A66 Northern Trans-Pennine Project
TR010062

3.4 Environmental Statement
Appendix 6.1 Non-significant Effects

APFP Regulations 5(2)(a)

Planning Act 2008

Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

Volume 3

June 2002

Infrastructure Planning

Planning Act 2008

The Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

A66 Northern Trans-Pennine Project Development Consent Order 202x

3.4 ENVIRONEMENTAL STATEMENT APPENDIX 6.1 NON-SIGNIFICANT EFFECTS

Regulation Number:	Regulation 5(2)(a)
Planning Inspectorate Scheme Reference	TR010062
Application Document Reference	3.4
Author:	A66 Northern Trans-Pennine Project Team, National Highways

Version	Date	Status of Version
Rev 1	13/06/22	DCO Application

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6.1 Non-significant Effects

Table 6-1: Summary of non-significant effects (construction) on designated sites

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
Routewide						
Veteran and notable trees	Veteran and notable trees	Medium	Potential dust deposition from dust emitting activities which may smother vegetation and affect evapotranspiration and photosynthesis. Adjacent ground compaction which may affect water uptake and transpiration rates, which affect the tree's health or physical damage to tree limbs.	Site-specific measures regarding dust are secured within the EMP (Application Document Number 2.7). Avoidance and protection measures will be stated in the EMP and follow government advice for avoidance of impacts upon ancient or veteran trees (UK Government, 2022). Should permanent fencing be required fence posts are to be hand dug to avoid heavy machinery being used. If machinery is required, low pressure vehicles and vehicle mats/pads are to be used to avoid ground compaction.	n/a	n/a
M6 Junction 40 to Kemplay Bank						
River Eden SAC, River Eden and Tributaries SSSI and Eamont Bridge, Banks of River Eamont Site of Invertebrate Significance	All qualifying features	Very high to low	Localised alteration of riparian habitats as a result of the three discharges to the River Eamont (part of the River Eden SAC) that will deliver treated road runoff from new attenuation basins. Construction activities result in additional lighting, noise and vibration which may cause fragmentation impacts for faunal qualifying species (otter, bird and fish species) through preventing natural foraging or migratory, or	Discharge outlets to the SAC will be open ditches where natural banks material is present under baseline conditions to allow free migration of the channel and geomorphological change to occur; where artificial banks, or bank protection is in place discharges will tie into the existing bank structure. The duration of works are localised and temporary and suitable alternative habitat is present, for use by the qualifying species. Works timings will be appropriate with periods of 'down time' to facilitate	Negligible	Slight adverse

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
(SIS) and Lowther Bridge SIS.			seasonal movements. Or by preventing access to nesting habitat. The river is currently adjacent to the A66 so some habituation occurs now, the duration of these impacts are temporary and suitable alternative habitat is present, despite this there will still be disturbance impacts. Construction activities have the potential to generate water-borne pollution (e.g. dust, fine sediment, fuels and oils) which could give rise to an adverse effect on the Annex I river and the species it supports. Construction activities, such as cutting, piling, temporary abstractions and discharges and floodplain utilisation, also have the potential to impact on the water environment through changes in surface and groundwater quality and quantity and fluvial geomorphological processes. Non-native faunal riparian species are not currently identified within this scheme, but there remains the potential for introduction of such species (lack of contractor awareness), or for biosecurity	such movements. Works will have an aquatic specialist ECOW to monitor the faunal species using the river for the project duration and guide appropriate timings of works to avoid impacts for example avoidance of works during key salmonid breeding season. The majority of the works will be during day-light hours only and where not feasible sensitive lighting will be used for any night-time works for both construction sites and compounds. Rivers and streams will be protected during construction through the implementation of best practice construction techniques and pollution prevention. Site-specific measures, as secured in the EMP (Application Document 2.7) and will include a surface water management system using measures such as temporary silt fencing, cut off ditches, settlement ponds and bunds set up early in the construction period to capture all runoff and prevent ingress of sediments and contaminants into existing drainage ditches where necessary. This will be managed by the EMP in accordance with CIRIA guidelines and the Environment Agency's approach to groundwater protection and groundwater protection guidelines. In addition, adherence to dust		

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			issues for example potential for introduction of crayfish plague. Non-native plant species are identified within this site for the sections of river adjacent to this scheme within the adjacent Skirsgill Woods LWS of Himalayan balsam (*Impatiens glandulifera*), with potential for accidental spreading of this or other non-native species from within the scheme or from alternative sites works on by contractors either prior or between contracts. The water crowfoot Annex 1 habitat is present throughout this river and may colonise new areas prior to commencement of works, in addition highly mobile faunal species are present. Checks on presence of such species will be required prior to works. To inform works appropriately. Air quality modelling recorded an increase in nitrogen deposition at two crossings. Aquatic plants that are a component of the vegetation community are submerged for the majority of the year due to their growth form, consequently they are regularly inundated and flushed	suppression methods as specified within the dEMP will be adhered to and monitored during construction, with any appropriate remedial actions as specified in the dEMP, will be implemented as soon as feasible. Appropriate biosecurity measures as specified within the Invasive Species Management Plan as specified as a contractor's requirement within the EMP will be adhered to. The aquatic ECOW will map the presence of such species and brief contractors on biosecurity measures to be adhered to for avoidance of contaminated soil (with seed bank or vegetative remains of invasive plants for example) transfer as presented within the EMP. Monitoring of presence and extent of invasive non-native species will be undertaken for the duration of the Project. Where measures exist localised removal of species can be undertaken in advance to reduce the potential for spreading of non-native invasive species. This is not likely to be a beneficial effect due to constant replenishment of seed resource from upstream areas for species such as Himalayan balsam, The EMP specifies the use of pre-construction checks for the qualifying species of The River Eden to appropriately		

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			during modest flood events. Local contributions to nitrogen deposition identified road transport as the smallest identified source. It is considered that any increase in nitrogen deposition as a result of the Project, even an increase in over 1000 Annual Average Daily Traffic will not make a considerable impact to the overall source of nitrogen deposition that the SAC currently received from various other sources. The contribution of nitrogen from road transport in the context of other nitrogen sources (as discussed above) is modest, especially when the flushing effect of the water is considered. The impacts are localised and therefore, it is considered that nitrogen deposition would not result in an adverse effect of this feature within the respective SSSI units. Subsequently no significant effect is predicted on the River Eden SAC and River Eden and Tributaries SSSI.	inform works and to identify any appropriate mitigation or additional species licencing requirements.		
Skirsgill Wood LWS and Skirsgill Wood not on	Woodland habitat with ancient woodland	High	Loss of a small area of woodland habitat to the east of the site to accommodate a drainage route from an attenuation basin to the	Habitat loss measures are captured through essential mitigation of habitat replacement through BNG. Micro-siting is likely feasible within Order Limits to direct	Minor	Slight adverse

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
Ancient Woodland Inventory).	and ancient woodland indicator species.		north, between this and the River Eden. Construction works may also cause ground compaction which may result in the loss of or damage to adjacent trees or ground flora. Potential for habitat or vegetative damage as a result of dust or pollution. Potential for spread of invasive species. Himalayan balsam is recorded present within this site.	works to poorer areas of the woodland, this is to be reviewed at detailed design. Appropriate fencing is to be used to screen works areas and to avoid accidental encroachment on further sensitive habitat outside the work area. Site specific measures regarding surface and groundwater quality, dust and pollution stated within the EMP will be adhered to. Measures stated within the Invasive Species Management Plan will be adhered to with respect to avoidance of spread of or transfer of soils with seed bank of Himalayan balsam. Should permanent fencing be required fence posts are to be hand dug to avoid heavy machinery being used. If machinery is required, low pressure vehicles and vehicle mats/pads are to be used to avoid ground compaction.		
Yanwath Wood LWS and Yanwath Wood (not listed on the Ancient Woodland Inventory)	Ancient woodland habitat with ancient woodland indicator species.	High	Potential for habitat or vegetative damage as a result of dust or pollution. Adjacent woodland planting will add to this habitat and will serve to further buffer this designated site and provide additional linked habitat for the species within this site for example breeding bird species.	Site specific measures regarding surface and groundwater quality, dust and pollution stated within the EMP will be adhered to.	Minor	Slight beneficial

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
Penrith to Temple Sowerby						
River Eden SAC, River Eden and Tributaries SSSI	All qualifying features	Very high to high	Localised alteration of riparian habitats as a result of two discharges to the River Eamont (part of the River Eden SAC) that will deliver treated road runoff from new attenuation basins. Construction activities result in additional lighting, noise and vibration which may cause fragmentation impacts for faunal qualifying species (otter, bird and fish species) through preventing natural foraging or migratory, or seasonal movements. Or by preventing access to nesting habitat. The river is currently adjacent to the A66 so some habituation occurs now, the duration of these impacts are temporary and suitable alternative habitat is present, despite this there will still be disturbance impacts. Construction activities have the potential to generate water-borne pollution (e.g. dust, fine sediment, fuels and oils) which could give rise to an adverse effect on the Annex I river and the species it supports. Construction activities, such as	Discharge outlets to the SAC will be open ditches where natural banks material is present under baseline conditions to allow free migration of the channel and geomorphological change to occur; where artificial banks, or bank protection is in place discharges will tie into the existing bank structure. The duration of works are localised and temporary and suitable alternative habitat is present, fur use by the qualifying species. Works timings will be appropriate with periods of 'down time to facilitate such movements. Works will have an aquatic specialist ECOW to monitor the faunal species using the river for the project duration and guide appropriate timings of works to avoid impacts for example avoidance of works during key salmonid breeding season. The majority of the works will be during day-light hours only and where not feasible sensitive lighting will be used for any night-time works for both construction sites and compounds. Rivers and streams will be protected during construction through the implementation of best practice construction techniques and pollution prevention. Site-specific measures, as	Negligible	Slight adverse

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			cutting, piling, temporary abstractions and discharges and floodplain utilisation, also have the potential to impact on the water environment through changes in surface and groundwater quality and quantity and fluvial geomorphological processes. Non-native faunal riparian species are not currently identified within this scheme, but there remains the potential for introduction of such species (lack of contractor awareness), or for biosecurity issues for example potential for introduction of crayfish plague. Non-native plant species with potential for accidental spreading from alternative sites works on by contractors either prior of between contracts. The water crowfoot Annex 1 habitat is present throughout this river and may colonise new areas prior to commencement of works, in addition highly mobile faunal species are present. Checks on presence of such species will be required prior to works. To inform works appropriately.	secured in EMP (Application Document 2.7) and will include a surface water management system using measures such as temporary silt fencing, cut off ditches, settlement ponds and bunds set up early in the construction period to capture all runoff and prevent ingress of sediments and contaminants into existing drainage ditches where necessary. This will be managed by the EMP in accordance with CIRIA guidelines and the Environment Agency's approach to groundwater protection and groundwater protection guidelines. In addition adherence to dust suppression methods as specified within the dEMP will be adhered to and monitored during construction, with any appropriate remedial actions as specified in the dEMP, will be implemented as soon as feasible. Appropriate biosecurity measures as specified within the Invasive Species Management Plan as specified as a contractor's requirement within the EMP will be adhered to. The aquatic ECOW will map the presence of such species and brief contractors on biosecurity measures to be adhered to for avoidance of contaminated soil (with seed bank or vegetative remains of invasive plants for example) transfer as presented within the		

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			Air quality modelling recorded an increase in nitrogen deposition at two crossings. Aquatic plants that are a component of the vegetation community are submerged for the majority of the year due to their growth form, consequently they are regularly inundated and flushed during modest flood events. Local contributions to nitrogen deposition identified road transport as the smallest identified source. It is considered that any increase in nitrogen deposition as a result of the Project, even an increase in over 1000 Annual Average Daily Traffic will not make a considerable impact to the overall source of nitrogen deposition that the SAC currently received from various other sources. The contribution of nitrogen from road transport in the context of other nitrogen sources (as discussed above) is modest, especially when the flushing effect of the water is considered. The impacts are localised and therefore, it is considered that nitrogen deposition would not result in an adverse effect of this feature within the respective SSSI units.	EMP. Monitoring of presence and extent of invasive non-native species will be undertaken for the duration of the Project. Where measures exist localised removal of species can be undertaken in advance to reduce the potential for spreading of non-native invasive species. This is not likely to be a beneficial effect due to constant replenishment of seed resource from upstream areas for species such as Himalayan balsam, The EMP specifies the use of pre-construction checks for the qualifying species of The River Eden to appropriately inform works and to identify any appropriate mitigation or additional species licencing requirements.		

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			Subsequently no significant effect is predicted on the River Eden SAC and River Eden and Tributaries SSSI.			
Whinfell Forest LWS and Salter Wood	Heathland (a HoPI), ancient woodland and the presence of red squirrel	High	Potential for construction activities to cause dust and this to smother vegetation and affect photosynthetic and evapotranspiration processes.	Site specific measures for dust and pollution management, as stated within the EMP will be adhered to.	No change	Neutral
Temple Sowerby to Appleby						
River Eden SAC, River Eden and Tributaries SSSI	All qualifying features	Very high to high	Localised alteration of riparian habitats as a result of discharges to unnamed tributary of Trout Beck (part of the River Eden SAC) that will deliver treated road runoff from new attenuation basins. A multi-span viaduct over Trout Beck and its floodplain. Poorly designed watercourse crossings and temporary and permanent floodplain utilisation have the potential to alter fluvial geomorphological processes locally. This may result in alterations of habitats locally and indirect effects on populations of qualifying species.	Discharge outlets to the SAC will be open ditches where natural banks material is present under baseline conditions to allow free migration of the channel and geomorphological change to occur; where artificial banks, or bank protection is in place discharges will tie into the existing bank structure. The construction of Trout Beck viaduct will not result in the physical loss of habitat and the viaduct piers will be set well back from the bank top. Modelling data predicts the design of Trout Beck Viaduct does not affect the fluvial geomorphological processes both within the channel and on the floodplain.	Negligible	Slight adverse

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			Construction activities result in additional lighting, noise and vibration which may cause fragmentation impacts for faunal qualifying species (otter, bird and fish species) through preventing natural foraging or migratory, or seasonal movements. Or by preventing access to nesting habitat. The river is currently adjacent to the A66 so some habituation occurs now, the duration of these impacts are temporary and suitable alternative habitat is present, despite this there will still be disturbance impacts.	The duration of works are localised and temporary and suitable alternative habitat is present, fur use by the qualifying species. Works timings will be appropriate with periods of 'down time to facilitate such movements. Works will have an aquatic specialist ECOW to monitor the faunal species using the river for the project duration and guide appropriate timings of works to avoid impacts for example avoidance of works during key salmonid breeding season. The majority of the works will be during day-light hours only and where not feasible sensitive lighting will be used for any night-time works for both construction sites and compounds.		
			Construction activities have the potential to generate water-borne pollution (e.g. dust, fine sediment, fuels and oils) which could give rise to an adverse effect on the Annex I river and the species it supports. Construction activities, such as cutting, piling, temporary abstractions and discharges and floodplain utilisation, also have the potential to impact on the water environment through changes in surface and groundwater quality and quantity and fluvial geomorphological processes.	Rivers and streams will be protected during construction through the implementation of best practice construction techniques and pollution prevention. Site-specific measures, as secured in EMP (Application Document 2.7)and will include a surface water management system using measures such as temporary silt fencing, cut off ditches, settlement ponds and bunds set up early in the construction period to capture all runoff and prevent ingress of sediments and contaminants into existing drainage ditches where necessary. This will be managed by the EMP in accordance with		

