficient risk of bats being present, despite no roost being confirmed during surveys, sensitive demolition by hand/ felling techniques under the supervision of a bat licenced ecologist will be undertaken until such time that the bat licenced ecologist is fully satisfied that no bats remain within the building, structure or tree and all reasonable precautions have been taken to avoid harming bats.	To mitigate for disturbance to/loss of bat roosts.	NatureScot, as required.	The ECoW will monitor compliance throughout works. Licence returns will be submitted to NatureScot in line with conditions set out in the licence and detailed in CEMP.
P02-E22	Refer to Figure 10.6 for locations.	Pre-Construction Construction Operation	Designer Advance works Contractor Main Contractor Road Operating Company	The loss of suitable roosting locations in trees, buildings and structures under the proposed scheme will be mitigated through the provision of suitable alternative roosting habitat, such as bat boxes or tree veteranisation and the installation of a dedicated bat roost structure as follows: ▪ Three bat boxes, or suitable roosting features, to be installed for every PRF-M tree lost. ▪ Three bat boxes, or suitable roosting features, to be installed for every building and structure lost with bat potential. ▪ Bat boxes, or suitable roosting features, will be installed in each of five areas identified as being suitable locations for replacement roost habitat; the proportion of features installed in each of the five areas would take into account the size of the replacement roost habitat areas, along with the proximity to confirmed roosts or potential roost features being lost. ▪ A dedicated roost compensation structure (such as a timber pole with 1FS Schwegler bat boxes, or similar, mounted on it suitable for a large number of bats) will be installed in/near the woodland to the south of Inver and the River Braan. This will provide alternative roosting locations for the summer soprano pipistrelle roosts to be destroyed at BB 2.42a, BB 2.42b and BB 2.42d. This will also provide possible satellite roost opportunities for the large maternity roost at BB 2.81c. ▪ All replacement bat roost habitat will be installed prior to roosts or potential roost features in trees, buildings and structures being removed or destroyed.	To mitigate for disturbance to/loss of bat roosts.	NatureScot, as required.	The ECoW will monitor compliance throughout works.

Mitigation	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/ Objective	Specific Consultation or Approval Required	Monitoring Measure
P02-E23	For locations see Appendix A12.4 (Confidential Biodiversity Resources)	Construction	Advance works Contractor Main Contractor	Where high noise generating activity, such as piling, must take place within 100m of known maternity and hibernation roosts this must be done outside sensitive periods. For maternity roosts this would avoid the maternity season (May to August) and for hibernation roosts this would avoid the peak hibernation period (December to February). Where these sensitive periods cannot be avoided, consultation with NatureScot would be undertaken and methods agreed through licensing where required.	To mitigate for disturbance to bat roosts.	NatureScot, as required.	The ECoW will monitor compliance throughout works.
P02-E24	Throughout the proposed scheme	Construction Operation	Designer Advance works Contractor Main Contractor Road Operating Company	Retention of bat commuting routes through provision of culverts, underpasses and underbridges, and through retention of key linear woodland features, such that movement between areas of habitat is maintained.	To retain bat commuting routes and mitigate for habitat fragmentation during construction.	None	The ECoW will monitor compliance throughout works.
P02-E25	Refer to Figure 10.6 for locations.	Construction Operation	Main Contractor Road Operating Company	Culverts, underpasses and overbridges suitable for multiple species, including bats, will be provided to mitigate fragmentation of habitat and to increase the permeability of the proposed scheme.	To mitigate fragmentation of habitat for bats and other protected species and to increase the permeability of the proposed scheme.	None	The ECoW will monitor compliance throughout works. Monitoring during operation will be undertaken as specified in the EMP.
P02-E26	Refer to Figure 10.6 for locations and extent of planting.	Construction Operation	Main Contractor Road Operating Company	Additional planting around SuDS ponds will be provided to increase habitat suitability for foraging bats. Planting will include native species mixes suitable for the surrounding landscape. There will also be additional planting in areas throughout the proposed scheme to mitigate for the loss of commuting and foraging habitat as a result of the vegetation removal required for construction of the proposed scheme.	To mitigate for the loss of bats commuting and foraging habitat	None	The ECoW will monitor compliance throughout works. Planting/ regrowth will be monitored to ensure success as specified in the EMP.
P02-E27	For locations see Appendix A12.4 (Confidential Biodiversity Resources)	Pre-Construction Construction Operation	Advance works Contractor Main Contractor Road Operating Company	▪ Works which will cause damage or disturbance to badger setts (e.g., very heavy or noisy machinery working within 30m of sett entrances) or disturbance from other works (such as piling out to 100m) will not be undertaken without a development licence from NatureScot. Disturbance distances vary by the type of activity and local setting and would be confirmed by the ECoW. Where there is potential for disturbance, a precautionary approach will be taken and a licence obtained.	To mitigate for disturbance to/destruction of badger setts and fragmentation of badger habitat.	NatureScot, as required.	The ECoW will monitor compliance throughout works. If required ecologists (acting on behalf of Transport Scotland) will monitor use of any replacement setts during operation as specified in SMP and licence conditions. Licence returns will be submitted to

Mitigation	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/ Objective	Specific Consultation or Approval Required	Monitoring Measure
				▪ No main setts fall under the footprint of the proposed scheme based on survey data collected to inform the assessment (see Appendix A12.4: Confidential Biodiversity Resources). However, if, following pre-construction surveys, a main sett or other significant sett likely to be used for breeding is found under the footprint of the proposed scheme, or which due to the nature of works will be at risk from partial destruction or significant disturbance, a licence for destruction or temporary closure will require to be obtained. Detailed bait marking surveys would be undertaken where necessary to inform the territory of the main/breeding sett. Where necessary, and when agreed through consultation with NatureScot, an artificial replacement sett would be installed at least six months prior to closure of a main sett. Closure of any badger sett would only be undertaken following a minimum of three weeks of monitoring to determine use by badgers. Where setts are found to be in use, a licence will be obtained from NatureScot. Closure would only be undertaken between late-June to late-November inclusive. ▪ Light will be angled away from all active setts and areas of significant badger activity and directional and/or cowled lighting will be used to prevent light-spill. A 30m protection zone will be maintained around all active setts, where practicable. ▪ Dry mammal underpasses, culverts (with ledges if required) and overbridges, which provide suitable passage for mammals, including badger, will be provided to increase permeability of the proposed scheme to badgers. Details and specifications will be provided in a SMP for badger. The SMP will detail post-construction maintenance, along with monitoring requirements, to determine the structures' effectiveness. ▪ Mammal resistant fencing designed to discourage mammal movement (particularly of otter, beaver and badger) onto roads will be provided and will be positioned in such a way that mammals are directed to safe crossing points. Where badger are considered likely to use structures, a minimum of 100m mammal resistant fencing will be installed either side of underpasses, culverts and overbridges on both north and south bound sides of the road to direct badger towards structures (see Mitigation Item P02-E39). ▪ Any areas identified as badger habitat lost as a result of the proposed scheme will be replaced through the landscape and ecological mitigation planting as shown on Figure 10.6.			NatureScot, as required.
P02-E28	Throughout the proposed scheme	Construction	Advance works Contractor Main Contractor	Works which disturb any bird listed on Schedule 1 whilst it is building or occupying a nest, or any works occurring near a nest containing eggs or young, will not be undertaken. Appropriate disturbance buffers, following best practice guidance, will be adhered to (Goodship and Furness, 2022). See also Mitigation Item P02-E31 – P02-E33.	To avoid disturbance to Schedule 1 birds.	NatureScot, as required	The ECoW will monitor compliance throughout works.
P02-E29	Throughout the proposed scheme	Construction	Advance works Contractor Main Contractor	Tree felling and vegetation clearance will be minimised and undertaken outside of the core bird breeding season (March to August inclusive) (**Mitigation Item SMC-E7**). Tree felling in key crossbill habitat should be avoided between January and April inclusive also. Where vegetation in the core breeding season and/or crossbill breeding season cannot be avoided, a suitably qualified ecologist will complete a nesting bird check no more than 24-48 hours prior to works. If any nesting birds were identified during the survey then works would cease	To avoid disturbance to breeding birds and destruction of nests.	None	The ECoW will monitor active nests to establish when they are no longer active. The ECoW will advise on-site or task

Mitigation	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/ Objective	Specific Consultation or Approval Required	Monitoring Measure
				within an exclusion zone around the nest to avoid disturbance, as specified by the ECoW on site, until chicks have fledged.			specific mitigation to avoid (where legally required) or minimise disturbance to breeding birds.
P02-E30	Throughout the proposed scheme	Construction	Advance works Contractor Main Contractor	An ECoW will monitor nesting bird activity before and during the works and advise of any further control measures which must be adopted by the Main Contractor.	To avoid disturbance to breeding birds and destruction of nests.	None	The ECoW will monitor active nests to establish when they are no longer active. The ECoW will advise on-site or task specific mitigation to avoid (where legally required) or minimise disturbance to breeding birds.
P02-E31	Throughout the proposed scheme	Construction	Advance works Contractor Main Contractor	The suggested buffer distance for breeding birds (Goodship and Furness, 2022) should be adopted. Advice from a suitably qualified ornithologist should be obtained and consultation with NatureScot may be required.	To avoid disturbance to Schedule 1 birds.	NatureScot, as required	The ECoW will monitor active nests to establish when they are no longer active. The ECoW will advise on-site or task specific mitigation to avoid (where legally required) or minimise disturbance to breeding birds.
P02-E32	Throughout the proposed scheme	Construction	Advance works Contractor Main Contractor	The suggested buffer for crossbill species during breeding is 50-200m (Goodship and Furness, 2022). High disturbance works (such as pile driving) within 200m of crossbill key habitat should be avoided in the breeding season (January to April inclusive; however, it should be noted breeding has been recorded throughout the year for this species). If works are to occur within 200m of key crossbill habitat (coniferous woodland) surveys for nesting crossbill would be undertaken and appropriate exclusion buffers put in place.	To avoid disturbance to Schedule 1 birds.	NatureScot, as required	The ECoW will monitor active nests to establish when they are no longer active. The ECoW will advise on-site or task specific mitigation to avoid (where legally required) or minimise disturbance to breeding birds.
P02-E33	Throughout the proposed scheme	Construction	Advance works Contractor Main Contractor	The suggested buffer for breeding kingfisher is 100m (Goodship and Furness, 2022). works within 100m of a kingfisher nest should be avoided in the breeding season. Furthermore, works along kingfisher commuting and foraging routes should be minimised during the breeding season to reduce the risk of nest abandonment by breeding adults.	To avoid disturbance to Schedule 1 birds.	NatureScot, as required	The ECoW will monitor active nests to establish when they are no longer