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			Non-native faunal riparian species are not currently identified within this scheme, but there remains the potential for introduction of such species (lack of contractor awareness), or for biosecurity issues for example potential for introduction of crayfish plague. Non-native plant species with potential for accidental spreading from alternative sites works on by contractors either prior of between contracts. The water crowfoot Annex 1 habitat is present throughout this river and may colonise new areas prior to commencement of works, in addition highly mobile faunal species are present. Checks on presence of such species will be required prior to works. To inform works appropriately. Air quality modelling recorded an increase in nitrogen deposition at two crossings. Aquatic plants that are a component of the vegetation community are submerged for the majority of the year due to their growth form, consequently they are regularly inundated and flushed during modest flood events. Local	CIRIA guidelines and the Environment Agency's approach to groundwater protection and groundwater protection guidelines. In addition adherence to dust suppression methods as specified within the dEMP will be adhered to and monitored during construction, with any appropriate remedial actions as specified in the dEMP, will be implemented as soon as feasible. Appropriate biosecurity measures as specified within the Invasive Species Management Plan as specified as a contractor's requirement within the EMP will be adhered to. The aquatic ECOW will map the presence of such species and brief contractors on biosecurity measures to be adhered to for avoidance of contaminated soil (with seed bank or vegetative remains of invasive plants for example) transfer as presented within the EMP. Monitoring of presence and extent of invasive non-native species will be undertaken for the duration of the Project. Where measures exist localised removal of species can be undertaken in advance to reduce the potential for spreading of non-native invasive species. This is not likely to be a beneficial effect due to constant replenishment of seed resource from		

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			contributions to nitrogen deposition identified road transport as the smallest identified source. It is considered that any increase in nitrogen deposition as a result of the Project, even an increase in over 1000 Annual Average Daily Traffic will not make a considerable impact to the overall source of nitrogen deposition that the SAC currently received from various other sources. The contribution of nitrogen from road transport in the context of other nitrogen sources (as discussed above) is modest, especially when the flushing effect of the water is considered. The impacts are localised and therefore, it is considered that nitrogen deposition would not result in an adverse effect of this feature within the respective SSSI units. Subsequently no significant effect is predicted on the River Eden SAC and River Eden and Tributaries SSSI.	upstream areas for species such as Himalayan balsam, The EMP specifies the use of pre-construction checks for the qualifying species of The River Eden to appropriately inform works and to identify any appropriate mitigation or additional species licencing requirements.		
Temple Sowerby Moss SSSI	Species-rich fen habitat with associated notable	High	Potential for habitat degradation / damage through dust deposition as a result of construction activities. Potential for construction related air quality impacts.	Dust and pollution prevention measures as specified within the EMP will be adhered to, including site-specific measures regarding dust emitting activities in line	No change	Neutral

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
	plant species.			with Institute of Air Quality Management (IAQM) guidance.		
Bolton shingle Bank, River Eden, Oglebird Scars Ers and Temple Sowerby Shingle Bank Sites of Invertebrate Significance SIS.	Raised gravel bars and sandy banks of River Eden, which supports several rare and notable invertebrate species.	High	Poorly designed watercourse crossings and temporary and permanent floodplain utilisation have the potential to alter fluvial geomorphological processes locally. This may result in alterations of habitats locally and indirect effects on populations of invertebrates associated with sandbanks and gravel bar deposits. Potential for construction activities to temporarily cause dust and this to smother exposed river sediment as habitat used by rare and notable invertebrate species.	Not required due to specific modelling for the viaduct at Trout beck area of the River Eden has not been shown to affect fluvial geomorphological processes. Site specific measures for dust and pollution management, as stated within the EMP will be adhered to. Due to this being within the designation of the River Eden SAC and River Eden and Tributaries SSSI, a specific aquatic ECoW is to be appointed to ensure commitments within the EMP are adhered to for all notable habitats, species and features of this river.	No change	Neutral
Chapel Wood LWS and Chapel Wood	Ancient woodland and ancient woodland indicator species.	High	Construction activities and haul routes have the potential to generate pollution e.g. dust, fine sediments, fuels and oils. Potential dust deposition from dust emitting activities which may smother vegetation and affect evapotranspiration and photosynthesis. Potential for accidental encroachment onto sensitive habitats within this site. With the	Site-specific measures regarding dust emitting activities from construction or haul routes are secured within the EMP (Application Document Number 2.7) and follow IAQM guidance (Institute of Air Quality Management, 2014).[1] Appropriate fencing will be erected to demarcate the works area and the designated site, in order to ensure no accidental encroachment on retained habitats.	Negligible	Slight adverse

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			potential for indirect effects upon vegetation through ground compaction which may affect growth success for ancient woodland trees and presence of ground flora. Temporary minor loss of woodland within the LWS	Works will be located over 50m away from the boundary of the ancient woodland habitat, avoiding the potential for impacts to trees within the ancient woodland habitat, or for loss of, or damage to ground flora.. Environmental mitigation takes account of the potential temporary minor loss or damage to trees required for construction		
Appleby to Brough						
River Eden SAC, River Eden and Tributaries SSSI	All qualifying features	Very high to high	Construction activities have the potential to generate water-borne pollution (e.g. dust, fine sediment, fuels and oils) on watercourses which are hydrologically linked to the River Eden SAC and River Eden and Tributaries SSSI. This could give rise to an adverse effect on the Annex I river and the species it supports. Non-native faunal riparian species are not currently identified within this scheme, but there remains the potential for introduction of such species (lack of contractor awareness), or for biosecurity issues for example potential for introduction of crayfish plague. Non-native plant species with potential for accidental spreading	Rivers and streams will be protected during construction through the implementation of best practice construction techniques and pollution prevention. Site-specific measures, as secured in EMP (Application Document 2.7)) and will include a surface water management system using measures such as temporary silt fencing, cut off ditches, settlement ponds and bunds set up early in the construction period to capture all runoff and prevent ingress of sediments and contaminants into existing drainage ditches where necessary. This will be managed by the EMP in accordance with CIRIA guidelines and the Environment Agency's approach to groundwater protection and groundwater protection guidelines. In addition adherence to dust suppression methods as specified within	No change	Neutral

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			from alternative sites works on by contractors either prior of between contracts. Air quality modelling recorded an increase in nitrogen deposition at two crossings. Aquatic plants that are a component of the vegetation community are submerged for the majority of the year due to their growth form, consequently they are regularly inundated and flushed during modest flood events. Local contributions to nitrogen deposition identified road transport as the smallest identified source. It is considered that any increase in nitrogen deposition as a result of the Project, even an increase in over 1000 Annual Average Daily Traffic will not make a considerable impact to the overall source of nitrogen deposition that the SAC currently received from various other sources. The contribution of nitrogen from road transport in the context of other nitrogen sources (as discussed above) is modest, especially when the flushing effect of the water is considered. The impacts are localised and therefore, it is considered that nitrogen	the dEMP will be adhered to and monitored during construction, with any appropriate remedial actions as specified in the dEMP, will be implemented as soon as feasible. Appropriate biosecurity measures as specified within the Invasive Species Management Plan as specified as a contractor's requirement within the EMP will be adhered to. The aquatic ECOW will map the presence of such species and brief contractors on biosecurity measures to be adhered to for avoidance of contaminated soil (with seed bank or vegetative remains of invasive plants for example) transfer as presented within the EMP. Monitoring of presence and extent of invasive non-native species will be undertaken for the duration of the Project. Where measures exist localised removal of species can be undertaken in advance to reduce the potential for spreading of non-native invasive species. This is not likely to be a beneficial effect due to constant replenishment of seed resource from upstream areas for species such as Himalayan balsam, The EMP specifies the use of pre-construction checks for the qualifying species of The River Eden to appropriately inform works and to identify any		

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			deposition would not result in an adverse effect of this feature within the respective SSSI units. Subsequently no significant effect is predicted on the River Eden SAC and River Eden and Tributaries SSSI.	appropriate mitigation or additional species licencing requirements.		
Sandford Mire LWS	Species-rich fen, marsh and swamp, running water and pond habitats	High	Potential for pollution (dust, fine sediments, fuels and oils) from construction activities. Potential for impacts upon irreplaceable fen habitat, or upon marsh, swamp or running water through ground water impacts, causing vegetation change and potential loss of or damage to structural component vegetation.	Site-specific measures regarding dust emitting activities and pollution prevention arising from construction are secured within the EMP (Application Document Number 2.7) No specific measures are required regarding the potential for impacts via ground water, due to the scheme being above the level of the ground water for this site and presence of a cutting (rail line) between the Order limits and the site.	No change	Neutral
Four of Special Roadside Verges C2P, C25 (10a, 10b, 7a and 7b)	Species-rich neutral grassland habitat	Low	Potential for pollution (dust, fine sediments, fuels and oils) from construction activities.	Site-specific measures regarding dust emitting activities and pollution prevention arising from construction are secured within the EMP (Application Document Number 2.7)	No change	Neutral
Bowes Bypass						
North Pennine Moors SAC,	All qualifying features	Very high to high	Potential for habitat degradation as a result of poor air quality during construction activities.	Not required as construction traffic will not be using the adjacent sections of the A66.	No change	Neutral

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
SPA and Bowes Moor SSSI						
Cross Lanes to Rokeby						
Rokeby Park and Mortham Wood LWS	Parkland with mature trees, potential ancient woodland and veteran or ancient trees.	High	Potential temporary or permanent minor loss of habitat due to the Order Limits extending into the designated site for the proposed junction improvement works at Rokeby Grange drive/approach road. Noting, the permanent acquisition of land will not extend into the designated site. Construction activities have the potential to generate pollution e.g. dust, fine sediments, fuels and oils. Potential for damage to adjacent mature trees. Air quality modelling recorded a 1% change against the critical load at 0m of the transect located approximately 5m from the road. The site was recorded to be sheep and cattle grazed with short cropped improved grassland with scattered mature trees during the Phase 1 survey. No woodland ground flora exists beneath trees within this area of the site. Using mapping Google Earth, December	ECoW surveys will be undertaken to ensure any temporary impacts to valued ground flora within areas of temporary landtake are protected or relocated as stated within the EMP. Site-specific measures regarding dust, pollution and protection measures for the designated site, mature trees and ground flora are secured within the EMP (Application Document Number 2.7). Works associated with the Rokeby Grange drive/approach road are to be on areas of hardstanding only and no impacts to root protection zones of adjacent trees is anticipated. Should permanent fencing be required fence posts are to be hand dug to avoid heavy machinery being used. If machinery is required, low pressure vehicles and vehicle mats/pads are to be used to avoid ground compaction.	Negligible	Slight adverse

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			2021 and reviewing historical OS maps 1885-1900, the number of mature trees which may qualify as veteran or ancient trees within the site that may be impacted by increases in nitrogen deposition within 0m of the transect during construction is approximately five. No trees will be lost or disturbed as a result of construction. Potential impacts from increased nitrogen deposition are not predicted to lead to indirect impacts on the functioning of ectomychorrhizal fungi to support the protection of potential veteran or ancient trees.			
Graham's Gill/ Jack Wood	Ancient woodland with ancient woodland indicator species.	High	Permanent land-take resulting in the potential minor loss of habitat, due to the Order Limits for a drainage channel extending into the designated site. An existing channel in this woodland is to be used to accommodate new drainage from an attenuation basin to the north. Requirement of a post and wire fence within 15m of the ancient woodland buffer.	Woodland planting adjacent to this woodland is proposed for external woodland losses through BNG and this provides both additional habitat and further buffering capacity for this ancient woodland from other existing environmental effects. Discussions with Natural England (14.03.2022) have considered the use of the existing drainage channel for the area of minor permanent land take and this is not perceived to be a significant impact to the integrity or functions of the ancient woodland from the proposed drainage works.	Negligible	Slight adverse

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
				Should permanent post and wire fencing be required, fence posts are to be hand dug to avoid heavy machinery being used. If machinery is required, low pressure vehicles and vehicle mats/pads are to be used to avoid ground compaction.		
Stephen Bank to Carkin Moor						
n/a	n/a	n/a	n/a	n/a	n/a	n/a
A1(M) Junction 53 Scotch Corner						
n/a	n/a	n/a	n/a	n/a	n/a	n/a

Table 6-2: Summary of non-significant effects (construction) on habitats

Receptor	Attribute	Receptor sensitivity	Potential Impact before essential mitigation	Essential mitigation/ enhancement	Impact magnitude	Residual effect
Routewide						
Habitats	Improved Grassland	Negligible to Low	Minor. Loss of approximately 335.73ha of habitat.	Creation of 451.92ha of grassland habitats Details of species seed mixes and management regimes to maximises opportunities for biodiversity will be provided within the LEMP	Negligible	Slight benefit
	Poor semi-improved grassland	Low	Minor. Loss of approximately 69.97ha of habitat.	Creation of 451.92ha of grassland habitats Specifically, 183.2ha of modified grassland which fulfils the same ecological niche	Negligible	Slight benefit

Receptor	Attribute	Receptor sensitivity	Potential Impact before essential mitigation	Essential mitigation/ enhancement	Impact magnitude	Residual effect
				Details of species seed mixes and management regimes to maximises opportunities for biodiversity will be provided within the LEMP		
	Neutral grassland - semi-improved	Low to medium	Minor. Loss of approximately 18.31ha of habitat.	Creation of 451.92ha of grassland habitats Specifically, 241ha of other neutral grassland which fulfils the same ecological niche Details of species seed mixes and management regimes to maximises opportunities for biodiversity will be provided within the LEMP	Negligible	Slight benefit
	Acid grassland - semi-improved	Medium	Minor. Loss of approximately 0.15ha of habitat.	Approximately 8.97ha and 13.38ha of lowland and upland acid grassland will be provided	Negligible	Slight benefit
	Cultivated/disturbed land - arable	Low	Minor. Loss of approximately 198.57ha of habitat.	471ha of grassland to be created routewide, including floodplain wetland mosaic, modified grassland, other lowland acid grassland, other neutral grassland, tall herb communities and upland acid grassland. Newly created grassland habitats will provide a range of conditions and functionality, similar to those provided within arable field margin habitats	Negligible	Neutral

Receptor	Attribute	Receptor sensitivity	Potential Impact before essential mitigation	Essential mitigation/ enhancement	Impact magnitude	Residual effect
	Lichen/bryophyte heath	Medium	Large. Loss of approximately 0.37ha of habitat.	Approximately 1.56ha of heathland creation is proposed Details of the heathland proposals should be provided within an appropriately worded LEMP to ensure opportunities for biodiversity are maximised	Minor	Slight adverse
	Mixed woodland - plantation	Low	Minor. Loss of approximately 14.95ha of habitat.	105.18ha of woodland creation is proposed to mitigate for losses of woodland present at baseline The LEMP will seek to maximise opportunities for biodiversity within the woodland habitats with long-term management (at least 30 years) secured as part of the Project, ensuring successful establishment	Negligible	Neutral
	Broadleaved woodland - plantation	Low to Medium	Minor. Loss of approximately 11.14ha of habitat.	105.18ha of woodland creation is proposed to mitigate for losses of woodland present at baseline The LEMP will seek to maximise opportunities for biodiversity within the woodland habitats with long-term management (at least 30 years) secured as part of the Project, ensuring successful establishment	Negligible	Neutral