Mitigation	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/ Objective	Specific Consultation or Approval Required	Monitoring Measure
							active. The ECoW will advise on-site or task specific mitigation to avoid (where legally required) or minimise disturbance to breeding birds.
P02-E34	Throughout the proposed scheme.	Construction Operation	Main Contractor Road Operating Company	Compensatory planting will take place to replace lost habitat suitable for a range of Schedule 1 and other bird species. All planting and landscape design must also meet the requirements of DMRB and will comply with **Mitigation Item SMC-E9**.	To mitigate for loss of bird habitat.	None	The ECoW will monitor compliance throughout works. Planting/ regrowth will be monitored to ensure success as specified in the EMP.
P02-E35	Watercourses throughout proposed scheme	Construction	Advance works Contractor Main Contractor	Construction compounds, storage areas, temporary access tracks, and other temporary land-take required for construction, will be sited at least 10m from watercourse banks (except for those required for culvert, bridge and outfall works) (**Mitigation Item SMC-W2**).	To mitigate for pollution to watercourses and disturbance to aquatic and riparian species.	None	The ECoW will monitor compliance throughout works.
P02-E36	Watercourses throughout proposed scheme	Construction	Main Contractor	Provision will be made to ensure that watercourses are accessible to otters and beavers during construction. This may include where practicable: ensuring one bank of a watercourse remains open and accessible to otter and beaver at all times; culverts and bridges will remain open to otter and beaver movement at night; and one side of a double-celled culvert will remain open at all times.	To mitigate for otter and beaver habitat fragmentation.	None	The ECoW will monitor compliance throughout works.
P02-E37	Watercourses throughout proposed scheme	Construction	Main Contractor	If piling is required to be undertaken within 100m (or 200m if breeding) of an otter holt or couch, or within 100m of a beaver lodge, NatureScot will be consulted and the need for a licence agreed. Mitigation will be detailed within a method statement or the licence conditions and will include soft-starts of machinery to encourage otter/beaver to evacuate the area prior to commencement of works that day and the presence of an ECoW. **Mitigation Item SMC-E6** will need to be adhered to where relevant.	To mitigate for disturbance to otter and beaver.	None	The ECoW will monitor compliance throughout works.
P02-E38	Watercourses throughout proposed scheme	Construction	Advance works Contractor Main Contractor	Working during hours of darkness will be avoided in sensitive areas, where possible, such as within 30m of otter and beaver resting sites. If this cannot be avoided, any lighting will be angled away from all otter and beaver resting sites and areas of activity; directional and/or cowled lighting will be used to prevent light-spill. Where directional lighting cannot be used and light spill cannot be controlled during construction, temporary screening will be provided to protect otter and beaver resting sites and riparian habitat through maintaining areas of darkness. In otter sensitive areas, dark areas along at least one bank of the watercourse will be maintained whenever possible.	To mitigate for disturbance to otter and beaver.	None	The ECoW will monitor compliance throughout works.

Mitigation	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/ Objective	Specific Consultation or Approval Required	Monitoring Measure
P02-E39	Refer to Figure 10.6 for locations and extent of fencing.	Operation	Advance works Contractor Main Contractor	Mammal resistant fencing designed to discourage mammal movement (particularly otter, beaver and badger) onto roads will be provided and will be positioned in such a way that mammals will be directed to safe crossing points.	To encourage safe crossing of mammals and reduce mortality risk from roads.	None	The ECoW will monitor compliance throughout works.
P02-E40	Refer to Figure 10.6 for locations.	Operation	Advance works Contractor Main Contractor Road Operating Company	Fragmentation of otter and beaver habitat due to the increased road footprint will be mitigated during operation by improving existing crossing points or creating new crossing points, including culverts with mammal ledges and dry mammal underpasses.	To mitigate for otter and beaver habitat fragmentation.	None	The ECoW will monitor compliance throughout works. Monitoring during operation will be undertaken as specified in the EMP.
P02-E41	Refer to Figure 10.6 for locations and extent of planting.	Operation	Advance works Contractor Main Contractor	Landscape planting and woodland retention has been designed to maintain and encourage otter and beaver use of suitable crossing points, maintaining habitat connectivity.	To mitigate for otter and beaver habitat fragmentation.	None	The ECoW will monitor compliance throughout works. Planting/ regrowth will be monitored to ensure success as specified in the EMP.
P02-E42	Watercourses throughout proposed scheme	Pre-construction Construction Operation	Advance works Contractor Main Contractor Road Operating Company	A replacement artificial holt will be provided for any active holt destroyed to accommodate the construction of the proposed scheme, following consultation with NatureScot. Additionally, if significant disturbance of any holt is anticipated, a temporary closure may be considered, in consultation with NatureScot.	To mitigate for loss/significant disturbance of otter resting sites.	NatureScot, as required.	The ECoW will monitor compliance throughout works. If required ecologists (acting on behalf of Transport Scotland) will monitor use of any replacement holts during operation as specified in SMP and licence conditions. Licence returns will be submitted to NatureScot, as required.
P02-E43	Throughout proposed scheme	Construction Operation	Advance works Contractor Main Contractor	Operational lighting will be designed to be minimised at crossing points.	To reduce disturbance to mammals, including otter.	None	The ECoW will monitor compliance throughout works.

Mitigation	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/ Objective	Specific Consultation or Approval Required	Monitoring Measure
P02-E44	Woodland throughout the proposed scheme	Pre-construction Construction	Advance works Contractor Main Contractor	Pre-works checks (see Mitigation Item SMC-E1) will take place at least three weeks prior to construction and repeated again at least two days prior to any vegetation clearance taking place to identify any active pine marten dens or red squirrel dreys.	To mitigate against direct mortality of pine marten and red squirrel.	None	The ECoW will monitor compliance throughout works.
P02-E45	Woodland throughout the proposed scheme	Pre-construction Construction	Advance works Contractor Main Contractor	Exclusion zones will be marked around dens/dreys following NatureScot guidance. Any works required within these exclusion zones will be supervised by an ECoW and, where necessary, will be carried out under a development licence from NatureScot. Exclusion zones will follow the latest NatureScot guidance or be agreed in consultation with NatureScot.	To mitigate against direct mortality of pine marten and red squirrel.	NatureScot, as required.	The ECoW will monitor compliance throughout works.
P02-E46	Woodland throughout the proposed scheme	Pre-construction Construction	Advance works Contractor Main Contractor	Site clearances will avoid the breeding seasons for pine marten (March to June inclusive) and red squirrel (February to September inclusive). Where this is not possible, pre-construction surveys will be undertaken (see **Mitigation Item SMC-E1**) and protection zones will be established around any breeding dens/dreys found. If the disturbance or destruction of dens/dreys is required, works will be conducted under a development licence from NatureScot.	To mitigate against direct mortality of pine marten and red squirrel.	None	The ECoW will monitor compliance throughout works. The ECoW will monitor any active dens/dreys and will advise on-site or task specific mitigation to avoid (where legally required) or minimise disturbance to red squirrel and pine marten.
P02-E47	Woodland throughout the proposed scheme	Construction Operation	Advance works Contractor Main Contractor	Areas identified as pine marten and/or red squirrel habitat that will be lost as a result of the proposed scheme will be replaced through the landscape and ecological mitigation planting design (Figure 10.6). Trees of different age and species composition will be planted, for example Scot's pine (*Pinus sylvestris*), birch (*Betula pendula*) and alder (*Alnus glutinosa*), as appropriate.	To mitigate for loss of red squirrel and pine marten habitat.	None	The ECoW will monitor compliance throughout works. Planting/ regrowth will be monitored to ensure success as specified in the EMP.
P02-E48	Refer to Figure 10.6 for locations.	Construction	Advance works Contractor Main Contractor	Dry mammal underpasses and culverts with mammal provision will be constructed early in the construction phase to reduce habitat fragmentation/severance effects.	To mitigate disturbance and fragmentation of habitat for otter, badger, beaver, pine marten and red squirrel caused by construction related activities.	None	The ECoW will monitor compliance throughout works.
P02-E49	Refer to Figure 10.6 for locations.	Construction Operation	Advance works Contractor Main Contractor	Artificial squirrel drey boxes and pine marten den boxes will be erected in areas of retained woodland close to the proposed scheme prior to tree clearance to compensate for lost habitat. These will be erected and positioned under direction of an ECoW and will be monitored post habitat clearance to determine maintenance requirements and record use	To mitigate for loss of red squirrel and pine marten habitat.	None	The ECoW will monitor compliance throughout works.

Mitigation	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/ Objective	Specific Consultation or Approval Required	Monitoring Measure
			Road Operating Company	which would be reported to Transport Scotland. The location of woodland habitat identified for erection of replacement breeding den boxes is shown on Figure 10.6.			Ecologists (acting on behalf of Transport Scotland) will monitor use of dens and boxes as specified in the SMP.
P02-E50	Refer to Figure 10.6 for locations.	Construction Operation	Advance works Contractor Main Contractor Road Operating Company	▪ Areas identified as Key Reptile Sites and isolated reptile sites that will be lost as a result of the proposed scheme will be replaced through landscape and ecological planting and dedicated habitat creation (to be provided pre-construction). A reptile translocation receptor site will be located at ch1350-1650, which will include appropriately located hibernacula (hibernation sites) (Figure 10.6). ▪ Exclusion fencing will be installed around Key Reptile Sites (where reptiles are to be captured and translocated out of the works area) to prevent reptiles from moving back into Key Reptile Areas prior to soil stripping. The requirement for exclusion fencing would be determined by the ECoW. ▪ Where suitable habitat exists but translocation is not considered necessary (for example, where there is safe habitat nearby for reptile to move to), reptiles and amphibians will be encouraged to move out of the works area by phased strimming of habitat during the active season (April to September). Where potential hibernacula are present, including but not limited to drystone walls, dense tussocks of grass and log piles, these will be removed during the early part of the active season, followed by phased strimming within the same season. ▪ Fragmentation of reptile and amphibian habitat between ch1400 and ch2100 will be prevented during operation of the proposed scheme by creation of a suitable herpetofauna crossing structure, with herpetofauna guide fencing, at the Birnam Junction (ch1900). ▪ Features such as rock piles and other suitable areas of insolation will be used to provide basking opportunities for reptiles, where appropriate, within the native grassland planted around SuDS.	To mitigate for loss of reptile habitat and direct mortality of reptiles.	None	The ECoW will monitor compliance throughout works. Monitoring during operation will be undertaken as specified in the EMP.
P02-E51	Throughout the proposed scheme	Operation	Advance works Contractor Main Contractor Road Operating Company	Bee and bug hotels constructed along the scheme to provide habitat for a range of invertebrate species.	To mitigate for loss of habitat for invertebrates during construction and enhance habitats in the operation phase.	None	The ECoW will monitor compliance throughout works. Monitoring during operation will be undertaken as specified in the EMP.
P02-E52	Throughout the proposed scheme	Construction Operation	Designer Advance Contractor Main Contractor	Inclusion of common rock rose and kidney vetch in planting mixes to support butterfly species, including those listed on the Tayside LBAP and SBL.	To mitigate for loss of habitat for invertebrates during construction and	None	The ECoW will monitor compliance throughout works.

Mitigation	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/ Objective	Specific Consultation or Approval Required	Monitoring Measure
					enhance habitats in the operation phase.		
P02-E53	ch870	Operation	Designer Advance Contractor Main Contractor Road Operating Company	The Murthly Estate Bridge has been designed to be of benefit for a number of terrestrial species, including bats, badgers, pine marten and red squirrel (Mitigation Item P02-E53). The design adheres to the following: ▪ the Bridge will be unlit; ▪ the embankments leading to the entrances of the Bridge will be vegetated to shelter and direct wildlife using it as a crossing point; ▪ if there are drains within the Bridge, the design will include gully pot ladders and wildlife curbs; and ▪ noise and light from the road and traffic is minimised, potentially through noise barriers above the entrances.	To mitigate for habitat fragmentation and enhance habitat connectivity for badger, bats, pine marten and red squirrel, and other species.	None	The ECoW will monitor compliance throughout works. Monitoring during operation will be undertaken as specified in the EMP.
P02-E54	Watercourses throughout the proposed scheme	Construction	Advance works Contractor Main Contractor	Noise and vibration will be minimised by working back from the riverbank, 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). 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, vibration and light spill.	None	The ECoW will monitor compliance throughout works.
P02-E55	Watercourses throughout the proposed scheme	Construction	Advance works Contractor Main Contractor	In-stream works will be undertaken between July and mid-October inclusive (August and mid-October at the Braan for lamprey), where possible, to avoid the sensitive periods for FWPM spawning and fish spawning and emergence. If in-stream works are required outwith this period, a working method will be agreed with NatureScot. In-stream works will comply with SEPA Good Practice Guidance – Temporary Construction Methods (WAT-SG-29) (SEPA, 2009).	To mitigate effects of dewatering of watercourse sections and in-stream works during construction on FWPM and fish.	CAR licence approved by SEPA	The ECoW will monitor compliance throughout works.
P02-E56	Watercourses throughout the proposed scheme	Construction	Advance works Contractor Main Contractor	Where areas are required to be temporarily dewatered to permit construction activities, fish will be removed by means of electrofishing and relocated prior to dewatering (SFCC, 2007).	To mitigate effects of dewatering of watercourse sections and in-stream works during construction on fish.	CAR licence approved by SEPA	The ECoW will monitor compliance throughout works.
P02-E57	Watercourses throughout the proposed scheme	Construction	Advance works Contractor Main Contractor	Water flow/passage will be sufficiently maintained to permit movement of Atlantic salmon, brook lamprey, river lamprey, sea lamprey and brown/sea trout past areas of dewatering and/or significant alteration of water movement during any construction works within the watercourses. Suitable temporary channels 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 mitigate effects of dewatering of watercourse sections and in-stream works during	CAR licence approved by SEPA	The ECoW will monitor compliance throughout works.

Mitigation	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/ Objective	Specific Consultation or Approval Required	Monitoring Measure
					construction on fish.		
P02-E58	Watercourses throughout the proposed scheme	Construction	Advance works Contractor Main Contractor	No pile driving will be undertaken within 100m of the River Tay SAC from mid-October to the end of June. Any exceptions will be agreed with NatureScot in advance, and additional mitigation implemented as required.	To mitigate the effects of noise and vibration on fish and FWPM	None.	The ECoW will monitor compliance throughout works.
P02-E59	Watercourses throughout the proposed scheme	Construction	Advance works Contractor Main Contractor	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 sensitives and implementation of mitigation will be conducted. The ECoW will regularly inspect pollution controls and construction sites as appropriate. An agreed working area will be established prior to the start of works which will avoid sensitive fish habitat and FWPM.	To mitigate the effects of noise, vibration and water quality changes on fish and FWPM .	NatureScot, as required.	The ECoW will monitor compliance throughout works.
P02-E60	Watercourses throughout the proposed scheme	Construction	Advance works Contractor Main Contractor	In-stream and bankside works will be restricted to daylight hours. Where working during darkness is required, a working method will be agreed with NatureScot and directional and/or shielded lighting will be utilised to minimise light-spill and angle light away from watercourses.	To mitigate for disturbance of aquatic and riparian species.	NatureScot, as required.	The ECoW will monitor compliance throughout works.
P02-E61	Watercourses throughout the proposed scheme	Construction	Advance works Contractor Main Contractor	Where directional lighting cannot be used and light spill cannot be controlled during construction, temporary screening will be provided to protect fish commuting routes through maintaining areas of darkness along at least one section of affected watercourses.	To mitigate for disturbance of fish.	None	The ECoW will monitor compliance throughout works.
P02-E62	Watercourses throughout the proposed scheme	Pre-construction Construction	Advance works Contractor Main Contractor	A FWPM Management Plan (including Emergency Action Plan) will be developed. As a part of this plan, prior to works commencing, all suitable habitat in the area around in-stream works and bankside vegetation clearance will be surveyed, to include a photographic record, to confirm the presence of FWPM. Upon discovery of any previously unrecorded FWPM, all works that could affect the FWPM will immediately cease. Works will not begin until the appropriate mitigation measures have been implemented and NatureScot has been consulted.	To mitigate effects of instream works and removal of bankside vegetation (trees) during construction on FWPM.	NatureScot	The ECoW will monitor compliance throughout works.
P02-E63	Watercourses throughout the proposed scheme	Pre-construction Construction	Advance works Contractor Main Contractor	A Silt Control Management Plan (SCMP) will be developed and implemented.	To mitigate effects of dewatering of watercourse sections and in-stream works during construction on FWPM.	NatureScot, as required.	The ECoW will monitor compliance throughout works.
P02-E64	Watercourses throughout	Pre-construction Construction	Advance works Contractor Main Contractor	The contractor will monitor the weather and river level conditions (as published by SEPA) to assess the potential for high flows or spate events during sensitive works (**Mitigation Item**	To mitigate effects of	None	The ECoW will monitor compliance throughout works.

Mitigation	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/ Objective	Specific Consultation or Approval Required	Monitoring Measure
	the proposed scheme			**SMC-W2**). 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.	increased sediment loading from high flows on FWPM.		
P02-E65	Watercourses throughout the proposed scheme	Construction	Advance works Contractor Main Contractor	Where sediment levels exceed safe thresholds for FWPM (determined through monitoring detailed in **Mitigation Item P02-E59**), an Emergency Action Plan (produced as part of the FWPM Management Plan) will be enacted which will detail measures such as how FWPM will be protected, rapid installation of temporary barriers or temporary removal of FWPM (under licence). Where fine sediment has infiltrated the substrate or sediment loading is persistent, temporary translocation of FWPM (under licence) 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	The ECoW will monitor compliance throughout works.
P02-E66	Watercourses throughout the proposed scheme	Pre-construction Construction	Advance works Contractor Main Contractor	Bankside vegetation shall 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. 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.	None	The ECoW will monitor compliance throughout works.
P02-E67	Watercourses throughout the proposed scheme	Construction Operation	Advance works Contractor Main Contractor Road Operating Company	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	The ECoW will monitor compliance throughout works. Planting/ regrowth will be monitored to ensure success as specified in the FWPM Management Plan.
P02-E68	For locations see Appendix A12.4 (Confidential Biodiversity Resources)	Construction Operation	Main Contractor Road Operating Company	Monitoring of FWPM populations will be required where a licence has been granted to disturb, damage or destroy mussel beds; the extent of this monitoring would be agreed through the licensing process. In addition, long-term monitoring would be undertaken up to ten years post-construction at approximately five-year intervals (e.g. year five and year ten after construction). Details of long-term monitoring would be agreed with NatureScot dependant on scale and location of potential impacts; the monitoring plan would be detailed in a SMP for FWPM.	To mitigate for disturbance, damage and destruction to FWPM beds.	NatureScot	The ECoW will monitor compliance throughout works. Monitoring during operation will be undertaken as specified in the FWPM Management Plan. Licence returns will be submitted to NatureScot, as required.
P02-E69	Watercourses throughout the proposed scheme	Construction	Main Contractor	Existing bed material removed during construction at the indicated locations and locations of any other in-channel works will be stored and kept clean. Bed material will be reinstated where appropriate (e.g. on top of bridge foundations and scour protection) to ensure that the aquatic habitat is returned to a similar state.	To mitigate for temporary loss of aquatic habitat	CAR Licence approved by SEPA	The ECoW will monitor compliance throughout works.

Mitigation	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/ Objective	Specific Consultation or Approval Required	Monitoring Measure
P02-E70	Watercourses throughout the proposed scheme	Construction	Main Contractor	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 best practise guidance SEPA Good Practice Guide for River Crossings (WAT-SG-25)(SEPA, 2010); CIRIA Culvert Design and Operation Guide (CIRIA, 2010); and SEPA Good Practice Guide Intakes and Outfalls (WAT-SG-28)(SEPA, 2019).	To mitigate the loss and alteration of aquatic habitat to accommodate the proposed scheme.	SEPA	The ECoW will monitor compliance throughout works.
P02-E71	Watercourses throughout the proposed scheme	Construction Operation	Main Contractor	To prevent pollution of water features from road run-off during operation, SEPA pollution prevention guidelines/guidance for pollution prevention 1, 5, 21 and 22 (NetRegs, 2024) will be abided by.	To protect aquatic resources from water quality impacts.	None	The ECoW will monitor compliance throughout works.