Receptor	Attribute	Receptor sensitivity	Potential Impact before essential mitigation	Essential mitigation/ enhancement	Impact magnitude	Residual effect
	Coniferous woodland - plantation	Low	Minor. Loss of approximately 8.05ha of habitat.	105.18ha of woodland creation is proposed to mitigate for losses of woodland present at baseline The LEMP will seek to maximise opportunities for biodiversity within the woodland habitats with long-term management (at least 30 years) secured as part of the Project, ensuring successful establishment	Slight	Minor benefit
	Other habitat	Low to Medium	Negligible to Minor. Loss of approximately 2.71ha of habitat.	No mitigation necessary for artificial surfaces 105.18ha of woodland creation is proposed to mitigate for losses of woodland present at baseline It is proposed that a proportion of this woodland planting includes groups of fruit bearing trees in the apple (*Malus* sp.), pear (*Pyrus* sp.) and cherry (*Prunus* sp.) families to replace those lost from baseline orchard habitats. The LEMP will seek to maximise opportunities for biodiversity within the created woodland habitats with long-term management (at least 30 years) secured as part of the Project, ensuring successful establishment	Neutral	Negligible to Minor adverse

Receptor	Attribute	Receptor sensitivity	Potential Impact before essential mitigation	Essential mitigation/ enhancement	Impact magnitude	Residual effect
	Broadleaved Parkland/scattered trees	Medium	Major. Loss of approximately 0.22ha of habitat.	105.18ha of woodland creation 0.4ha of parkland creation Veteranisation of retained trees Provision of LEMP that will seek to maximise opportunities for biodiversity within newly created woodland Commitment to long-term management (at least 30 years) that will seek to maximise opportunities for biodiversity Further avoidance sought at detailed design stage	Slight	Minor adverse
	Scrub - dense/continuous	Low	Minor. Loss of approximately 5.84ha of habitat.	53.62ha of scrub habitat will be created as part of the Project to mitigate for habitat losses. Moderate to high quality creation will be secured, subject to an appropriate LEMP	Slight	Minor benefit
	Scrub - scattered	Low	Minor. Loss of approximately 5.84ha of habitat.	53.62ha of scrub habitat will be created as part of the Project to mitigate for habitat losses. Moderate to high quality creation will be secured, subject to an appropriate LEMP	Slight	Minor benefit
	Marsh/marshy grassland	Medium	Minor to Major. Loss of approximately 6.32ha of habitat.	21.51ha of fen and 0.53ha of purple moor grass and rush pasture creation is proposed	Slight	Minor adverse

Receptor	Attribute	Receptor sensitivity	Potential Impact before essential mitigation	Essential mitigation/ enhancement	Impact magnitude	Residual effect
				The LEMP will seek to maximise opportunities for biodiversity within the created habitats, set out long-term management (at least 30 years) and detail legally binding funding mechanisms for its implementation		
	Swamp (Local and County importance)	Low to Medium	Moderate. Loss of approximately 1.36ha of habitat.	20.1ha of wetland creation is proposed	Slight	Negligible
	Standing water - eutrophic	Medium	Minor. Loss of approximately 0.13ha of habitat.	Approximately 0.48ha of pond habitat will be created as part of the Project Detail of wildlife friendly design and management prescriptions will be provided within an appropriately worded LEMP	Slight	Negligible
	Standing water - mesotrophic	Low	Minor. Less that 0.001ha of habitat loss.	Approximately 0.48ha of pond habitat will be created as part of the Project Detail of wildlife friendly design and management prescriptions will be provided within an appropriately worded LEMP	Slight	Negligible
M6 Junction 40 to Kemplay Bank						
Habitats	Standing water - mesotrophic	Low	Minor. Less that 0.001ha of habitat loss.	Approximately 0.48ha of pond habitat will be created as part of the Project	Slight	Negligible

Receptor	Attribute	Receptor sensitivity	Potential Impact before essential mitigation	Essential mitigation/ enhancement	Impact magnitude	Residual effect
				Detail of wildlife friendly design and management prescriptions will be provided within an appropriately worded LEMP		
	Improved Grassland	Negligible to Low	Minor. Loss of approximately 14.51ha of habitat.	Creation of 451.92ha of grassland habitats Details of species seed mixes and management regimes to maximises opportunities for biodiversity will be provided within the LEMP	Negligible	Slight benefit
	Poor semi-improved grassland	Low	Minor. Loss of approximately 2.14ha of habitat.	Creation of 451.92ha of grassland habitats Specifically, 183.2ha of modified grassland which fulfils the same ecological niche Details of species seed mixes and management regimes to maximises opportunities for biodiversity will be provided within the LEMP	Negligible	Slight benefit
	Neutral grassland - semi-improved	Low to medium	Minor. Loss of approximately 2.1ha of habitat.	Creation of 451.92ha of grassland habitats Specifically, 241ha of other neutral grassland which fulfils the same ecological niche Details of species seed mixes and management regimes to maximises opportunities for biodiversity will be provided within the LEMP	Negligible	Slight benefit

Receptor	Attribute	Receptor sensitivity	Potential Impact before essential mitigation	Essential mitigation/ enhancement	Impact magnitude	Residual effect
	Broadleaved woodland - plantation	Low to Medium	Minor. Loss of approximately 1.99ha of habitat.	105.18ha of woodland creation is proposed to mitigate for losses of woodland present at baseline The LEMP will seek to maximise opportunities for biodiversity within the woodland habitats with long-term management (at least 30 years) secured as part of the Project, ensuring successful establishment	Negligible	Neutral
	Coniferous woodland - plantation	Low	Minor. Loss of approximately 2.12ha of habitat.	105.18ha of woodland creation is proposed to mitigate for losses of woodland present at baseline The LEMP will seek to maximise opportunities for biodiversity within the woodland habitats with long-term management (at least 30 years) secured as part of the Project, ensuring successful establishment	Slight	Minor benefit
	Mixed woodland - plantation	Low	Minor. Loss of approximately 6.14ha of habitat.	105.18ha of woodland creation is proposed to mitigate for losses of woodland present at baseline The LEMP will seek to maximise opportunities for biodiversity within the woodland habitats with long-term management (at least 30 years) secured as part of the Project, ensuring successful establishment	Negligible	Neutral

Receptor	Attribute	Receptor sensitivity	Potential Impact before essential mitigation	Essential mitigation/ enhancement	Impact magnitude	Residual effect
	Scrub - dense/continuous	Low	Minor. Loss of approximately 1.41ha of habitat.	53.62ha of scrub habitat will be created as part of the Project to mitigate for habitat losses. Moderate to high quality creation will be secured, subject to an appropriate LEMP	Slight	Minor benefit
Penrith to Temple Sowerby						
Habitats	A3.1 - Broadleaved Parkland/scattered trees	Medium	Major. Loss of 1.01ha of habitat.	105.18ha of woodland creation Provision of LEMP that will seek to maximise opportunities for biodiversity within newly created woodland Commitment to long-term management (at least 30 years) that will seek to maximise opportunities for biodiversity.	Slight	Minor adverse
	B2.2 - Neutral grassland - semi-improved	Low to medium	Minor. Loss of 3.37ha of habitat.	Creation of 451.92ha of grassland habitats Specifically, 241ha of other neutral grassland which fulfils the same ecological niche Details of species seed mixes and management regimes to maximises opportunities for biodiversity will be provided within the LEMP	Low to medium	Minor.
	B4 - Improved grassland	Negligible to Low	Minor. Loss of approximately 47.63ha of habitat.	Creation of 451.92ha of grassland habitats	Negligible	Slight benefit

Receptor	Attribute	Receptor sensitivity	Potential Impact before essential mitigation	Essential mitigation/ enhancement	Impact magnitude	Residual effect
				Details of species seed mixes and management regimes to maximises opportunities for biodiversity will be provided within the LEMP		
	B6 - Poor semi-improved grassland	Low	Minor. Loss of approximately 22.01ha of habitat.	Creation of 451.92ha of grassland habitats Specifically, 183.2ha of modified grassland which fulfils the same ecological niche Details of species seed mixes and management regimes to maximises opportunities for biodiversity will be provided within the LEMP	Negligible	Slight benefit
	B2.2 - Neutral grassland - semi-improved	Low	Minor. Loss of approximately 3.37ha of habitat.	Creation of 451.92ha of grassland habitats Specifically, 241ha of other neutral grassland which fulfils the same ecological niche Details of species seed mixes and management regimes to maximises opportunities for biodiversity will be provided within the LEMP	Negligible	Slight benefit
	A1.1.2 - Broadleaved woodland - plantation	Low	Minor. Loss of approximately 0.78ha of habitat.	105.18ha of woodland creation is proposed to mitigate for losses of woodland present at baseline The LEMP will seek to maximise opportunities for biodiversity within the woodland habitats with long-term management (at least 30	Negligible	Neutral

Receptor	Attribute	Receptor sensitivity	Potential Impact before essential mitigation	Essential mitigation/ enhancement	Impact magnitude	Residual effect
				years) secured as part of the Project, ensuring successful establishment		
	A1.2.2 - Coniferous woodland - plantation	Low	Minor. Loss of approximately 0.67ha of habitat.	105.18ha of woodland creation is proposed to mitigate for losses of woodland present at baseline The LEMP will seek to maximise opportunities for biodiversity within the woodland habitats with long-term management (at least 30 years) secured as part of the Project, ensuring successful establishment	Slight	Minor benefit
	A1.3.2 - Mixed woodland - plantation	Low	Minor. Loss of approximately 1.13ha of habitat.	105.18ha of woodland creation is proposed to mitigate for losses of woodland present at baseline The LEMP will seek to maximise opportunities for biodiversity within the woodland habitats with long-term management (at least 30 years) secured as part of the Project, ensuring successful establishment	Negligible	Neutral
	A2.1 - Scrub - dense/continuous	Low	Minor. Loss of approximately 1.35ha of habitat.	53.62ha of scrub habitat will be created as part of the Project to mitigate for habitat losses. Moderate to high quality creation will be secured, subject to an appropriate LEMP	Slight	Minor benefit

Receptor	Attribute	Receptor sensitivity	Potential Impact before essential mitigation	Essential mitigation/ enhancement	Impact magnitude	Residual effect
	F1 - Swamp	Low	Moderate. Loss of approximately 0.01ha of habitat.	20.1ha of wetland creation is proposed	Slight	Negligible
	B5 - Marsh/ marshy grassland	Low	Minor. Loss of approximately 0.32ha of habitat.	21.51ha of fen and 0.53ha of purple moor grass and rush pasture creation is proposed The LEMP will seek to maximise opportunities for biodiversity within the created habitats, set out long-term management (at least 30 years) and detail legally binding funding mechanisms for its implementation	Slight	Neutral
Temple Sowerby to Appleby						
Habitats	A3.1 - Broadleaved Parkland/scattered trees	Medium	Major. Loss of approximately 0.01ha of habitat.	105.18ha of woodland creation 0.04ha of parkland creation Veteranisation of retained trees Provision of LEMP that will seek to maximise opportunities for biodiversity within newly created woodland Commitment to long-term management (at least 30 years) that will seek to maximise opportunities for biodiversity Further avoidance sought at detailed design stage	Slight	Minor adverse

Receptor	Attribute	Receptor sensitivity	Potential Impact before essential mitigation	Essential mitigation/ enhancement	Impact magnitude	Residual effect
	A1.1.2 - Broadleaved woodland - plantation	Low to Medium	Minor. Loss of approximately 0.53ha of habitat.	105.18ha of woodland creation is proposed to mitigate for losses of woodland present at baseline The LEMP will seek to maximise opportunities for biodiversity within the woodland habitats with long-term management (at least 30 years) secured as part of the Project, ensuring successful establishment	Negligible	Neutral
	A1.2.2 - Coniferous woodland - plantation	Low	Minor. Loss of approximately 0.37ha of habitat.	105.18ha of woodland creation is proposed to mitigate for losses of woodland present at baseline The LEMP will seek to maximise opportunities for biodiversity within the woodland habitats with long-term management (at least 30 years) secured as part of the Project, ensuring successful establishment	Slight	Minor benefit
	A1.3.2 - Mixed woodland - plantation	Low	Minor. Loss of approximately 1.61ha of habitat.	105.18ha of woodland creation is proposed to mitigate for losses of woodland present at baseline The LEMP will seek to maximise opportunities for biodiversity within the woodland habitats with long-term management (at least 30 years) secured as part of the Project, ensuring successful establishment	Negligible	Neutral

Receptor	Attribute	Receptor sensitivity	Potential Impact before essential mitigation	Essential mitigation/ enhancement	Impact magnitude	Residual effect
	A2.1 - Scrub - dense/continuous	Low	Minor. Loss of approximately 0.25ha of habitat.	53.62ha of scrub habitat will be created as part of the Project to mitigate for habitat losses. Moderate to high quality creation will be secured, subject to an appropriate LEMP	Slight	Minor benefit
	B5 - Marsh/marshy grassland	Low	Minor. Loss of approximately 0.37ha of habitat.	21.51ha of fen and 0.53ha of purple moor grass and rush pasture creation is proposed The LEMP will seek to maximise opportunities for biodiversity within the created habitats, set out long-term management (at least 30 years) and detail legally binding funding mechanisms for its implementation	Slight	Neutral
	A2.2 - Scrub - scattered	Low	Minor. Loss of approximately 0.12ha of habitat.	53.62ha of scrub habitat will be created as part of the Project to mitigate for habitat losses. Moderate to high quality creation will be secured, subject to an appropriate LEMP	Slight	Minor benefit
Appleby to Brough						
Habitats	B5 - Marsh/marshy grassland	Medium	Major (on Nationally important areas of habitat). Direct loss of 5.44ha of habitats and potential degradation of 2.5ha of habitat outside of the Order Limits.	Creation of 21.5ha of fen and 0.53 ha of purple moor grass and rush pasture habitat LEMP that seeks to maximise opportunities for biodiversity, set out long-term management (at least 30		Minor adverse

Receptor	Attribute	Receptor sensitivity	Potential Impact before essential mitigation	Essential mitigation/ enhancement	Impact magnitude	Residual effect
				years) and detail legally binding funding mechanisms for its implementation.		
	A3.1 - Broadleaved Parkland/scattered trees		Major. Loss of 0.09ha of habitat.	105.18ha of woodland creation 0.4ha of parkland creation Veteranisation of retained trees Provision of LEMP that will seek to maximise opportunities for biodiversity within newly created woodland Commitment to long-term management (at least 30 years) that will seek to maximise opportunities for biodiversity Further avoidance sought at detailed design stage	Slight	Minor adverse
	D3 - Lichen/bryophyte heath	Medium	Major. Loss of 0.37ha of habitat.	1.56ha of heathland creation Provision of LEMP that will seek to maximise opportunities for biodiversity within newly created woodland Commitment to long-term management (at least 30 years) that will seek to maximise opportunities for biodiversity		Minor adverse
	A3.3 - Mixed Parkland/scattered trees	Medium	Major. Loss of approximately 0.04ha of habitat.	105.18ha of woodland creation 0.4ha of parkland creation Veteranisation of retained trees	Slight	Minor adverse