Table 22.6: Geology and Soils

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required	Monitoring Measure
Standard Mitigation							
SMC-G1	Throughout proposed scheme	Pre-Construction	Advance works Contractor	Prior to construction, consultation will be undertaken with the relevant local authorities and SEPA 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, 2017). 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	None required
SMC-G2	Throughout proposed scheme	Pre-Construction	Advance works Contractor	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	None required
SMC-G3	Throughout proposed scheme	Pre-Construction Construction	Advance works Contractor Main Contractor	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 account of inter alia Waste Management Licence (Scotland) Regulations 2011 (as amended by the Waste Management Licensing (Scotland) Amendment Regulations 2016), HSE Guidance Note MS31 (HSE, 2018), the Health and Safety Commission Approved Code of Practice and Guidance Note L143 (HSE, 2013) and Developments on Peat and Off-Site Uses of Waste Peat (SEPA, 2017c). 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	None required
SMC-G4	Throughout proposed scheme	Construction Post-Construction / Operation	Main Contractor Road Operating Company	Risks to construction and maintenance staff working with/near land affected by contamination will be mitigated by the implementation of Mitigation Item SMC-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	Via supervision requirements outlined in Contract Documents
SMC-G5	Throughout proposed scheme	Construction	Main Contractor	Appropriate training of personnel involved in earthworks activities to implement a watching brief to identify potential presence of previously unidentified contamination.	To identify potential presence of previously unidentified contamination.	None required	Via supervision requirements outlined in Contract Documents
SMC-G6	Throughout proposed scheme	Pre-Construction Construction	Advance works Contractor Main Contractor	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 BotS they will	To mitigate the loss of any septic tanks.	Approval from landowners	Via supervision requirements outlined

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required	Monitoring Measure
				be relocated and/or rebuilt subject to discussion and agreement with the affected landowner(s).			in Contract Documents
SMC-G7	Throughout proposed scheme	Construction	Main Contractor	To prevent cross contamination and pollution from piling works undertaken in areas of land affected by contamination, the Contractor will 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	Via supervision requirements outlined in Contract Documents
SMC-G8	Throughout proposed scheme	Construction	Main Contractor	If excavated soils are deemed unsuitable for reuse they 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) prior to disposal to determine whether they are hazardous or non-hazardous. This will establish the most appropriate and cost effective waste stream for the waste materials.	To determine whether disposed soils are hazardous or non-hazardous.	None required	Via supervision requirements outlined in Contract Documents
SMC-G9	Throughout proposed scheme	Pre-Construction	Advance works Contractor	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 SMC-M3).	None required	Via supervision requirements outlined in Contract Documents

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required	Monitoring Measure
SMC-G10	Throughout proposed scheme	Construction	Main Contractor	Whilst no substantial peat horizons are expected to be encountered during construction of the scheme, there may be localised deposits encountered within the BotS. If peat is encountered during construction to avoid localised detrimental effects an outline Peat Management Plan (PMP) will be developed as part of the CEMP in accordance with '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 Developments on Peat and Off-Site Uses of Waste Peat (SEPA, 2017c). The PMP (and CEMP) will comply with relevant waste management practices under The Waste Management Licensing (Scotland) Regulations 2011 (Scottish Government, 2011b) (Mitigation Item SMC-G10). Peat will be extracted, excavated, stored, with any off-site removal undertaken with cognisance of the above.	To comply with relevant waste management practices under The Waste Management Licensing (Scotland) Regulations 2011 and reduce impacts on peatlands.	Consultation with SEPA	Via supervision requirements outlined in Contract Documents
SMC-G11	Throughout proposed scheme	Pre-Construction Construction	Advance works Contractor Main Contractor	Where concrete materials are proposed to be used, appropriate guidance such as 'Building Research Establishment (BRE) SD1:2005' and 'British Standard (BS) BS8500' (BSI 2023) 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	Via supervision requirements outlined in Contract Documents
SMC-G12	Contamination sources: PBTC-C1, PBTC-C11, PBTC-C12, PBTC-C15, PBTC-C18, PBTC-C22, PBTC-C29, PBTC-C49, PBTC-C52, PBTC-C53	Pre-Construction, Construction Post-Construction/ Operation	Advance works Contractor Main Contractor Road Operating Company	Where potential pollutant pathways for ground gas have been identified, a ground gas monitoring program 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	Via supervision requirements outlined in Contract Documents
SMC-G13	Throughout proposed scheme	Construction	Main Contractor	With regards to groundwater quality, unless it can be demonstrated by the Contractor via a Quantitative Risk Assessment that no water quality impacts will occur due to leaching from Sustainable Urban Drainage System (SuDS) ponds, basins or wetland features, operational SuDS features and associated infrastructure are to be lined. Any potential water quality impacts due to leaching from SuDS features will be addressed through the Controlled Activities Regulations (CAR) process.	To mitigate against potential impacts on water quality due to leaching from SuDS features.	Consultation with SEPA	Via supervision requirements outlined in Contract Documents
SMC-G14	Throughout proposed scheme	Construction	Main Contractor	Where required, 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.	To ensure that no polluted water percolates into the ground or contaminated run-off is generated.	None required	Via supervision requirements outlined in Contract Documents

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required	Monitoring Measure
SMC-G15	Throughout proposed scheme	Pre-Construction Construction	Main Contractor	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	Via supervision requirements outlined in Contract Documents
n/a (note)	*n/a*	*n/a*	As required by the mitigation measures	Further to the above, the implementation of Mitigation Items W1, W3, W4, W6 to W10 and W12 (as detailed in Chapter 19: Road Drainage and the Water Environment) and the measures detailed in Chapter 8 (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.	As required by the mitigation measures	Via supervision requirements outlined in Contract Documents
Specific Mitigation							
P02-G16	Throughout proposed scheme	Pre-construction	Advance works Contractor	Seventeen cuttings are expected to intercept groundwater as per Table 13.14. The potential volume of groundwater drainage will be considered in the context of potential groundwater abstraction CAR licences during construction, prior to works commencing	Compliance with CAR licensing to protect the water environment	Approval required from SEPA	None required
P02-G17	Throughout proposed scheme	Pre-construction Construction	Advance works Contractor Main Contractor	Where areas of land within the CPO are identified as being surplus following construction of the proposed scheme, former owners may, as a general principle, be offered the opportunity to repurchase the land previously in their ownership in accordance with normal procedures (Crichel Down Rules). The full depth of topsoil would be stripped from areas to be disturbed by construction, such as haul roads, compounds subsoil stockpile locations, and from areas where topsoil would otherwise be sealed by permanent development (hardstanding). This soil should be sustainably reused on Site as far as possible, with any surplus material collected by a regional waste contractor for reuse or recycling.	Protection and management of soils.	None Required	Via supervision requirements outlined in Contract Documents
P02-G18	Throughout proposed scheme	Pre-construction Construction	Advance works Contractor Main Contractor	In addition to Standard Mitigation Item SMC-LU8, the following measures apply to topsoils and subsoils to be restored to agricultural land or reused in shallow landscaping/ecological mitigation areas, to a maximum depth of 1.2m of the final landform: • Appropriate supervision of soil management should be put in place to ensure that soils are handled in accordance with good practice and the soil management plan; and • Topsoil and subsoil should only be handled or trafficked when the surface is free of standing water and not frozen. Soils should only be handled when they are in a reasonable dry and friable state, below the plastic limit.	Protection and management of soils.	None	Via supervision requirements outlined in Contract Documents
P02-G19	Throughout proposed scheme	Pre-construction	Main Contractor	Detailed assessment of slope stability will be required to determine the appropriate slope angles for the cuttings and embankments and to confirm that the works will have no detrimental effect on the existing geotechnical hazards.	To mitigate against slope instability.	None required	Review of Main Contractor design proposals.

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required	Monitoring Measure
P02-G20	Throughout proposed scheme	Pre-construction	Main Contractor	The angle at which rock slopes can be stable is dependent on various location-specific factors including the presence and nature of discontinuities (dip, dip direction, persistence, spacing, infill, etc.), and the interactions between the main discontinuity sets. It is critical that these factors are considered during rock slope design and that a kinematic analysis is undertaken to inform rock slope stability. Blasting using pre-split techniques may reduce the potential for future slope instability; however, the effects of any proposed blasting operations should consider the potential for blast-induced damage to sensitive receptors. These could include existing services and the Highland Mainline railway; blast plans should be prepared to manage any blasting works.	To mitigate against rock slope instability.	None required	Review of main works contractor design proposals.
P02-G21	Throughout proposed scheme	Pre-construction	Main Contractor	Appropriate slope drainage should be given due consideration as an integral part of cutting design. These can include, but are not limited to, crest drainage, counterfort slope drainage and in-slope drainage comprising raking drains. Slope drainage should be tied-in to the road drainage, if possible.	To mitigate against slope instability.	None required	Review of Main Contractor design proposals.

Table 22.7: Material Assets and Waste

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required	Monitoring Measure
Standard Mitigation							
SMC-M1	Throughout proposed scheme	Pre-construction; Construction	Main Contractor	Prior to construction a 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 Re-use 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.	SWMP
SMC-M2	Throughout proposed scheme	Pre-construction; Construction	Main Contactor	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 practice, licences and exemptions where appropriate.	To ensure waste handling, storage, transport and disposal is compliant with all relevant waste legislation.	Consultation with SEPA	SWMP
SMC-M3	Throughout proposed scheme	Pre-construction; Construction	Main Contractor	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	SWMP
SMC-M4	Throughout proposed scheme	Pre-construction; Construction	Main Contractor	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	SWMP
SMC-M5	Throughout proposed scheme	Pre-construction; Construction	Main Contractor	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	None required	Material procurement records

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/Objective	Specific Consultation or Approval Required	Monitoring Measure
					manufacture of materials.		
SMC-M6	Throughout proposed scheme	Pre-construction; Construction	Main Contractor	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	Material procurement records
SMC-M7	Throughout proposed scheme	Pre-construction; Construction	Main Contractor	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	Material procurement records

Table 22.8: Noise and Vibration

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/ Objective	Specific Consultation or Approval Required	Monitoring Measure
Standard Mitigation							
SMC-NV1	Throughout proposed scheme	Pre-Construction Construction	Advance works Contractor Main Contractor	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 SMC-NV2, where required.	Perth & Kinross Council	Via supervision requirements outlined in Contract Documents
SMC-NV2	Throughout proposed scheme	Construction	Main Contractor	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: ▪ 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; ▪ 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 will be agreed 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;	To reduce, as far as practicable, the level of noise to which operators and others in the vicinity of site operations would be exposed.	Perth & Kinross Council if any working outwith normal working hours.	Via supervision requirements outlined in Contract Documents

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/ Objective	Specific Consultation or Approval Required	Monitoring Measure
				▪ 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 5228-1 and the guidance given therein minimising noise emissions from the site. In addition, PKC will be consulted regarding any proposed working outwith normal working hours. Where, following application of proposed mitigation and any Section 61 consents under the Control of Pollution Act 1974, noise levels are expected to still exceed the trigger levels defined in Annex E.4 of BS 5228-1 and any Section 61 consents under the Control of Pollution Act 1974, a scheme for the installation of noise insulation or the reasonable costs thereof, or a scheme to facilitate temporary rehousing of occupants, as appropriate, shall be implemented.			
n/a (note)	*n/a*	*n/a*		In addition to the above, mitigation item SMC-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.			
Specific Mitigation							
P02-NV01	Throughout proposed scheme	Construction	Main Contractor	The following measures would be considered at each Vibration Sensitive Receptor (VSR) where a potential for significant vibration effects from vibratory compaction is identified: ▪ selection of low vibratory or non-vibratory plant; ▪ starting up and turning off vibratory compaction plant as far away from sensitive receptors as practicable; and, ▪ engage with the local community to warn them of the potential for construction vibration, provide timings and contact information, and advise what is being done to control vibration; ▪ where there is considered to be the potential for cosmetic damage on a building or structure due to vibratory compaction:	To reduce the risk that significant adverse vibration effects would arise from vibratory compaction during construction	None required	Via supervision requirements outlined in Contract Documents