Receptor	Attribute	Receptor sensitivity	Potential Impact before essential mitigation	Essential mitigation/ enhancement	Impact magnitude	Residual effect
				Provision of LEMP that will seek to maximise opportunities for biodiversity within newly created woodland Commitment to long-term management (at least 30 years) that will seek to maximise opportunities for biodiversity Further avoidance sought at detailed design stage		
Bowes Bypass						
Habitats	Improved Grassland	Negligible to Low	Minor. Loss of approximately 29.08ha of habitat.	Creation of 451.92ha of grassland habitats Details of species seed mixes and management regimes to maximises opportunities for biodiversity will be provided within the LEMP	Negligible	Slight benefit
	Poor semi-improved grassland	Low	Minor. Loss of approximately 10.56ha of habitat.	Creation of 451.92ha of grassland habitats Specifically, 183.2ha of modified grassland which fulfils the same ecological niche Details of species seed mixes and management regimes to maximises opportunities for biodiversity will be provided within the LEMP	Negligible	Slight benefit
	Neutral grassland -	Low to medium	Minor.	Creation of 451.92ha of grassland habitats	Negligible	Slight benefit

Receptor	Attribute	Receptor sensitivity	Potential Impact before essential mitigation	Essential mitigation/ enhancement	Impact magnitude	Residual effect
	semi-improved		Loss of approximately 0.17ha of habitat.	Specifically, 241ha of other neutral grassland which fulfils the same ecological niche Details of species seed mixes and management regimes to maximises opportunities for biodiversity will be provided within the LEMP		
	Broadleaved woodland - plantation	Low to Medium	Minor. Loss of approximately 3.19ha of habitat.	105.18ha of woodland creation is proposed to mitigate for losses of woodland present at baseline The LEMP will seek to maximise opportunities for biodiversity within the woodland habitats with long-term management (at least 30 years) secured as part of the Project, ensuring successful establishment	Negligible	Neutral
	Mixed woodland - plantation	Low	Minor. Loss of approximately 0.64ha of habitat.	105.18ha of woodland creation is proposed to mitigate for losses of woodland present at baseline The LEMP will seek to maximise opportunities for biodiversity within the woodland habitats with long-term management (at least 30 years) secured as part of the Project, ensuring successful establishment	Negligible	Neutral
	Scrub - dense/continuous	Low	Minor.	53.62ha of scrub habitat will be created as part of the Project to mitigate for habitat losses.	Slight	Minor benefit

Receptor	Attribute	Receptor sensitivity	Potential Impact before essential mitigation	Essential mitigation/ enhancement	Impact magnitude	Residual effect
			Loss of approximately 1.41ha of habitat.	Moderate to high quality creation will be secured, subject to an appropriate LEMP		
	Marsh/marshy grassland	Low	Minor. Loss of approximately 6.32ha of habitat.	21.51ha of fen and 0.53ha of purple moor grass and rush pasture creation is proposed The LEMP will seek to maximise opportunities for biodiversity within the created habitats, set out long-term management (at least 30 years) and detail legally binding funding mechanisms for its implementation	Slight	Neutral
Cross Lanes to Rokeby						
Habitats	A3.1 - Broadleaved Parkland/scattered trees	Medium	Major. Loss of approximately 0.12ha of habitat.	105.18ha of woodland creation Provision of LEMP that will seek to maximise opportunities for biodiversity within newly created woodland Commitment to long-term management (at least 30 years) that will seek to maximise opportunities for biodiversity.	Slight	Minor adverse
	B2.2 - Neutral grassland - semi-improved	Low to medium	Minor. Loss of 0.06ha of habitat.	Creation of 451.92ha of grassland habitats Specifically, 241ha of other neutral grassland which fulfils the same ecological niche	Low to medium	Minor.

Receptor	Attribute	Receptor sensitivity	Potential Impact before essential mitigation	Essential mitigation/ enhancement	Impact magnitude	Residual effect
				Details of species seed mixes and management regimes to maximises opportunities for biodiversity will be provided within the LEMP		
	A1.1.2 - Broadleaved woodland - plantation	Low to Medium	Minor. Loss of approximately 2.01ha of habitat.	105.18ha of woodland creation is proposed to mitigate for losses of woodland present at baseline The LEMP will seek to maximise opportunities for biodiversity within the woodland habitats with long-term management (at least 30 years) secured as part of the Project, ensuring successful establishment	Negligible	Neutral
	A2.1 - Scrub - dense/continuous	Low	Minor. Loss of 0.13ha of habitat.	Approximately 53.62ha of scrub habitat will be created Provision of LEMP that will seek to maximise opportunities for biodiversity within newly created woodland Commitment to long-term management (at least 30 years) that will seek to maximise opportunities for biodiversity	Slight	Minor beneficial
	F1 - Swamp	Low	Moderate. Loss of approximately 1.36ha of habitat.	20.1ha of wetland creation is proposed	Slight	Negligible

Receptor	Attribute	Receptor sensitivity	Potential Impact before essential mitigation	Essential mitigation/ enhancement	Impact magnitude	Residual effect
	B5 - Marsh/marshy grassland	Low	Minor. Loss of approximately 0.07ha of habitat.	21.51ha of fen and 0.53ha of purple moor grass and rush pasture creation is proposed The LEMP will seek to maximise opportunities for biodiversity within the created habitats, set out long-term management (at least 30 years) and detail legally binding funding mechanisms for its implementation	Slight	Neutral
	G1.1 - Standing water - eutrophic	Medium	Minor. Loss of approximately 0.3ha of habitat.	Approximately 0.48ha of pond habitat will be created as part of the Project Detail of wildlife friendly design and management prescriptions will be provided within an appropriately worded LEMP	Slight	Negligible
Stephen Bank to Carkin Moor						
Habitats	A3.1 - Broadleaved Parkland/scattered trees	Medium	Major. Loss of approximately 0.78ha of habitat.	105.18ha of woodland creation 0.4ha of parkland creation Veteranisation of retained trees Provision of LEMP that will seek to maximise opportunities for biodiversity within newly created woodland Commitment to long-term management (at least 30 years) that will seek to maximise opportunities for biodiversity	Slight	Minor adverse

Receptor	Attribute	Receptor sensitivity	Potential Impact before essential mitigation	Essential mitigation/ enhancement	Impact magnitude	Residual effect
				Further avoidance sought at detailed design stage		
	B4 - Improved grassland	Negligible to Low	Minor. Loss of approximately 11.35ha of habitat.	Creation of 451.92ha of grassland habitats Details of species seed mixes and management regimes to maximises opportunities for biodiversity will be provided within the LEMP	Negligible	Slight benefit
	B6 - Poor semi-improved grassland	Low	Minor. Loss of approximately 11.35ha of habitat.	Creation of 451.92ha of grassland habitats Specifically, 183.2ha of modified grassland which fulfils the same ecological niche Details of species seed mixes and management regimes to maximises opportunities for biodiversity will be provided within the LEMP	Negligible	Slight benefit
	A1.1.2 - Broadleaved woodland - plantation	Low to Medium	Minor. Loss of approximately 0.9ha of habitat.	105.18ha of woodland creation is proposed to mitigate for losses of woodland present at baseline The LEMP will seek to maximise opportunities for biodiversity within the woodland habitats with long-term management (at least 30 years) secured as part of the Project, ensuring successful establishment	Negligible	Neutral

Receptor	Attribute	Receptor sensitivity	Potential Impact before essential mitigation	Essential mitigation/ enhancement	Impact magnitude	Residual effect
	A1.2.2 - Coniferous woodland - plantation	Low	Minor. Loss of approximately 0.19ha of habitat.	105.18ha of woodland creation is proposed to mitigate for losses of woodland present at baseline The LEMP will seek to maximise opportunities for biodiversity within the woodland habitats with long-term management (at least 30 years) secured as part of the Project, ensuring successful establishment	Slight	Minor benefit
	A1.3.2 - Mixed woodland - plantation	Low	Minor. Loss of approximately 1.78ha of habitat.	105.18ha of woodland creation is proposed to mitigate for losses of woodland present at baseline The LEMP will seek to maximise opportunities for biodiversity within the woodland habitats with long-term management (at least 30 years) secured as part of the Project, ensuring successful establishment	Negligible	Neutral
	A2.1 - Scrub - dense/continuous	Low	Minor. Loss of approximately 1.65ha of habitat.	53.62ha of scrub habitat will be created as part of the Project to mitigate for habitat losses. Moderate to high quality creation will be secured, subject to an appropriate LEMP	Slight	Minor benefit
	F1 - Swamp	Medium	Moderate. Loss of approximately 1.33ha of habitat.	20.1ha of wetland creation is proposed	Slight	Negligible

Receptor	Attribute	Receptor sensitivity	Potential Impact before essential mitigation	Essential mitigation/ enhancement	Impact magnitude	Residual effect
	B5 - Marsh/marshy grassland	Low	Minor. Loss of approximately 0.1ha of habitat.	21.51ha of fen and 0.53ha of purple moor grass and rush pasture creation is proposed The LEMP will seek to maximise opportunities for biodiversity within the created habitats, set out long-term management (at least 30 years) and detail legally binding funding mechanisms for its implementation	Slight	Neutral
	A2.2 - Scrub - scattered	Low	Minor. Loss of approximately 0.19ha of habitat.	53.62ha of scrub habitat will be created as part of the Project to mitigate for habitat losses. Moderate to high quality creation will be secured, subject to an appropriate LEMP	Slight	Minor benefit
	G1.1 - Standing water - eutrophic	Medium	Minor. Loss of approximately 0.1ha of habitat.	Approximately 0.48ha of pond habitat will be created as part of the Project Detail of wildlife friendly design and management prescriptions will be provided within an appropriately worded LEMP	Slight	Negligible
A1(M) Junction 53 Scotch Corner						
Habitats	Improved grassland	Negligible to Low	Minor. Loss of approximately 0.02ha of habitat.	Creation of 451.92ha of grassland habitats Details of species seed mixes and management regimes to maximises	Negligible	Slight benefit

Receptor	Attribute	Receptor sensitivity	Potential Impact before essential mitigation	Essential mitigation/ enhancement	Impact magnitude	Residual effect
				opportunities for biodiversity will be provided within the LEMP		
	Poor semi-improved grassland	Low	Minor. Loss of approximately 0.27ha of habitat.	Creation of 451.92ha of grassland habitats Specifically, 183.2ha of modified grassland which fulfils the same ecological niche Details of species seed mixes and management regimes to maximises opportunities for biodiversity will be provided within the LEMP	Negligible	Slight benefit
	Broadleaved woodland - plantation	Low	Minor. Loss of approximately 0.07ha of habitat.	105.18ha of woodland creation is proposed to mitigate for losses of woodland present at baseline The LEMP will seek to maximise opportunities for biodiversity within the woodland habitats with long-term management (at least 30 years) secured as part of the Project, ensuring successful establishment	Negligible	Neutral
	Mixed woodland - plantation	Low	Negligible. Loss of approximately 0.01ha of habitat.	105.18ha of woodland creation is proposed to mitigate for losses of woodland present at baseline The LEMP will seek to maximise opportunities for biodiversity within the woodland habitats with long-term management (at least 30 years) secured as part of the	Negligible	Neutral

Receptor	Attribute	Receptor sensitivity	Potential Impact before essential mitigation	Essential mitigation/ enhancement	Impact magnitude	Residual effect
				Project, ensuring successful establishment		
	Scrub - scattered	Low	Negligible. Loss of less than 0.01ha of habitat.	53.62ha of scrub habitat will be created as part of the Project to mitigate for habitat losses. Moderate to high quality creation will be secured, subject to an appropriate LEMP	Slight	Minor benefit

Table 6-3: Summary of non-significant effects (construction) on hedgerow

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
Hedgerow	Important hedgerows, S41 hedgerows and all other hedgerows	Low	• Minor. • Loss of all hedgerows within the construction area.	• Hedgerow planting will occur across all schemes and as a minimum planting will achieve No Net Loss. • All hedgerow planting will include as a minimum native-species rich. • All hedgerow planting will be created to achieve 'good' condition. • The LEMP will seek to maximise opportunities for biodiversity with long-term management (at least 30 years) secured as part of the Project ensuring successful establishment.	Slight	Minor benefit

Table 6-4: Summary of non-significant effects (construction) on amphibians

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
Routewide						
Amphibians	Breeding ponds and terrestrial habitat	Low	The construction of the Project will result in the permanent removal of habitat suitable for amphibians. The resulting loss of breeding ponds and terrestrial habitats which provide foraging, sheltering and hibernation resources has the potential to result in a population decline for all species of amphibians present within the Order Limits. Temporary habitat fragmentation will be caused as a result of the creation of construction routes which might remove habitat suitable for amphibian movement and prevent amphibians from moving between key resources such as to or from breeding ponds.	Much of the habitat creation, included as mitigation for habitat loss, will be of a nature suitable to support amphibians. This includes the creation of 0.48ha ponds, a substantial quantum of which will be designed and managed as wildlife ponds, suitable for amphibians to colonise. In addition, much of the terrestrial habitat creation will provide resource for amphibians at all stages of their life cycle.	Negligible	Neutral
	Individuals	Low	Vegetation clearance during construction has the potential to cause injury or mortality of amphibians. Of particular note is the hibernating period (between October and March inclusive), during which amphibians are particularly vulnerable as they enter a state of reduced activity and are less able to	ECoW presence on specific sites and during specific tasks which have the potential to impact amphibians. Construction works carried out in proximity to the River Eamont will be monitored by the ECoW for toad activity, especially during warm spring evenings. Mitigations such as cessation of works and deployment of temporary amphibian fencing and	Negligible	Neutral

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			respond to sudden impacts which may cause them injury or mortality. Injury and mortality could also arise from construction traffic or through entering pre-mitigation SuDS elements and becoming incapacitated or trapped. Eggs and juveniles raised in suboptimal shallow ephemeral waterbodies created as a result of construction works (tracks or puddles) will have increased mortality due to drying out, predation or direct impact from construction traffic and workforce. This is more likely to occur in a scenario of reduced habitat availability or where connective habitats have been severed as a result of construction.	toad tunnels will be used to facilitate movement of toads across the site. The role of the ECoW is further defined within the EMP (Application Document 2.7).		

Table 6-5: Summary of non-significant effects (construction) on reptiles

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
Routewide						
Reptiles	Terrestrial habitat	Low	The construction phase will result in the permanent or temporary loss of pockets of suitable habitat which may support reptiles. This equates to an area of approximately 7.5ha within the Order Limits	Where construction of the Project results in the removal of habitat on either a temporary or permanent basis, this will be replaced on a like-for-like or better basis. This includes the provision of reptile receptor sites including features such as hibernacula, log piles and egg laying sites as enhancement measures for reptiles. These areas require advance planting with a scrub/grassland mosaic or cessation of management/grazing to allow longer grass to develop.	Minor	Slight benefit
	Individuals	Low	The presence of common lizard, slow worm and, to a lesser extent, adder within the Project area cannot be ruled out. In the absence of mitigation, activities such as the vegetation clearance, stockpiling of equipment and materials, has the potential to harm or kill reptiles. When disturbed, reptiles frequently bury themselves beneath vegetation to evade predation. The latter response to predation makes them particularly vulnerable to being crushed by heavy machinery.	To mitigate impacts to reptiles, a combination approach of exclusion and displacement has been agreed with Natural England (ES Appendix 6.7: Reptiles (Application Document 3.4)) and this will be further detailed within a Reptile Method Statement to be prepared prior to site preparation and construction works commencing. The Reptile Method Statement will be informed by the surveys described in ES Appendix 6.7: Reptile (Application Document 3.4) to confirm the presence or absence	Negligible	Neutral

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
				of reptiles and identify suitable receptor sites and detail the preparation and management required of these receptor sites in order for them to receive translocated reptiles. The Reptile Method Statement will also develop a mitigation solution that ensures an increase in area of better-quality habitat than that lost to development and that these habitats are well connected to the wider landscape.		