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/ Objective	Specific Consultation or Approval Required	Monitoring Measure
				▫ undertake a structural survey of the building or structure prior to and after construction of the proposed scheme begins to ascertain its structural condition before and after the works; and, ▫ once the structural assessments have been undertaken, consideration of vibration limit values and compliance measurements would be required, with the requirement to undertake vibration measurement whilst the works are within a certain distance.			
P02-NV02	Throughout the proposed scheme	Construction	Main Contractor	The following measures would be considered at each VSR (Vibration Sensitive Receptor) where a potential for significant vibration effects from sheet piling is identified: ▪ use of 'soft-start' piling techniques to reduce the vibration impacts generated by start-up and ramp down of the piling rig; ▪ pre-augering or pre-excavation of pile route to remove obstructions and reduce the potential for high vibration events and increase the rate of pile insertion; ▪ where vibratory piling is proposed, use percussive piling or an alternative method of piling (such as press piling) for piling near to sensitive buildings or structures; ▪ engage with the local community to warn them of the potential for construction vibration, provide timings and contact information, and advise what is being done to control vibration; ▪ where there is considered to be the potential for cosmetic damage on a building or structure due to sheet piling: ▫ undertake a structural survey of the building or structure prior to and after construction of the proposed scheme begins to ascertain its structural condition before and after the works; and, ▫ once the structural assessments have been undertaken, consideration of vibration limit values and compliance measurements would be required, with the requirement to undertake vibration measurement whilst the works are within a certain distance.	To reduce the risk that significant adverse vibration effects would arise from sheet piling during construction	None required	Via supervision requirements outlined in Contract Documents
P02-NV03	ch1240 to ch1340	Construction	Main Contractor	A 2.0m high, 100m long reflective barrier is to be installed along the northbound side of the proposed scheme (ch1240-1340; see Figure 15.3 of the EIAR) where it passes affected noise sensitive receptors as identified and detailed in Chapter 15 (Noise and Vibration) of the EIAR.	To reduce noise levels at four noise sensitive receptors as identified and detailed in Chapter 15 (Noise and Vibration) of the EIAR	None required	Via supervision requirements outlined in Contract Documents

Table 22.9: Population – Land Use

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Responsible Party for implementation	Description	Mitigation Purpose/ Objective	Specific Consultation or Approval Required	Monitoring Measure
Standard Mitigation							
SMC-LU1	Throughout	Pre-construction Construction	Main Contractor	Access to/from private property and housing, community land and assets, development land and businesses, and agricultural land holdings 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 2 weeks in advance, before they are put in place.	Maintaining access to land	None	Via supervision requirements outlined in Contract Documents.
SMC-LU2	Throughout	Pre-construction Construction Post-construction	Main Contractor	Existing access arrangements to land and property outwith the boundaries of the site (BotS) will not be prevented by the construction works during or post construction, unless alternative access is provided.	Maintaining access to land	None	Via supervision requirements outlined in Contract Documents.
SMC-LU3	Throughout	Pre-construction Construction	Main Contractor	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.	Reducing disturbance to landowners	None	Via supervision requirements outlined in Contract Documents.
SMC-LU4	Throughout	Pre-construction Construction	Main Contractor	Notice of intention to commence construction work will be provided to owners and occupiers of land and property adjacent to the proposed scheme before works commence.	Reducing disturbance to landowners	None	Via supervision requirements outlined in Contract Documents.
SMC-LU5	Throughout	Pre-construction Construction	Main Contractor	Where practicable, temporary construction compounds that are required outwith the BotS will not be sited on prime agricultural land or on areas of woodland and forestry.	Reducing disturbance to landowners	None	Via supervision requirements outlined in Contract Documents.
SMC-LU6	Throughout	Pre-construction Construction	Main Contractor	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 Contractor(s).	Reducing disturbance to landowners	None	Via supervision requirements outlined in Contract Documents.
SMC-LU7	Throughout	Pre-construction Construction	Main Contractor	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.	Reinstatement of boundary features	None	Via supervision requirements outlined in Contract Documents.
SMC-LU8	Throughout	Pre-construction Construction	Main Contractor	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.	Protection and management of soils.	None	Via supervision requirements outlined in Contract Documents.

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Responsible Party for implementation	Description	Mitigation Purpose/ Objective	Specific Consultation or Approval Required	Monitoring Measure
SMC-LU9	Throughout	Pre-construction Construction	Main Contractor	Reasonable precautions will be taken during construction to avoid 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 including SEPA Guidance: Disposal of trees and plants infected with specific plant diseases.	Protection and management of soils	None	Via supervision requirements outlined in Contract Documents. Monitoring by ECoW
SMC-LU10	Throughout	Pre-construction Construction Post-construction	Main Contractor	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 by the Contractor as part of pre-construction drainage works. 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.	Protection and reinstatement of land drainage systems	None	Via supervision requirements outlined in Contract Documents. Monitoring by ECoW
SMC-LU11	Throughout	Pre-construction Construction	Main Contractor	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.	Protection and reinstatement of water supplies	None	Via supervision requirements outlined in Contract Documents. Monitoring by ECoW
SMC-LU12	Throughout	Construction Post-construction	Main Contractor	Where areas of land within the CPO are identified as being surplus following construction of the proposed scheme, former owners may, as a general principle, be offered the opportunity to repurchase the land previously in their ownership in accordance with normal procedures (Crichel Down Rules).	Protection and reinstatement of land	None	Via supervision requirements outlined in Contract Documents.
SMC-LU13	Throughout	Pre-construction Construction	Main Contractor	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.	Reducing disturbance to landowners	None	Via supervision requirements outlined in Contract Documents. Monitoring by ECoW
SMC-LU14	Throughout	Construction Post-construction	Main Contractor	On completion of works, any land required for construction works will be reinstated as far as practicable and in line with mitigation plans. A record of condition survey is to be undertaken of any land to be returned to agriculture, to ensure all land is restored as near to its original condition as is reasonably practicable.	Protection and reinstatement of land	None	Via supervision requirements outlined in Contract Documents. Monitoring by ECoW
Specific Mitigation							
P02-LU15	Throughout	Pre-construction Construction Post-construction	Main Contractor	Consideration will be given by Transport Scotland to the replacement of existing road signage on the proposed scheme for community land and assets. In addition, consideration will be given to the addition of road signage where new access is provided to community land or asset, as a result of the proposed scheme	Maintaining access to land and property	None	Via supervision requirements outlined in Contract Documents.

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Responsible Party for implementation	Description	Mitigation Purpose/ Objective	Specific Consultation or Approval Required	Monitoring Measure
P02-LU16	Throughout	Pre-construction Construction Post-construction	Main Contractor	Consideration will be given by Transport Scotland to the replacement of existing roadside signage on the proposed scheme including that for certain tourist attractions, tourist destinations and properties where the proposed scheme results in a change in vehicle access routes or where access to properties has changed in vehicle access routes or where property access and/or business activities is particularly dependent on vehicular access movements. This also includes where the proposed scheme has provided new or replacement access to business property.	Maintaining access to land and property	None	Via supervision requirements outlined in Contract Documents.
P02-LU17	Throughout	Pre-construction Construction	Main Contractor	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 areas included in the CPO where land will be allowed to flood to greater depths to mitigate flood impacts, former owners may, as a general principle, be offered the opportunity to repurchase the land previously in their ownership in accordance with normal procedures (Crichel Down Rules) and following imposition of appropriate burdens.	Reducing disturbance to landowners	None	Via supervision requirements outlined in Contract Documents.
P02-LU18	Throughout	Pre-construction Construction	Main Contractor	Where field access points require temporary or permanent alteration as a result of construction, alternative field access will be provided in consultation with the landowner/occupier. Where recessed field access from local roads is identified as being required, this shall be provided.	Reducing disturbance to landowners	None	Via supervision requirements outlined in Contract Documents.
P02-LU19	Birnam Glen	Construction	Main Contractor	The Main Contractor will develop proposals to ensure access to properties at Birnam Glen is provided during construction of Birnam Glen and Inchewan Burn Bridge. Where temporary overnight closures are required to facilitate removal of existing structures and installation of new structures appropriate notification will be given to affected residents. Where practicable, temporary closures will happen on single nights rather than consecutively. During temporary overnight closures the Main Contractor will liaise with emergency services and agree appropriate access arrangements to Birnam Glen for emergency services.	Reducing disturbance to landowners. Maintaining access to land and property.	None	Via supervision requirements outlined in Contract Documents.

Table 22.10: Population - Accessibility

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/ Objective	Specific Consultation or Approval Required	Monitoring Measure
Standard Mitigation							
SMC-AT1	Throughout proposed scheme	Construction	Main Contractor	The construction programme will minimise the length of closures or restrictions of access for WCH as far as reasonably practicable.	To minimise length of closures or restrictions of access for WCH.	None required	N/A
SMC-AT2	Throughout proposed scheme	Construction	Main Contractor	Where practicable, temporary diversion routes and/or assisted crossings will be provided to maintain safe access for WCH throughout the construction works. Any closure or re-routing of routes used by WCH would take cognisance of the 'Roads for All: Good Practice Guides for Roads' (Transport Scotland, 2013a). 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 WCH throughout the construction works.	Any closures will be agreed with Transport Scotland (Rights of Way), Cairngorms National Park Authority and/or PKC (local and core paths).	N/A
SMC-AT3	Throughout proposed scheme	Construction	Main Contractor	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 WCH.	To maintain access to Public Transport facilities.	Consultation with the relevant Roads Authority and public transport provider	N/A
SMC-AT4	Throughout proposed scheme	Pre-Construction Construction	Main Contractor	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	Via supervision requirements outlined in Contract Documents.
SMC-AT5	Throughout proposed scheme	Construction	Main Contractor	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 form transport Scotland in the event of required A9 lane closures during peak hours.	Via supervision requirements outlined in Contract Documents.
SMC-AT6	Throughout proposed scheme	Construction	Main Contractor	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	Via supervision requirements outlined in Contract Documents.

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/ Objective	Specific Consultation or Approval Required	Monitoring Measure
SMC-AT7	Throughout proposed scheme	Construction	Main Contractor	Appropriate lighting will be provided during any necessary night-time working, taking into account the requirements of Mitigation Items E10 and LV4.	To mitigate potential impacts on driver stress such as fear of potential accidents due to inadequate lighting provision.	None required	Via supervision requirements outlined in Contract Documents.
SMC-AT8	WCH facilities	Construction	Main Contractor	Access for WCH 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, 2013a) shall be incorporated into the proposed scheme wherever practicable, e.g. any bridges, ramps or footpaths will not present potential barriers to disabled people such as the gradient or surfacing. ▪ WCH access shall be provided in accordance with the objectives set out in the A9 Dualling WCH 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.	To maintain access for WCH and provide appropriate facilities based on use and improve access for WCH.	None required	Via supervision requirements outlined in Contract Documents.
Specific Mitigation							
P02-AT9	ch.100, ch.1400	Construction	Main Contractor	WCH facilities will be incorporated into the new underpass at Murthly, which will provide a safer crossing of the A9 for WCH. Facilities New signage will be provided to direct users along the new WCH provision at Murthly underpass.	To describe where new or updated WCH provision is.	None required	N/A
P02-AT10	ch. 2080	Construction	Main Contractor	New signage will be provided to direct users to the path adjacent to northbound carriageway to Dunkeld & Birnam Station. A stepped slope with adjacent cycle gutter from Platform 1 of the station will allow access to Birnam Glen. Additionally, signage for step-free access to Birnam Glen via the station underpass between Platform 1 and Station Road will be provided.	To describe where new or updated WCH provision is.	None required	N/A
P02-AT11	ch.1670, ch.2490	Construction	Main Contractor	WCH facilities will be incorporated into the new underpass to provide a safer crossing of the A9 for WCH accessing Perth Road from B867 or the A9 (or vice versa). New signage will be provided to direct users along this new WCH provision at the new underpass.	To describe where new or updated WCH provision is.	None required	N/A
P02-AT12	ch.3920	Construction	Main Contractor	A footway will be provided along the southern arm of the new roundabout, providing WCH access to the underpass at CP07 to allow WCH to cross the A9. New signage will be provided to direct users along the new footway.	To describe where new or updated WCH provision is.	None required	N/A
P02-AT13	ch.4290	Construction	Main Contractor	New signage will be provided to direct WCH along the new footway running alongside the northbound A9 carriageway.	To describe where new or updated WCH provision is.	None required	N/A

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/ Objective	Specific Consultation or Approval Required	Monitoring Measure
P02-AT14	ch.4300	Construction	Main Contractor	New signage will be provided to direct WCH along the existing diversion in place due to the footbridge being washed away.	To describe where new or updated WCH provision is.	None required	N/A
P02-AT15	ch.3350 (Dunkeld and Birnam Station)	Construction	Main Contractor	Advance notice will be given of disruption to rail services and closure of the Dunkeld and Birnam Station during construction. Alternative bus routes for travellers during this period will be available.	To provide notice of rail disruption and closures.	None required	N/A

Table 22.11: Population - Human Health

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/ Objective	Specific Consultation or Approval Required	Monitoring Measure
There are no specific mitigation measures for Human Health. Mitigation measures provided by other environmental factors contribute to mitigating potential impacts on Human Health.							

Table 22.12: Road Drainage and the Water Environment

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/ Objective	Specific Consultation or Approval Required	Monitoring Measure
Standard Mitigation							
SMC-W1	Throughout	Construction	Main Contractor	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.	Protect the water environment during construction	SEPA	N/A
SMC-W2	Throughout	Construction	Main Contractor	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 22.1 of Chapter 22 (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.	Protect the construction site against most common flood events.	SEPA	N/A

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/ Objective	Specific Consultation or Approval Required	Monitoring Measure
SMC-W3	Throughout	Construction	Main Contractor	The Contractor will implement appropriate controls for construction site runoff and sedimentation, including but not limited to: ▪ 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.	Prevent excessive contaminated and sediment laden runoff leaving site untreated.	SEPA	Refer to Specific Mitigation Item P02-W19 (Table 19.20).
SMC-W4	Throughout	Construction	Main Contractor	In relation to in-channel working, the Contractor will adhere to GPPs (NRW, NIEA and SEPA, 2024) and other good practice guidance and implement appropriate measures, including but not 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 the length of channel disturbed and size of working corridor, with the use of silt fences or bunds where appropriate to prevent sediment being washed into the 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.	Prevent excessive release of sediment from the channel or introduction of sediment from out with the channel to suspension. Protection to sediment sensitive species.	N/A	Refer to Specific Mitigation Item P02-W19 (Table 19.20).
SMC-W5	Throughout	Construction	Main Contractor	Where channel realignment is necessary the Contractor will adhere to good practice guidance and implement appropriate measures, including but not limited to:	Prevent excessive erosion during higher flows, giving	SEPA	N/A

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/ Objective	Specific Consultation or Approval Required	Monitoring Measure
				▪ once a new channel is constructed, the flow should, where practicable, be diverted from 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.	time for new channel to adjust.		
SMC-W6	Throughout	Construction	Main Contractor	In relation to refuelling and storage of fuels the Contractor will adhere to GPPs (NRW, NIEA and SEPA, 2024) and other good practice guidance and implement appropriate measures, including but not 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 SMC-W7); and ▪ compliance with the Pollution Incident Response Plan (refer to Mitigation Item SMC-S1).	Prevent excessive contamination of the water environment from construction works.	SEPA	Refer to Specific Mitigation Item P02-W19 (Table 19.20).
SMC-W7	Throughout	Construction	Main Contractor	In relation to oil/fuel leaks and spillages the Contractor will adhere to GPPs (NRW, NIEA and SEPA, 2024) and other good practice guidance and implement appropriate measures, including but not 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 SMC-S1); and ▪ construction activities will comply with the Pollution Incident Response Plan (refer to Mitigation Item SMC-S1).	Prevent excessive contamination of the water environment from construction works.	SEPA	Refer to Specific Mitigation Item P02-W19 (Table 19.20).
SMC-W8	Throughout	Construction	Main Contractor	In relation to chemical storage, handling and reuse the Contractor will adhere to GPPs (NRW, NIEA and SEPA, 2024) and other good practice guidance 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.	Prevent excessive contamination of the water environment from construction works.	SEPA	Refer to Specific Mitigation Item P02-W19 (Table 19.20).

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/ Objective	Specific Consultation or Approval Required	Monitoring Measure

SMC-W9	Throughout	Construction	Main Contractor	In relation to concrete, cement and grout the Contractor will adhere to GPPs (NRW, NIEA and SEPA, 2024) and other good practice guidance and implement appropriate measures, including but not 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.
					Prevent excessive contamination of the water environment from construction works.	SEPA, Scottish Water	Refer to Specific Mitigation Item P02-W19 (Table 19.20).

SMC-W10	Throughout	Construction	Main Contractor	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 'GPP 4: Treatment and disposal of wastewater where there is no connection to the public foul sewer' (NRW, NIEA and SEPA, 2024).	Prevent excessive contamination to the water environment from the construction site.	SEPA, Scottish Water	N/A
SMC-W11	Throughout	Construction	Main Contractor	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) if services are to be disrupted or diverted by the works.	To prevent damage or disruption the water supply infrastructure.	Scottish Water	Via supervision requirements outlined in Contract Documents
SMC-W12	Throughout	Construction	Main Contractor	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	Prevent excessive contamination to the water environment.	SEPA	Refer to Specific Mitigation Item P02-W19 (Table 19.20).

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/ Objective	Specific Consultation or Approval Required	Monitoring Measure
				▪ adoption of mitigation measures relating to contaminated land as outlined in Chapter 13 (Geology and Soils).			
SMC-W13	Throughout	Operation/ post-construction	Main Contractor Road Operating Company	In relation to bank reinforcement, design principles and mitigation measures will adhere to good practice (SEPA, 2008), including but not 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 limit the impacts on hydromorphology. Good practical guidance followed post-construction.	SEPA	Post project appraisal.
SMC-W14	Throughout	Operation/ post-construction	Main Contractor Road Operating Company	In relation to outfalls, specimen and detailed design will ensure compliance to good practice (e.g. CIRIA, 2015b; Highways England et al., 2021; SEPA, 2019b), including but not 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 limit the impacts on hydromorphology, flow and water quality. Good practical guidance followed post-construction.	SEPA	Post project appraisal.
SMC-W15	Throughout	Operation/ post-construction	Main Contractor Road Operating Company	In relation to watercourse crossings, specimen and detailed design will ensure compliance with good practice (SEPA, 2010b), including but not 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 CC 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; ▪ allowance for the appropriate conveyance of water and sediment for a range of flows (including at low flow conditions);	Reduce flood risk to the scheme and to limit the impacts on hydromorphology. Good practical guidance followed post-construction.	SEPA	Post project appraisal.

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/ Objective	Specific Consultation or Approval Required	Monitoring Measure
				▪ 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 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); ▪ roughening of culvert inverts and interiors to help reduce water velocities; and ▪ post project appraisal to identify if there are issues that can be investigated and addressed at an early stage.			

SMC-W16	Throughout	Operation/ post-construction	Main Contractor Road Operating Company	In relation to channel realignments, specimen and detailed design will ensure compliance with good practice including but not 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 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 limit the impacts on hydromorphology and flow. Good practical guidance followed post-construction.	SEPA	Post project appraisal.

SMC-W17	Throughout	Operation/ post-construction	Main Contractor Road Operating Company	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 including The SuDS Manual (CIRIA, 2015b) and SuDS for Roads (SCOTS, 2009); ▪ for each drainage run, wherever practicable, a minimum of two levels of SuDS treatment within a 'treatment train' to limit the volume of discharge and risk to water quality;	Regular maintenance to ensure functional operation post-construction	SEPA	N/A

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/ Objective	Specific Consultation or Approval Required	Monitoring Measure
				▪ 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; ▪ inspect inlets, outlets, banksides, structures and pipework for any blockage and/or structural damage and remediate where appropriate; ▪ 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).			
Specific Mitigation							
P02-W18	Throughout	Construction	Main Contractor	Measures to prevent water quality impacts during construction by controlling sources of suspended sediment and other contaminants, and treating and managing construction drainage, will be set out within a site-specific Pollution Prevention Plan that will be submitted to SEPA for approval prior to construction. The document will comply with SEPA guidance WAT-SG-75 (SEPA, 2021), with specific measures including, but not 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 for erosion control and check dams. ▪ Use of an appropriate grade of material on temporary haul routes that would be clean, washed, 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. Material likely to result in metallic, sulphide rich or strongly acidic runoff will not be used. Frequent monitoring of the performance of haul routes will be undertaken, with maintenance and regrading where issues are identified. ▪ Use of biodegradable fuels, oils and chemicals on site, as far as reasonably practicable. 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. If flocculants are considered necessary to aid settlement of fine suspended sediment, such as clay particles, only	Protect the water environment during construction	SEPA	Refer to Specific Mitigation Item P02-W19.