Table 6-6: Summary of non-significant effects (construction) on terrestrial invertebrate

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
Routewide						
Terrestrial invertebrates	Terrestrial habitat	Low	Construction of the Project will result in the loss of habitats such as structured mature broadleaved woodland canopy, tall sward and scrub and short sward and bare ground, which support a diversity of terrestrial invertebrate species.	Any habitat loss will be mitigated for on a like-for-like or better basis and the substantial areas of grassland, scrub and woodland proposed for creation will result in an increase in supportive habitat for the terrestrial invertebrate species present. In the longer term, this is likely to result in increases of population and species diversity.	Minor	Slight benefit

Table 6-7: Summary of non-significant effects (construction) on badger

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
Routewide						
Badger	Individuals	Low	Mortality and injury of badger within setts through impacting structural integrity of setts and causing collapse. Direct mortality and injury of badger from construction machinery Disturbance from noise and vibration can lead to abandonment of setts and young or in the case of vibration could lead to collapse of sett tunnels and chambers.	Setts which could be directly impacted by construction will undergo closure. Majority of works will occur during the day Where night works are unavoidable, best practise to be followed such as site speed limits to reduce injury/mortality potential	Negligible	Neutral
	Terrestrial habitat, including setts	Low	Within the Order Limits and within 30m of the Order Limits, there are six main setts, and within the indicative site clearance boundary and within 30m of it, there are two main setts. Of these, two main setts will likely require closure as they are located within the indicative site clearance boundary. Construction of the Project will result in the removal of suitable foraging and sett creation habitats such as woodland, scrub, hedgerows, rough grassland, arable land/cereal crops, road verges and ditches.	Any closure of a main or annex sett would need to be agreed and approved by Natural England and subject to the issue of a development licence by this agency. This licence and the activities authorised under it will be subject to certain mitigation requirements. The creation and enhancement of habitats and the provision of 12 new badger underpasses under the Project would mitigate severance of habitat and territories. The installation of these underpasses will be phased during construction, with some existing underpasses retained	Minor	Slight adverse

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			Site clearance and construction could lead to isolation of badger populations both within and between clans. Habitat severance could cause an increase in conflict and competition due to a temporary reduction in territory size and foraging resource.	until new underpasses have been constructed, to ensure badger are able to move across the Project throughout the construction phase.		
M6 Junction 40 to Kemplay Bank						
Badger	Terrestrial habitat	Low	Temporary closure of underpass connecting Police station to A686 would lead to isolation of badger populations and reduce foraging availability	Underpass to remain accessible to badgers at all times	Negligible	Neutral
Penrith to Temple Sowerby						
Badger	Habitat loss	Low	Habitat loss as a result of construction of the Project. Destruction of setts within new A66 footprint Disturbance of setts within 30m of construction boundary	Creation of compensatory habitat to restore connectivity and increase foraging habitat Closure of setts within 30m of construction boundary	Negligible	Neutral
	Severance	Low	Isolation of badger populations could cause an increase in conflict and competition	Construction programme allows for certain crossing areas to remain available until a wildlife culvert is constructed Temporary fencing to funnel badgers to appropriate crossing points during the construction phase	Minor	Slight adverse

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
Temple Sowerby to Appleby						
Badger	Habitat loss, species mortality, injury and disturbance	Low	Habitat loss due to new A66 footprint Destruction of setts within new A66 footprint Disturbance of setts within 30m of construction boundary	Creation of compensatory habitat to restore connectivity and increase foraging habitat Closure of setts within 30m of construction boundary Construction of artificial setts to replace closed main setts	Minor	Slight adverse
	Severance	Low	Habitat severance due to new A66 footprint on undisturbed land	Construction programme allows for certain crossing areas to remain available until a wildlife culvert is constructed Temporary fencing to funnel badgers to appropriate crossing points during the construction phase	Minor	Slight adverse
Appleby to Brough						
Badger	Habitat loss, species mortality, injury and disturbance	Low	Habitat loss minimal as scheme is largely within existing A66 footprint Destruction of setts within new A66 footprint Disturbance of setts within 30m of construction boundary	Creation of compensatory habitat to restore connectivity and increase foraging habitat Closure of setts within 30m of construction boundary Construction of artificial setts to replace closed main setts	Minor	Slight adverse
	Severance	Low	Habitat severance due to extended footprint of existing A66	Construction programme allows for certain crossing areas to remain available until a wildlife culvert is constructed	Minor	Slight adverse

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
				Temporary fencing to funnel badgers to appropriate crossing points during the construction phase		
Bowes Bypass						
n/a	n/a	n/a	n/a	n/a	n/a	n/a
Cross Lanes to Rokeby						
Badger	Habitat loss, species mortality, injury and disturbance	Low	Habitat loss minimal as scheme is largely within existing A66 footprint	Creation of compensatory habitat to restore connectivity and increase foraging habitat	Minor	Neutral
	Severance	Low	Habitat severance due to extended footprint of existing A66	None required as no badger field signs recorded on south side of A66	Negligible	Neutral
Stephen Bank to Carkin Moor						
Badger	Habitat loss, species mortality, injury and disturbance	Low	Habitat loss minimal as scheme is largely within existing A66 footprint	Creation of compensatory habitat to restore connectivity and increase foraging habitat	Minor	Slight adverse
	Severance	Low	Habitat severance due to extended footprint of existing A66	Construction programme allows for certain crossing areas to remain available until a wildlife culvert is constructed Temporary fencing to funnel badgers to appropriate crossing points during the construction phase	Minor	Slight adverse

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
A1(M) Junction 53 Scotch Corner						
n/a	n/a	n/a	n/a	n/a	n/a	n/a

Table 6-8: Summary of non-significant effects (construction) on red squirrel

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
Routewide						
Red squirrel	Terrestrial habitats	Medium	Habitat loss will affect existing populations of red squirrel as it will result in a loss of suitable foraging and breeding habitat available and put pressure on existing suitable habitat areas, which could become degraded over time due to the increased use. Temporary habitat fragmentation from construction activities will occur. This will result in temporary loss of connectivity between areas of habitat which could lead to a loss of available seasonal food resources and put increased pressure on resources in remaining areas of woodland.	Habitat creation, proposed as mitigation for habitat loss, will provide suitable habitat for foraging and drey construction, ultimately supporting the existing red squirrel population to expand. The provision of green bridges throughout the Project will provide permanent suitable connective habitat for red squirrel to safely cross the live carriageway.	Negligible	Slight
	Individuals	Medium	Disturbance such as noise and vibration could lead to squirrels abandoning an area or abandoning breeding dreys,	Essential mitigation and enhancement and the EMP, including installation of green overbridges, habitat creation and feeding stations to sustain red squirrels whilst habitat matures.	Negligible	Neutral

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			particularly leaving young at risk of predation and mortality. There may be an increase in incidental red squirrel injury and mortality from road traffic accidents from construction traffic. Collisions may occur from vehicle movement or when plant are in operation and vehicle movement in areas where red squirrel are present	Essential mitigation and enhancement and the EMP, including installation of green overbridges, habitat creation and feeding stations. Where possible, tree felling should be undertaken between October to January, outside of the red squirrel breeding season. If felling is required within the red squirrel breeding season, an Ecological Clerk of Works (ECoW) will undertake a pre-dawn walkover of the area three weeks prior to clearance to check for presence of red squirrels and to mark active dreys.		
M6 Junction 40 to Kemplay Bank						
Red squirrel	Disturbance from construction activities	Medium	Disturbance	Essential mitigation and enhancement and the EMP, including installation of green overbridges, habitat creation and feeding stations to sustain red squirrels whilst habitat matures.	Negligible	Neutral
	Incidental Injury and mortality from road traffic accidents	Medium	Species mortality	Temporary and permanent wildlife bridges and underpasses (located at the underpass leading to Cumbria Constabulary) for squirrels to avoid crossing the carriageway. Where possible, tree felling should be undertaken between October to January, outside of the red squirrel	Negligible	Neutral

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
				breeding season. If felling is required within the red squirrel breeding season, an Ecological Clerk of Works (ECoW) will undertake a pre-dawn walkover of the area three weeks prior to clearance to check for presence of red squirrels and to mark active dreys.		
Penrith to Temple Sowerby						
Red squirrel	Disturbance from construction activities	Medium	Disturbance	Essential mitigation and enhancement and the EMP, including installation of green overbridges, habitat creation and feeding stations to sustain red squirrels whilst habitat matures. Particularly important in areas near Whinfell Forest, which is a Red Squirrel Reserve.	Negligible	Neutral
	Incidental Injury and mortality from road traffic accidents	Medium	Species mortality	Temporary and permanent wildlife bridges (located at Whinfell Forest) and underpasses for squirrels to avoid crossing the carriageway. Where possible, tree felling should be undertaken between October to January, outside of the red squirrel breeding season. If felling is required within the red squirrel breeding season, an Ecological Clerk of Works (ECoW) will undertake a pre-dawn walkover of the area three weeks prior to clearance to check for presence of red squirrels and to mark active dreys.	Negligible	Neutral

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
Temple Sowerby to Appleby						
Red squirrel	Disturbance from construction activities	Medium	Disturbance	Essential mitigation and enhancement and the EMP, including habitat creation and feeding stations to sustain red squirrels whilst habitat matures.	Negligible	Neutral
	Incidental Injury and mortality from road traffic accidents	Medium	Species mortality	Where possible, tree felling should be undertaken between October to January, outside of the red squirrel breeding season. If felling is required within the red squirrel breeding season, an Ecological Clerk of Works (ECoW) will undertake a pre-dawn walkover of the area three weeks prior to clearance to check for presence of red squirrels and to mark active dreys.	Negligible	Neutral
Appleby to Brough						
Red squirrel	Disturbance from construction activities	Medium	Disturbance	Essential mitigation and enhancement and the EMP, including habitat creation and feeding stations to sustain red squirrels whilst habitat matures.	Negligible	Neutral
	Incidental Injury and mortality from road	Medium	Species mortality	Where possible, tree felling should be undertaken between October to January, outside of the red squirrel breeding season. If felling is required	Negligible	Neutral

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
	traffic accidents			within the red squirrel breeding season, an Ecological Clerk of Works (ECoW) will undertake a pre-dawn walkover of the area three weeks prior to clearance to check for presence of red squirrels and to mark active dreys.		
Bowes Bypass						
n/a	n/a	n/a	n/a	n/a	n/a	n/a
Cross Lanes to Rokeby						
n/a	n/a	n/a	n/a	n/a	n/a	n/a
Stephen Bank to Carkin Moor						
n/a	n/a	n/a	n/a	n/a	n/a	n/a
A1(M) Junction 53 Scotch Corner						
n/a	n/a	n/a	n/a	n/a	n/a	n/a

Table 6-9: Summary of non-significant effects (construction) on bats

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
Routewide						
Bats	Roosts	Negligible to medium	Permanent loss of roosts due to deliberate removal for construction Permanent loss of roosting opportunities due to habitat removal	Replacement roosts for all those lost as a result of construction. Roost destruction will be undertaken under an European Protected Species Licence approved by Natural	Minor	Slight adverse

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			Temporary disturbance to roosts caused by construction works (including construction traffic and lighting) causing the mortality of individuals	England, in compliance with the licence conditions. Inclusion of bat boxes within newly created habitats or adjacent areas to replace roosting opportunities in mature trees. Construction works to be avoided within 30m of a known bat roost. If works cannot be avoided, they will be undertaken sensitively (reduced noise and lighting), with supervision from an Ecological Clerk of Works (ECoW), within 30m proximity to known bat roosts. Construction work within 30m of maternity roosts will require approval by the ECoW in advance of works commencing with regard to lighting, and particularly noisy activities may require a European Protected Species Licence where there is a risk of roost abandonment.		
	Commuting and foraging habitats	Negligible to medium	Permanent loss of commuting and foraging habitats Permanent and temporary fragmentation of habitats due to the removal of linear corridors, severing flight routes	Creation of a mosaic of habitats suitable to support foraging and commuting by bats within National Highways' soft estate and within the Order Limits of the Project. Planting suitable to support foraging and commuting by bats on bridges, on approaches to underpasses, and	Minor	Slight adverse

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			Increase in dust and vehicle emissions, degradation of habitats used by bats for foraging. Degradation of aquatic habitats due to pollution arising from construction, affecting the availability of invertebrate food sources(s).	tree canopy planting close to the carriageway verges, to maintain connectivity across the Project. Removal of hedgerows within temporary construction areas will be minimised where possible. Where known bat flight lines are severed as a result of construction, temporary hedgerows and treelines will be reinstated each evening, overnight, throughout the construction period, between March and November, with bat activity monitored by the ECoW. Restrictive working will be required between March to November within 30m of any bat flight routes of district importance or higher. The ECoW will approve all construction activities in these areas in advance of works commencing to ensure any requirements related to lighting or location of noisy machinery are highlighted to the contractor. Degradation of adjacent foraging habitat will be reduced by the implementation of standard pollution control measures as detailed in the Environmental Management Plan (EMP).		