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/ Objective	Specific Consultation or Approval Required	Monitoring Measure
				natural organic flocculants would be used for surface water treatment and permission from SEPA for the use of such chemicals would be sought at an early stage prior to construction. ▪ Protocols would be developed for ceasing or reducing construction activities during periods of high rainfall to reduce the risks of erosion, sedimentation and pollution. ▪ A temporary drainage design will be developed which would take consideration of the phasing of works, topography, land available for treatment of surface water and the location of surface water features. ▪ Isolation of existing A9 drainage systems from areas construction activities to prevent pollutants from entering the drainage system and polluting downstream water bodies. ▪ 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. ▪ 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 runoff that would be reasonably expected to occur on any occasion during the period of construction. ▪ All features associated with the temporary drainage system, including settlement ponds, settlement tanks, ditches and silt traps, will be maintained in a good state of repair by the Contractor.			
P02-W19	Throughout	Pre-Construction / Construction / Post-Construction	Advance works Contractor Main Contractor Road Operating Company	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 not be limited to: ▪ Appointment of a suitable 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 advise the contractor to stop works and implement remedial action with immediate effect.	Protect the water environment from contamination from construction activities from site runoff.	SEPA, NatureScot	N/A

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/ Objective	Specific Consultation or Approval Required	Monitoring Measure
				▪ Water quality monitoring one year prior to construction, during construction and one year's 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, to be informed by pre-construction water quality monitoring and agreed in consultation with SEPA and NatureScot. The Contractor will ensure compliance with these standards through the adoption of standard mitigation (Table 19.19) and Mitigation Item P02-W18. ▪ 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.			
P02-W20	Throughout	Construction	Main Contractor	In relation to near channel working: ▪ Maintain riparian corridor to provide additional bank stability and minimise the extent of channel disturbance and size of working corridor. Avoid in-channel works where practicable and work from one bank if possible. ▪ Restrict in channel and near channel working to preserve natural features including bars, riffles, banks and natural floodplain.	Prevent excessive geomorphological changes to water courses to maintain channel stability	SEPA	N/A
P02-W21	Throughout	Construction	Main Contractor	In relation to channel realignments and in/near channel working where the removal of existing bed and bank material is required by the proposed design. The contractor should: ▪ Remove, store and reinstate natural bed and bank material where practicable. ▪ Provide temporary scour protection where required for instance downstream outlet of over pumping. Care should be taken to preserve natural morphological features out with the working area where present. For example, these could include, but not be limited to, natural steps, pools, cascades, riffles and bars.	Prevent excessive geomorphological changes to water courses to maintain channel stability	SEPA	N/A
P02-W22	WF12B	Construction	Main Contractor	In relation to the poorly defined, ephemeral watercourse which is currently capturing overland flow during periods of sustained rainfall upstream of the existing A9, the contractor should ensure that during construction: ▪ Natural flow paths are not disturbed to ensure that overland flow reaches the intended culvert/structure to convey it below the proposed scheme.	Prevent disruptions to flow	SEPA	N/A
P02-W23	WF06, WF05A, WF08, WF11, WF12	Operation/ Post-Construction	Main Contractor Road Operating Company	▪ Re-planting of vegetation around outfall structures, tying in with natural vegetation. The planting of trees, if removed, is of particular importance for bank stability. ▪ Provide sufficient energy gradient differential for maintenance of flow and hydraulics from outfall locations. ▪ Provision of scour protection where required i.e. at outlet headwall.	Reducing bare soil to prevent excessive sediment influx from runoff and maintain stability of banks through root systems. Reducing excessive change to hydromorphology of	SEPA	N/A

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/ Objective	Specific Consultation or Approval Required	Monitoring Measure
					water courses. Protect outfalls from erosion		
P02-W24	WF06, WF11, WF12	Operation/ Post-Construction	Main Contractor Road Operating Company	Operational Mainline SuDS: Management Train 1 (MT1) comprising filter drains and a detention basin. MT1 will be adopted for drainage catchments A, B2, D, F and H.	Treat road runoff to protect water environment from excessive sediment and contaminants	SEPA	N/A
P02-W25	WF05A	Operation/ Post-Construction	Main Contractor Road Operating Company	Operational Mainline SuDS: MT2 comprising filter drains and a retention pond. This management train will be adopted for drainage catchment B1.	Treat road runoff to protect water environment from excessive sediment and contaminants	SEPA	N/A
P02-W26	WF08	Operation/ Post-Construction	Main Contractor Road Operating Company	Operational Mainline SuDS: MT3 comprising filter drains, geocellular storage and a hydrodynamic vortex separator. This management train will be adopted for drainage catchment C1.	Treat road runoff to protect water environment from excessive sediment and contaminants	SEPA	N/A
P02-W27	WF08	Operation/ Post-Construction	Main Contractor Road Operating Company	Operational Mainline SuDS: MT4 comprising filter drains and a dry swale. This management train will be adopted for drainage catchment C2.	Treat road runoff to protect water environment from excessive sediment and contaminants	SEPA	N/A
P02-W28	WF06	Operation/ Post-Construction	Main Contractor Road Operating Company	Operational Mainline SuDS: MT5 comprising filter drains, a dry swale and a detention basin. This management train will be adopted for drainage catchment G.	Treat road runoff to protect water environment from excessive sediment and contaminants	SEPA	N/A
P02-W29	WF06	Operation/ Post-Construction	Main Contractor Road Operating Company	Operational Mainline SuDS: MT6 comprising filter drains and a wetland. This management train will be adopted for drainage catchment I.	Treat road runoff to protect water environment from excessive sediment and contaminants	SEPA	N/A
P02-W30	Throughout	Operation/ Post-Construction	Main Contractor Road Operating Company	Side road drainage during operation will incorporate a single level of treatment through either filter drains and/or swales. Access track drainage during operation will be provided through over-the-edge (OTE) drainage and/or soakaways.	Treat road runoff to protect water environment from excessive sediment and contaminants	SEPA	N/A
P02-W31	WF06, WF08, WF11	Operation/ Post-Construction	Main Contractor Road Operating Company	In relation to bridge crossings: ▪ Restrict length of grey bank protection and implement green bank protection measures where applicable.	Reducing excessive change to	N/A	Post-construction management and maintenance regime.

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/ Objective	Specific Consultation or Approval Required	Monitoring Measure
				▪ Re-plant with appropriate cover if vegetation is lost. ▪ Post project appraisal, which shall include an operational management and maintenance regime for sediment and debris clearance, riparian vegetation management, and structure repair or maintenance.	hydromorphology of watercourses.		
P02-W32	WF01, WF05, WF05A, WF07, WF09, WF12, WF12A, WF12B, WF13, WF14, WF16, WF18	Operation/ Post-Construction	Main Contractor Road Operating Company	In relation to culvert extension/ replacements: ▪ maintain natural channel width and bed gradient through the culvert where possible; ▪ sediment retention system (e.g. baffles) will be installed within culverts where required energy dissipation at culvert outlets where deemed necessary; and ▪ Post project appraisal, which shall include an post-construction/operational management and maintenance should include sediment and debris clearance, riparian vegetation management, and structure repair or maintenance.	Reducing excessive change to hydromorphology of watercourses.	N/A	Post-construction management and maintenance regime.
P02-W33	WF01, WF05, WF05A, WF07, WF09, WF12, WF12A, WF12B, WF13, WF14, WF16, WF18	Operation/ Post-Construction	Main Contractor Road Operating Company	In relation to channel realignments and diversions where appropriate: ▪ maximise open-channel realignments where possible ▪ maintain natural channel width and bed gradient where possible ▪ provide suitably sized sediment to be reinstated in the channel ▪ banks should be re-graded to replicate existing bank conditions, where practicable. Bank slopes of at least 1 in 2 are typically considered to be stable. Reinstated banks would be further stabilised with biodegradable geotextile and re-planted with suitable riparian vegetation ▪ incorporate fence-lines to protect banks and establishing planting where required	Reducing excessive change to hydromorphology of watercourses.	N/A	N/A
P02-W34	WF05, WF05A, WF07	Operation/ Post-Construction	Main Contractor Road Operating Company	Appropriate realignment design should be undertaken at the specimen design stage to design new channel downstream of the existing A9 if it is not going to be tied into drainage system. This should include calculation of sediment sizes to be reinstated, appropriate grade control, though provision of morphological features should also be provided to ensure channel stability. Further design required during specimen and detailed design stages.	To retain watercourses potentially impacted by the scheme	SEPA	N/A
P02-W35	WF12B	Operation/ Post-Construction	Main Contractor Road Operating Company	Currently WF12B is an ephemeral channel upstream. Steps should be taken to ensure the design captures overland flow during periods of high rainfall and directs it downstream from the side road and mainline. This might mean incorporating this watercourse into the road drainage or piping it to the existing culvert downstream. Methods will be determined during specimen design.	To maintain overland flow paths	SEPA	Post-construction management and maintenance regime.
P02-W36	WF06, WF11	Operation/ Post-Construction	Main Contractor Road Operating Company	In relation to scour protection associated with access tracks/ embankments specimen design should consider best practice which would include but not be limited to: ▪ Restrict length of bed and bank protection and implement green bank protection measures where applicable. ▪ Re-plant with appropriate cover if vegetation is lost. ▪ If grey bank protection is required minimise extent through design. Where applicable if scour protection is required, and if deemed necessary by a suitably qualified geomorphologist, provide rock armour/boulder toe protection downstream of the	Reducing excessive change to hydromorphology of water courses.	N/A	N/A