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
	Individual bats	Negligible to medium	Injury or mortality caused by vegetation clearance works or construction traffic.	Crepuscular or night time construction works in 30m proximity to known bat roosts will require approval by the ECoW in advance of works commencing. Restrictions may be required, with particular emphasis on the maternity period when juvenile bats are at higher risk of colliding with construction vehicles.	Minor	Slight adverse
M6 Junction 40 to Kemplay Bank						
Bats	Roosts	Low to medium	No bat roosts are expected to be removed within the indicative site clearance boundary of this scheme. Maternity roosts 1, 2, 100, 102 and 104 are likely to be subject to disturbance from construction activities.	Maternity roosts 1, 2, 100, 102 and 104 will all require restrictive working during the maternity period, to be specified in the EMP and agreed with the ECoW prior to works commencing.	Negligible	Slight adverse
	Commuting and foraging habitats	Low to medium	The bat flight routes RTCP1 and CP1 across the existing A66 at Wetheriggs Country Park and Carleton Hall underpass will be subject to temporary severance from construction activities. Carleton Hall underpass will be impacted through the construction works for general site access and the engineering work.	Working methods and restrictions will be detailed in the EMP and discussed with the ECoW prior to commencement of work. The ECoW will ensure any connective habitats, such as hedgerows and treelines, are re-instated nightly through the active bat period of March to November.	Negligible	Slight adverse
	Individual bats	Low to medium	Injury or mortality, particularly in association with maternity roosts and	Activities in the areas directly surrounding maternity roosts 1, 2,	Negligible	Slight adverse

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			in commuting and foraging corridors severed, as a result of collision with construction traffic	100, 102 and 104 will require restrictive working, to be detailed in the EMP and agreed with the ECoW, during the maternity period. This may include limitations on crepuscular or night time working between March and November within 30m of the crossing points, particularly with regard to construction vehicle movements speed and location and site lighting.		
Penrith to Temple Sowerby						
Bats	Roosts	Negligible to medium	Roost 3 (High Barn) will be removed as a result of construction of this scheme. Roosts 4 to 7, 42, 43 and 124 will be subject to disturbance from construction activities.	One bat house, with associated landscaping, will be constructed to replace this roost. Roost activity and characterisation surveys will be repeated in advance of construction, and at an appropriate time of year, to inform the construction of the replacement roost bat house. The replacement bat roost will be constructed in advance of the removal of Roost 3, under an EPSL. Sensitive working methods established by the ECoW and restrictions detailed in a EMP will be enacted in relation to construction works which may disturb Roosts 4 to 7, 42, 43 and 124.	Minor	Slight adverse

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
	Commuting and foraging habitat	Negligible to low	The bat flight routes CP-7 and RTCP2 crossing the existing A66 will be severed during construction. The bat flight routes CP-7 and RTCP2 crossing the existing A66 together with other remaining habitat parallel with the carriageway will be subject to disturbance as a result of construction works.	Sensitive working methods established by the ECoW and restrictions will be detailed in the EMP and agreed with the ECoW.	Negligible	Neutral
	Individual bats		Injury or mortality, particularly in association with maternity roosts (Roost 4) and in commuting and foraging corridors severed, as a result of collision with construction traffic	Construction works in the areas surrounding Roost 4 will require restrictive working during the maternity period, to be detailed in a EMP and agreed with the ECoW, Crepuscular and night-time working between March and November within 30m of Roost 4 will require restrictions notably with regard to construction vehicle movements and site lighting.	Minor	Neutral
Temple Sowerby to Appleby						
Bats	Roosts	Negligible to medium	Three bat roosts will be removed as a result of construction of this scheme, Roosts 8, 128 and 132. Roosts 9 to 18 and 121 will all be subject to varying degrees of disturbance from construction works.	Repeat roost activity surveys will be required in advance of construction, to inform the type of replacement bat roosts that will be required in advance of the roost demolition under an EPSL. Sensitive working methods established by the ECoW and	Negligible	Slight adverse

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
				restrictions detailed in a EMP will be enacted in relation to construction works which may disturb Roosts 9 to 18 and 121.		
	Commuting and foraging	Negligible to medium	The bat flight routes CP8-20, RTCP3, RTCP4 and the Roman Road corridor (public right of way) will all be subject to severance from construction activities. The bat flight routes CP8-20, RTCP3, RTCP4 and the Roman Road corridor (public right of way) will all be subject to disturbance from construction works.	Sensitive working methods and restrictions will be detailed in the EMP and agreed with the ECoW. The ECoW will ensure any connective habitats, such as hedgerows and treelines are re-instated nightly between March and November.	Negligible	Slight adverse
	Individual bats	Negligible to medium	Injury or mortality, particularly in association with the maternity roost in Eden View Cottages (Roost 11), in the area surrounding the complex of roosts at Sleastonhow Farm (Roosts 14 to 18), and in the areas identified as bat crossing points of county or regional importance.	Restrictive working measures during the maternity period between May to August, will be detailed in a EMP and agreed with the ECoW. In particular, crepuscular or night time working within 30m of these roosts and crossing points will be restricted, notably with regard to construction vehicle movements and site lighting.	Negligible	Slight adverse
Appleby to Brough						
Bats	Roosts	Negligible to low	One bat roost will be removed as a result of the construction of this scheme, Roost 131. Roosts 19 to 21, 86, 114 and 130 will all be subject to varying degrees of	Repeat roost activity surveys will be required in advance of construction, to inform the type of replacement bat roosts that will be required in	Negligible	Neutral

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			disturbance from construction activities.	advance of the roost demolition under an EPSL. Sensitive working methods established by the ECoW and restrictions detailed in a EMP will be enacted in relation to construction works which may disturb Roosts 19 to 21, 86, 114 and 130.		
	Commuting and foraging habitat	Negligible to medium	The bat flight routes CP21 to 27, CP29 and CP30 will be subject to severance. The bat flight routes CP21 to 27, CP29 and CP30 will be subject to disturbance as a result of construction.	Sensitive working methods and restrictions will be detailed in the EMP and agreed with the ECoW. The ECoW will ensure any connective habitats, such as hedgerows and treelines are re-instated nightly between March and November.	Negligible	Neutral
	Individual bats	Negligible to low	Injury or mortality, particularly in association with the areas identified as bat crossing points of county or regional importance.	Restrictive working measures will be detailed in a EMP and agreed with the ECoW. In particular, crepuscular or night time working within 30m of these crossing points will be restricted, notably with regard to construction vehicle movements and site lighting.	Negligible	Neutral
Bowes Bypass						
Bats	Roosts	Negligible to medium	One bat roost will be removed as a result of construction of this scheme (Roost 24, a maternity roost).	On bat house will be provided to replace Roost 24.	Minor	Slight adverse

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			Roosts 23, 25 and the replacement bat house for Roost 24 will be subject to disturbance from construction activities.	Roost activity and characterisation surveys will be repeated in advance of construction, and at an appropriate time of year, to inform the construction of the replacement roost bat house. The replacement bat roost will be constructed in advance of the removal of Roost 24, under an EPSL. The bat house will have appropriate landscape planting to connect it to the wider landscape. Sensitive working methods established by the ECoW and restrictions detailed in a EMP will be enacted in relation to construction works which may disturb Roosts 23, 25 and the replacement bat house for Roost 24. In particular, there will be specific consideration of limiting construction activities which are likely to cause high levels of disturbance during the maternity period between May to August.		
	Commuting and foraging habitat	Negligible to medium	The bat flight routes CP33, CP36 and the areas surrounding the replacement bat house for Roost 24 will all be subject to severance.	Sensitive working methods and restrictions will be detailed in the EMP and agreed with the ECoW. Specific consideration of limiting construction activities which are	Negligible	Slight adverse

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			CP36 and the areas surrounding Roost 24 are key routes and areas for access to the maternity roosts present. The bat flight routes CP33, CP36 and the areas surrounding the replacement bat house for Roost 24 will all be subject to disturbance from construction activities.	likely to cause high levels of disturbance during the maternity period between May to August will be given to CP36 and the area around Roost 24. The ECoW will ensure any connective habitats, such as hedgerows and treelines are re-instated nightly between March and November.		
	Individual bats	Negligible to medium	Injury or mortality, particularly in association with Roost 23, the replacement bat house for Roost 24 and areas identified as bat crossing points of county or regional importance.	Sensitive working methods established by the ECoW and restrictions detailed in a EMP will be enacted. Maternity roost 23 and the replacement bat house for Roost 24 will require restrictive working during the maternity period, to be specified in the EMP and agreed with the ECoW prior to works commencing. Crepuscular or night time working between March and November within 30m of the maternity roosts or crossing points identified, will require specific consideration, notably with regard to construction vehicle movements and lighting. This will be detailed in a EMP and agreed with the ECoW prior to works taking place.	Negligible	Slight adverse

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
Cross Lanes to Rokeby						
Bats	Roosts	Negligible to medium	Three bat roosts will be lost as a result of construction of this scheme, Roosts 27, 60 and 129. Roosts 26, 28 to 32, 59, 75, and 107 will be subject to disturbance from construction activities. Roosts 29 and 30 are maternity roosts.	Repeat roost activity surveys will be required of all roosts to be removed in advance of construction, to inform the type of replacement bat roosts that will be required in advance of the roost demolition under an EPSL. Sensitive working methods established by the ECoW and restrictions detailed in a EMP will be enacted in relation to construction works which may disturb Roosts 26, 28 to 32, 59, 75, and 107. Repeat surveys will be required of Roosts 29 and 30 (both maternity roosts) at an appropriate time of year in advance of the construction works commencing. This will allow the ECoW to manage the disturbance arising from construction works.	Negligible	Slight adverse
	Commuting and foraging habitat	Negligible to medium	Construction works will disturb the habitats surrounding Roosts 26, 28 to 32, 59, 75, and 107 affecting access to or from the roosts. Roosts 29 and 30 are maternity roosts. The bat flight routes CP37, 39, 40, 42, 43 and RTCP5 will be subject to severance.	Sensitive working methods and restrictions will be detailed in the EMP and agreed with the ECoW. Specific consideration will be given to CP37, 39, 40, 42, 43 and RTCP5. CP39 and RTCP5 are key habitats for flight access to the maternity roosts present in the area and will require specific consideration	Negligible	Slight adverse

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			CP39 and RTCP5 are both key habitats for flight access to the maternity roosts present in the area. The bat flight routes CP37, 39, 40, 42, 43 and RTCP5 will be subject to disturbance from construction works.	including limiting construction activities which are likely to cause high levels of disturbance during the maternity period between May to August during the maternity period.. Activities in the areas directly surrounding the maternity roosts in Streetside Farm (Roost 29) and in the area surrounding the maternity roost at Rokeby Grove (Roosts 30 to 32) will require restrictive working measures during the maternity period. These should be detailed within a EMP and agreed with an ECoW.		
	Individual bats	Negligible to medium	Injury or mortality, particularly in association with the areas identified as bat crossing points of county or regional importance (CP39 and RTCP5).	Restrictive working measures will be detailed in a EMP and agreed with the ECoW. In particular, crepuscular or night-time working between May and August within 30m of the roosts will require consideration, notably with regard to construction vehicle movements and site lighting.	Negligible	Slight adverse
Stephen Bank to Carkin Moor						
Bats	Roosts	Low	No bat roosts will be lost as a result of construction of this scheme. Roosts 33 to 35 will all be subject to varying degrees of disturbance from	Repeat surveys will be required of Roost 35 at an appropriate time of year in advance of the construction works commencing. This will allow the ECoW to manage the	Negligible	Neutral

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			construction activities. Roosts 33 and 34 are maternity roosts.	disturbance arising from construction works.		
	Commuting and foraging habitat	Negligible to low	The bat flight routes CP45 to 51 will be subject to severance from construction activities. The bat flight routes CP45 to 51 will be subject to disturbance from construction works.	Sensitive working methods and restrictions will be detailed in the EMP and agreed with the ECoW. The ECoW will ensure any connective habitats, such as hedgerows and treelines are re-instated nightly between March and November.	Negligible	Slight adverse
	Individual bats	Low	Injury or mortality, particularly in association with Roosts 33 to 25	Construction works in the area surrounding Monks Rest Farm (Roost 35) and in the area surrounding Layton Manor (maternity roosts 33 and 34) will require restrictive working measures, to be detailed in the EMP and agreed with the ECoW. In particular, crepuscular or night-time working between March and November within 30m of the roosts will require consideration, notably with regard to construction vehicle movements and site lighting.	Negligible	Slight adverse
A1(M) Junction 53 Scotch Corner						
n/a	n/a	n/a	n/a	n/a	n/a	n/a

Table 6-10: Summary of non-significant effects (construction) on other terrestrial mammals (polecat, brown hare and hedgehog)

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
Routewide						
Other terrestrial mammals (brown hare, hedgehog and polecat)	Terrestrial habitat	Low	Loss of foraging and breeding habitat Loss of connectivity between habitat areas Habitat damage/degradation	As part of the mitigation work, habitats suitable for badger foraging will be created. This will provide mitigation for the loss of foraging and breeding habitats of other mammals. Greening of the proposed bridges will maintain north-south connectivity, reduce the barrier effect of the Project. Environmental best practice working methods during the construction phase of the scheme to avoid or reduce impacts upon S41 mammal species individuals and their habitat from pollution events	Minor	Neutral
	Individuals	Low	Injury/death of individuals due to collisions with construction traffic	Creation of wildlife crossing points (underpasses, ledges and bridges) Construction of badger and otter fencing will also assist with guiding brown hare, hedgehog and polecat to the crossing points Grass verges and embankments adjacent to the road would be managed as short grassland, with arisings removed in order to reduce	Minor	Slight benefit

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
				the potential for long tussocky grassland with a deep thatch layer that would support S41 prey species. This would decrease the foraging potential and collision risks to polecats.		
M6 Junction 40 to Kemplay Bank						
Other terrestrial mammals (brown hare, hedgehog and polecat)	Terrestrial habitat	Low	Loss of foraging and breeding habitat Loss of connectivity between habitat areas Habitat damage/degradation	As part of the mitigation work, habitats suitable for badger foraging will be created. This will provide mitigation for the loss of foraging and breeding habitats of other mammals. Greening of the proposed bridges will maintain north-south connectivity, reduce the barrier effect of the Project. Environmental best practice working methods during the construction phase of the scheme to avoid or reduce impacts upon S41 mammal species individuals and their habitat from pollution events	Minor	Neutral
	Individuals	Low	Injury/death of individuals due to collisions with construction traffic	Creation of wildlife crossing points (underpasses, ledges and bridges) Construction of badger and otter fencing will also assist with guiding	Minor	Slight benefit

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
				brown hare, hedgehog and polecat to the crossing points Grass verges and embankments adjacent to the road would be managed as short grassland, with arisings removed in order to reduce the potential for long tussocky grassland with a deep thatch layer that would support S41 prey species. This would decrease the foraging potential and collision risks to polecats.		
Penrith to Temple Sowerby						
Other terrestrial mammals (brown hare, hedgehog and polecat)	Terrestrial habitat	Low	Loss of foraging and breeding habitat Loss of connectivity between habitat areas Habitat damage/degradation	As part of the mitigation work, habitats suitable for badger foraging will be created. This will provide mitigation for the loss of foraging and breeding habitats of other mammals. Greening of the proposed bridges will maintain north-south connectivity, reduce the barrier effect of the Project. Environmental best practice working methods during the construction phase of the scheme to avoid or reduce impacts upon S41 mammal	Minor	Neutral

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
				species individuals and their habitat from pollution events		
	Individuals	Low	Injury/death of individuals due to collisions with construction traffic	Creation of wildlife crossing points (underpasses, ledges and bridges) Construction of badger and otter fencing will also assist with guiding brown hare, hedgehog and polecat to the crossing points Grass verges and embankments adjacent to the road would be managed as short grassland, with arisings removed in order to reduce the potential for long tussocky grassland with a deep thatch layer that would support S41 prey species. This would decrease the foraging potential and collision risks to polecats.	Minor	Slight benefit
Temple Sowerby to Appleby						
Other terrestrial mammals (brown hare, hedgehog and polecat)	Terrestrial habitat	Low	Loss of foraging and breeding habitat Loss of connectivity between habitat areas	As part of the mitigation work, habitats suitable for badger foraging will be created. This will provide mitigation for the loss of foraging and breeding habitats of other mammals. Greening of the proposed bridges will maintain north-south connectivity, reduce the barrier effect of the Project.	Minor	Neutral

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			Habitat damage/degradation	Environmental best practice working methods during the construction phase of the scheme to avoid or reduce impacts upon S41 mammal species individuals and their habitat from pollution events		
	Individuals	Low	Injury/death of individuals due to collisions with construction traffic	Creation of wildlife crossing points (underpasses, ledges and bridges) Construction of badger and otter fencing will also assist with guiding brown hare, hedgehog and polecat to the crossing points Grass verges and embankments adjacent to the road would be managed as short grassland, with arisings removed in order to reduce the potential for long tussocky grassland with a deep thatch layer that would support S41 prey species. This would decrease the foraging potential and collision risks to polecats.	Minor	Slight benefit
Appleby to Brough						
Other terrestrial mammals (brown hare,	Terrestrial habitat	Low	Loss of foraging and breeding habitat	As part of the mitigation work, habitats suitable for badger foraging will be created. This will provide mitigation for the loss of foraging and breeding habitats of other mammals.	Minor	Neutral

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
hedgehog and polecat)			Loss of connectivity between habitat areas Habitat damage/degradation	Greening of the proposed bridges will maintain north-south connectivity, reduce the barrier effect of the Project. Environmental best practice working methods during the construction phase of the scheme to avoid or reduce impacts upon S41 mammal species individuals and their habitat from pollution events		
	Individuals	Low	Injury/death of individuals due to collisions with construction traffic	Creation of wildlife crossing points (underpasses, ledges and bridges) Construction of badger and otter fencing will also assist with guiding brown hare, hedgehog and polecat to the crossing points Grass verges and embankments adjacent to the road would be managed as short grassland, with arisings removed in order to reduce the potential for long tussocky grassland with a deep thatch layer that would support S41 prey species. This would decrease the foraging potential and collision risks to polecats.	Minor	Slight benefit
Bowes Bypass						

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
Other terrestrial mammals (brown hare, hedgehog and polecat)	Terrestrial habitat	Low	Loss of foraging and breeding habitat Loss of connectivity between habitat areas Habitat damage/degradation	As part of the mitigation work, habitats suitable for badger foraging will be created. This will provide mitigation for the loss of foraging and breeding habitats of other mammals. Greening of the proposed bridges will maintain north-south connectivity, reduce the barrier effect of the Project. Environmental best practice working methods during the construction phase of the scheme to avoid or reduce impacts upon S41 mammal species individuals and their habitat from pollution events	Minor	Neutral
	Individuals	Low	Injury/death of individuals due to collisions with construction traffic	Grass verges and embankments adjacent to the road would be managed as short grassland, with arisings removed in order to reduce the potential for long tussocky grassland with a deep thatch layer that would support S41 prey species. This would decrease the foraging potential and collision risks to polecats.	Minor	Slight benefit
Cross Lanes to Rokeby						

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
Other terrestrial mammals (brown hare, hedgehog and polecat)	Terrestrial habitat	Low	Loss of foraging and breeding habitat Loss of connectivity between habitat areas Habitat damage/degradation	As part of the mitigation work, habitats suitable for badger foraging will be created. This will provide mitigation for the loss of foraging and breeding habitats of other mammals. Greening of the proposed bridges will maintain north-south connectivity, reduce the barrier effect of the Project. Environmental best practice working methods during the construction phase of the scheme to avoid or reduce impacts upon S41 mammal species individuals and their habitat from pollution events	Minor	Neutral
	Individuals	Low	Injury/death of individuals due to collisions with construction traffic	Creation of wildlife crossing points (underpasses, ledges and bridges) Construction of badger and otter fencing will also assist with guiding brown hare, hedgehog and polecat to the crossing points Grass verges and embankments adjacent to the road would be managed as short grassland, with arisings removed in order to reduce the potential for long tussocky grassland with a deep thatch layer	Minor	Slight benefit

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
				that would support S41 prey species. This would decrease the foraging potential and collision risks to polecats.		
Stephen Bank to Carkin Moor						
Other terrestrial mammals (brown hare, hedgehog and polecat)	Terrestrial habitat	Low	Loss of foraging and breeding habitat Loss of connectivity between habitat areas Habitat damage/degradation	As part of the mitigation work, habitats suitable for badger foraging will be created. This will provide mitigation for the loss of foraging and breeding habitats of other mammals. Greening of the proposed bridges will maintain north-south connectivity, reduce the barrier effect of the Project. Environmental best practice working methods during the construction phase of the scheme to avoid or reduce impacts upon S41 mammal species individuals and their habitat from pollution events	Minor	Neutral
	Individuals	Low	Injury/death of individuals due to collisions with construction traffic	Creation of wildlife crossing points (underpasses, ledges and bridges) Construction of badger and otter fencing will also assist with guiding brown hare, hedgehog and polecat to the crossing points	Minor	Slight benefit

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
				Grass verges and embankments adjacent to the road would be managed as short grassland, with arisings removed in order to reduce the potential for long tussocky grassland with a deep thatch layer that would support S41 prey species. This would decrease the foraging potential and collision risks to polecats.		
A1(M) Junction 53 Scotch Corner						
Other terrestrial mammals (brown hare, hedgehog and polecat)	Terrestrial habitat	Low	Loss of foraging and breeding habitat Loss of connectivity between habitat areas Habitat damage/degradation	As part of the mitigation work, habitats suitable for badger foraging will be created. This will provide mitigation for the loss of foraging and breeding habitats of other mammals. Greening of the proposed bridges will maintain north-south connectivity, reduce the barrier effect of the Project. Environmental best practice working methods during the construction phase of the scheme to avoid or reduce impacts upon S41 mammal species individuals and their habitat from pollution events	Minor	Neutral

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
	Individuals	Low	Injury/death of individuals due to collisions with construction traffic	Grass verges and embankments adjacent to the road would be managed as short grassland, with arisings removed in order to reduce the potential for long tussocky grassland with a deep thatch layer that would support S41 prey species. This would decrease the foraging potential and collision risks to polecats.	Minor	Slight benefit

Table 6-11: Summary of non-significant effects (construction) on breeding birds

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
Routewide						
Breeding birds	Breeding and foraging areas	Medium	Habitat loss of woodland, hedgerow and scrub suitable for nesting birds using cavities, cupped or platform nests. Loss of grassland and wetland habitat for ground-nesting birds.	Creation of a mosaic of habitats suitable for breeding birds within the NH soft estate and in the surrounding affected land plots. Replacement of hedgerow and woodland habitat following an approximately 2:1 hedgerow replacement ratio and 6:1 replacement ratio of high-value woodland. Incorporation of targeted mitigation specifically for gulls, waders and wildfowl. Mitigation will take the form	Moderate	Slight adverse

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
				of short, grazed damp grassland in several areas of the Project.		
	Individuals and population	Medium	Direct mortality/destruction of active nests during vegetation clearance and during construction activities.	Working methods and seasonal constraints detailed in the dEMP.	Negligible	Slight adverse or neutral
	Breeding and foraging areas	Medium	Habitat degradation - increase in dust and vehicle emissions, degradation of habitats used by breeding birds for foraging. Degradation of aquatic habitats due to pollution arising from construction, affecting the availability of invertebrate food sources(s).	Working methods for pollution prevention and noise mitigation detailed in the dEMP. Several habitat creation areas of suitable breeding bird habitat will be sited away from the main construction areas, including large scale woodland planting for several schemes, which will be planted as soon as construction begins or in advance.	Negligible	Slight adverse or neutral
M6 Junction 40 to Kemplay Bank						
Breeding birds	Breeding and foraging areas	Medium	Permeant habitat loss of woodland, hedgerow and scrub suitable for supporting nesting birds using cavities, cupped or platform nests. Loss of grassland / wetland habitat for ground-nesting birds. Notable areas of habitat loss associated with diversion of the existing A66 alignment through woodland and	Creation of a mosaic of habitats within the NH soft estate and in the surrounding affected land plots. Incorporation of targeted mitigation specifically for ground nesting birds. In the form of short, grazed damp grassland and rush pasture.	Negligible	Slight adverse or neutral

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			grassland north of Cumbria Constabulary. Temporary loss of nesting habitats through the creation of construction compounds. Notably, construction compounds will cause the temporary loss of open grassland to the south of the existing A66 alignment suitable for ground nesting such as oyster catcher.			
	Individuals and population	Medium	Direct mortality caused by vegetation clearance works or construction traffic.	Working methods and seasonal constraints detailed in the dEMP.	Negligible	Slight adverse or neutral
	Breeding and foraging areas	Medium	Habitat degradation - increase in dust and vehicle emissions, degradation of habitats used by breeding birds for foraging. Construction compounds located toward the eastern and western extents of the Scheme are located adjacent to large areas of open grassland and the River Eamont which were found to be of value to breeding bird and supported sand martin, These features should be prioritised for protection. Degradation of aquatic habitats due to pollution arising from construction,	Working methods for pollution prevention and noise mitigation detailed in the dEMP.	Negligible	Slight adverse or neutral

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			affecting the availability of invertebrate food sources(s).			
Penrith to Temple Sowerby						
Breeding birds	Breeding and foraging areas	Medium	Permeant habitat loss of woodland, hedgerow and scrub suitable for supporting nesting birds using cavities, cupped or platform nests. Loss of grassland / wetland habitat for ground-nesting birds. Areas of woodland and grassland habitat will be lost largely as a result of a new junction north of Whinfell Forest. Temporary loss of nesting habitats through the creation of construction compounds. Notably, construction compounds and service diversion works will cause the temporary loss of open grassland north and south of the existing A66 alignment to the western section of the scheme.	Creation of a mosaic of habitats within the NH soft estate and in the surrounding affected land plots.	Negligible	Slight adverse or neutral
	Individuals and population	Medium	Direct mortality caused by vegetation clearance works or construction traffic.	Working methods and seasonal constraints detailed in the dEMP.	Negligible	Slight adverse or neutral
	Breeding and foraging areas	Medium	Habitat degradation - increase in dust and vehicle emissions, degradation of habitats used by breeding birds for foraging. Temporary land use for service disruption located toward the	Working methods for pollution prevention and noise mitigation detailed in the dEMP.	Negligible	Slight adverse or neutral

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			western extent of the scheme is located adjacent to Whinfell park which was found to be of value to breeding bird and should be protected. . Degradation of aquatic habitats due to pollution arising from construction, affecting the availability of invertebrate food sources(s).			
Temple Sowerby to Appleby						
Breeding birds	Breeding and foraging areas	Medium	Permeant habitat loss of woodland, hedgerow and scrub suitable for supporting nesting birds using cavities, cupped or platform nests. Loss of grassland / wetland habitat for ground-nesting birds. Notably the loss of large areas of open grassland suitable for ground nesting birds such as lapwing and skylark where the Scheme diverts to the north of the existing A66 alignment around Kirkby Thore, Temporary loss of nesting habitats through the creation of construction compounds. Notably, construction compounds and service diversion works will cause the temporary loss of open grassland north and south of	Creation of a mosaic of habitats within the NH soft estate and in the surrounding affected land plots. Incorporation of three targeted mitigation areas specifically for ground nesting birds. In the form of short, grazed damp grassland and wetland habitats.	Major	Slight adverse

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			the existing A66 alignment to the western section of the scheme.			
	Individuals and population	Medium	Direct mortality caused by vegetation clearance works or construction traffic.	Working methods and seasonal constraints detailed in the dEMP.	Negligible	Slight adverse or neutral
	Breeding and foraging areas	Medium	Habitat degradation - increase in dust and vehicle emissions, degradation of habitats used by breeding birds for foraging. Creation of construction compounds to the south of the Scheme around Kirby Thore are located in previously undisturbed areas. These areas were found to be of value to breeding bird and should be protected. Degradation of aquatic habitats due to pollution arising from construction, affecting the availability of invertebrate food sources(s). The areas of open grassland within this scheme were found to be of value for ground nesting birds associated with wet grassland such as lapwing.	Working methods for pollution prevention and noise mitigation detailed in the dEMP.	Negligible	Slight adverse or neutral
Appleby to Brough						
Breeding birds	Breeding and foraging areas	Medium	Permeant habitat loss of woodland, hedgerow and scrub suitable for supporting nesting birds using cavities, cupped or platform nests.	Creation of a mosaic of habitats within the NH soft estate and in the surrounding affected land plots.	Moderate	Slight adverse

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			Loss of grassland / wetland habitat for ground-nesting birds. Notably due to the construction of new junctions and diversions from the existing A66 alignment toward the eastern and central areas of the scheme. Temporary loss of nesting habitats through the creation of construction compounds. Notably, temporary land will cause the temporary loss of open grassland to the north of Warcop Training Centre.	Incorporation of one targeted mitigation area specifically for ground nesting birds. In the form of short, grazed damp grassland.		
	Individuals and population	Medium	Direct mortality caused by vegetation clearance works or construction traffic.	Working methods and seasonal constraints detailed in the dEMP.	Negligible	Slight adverse or neutral
	Breeding and foraging areas	Medium	Habitat degradation - increase in dust and vehicle emissions, degradation of habitats used by breeding birds for foraging. Temporary land use located toward the central area of the Scheme north of Warcop Training Centre on the southern side of the existing A66 alignment is located adjacent to a large area of open grassland and woodland outside the Order Limits which was found to be of value to breeding bird and should be protected.	Working methods for pollution prevention and noise mitigation detailed in the dEMP.	Negligible	Slight adverse or neutral

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			Degradation of aquatic habitats due to pollution arising from construction, affecting the availability of invertebrate food sources(s).			
Bowes Bypass						
Breeding birds	Breeding and foraging areas	Medium	Permeant habitat loss of woodland, hedgerow and scrub suitable for supporting nesting birds using cavities, cupped or platform nests. Loss of grassland / wetland habitat for ground-nesting birds. Notably due to the construction new junctions. Temporary loss of nesting habitats through the creation of construction compounds. Notably, a construction compound to the North of Bowes and flood storage area east of Bowes.	Creation of a mosaic of habitats within the NH soft estate and in the surrounding affected land plots.	Moderate	Slight adverse
	Individuals and population	Medium	Direct mortality caused by vegetation clearance works or construction traffic.	Working methods and seasonal constraints detailed in the dEMP.	Negligible	Slight adverse or neutral
	Breeding and foraging areas	Medium	Habitat degradation - increase in dust and vehicle emissions, degradation of habitats used by breeding birds for foraging. Temporary land use for construction compounds located toward the western and central extent of the Scheme around Bowes are adjacent	Working methods for pollution prevention and noise mitigation detailed in the dEMP.	Negligible	Slight adverse or neutral

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			to habitats of value to breeding birds. Grassland adjacent to compounds around Bowes outside the Order Limits of the Scheme buffer the North Pennines SPA from the Scheme and should be prioritised for protection. Degradation of aquatic habitats due to pollution arising from construction, affecting the availability of invertebrate food sources(s).			
Cross Lanes to Rokeby						
Breeding birds	Breeding and foraging areas	Medium	Permeant habitat loss of woodland, hedgerow and scrub suitable for supporting nesting birds using cavities, cupped or platform nests. Loss of grassland / wetland habitat for ground-nesting birds. Notably due to the construction of a new junctions and diversions from the existing A66 alignment toward the eastern extent of the Scheme. Temporary loss of nesting habitats through the creation of construction compounds. Notably, construction compounds will cause the temporary loss of open grassland largely associated with the new junctions.	Creation of a mosaic of habitats within the NH soft estate and in the surrounding affected land plots.	Moderate	Slight adverse

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
	Individuals and population	Medium	Direct mortality caused by vegetation clearance works or construction traffic.	Working methods and seasonal constraints detailed in the dEMP.	Negligible	Slight adverse or neutral
	Breeding and foraging areas	Medium	Habitat degradation - increase in dust and vehicle emissions, degradation of habitats used by breeding birds for foraging. Temporary land use for construction compounds located toward the western extent of the Scheme associated with a new junction are located adjacent to large areas of open grassland and woodland which was found to be of value to breeding bird and should be protected. Degradation of aquatic habitats due to pollution arising from construction, affecting the availability of invertebrate food sources(s).	Working methods for pollution prevention and noise mitigation detailed in the dEMP.	Negligible	Slight adverse or neutral
Stephen Bank to Carkin Moor						
Breeding birds	Breeding and foraging areas	Medium	Permeant habitat loss of woodland, hedgerow and scrub suitable for supporting nesting birds using cavities, cupped or platform nests. Loss of grassland / wetland habitat for ground-nesting birds. Notably due to the construction of a new junctions and diversions from the existing A66 alignment toward the southern extent	Creation of a mosaic of habitats within the NH soft estate and in the surrounding affected land plots. Incorporation of mitigation suitable for ground nesting birds. In the form of open mosaic habitat.	Moderate	Slight adverse