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/ Objective	Specific Consultation or Approval Required	Monitoring Measure
				scour protection on to minimise impact of flow deflection. This should cover at least 1-2 channel widths (approximately 60 – 120 m).			
P02-W37	Ch4350-4700	Operation/ Post-Construction	Main Contractor Road Operating Company	Compensatory Flood Storage Area (CSFA 1) providing 31,198m^3 of storage.	To provide storage of floodwater from floodplain lost by encroachment of the proposed scheme	SEPA	N/A
P02-W38	Ch4890	Operation/ Post-Construction	Main Contractor Road Operating Company	Mill Lade Flood Relief Culverts: 3no. 1.5m diameter Flood Relief Culverts proposed to convey additional floodwater within the Inver floodplain through the A9 carriageway into the River Tay.	To provide flow pathway for flood water under the proposed scheme to replicate existing flooding mechanism	SEPA	N/A
P02-W39	Ch 4400-4560	Operation/ Post-Construction	Main Contractor Road Operating Company	Embankment culverts to replicate current A9 overtopping - 14no. 3.6m x 1.2m Flood Relief Culverts constructed through proposed embankment (level of culverts set to existing carriageway level (52.1mAOD)). The culverts will only operate during the Run 1 0.5% AEP + CC flood event, replicating the existing flood path over the A9 carriageway.	To provide flow pathway for flood water under the proposed scheme to replicate existing flooding mechanism	SEPA	N/A
P02-W40	Ch 4100-4300	Operation/ Post-Construction	Main Contractor Road Operating Company	WF9 flood relief culvert – c.1.0mx1.2m box culvert running from the roundabout outlet culvert for 200m to the River Braan. The culvert will operate when the 600mm main culvert is close to surcharging.	To provide flow pathway for flood water to ensure flood risk is not increased downstream	SEPA	N/A
P02-W41	Ch 8300-8400	Operation/ Post-Construction	Road Operating Company	Preparation of an Emergency Response Plan in the event that the A9 is flooded during the 0.5%AEP (200-year) plus 53% CC event at chainage 8300 to 8400, north of the Tay Crossing, to manage the flood risk. The flooding occurs very close to the peak of the hydrograph and the inundation is relatively small in volume and extent. This residual flood risk at the design event will be managed through an Emergency Response Plan. The Emergency Response Plan would include measures that would be considered in advance of an extreme event, during the event as well as measures to deal with the clean up after the event.	To ensure safety of A9 road users during the 0.5%AEP plus 53% CC event	N/A	N/A

Table 22.13: Climate

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/ Objective	Specific Consultation or Approval Required	Monitoring Measure
Standard Mitigation							
SMC-S1	Throughout proposed scheme	Pre-construction	Contractor	The Main Contractor is required to develop a management system to structure the implementation of the mitigation measures outlined in this and other chapters of the EIAR. This will include a Construction Environmental Management Plan (CEMP), requirements for which will be established via the Contract Documents.	To manage environmental impacts during construction	Transport Scotland	Review of CEMP
Specific Mitigation							
P02-CC1	Throughout proposed scheme	Pre-construction; Construction	Designer and Main Contractor	**Implement avoid/reduce principles in the use of GHG intensive materials and processes** The Contractor shall aim to reduce or avoid where practicable, the use of carbon intensive materials (e.g. steel and concrete). The contractor shall be required to develop and implement a Carbon Management Plan which is aligned with the principles of PAS 2080:2023 in order to inform this process throughout the detailed design, procurement and construction stages.	To minimize materials embodied carbon	Transport Scotland	Review of Carbon Management Plan Quarterly Carbon Emissions Reporting (see **Mitigation Item P02-CC5**)
P02-CC2	Throughout proposed scheme	Pre-construction	Main Contractor	**Substitute/replace GHG intensive materials** As part of the Carbon Management Plan (see **Mitigation Item P02-CC1**), and where it would not significantly impact upon engineering, safety and maintenance characteristics, lower carbon alternatives for materials are to be considered by the Contractor. For example: ▪ the use of ground granulated blast-furnace slag (GGBFS) or pulverized fuel ash (PFA) could be specified for structural members (e.g. to contain 50% GGBFS addition). The addition of this recycled material is more sustainable than CEM1 concrete and would reduce peak temperatures during curing which reduces the effect of early thermal cracking, and hence reduces the volume of steel reinforcement required. It is expected that for every tonne of CEM1 substituted with GGBFS, an avoidance of emitting up to approximately 0.8 tonnes of CO_2e may be accomplished; and/or ▪ use of recycled plastic as a replacement for typical pavement materials. It is expected that for every tonne of bitumen substituted with recycled plastic, an avoidance of emitting up to approximately 3 tonnes of CO_2e may be accomplished.	To minimize materials embodied carbon	Transport Scotland	Review of Carbon Management Plan (see **Mitigation Item P02-CC1**) Quarterly Carbon Emissions Reporting (see **Mitigation Item P02-CC5**)

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/ Objective	Specific Consultation or Approval Required	Monitoring Measure
P02-CC3	Throughout proposed scheme	Pre-construction	Main Contractor	**Avoid/Reduce GHG Emissions from Processes** As part of the CEMP (see Mitigation Item SMC-01), the Contractor will prepare a Travel Management Plan (TMP) to capture the proposed travelling of staff required for the construction of the proposed scheme and measures to optimise journeys and demonstrate how the TMP has contributed to reduced GHG emissions. It should be noted that maximising the amount of local labour would also reduce GHG emissions from construction workers traveling to and from the site. As part of the Carbon Management Plan (see Mitigation Item P02-CC1), the Contractor will prefer, where possible, the sourcing of materials from local suppliers in order to reduce the travel distance of materials. Also, the contractor will optimize the transport of materials on site and include the appropriate plans and actions in the TMP. As part of the Carbon Management Plan (see Mitigation Item P02-CC1), the Contractor will investigate the potential of using electric construction equipment instead of conventionally powered construction plant. Also, the Contractor will investigate the potential of on-site renewable energy generation/storage to replace diesel generators and reduce grid power for plant operation. As covered by **Mitigation Items SMC-M1 to SMC-M7**, the Contractor should seek to reduce the quantities of waste materials that are generated as a result of the proposed scheme and that are required to be transported and treated off-site.	Reduce GHG emissions associated with construction activities	Transport Scotland	Review of Travel Management Plan Quarterly Carbon Emissions Reporting (see **Mitigation Item P02-CC5**)
P02-CC4	Throughout proposed scheme	Operation	Main Contractor/ Road Operating Company	**Substitute/Replace GHG Intensive Materials and Processes in Maintenance:** The embodied emissions from the materials needed for the maintenance of the proposed scheme during its whole life cycle comprise 38% of total embodied emissions (i.e. accumulated embodied emissions from construction and maintenance). A large part of the maintenance embodied emissions originates from road pavement resurfacing, including the surface course, sub-base and base course. Investigation of either a more hard-wearing material for the road surface course or a material with lower embodied emissions (e.g. recycled plastic) should be considered in order either to reduce the maintenance frequency or the total emissions per maintenance phase, respectively. This process should be undertaken before the commencement of any large maintenance works to encompass any future technological developments in the pavements and materials domain.	To minimize maintenance materials embodied carbon	Transport Scotland	Quarterly Carbon Emissions Reporting (see **Mitigation Item P02-CC5**)
P02-CC5	Throughout proposed scheme	Construction; operation	Main Contractor	Quarterly Carbon Emissions Reporting during the construction phase is required to be undertaken by the Contractor for the proposed scheme in line with the Overseeing Organisation's requirements (i.e. DMRB LA 114 and the Scottish NAA) using the 'Roads Projects Carbon Tool' (Transport Scotland, 2024). QCER during the operation phase will be required in line with the Overseeing Organisation's requirements (i.e. DMRB LA 114 and the Scottish NAA) using the 'Roads Projects Carbon Tool' (Transport Scotland, 2024). These reports will be informed with actual materials and fuel/energy consumption data.	To monitor and report actual carbon emissions.	Transport Scotland	Review of Quarterly Carbon Emissions Reports
P02-CC6	Throughout proposed scheme	Pre-construction; construction; operation	Designer/ Main Contractor/ Road Operating Company	**Design and mitigation measures to minimise vulnerability to climate change:** The designer, contractor and operator of the network shall ensure that, as a minimum, the embedded mitigation measures described in Appendix A20.1: Vulnerability to Climate Change are implemented.	To minimize the vulnerability of the proposed to climate change	Transport Scotland	N/A

Mitigation Item	Approximate Chainage/ Location	Timing of Measure	Responsible Party for Implementation	Description	Mitigation Purpose/ Objective	Specific Consultation or Approval Required	Monitoring Measure
P02-CC7	Throughout proposed scheme	Pre-construction	Designer	**Drainage and Landslide Conservative Approach – Good engineering practice:** The drainage and geotechnics design will adopt, where appropriate, a conservative approach in order to reduce the risks associated with climate-related hazards, including the use of appropriate landslide protection measures.	To minimize flooding and landslide vulnerability	Transport Scotland	N/A
P02-CC8	Throughout proposed scheme	Construction	Main Contractor	**CEMP – Weather Forecasts:** In order to reduce the risk of disruption to construction activities as a result of climate related impacts, the contractor will ensure that the CEMP is implemented, along with good construction practice, and that weather forecasts are taken into consideration in the planning of day to day works. The contractor will receive weather forecast information on a daily basis and subsequently confirm weather conditions are suitable for specific tasks to be undertaken, amending the schedule of works accordingly where required. This may, for example, include amending the extent, location and/or schedule of earthworks (e.g. excavations, soil piling), with reference to storm predictions from the National Severe Weather Warning Service or other construction-focused MetOffice services (e.g. VisualEyes) to avoid impacts associated with the flooding of excavations or the stability of earthworks. Appropriate action plans developed by the Contractor will be in place, including personnel training, to address extreme weather events and the subsequent hazards.	To minimize construction sites' vulnerability	Transport Scotland	Review of CEMP to ensure appropriate plans are in place to identify and mitigate potential impacts of adverse weather conditions during the construction phase, and minimise the risk of disruption.
P02-CC9	Throughout proposed scheme	Operation	Main Contractor/ Road Operating Company	**Appropriate Asset Management during Operation** The operator of the scheme shall have in place appropriate asset management procedures to maintain the resilience of the scheme to climate related impacts in line with DMRB requirements. These asset management measures should evolve once the asset is operational in response to changes in climate and associated impacts. For example, where a design issue is identified, an assessment should be made to determine if corrective action is required, e.g. drainage amendments to rectify a flooding hotspot that was not anticipated at the design stage. Furthermore, a procedure will be developed (and added as part of the maintenance plan) to establish communication with the operator of the former A9 (C502 (Dunkeld to Rotmell) Road) in order to confirm the maintenance of the road drainage is satisfactorily carried out. It should be noted that the 2004 landslide was exacerbated by the former A9 (C502 (Dunkeld to Rotmell) Road) drainage infrastructure failure, whereas ch7600 to ch8400 is identified as a landslide vulnerable area. The operator will include in their maintenance plans the visual inspection of the proposed scheme's assets to ensure that, if and where required, appropriate maintenance and repair activities are undertaken in response to climate related impacts, in addition to predefined maintenance intervals. The inspections will include one-off inspections after certain precipitation events e.g. intense storm events, longer persistent wet periods, or extended periods with very high temperatures.	To maintain the proposed schemes resilience	Transport Scotland	Review of proposed assessment procedures and reports on maintenance and inspection activities.