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			of the Scheme. Temporary loss of nesting habitats through the creation of construction compounds. Notably, construction compounds will cause the temporary loss of open grassland largely associated with new junctions.			
	Individuals and population	Medium	Direct mortality caused by vegetation clearance works or construction traffic.	Working methods and seasonal constraints detailed in the dEMP.	Negligible	Slight adverse or neutral
	Breeding and foraging areas	Medium	Habitat degradation - increase in dust and vehicle emissions, degradation of habitats used by breeding birds for foraging. Construction compounds located toward the central area of the Scheme associated with a departure from the existing alignment is located adjacent to large areas of open grassland which was found to be of value to breeding bird and should be protected. Degradation of aquatic habitats due to pollution arising from construction, affecting the availability of invertebrate food sources(s).	Working methods for pollution prevention and noise mitigation detailed in the dEMP.	Negligible	Slight adverse or neutral
A1(M) Junction 53 Scotch Corner						

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
Breeding birds	Breeding and foraging areas	Medium	Permanent loss of roosting and foraging habitats to facilitate the construction of new A66 footprint. Small amounts of grassland and woodland will be lost.	Replacement of trees/scrub like for like. Additional woodland planting to achieve no net loss will be incorporated into Stephen Bank to Carkin Moor.	Negligible	Slight adverse or neutral
	Individuals and population	Medium	Direct mortality caused by vegetation clearance works or construction traffic.	Working methods and seasonal constraints detailed in the dEMP.	Negligible	Slight adverse or neutral
	Breeding and foraging areas	Medium	Degradation of habitats through increases in noise, dust, light, vehicle emissions used by breeding birds from construction.	Working methods for pollution prevention and noise mitigation detailed in the dEMP.	Negligible	Slight adverse or neutral

Table 6-12: Summary of non-significant effects (construction) on wintering birds

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
Routewide						
Wintering birds	Roosting and foraging areas	Medium – High	Permanent habitat loss due to removal for construction.	Creation of a mosaic of habitats within the NH soft estate and in the surrounding affected land plots. Incorporation of targeted mitigation specifically for gulls, waders and wildfowl on several schemes. Mitigation will take the form of short, grazed damp grassland.	Major	Slight adverse

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
	Individuals and population	Medium – High	Direct mortality during vegetation clearance works or vehicle mortality during construction.	Working methods and seasonal constraints detailed in the dEMP.	Negligible	Slight adverse or neutral
	Roosting and foraging areas	Medium – High	Increase in dust and vehicle emissions, degradation of habitats used by wintering birds for foraging. Degradation of aquatic habitats due to pollution arising from construction, affecting the availability of invertebrate food sources(s).	Working methods for pollution prevention and noise mitigation detailed in the dEMP.	Negligible	Slight adverse or neutral
M6 Junction 40 to Kemplay Bank						
Wintering birds	Roosting and foraging areas	Medium	Permanent loss of roosting and foraging habitats to facilitate the construction of new A66 footprint through previously undisturbed land including loss of woodland habitat where the scheme diverts to the north of the existing A66 alignment, north of Cumbria Constabulary. Temporary loss of roosting and foraging habitats due to creation of construction compounds. Notably, construction compounds will cause the temporary loss of open grassland to the south of the existing A66 alignment.	Creation of a mosaic of habitats within the NH soft estate and in the surrounding affected land plots. Incorporation of targeted mitigation specifically for gulls, waders and wildfowl along the River Eamont corridor. Mitigation will take the form of damp grassland and rush pasture. Reinstatement of agricultural land post-construction.	Negligible	Slight adverse or neutral

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
	Individuals and population	Medium	Direct mortality caused by vegetation clearance works or construction traffic.	Working methods and seasonal constraints detailed in the dEMP.	Negligible	Slight adverse or neutral
	Roosting and foraging areas	Medium	Degradation of habitats through increases in noise, dust, light, vehicle emissions used by birds for foraging and roosting arising from construction. Construction compound located toward the eastern extent of the Scheme is located adjacent to a large area of open grassland and the River Eamont outside the Order Limits which was found to be of value to wintering bird and should be protected. Degradation of aquatic habitats and wet grassland due to pollution arising from construction, affecting the availability of invertebrate food sources(s) important for supporting wintering bird populations.	Working methods for pollution prevention and noise mitigation detailed in the dEMP.	Negligible	Slight adverse or neutral
Penrith to Temple Sowerby						
Wintering birds	Roosting and foraging areas	Medium	Permanent loss of roosting and foraging habitats to facilitate the construction of new A66 footprint through previously undisturbed land including loss of woodland and grassland habitat. Notably due to the	Creation of a mosaic of habitats within the NH soft estate and in the surrounding affected land plots. Reinstatement of agricultural land post-construction.	Negligible	Slight adverse or neutral

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			construction of a new junction north of Whinfell Forest. Temporary loss of roosting and foraging habitats due to creation of construction compounds. Notably, construction compounds and service diversion works will cause the temporary loss of open grassland north and south of the existing A66 alignment to the western section of the scheme.			
	Individuals and population	Medium	Direct mortality caused by vegetation clearance works or construction traffic.	Working methods and seasonal constraints detailed in the dEMP.	Negligible	Slight adverse or neutral
	Roosting and foraging areas	Medium	Degradation of habitats through increases in noise, dust, light, vehicle emissions used by birds for foraging and roosting arising from construction. Temporary land use for service disruption located toward the western extent of the Scheme on the northern side of the existing A66 alignment is located adjacent to a large area of open grassland and the River Eden outside the Order Limits which was found to be of value to wintering bird and should be protected. A proposed compound located to the north the new junction on this scheme is also located	Working methods for pollution prevention and noise mitigation detailed in the dEMP. Creation of a mosaic of habitats within the NH soft estate and in the surrounding affected land plots. Reinstatement of agricultural land post-construction.	Negligible	Slight adverse or neutral

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			adjacent to areas of open grassland outside the Order Limits found to be of value to wintering bird and should be protected. Degradation of aquatic habitats and wet grassland due to pollution arising from construction, affecting the availability of invertebrate food sources(s) important for supporting wintering bird populations.			
Temple Sowerby to Appleby						
Wintering birds	Roosting and foraging areas	High	Permanent loss of roosting and foraging habitats to facilitate the construction of new A66 footprint through previously undisturbed land. Notably the loss of large areas of open grassland suitable for foraging waders where the Scheme diverts to the north of the existing A66 alignment around Kirkby Thore, Temporary loss of roosting and foraging habitats due to creation of construction compounds. Notably, construction compounds and service diversion works will cause the temporary loss of open grassland north and south of the Scheme where it diverts from the existing A66 around Kirkby Thore.	Creation of a mosaic of habitats within the NH soft estate and in the surrounding affected land plots. Incorporation of three targeted mitigation areas specifically for gulls, waders and wildfowl. Mitigation will take the form of short, grazed damp grassland and wetland areas with scrapes/pools. Reinstatement of agricultural land post-construction.	Major	Slight adverse

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
	Individuals and population	High	Direct mortality caused by vegetation clearance works or construction traffic.	Working methods and seasonal constraints detailed in the dEMP. Design of obstacle planting to encourage birds to fly over the height of traffic.	Negligible	Slight adverse or neutral
	Roosting and foraging areas	High	Degradation of habitats through increases in noise, dust, light, vehicle emissions used by birds for foraging and roosting arising from construction. Creation of construction compounds to the south of the Scheme around Kirby Thore are located in previously undisturbed areas. These areas were found to be of value to wintering bird and should be protected. A proposed compound located to most western end of the Scheme to the south is located adjacent to areas of open grassland found to be of value for wintering golden plover and should be prioritised for protection. Degradation of aquatic habitats and wet grassland due to pollution arising from construction, affecting the availability of invertebrate food sources(s) important for supporting wintering bird populations. The areas of open grassland within this scheme were found to be of value for	Working methods for pollution prevention detailed in the dEMP.	Negligible	Slight adverse or neutral

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			wintering birds associated with wet grassland such as golden plover and lapwing.			
Appleby to Brough						
Wintering birds	Roosting and foraging areas	High	Permanent loss of roosting and foraging habitats to facilitate the construction of new A66 footprint through previously undisturbed land including loss of woodland and grassland habitat. Notably due to the construction of new junctions and diversions from the existing A66 alignment toward the eastern and central areas of the scheme. Temporary loss of roosting and foraging habitats due to creation of construction compounds and other temporary land take requirements. Notably, temporary land will cause the temporary loss of open grassland to the north of Warcop Training Centre.	Creation of a mosaic of habitats within the NH soft estate and in the surrounding affected land plots. Incorporation of one targeted mitigation area specifically for gulls, waders and wildfowl. Mitigation will take the form of short, grazed damp grassland. Reinstatement of agricultural land post-construction.	Moderate	Slight adverse
	Individuals and population	High	Direct mortality caused by vegetation clearance works or construction traffic.	Working methods and seasonal constraints detailed in the dEMP.	Negligible	Slight adverse or neutral
	Roosting and foraging areas	High	Degradation of habitats through increases in noise, dust, light, vehicle emissions used by birds for foraging and roosting arising from	Working methods for pollution prevention and noise mitigation detailed in the dEMP.	Negligible	Slight adverse or neutral

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			construction. Temporary land use located toward the central area of the Scheme north of Warcop Training Centre on the southern side of the existing A66 alignment is located adjacent to a large area of open grassland and woodland outside the Order Limits which was found to be of value to wintering bird and should be protected. . Degradation of aquatic habitats and wet grassland due to pollution arising from construction, affecting the availability of invertebrate food sources(s) important for supporting wintering bird populations.			
Bowes Bypass						
Wintering birds	Roosting and foraging areas	High	Permanent loss of roosting and foraging habitats to facilitate the construction of new A66 footprint through previously undisturbed land which will largely result in the loss of grassland habitat. Notably due to the construction new junctions. Temporary loss of roosting and foraging habitats due to temporary land. Notably, a construction compound to the North of Bowes	Creation of a mosaic of habitats within the NH soft estate and in the surrounding affected land plots. Reinstatement of agricultural land post-construction.	Moderate	Slight adverse

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			and flood storage area east of Bowes.			
	Individuals and population	High	Direct mortality caused by vegetation clearance works or construction traffic.	Working methods and seasonal constraints detailed in the dEMP.	Negligible	Slight adverse or neutral
	Roosting and foraging areas	High	Degradation of habitats through increases in noise, dust, light, vehicle emissions used by birds for foraging and roosting arising from construction. Temporary land use for construction compounds located toward the western and central extent of the Scheme around Bowes are adjacent to habitats of value to wintering birds. Grassland adjacent to compounds around Bowes outside the Order Limits of the Scheme buffer the North Pennines SPA from the Scheme and should be prioritised for protection. Degradation of aquatic habitats and wet grassland due to pollution arising from construction, affecting the availability of invertebrate food sources(s) important for supporting wintering bird populations.	Working methods for pollution prevention and noise mitigation detailed in the dEMP.	Negligible	Slight adverse or neutral
Cross Lanes to Rokeby						

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
Wintering birds	Roosting and foraging areas	High	Permanent loss of roosting and foraging habitats to facilitate the construction of new A66 footprint through previously undisturbed land including loss of woodland and grassland habitat. Notably due to the construction of a new junctions and diversions from the existing A66 alignment toward the eastern extent of the Scheme. Temporary loss of roosting and foraging habitats due to creation of construction compounds. Notably, construction compounds will cause the temporary loss of open grassland largely associated with the new junctions.	Creation of a mosaic of habitats within the NH soft estate and in the surrounding affected land plots. Reinstatement of agricultural land post-construction.	Moderate	Slight adverse
	Individuals and population	High	Direct mortality caused by vegetation clearance works or construction traffic.	Working methods and seasonal constraints detailed in the dEMP.	Negligible	Slight adverse or neutral
	Roosting and foraging areas	High	Degradation of habitats through increases in noise, dust, light, vehicle emissions used by birds for foraging and roosting arising from construction. Construction compounds located toward the western extent of the Scheme associated with a new junction is located adjacent to large areas of open grassland and woodland which	Working methods for pollution prevention and noise mitigation detailed in the dEMP.	Negligible	Slight adverse or neutral

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			was found to be of value to wintering bird and should be protected. Degradation of aquatic habitats and wet grassland due to pollution arising from construction, affecting the availability of invertebrate food sources(s) important for supporting wintering bird populations.			
Stephen Bank to Carkin Moor						
Wintering birds	Roosting and foraging areas	High	Permanent loss of roosting and foraging habitats to facilitate the construction of new A66 footprint through previously undisturbed land including loss of woodland and grassland habitat. Notably due to the construction of a new junctions and diversions from the existing A66 alignment toward the southern extent of the Scheme. Temporary loss of roosting and foraging habitats due to creation of construction compounds. Notably, construction compounds will cause the temporary loss of open grassland largely associated with new junctions.	Creation of a mosaic of habitats within the NH soft estate and in the surrounding affected land plots. Reinstatement of agricultural land post-construction.	Moderate	Slight adverse
	Individuals and population	High	Direct mortality caused by vegetation clearance works or construction traffic.	Working methods and seasonal constraints detailed in the dEMP.	Negligible	Slight adverse or neutral

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
	Roosting and foraging areas	High	Degradation of habitats through increases in noise, dust, light, vehicle emissions used by birds for foraging and roosting arising from construction. Construction compounds located toward the southern extent of the Scheme associated with a new junction is located adjacent to large areas of open grassland which was found to be of value to wintering bird and should be protected. Degradation of aquatic habitats and wet grassland due to pollution arising from construction, affecting the availability of invertebrate food sources(s) important for supporting wintering bird populations.	Working methods for pollution prevention and noise mitigation detailed in the dEMP.	Negligible	Slight adverse or neutral
A1(M) Junction 53 Scotch Corner						
Wintering birds	Roosting and foraging areas	Medium	Permanent loss of roosting and foraging habitats to facilitate the construction of new A66 footprint. Small amounts of grassland and woodland will be lost.	Replacement of like for like tree/scrub loss. Additional planting to achieve no net loss will be included in Stephen Bank to Carkin Moor.	Negligible	Slight adverse or neutral
	Individuals and population	Medium	Direct mortality caused by vegetation clearance works or construction traffic.	Working methods and seasonal constraints detailed in the dEMP.	Negligible	Slight adverse or neutral

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
	Roosting and foraging areas	Medium	Degradation of habitats through increases in noise, dust, light, vehicle emissions used by birds for foraging and roosting arising from construction.	Working methods for pollution prevention and noise mitigation detailed in the dEMP.	Negligible	Slight adverse or neutral

Table 6-13: Summary of non-significant effects (construction) on barn owl

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
Routewide						
Barn owl	Habitat loss	Medium	Loss of high-quality foraging habitat leading to a reduction and degradation of foraging areas within a barn owl's home range	Creation of alternative foraging habitat at a suitable location within a barn owl's home range	Negligible	Neutral
	Disturbance	Medium	Disturbance near to nest location may cause temporary or permanent abandonment of the nesting location Disturbance associated with overnight works may disturb foraging activities	Working practices would limit the amount of light, noise and vibration levels, as well as restrict the amount of night working in sensitive areas. A buffer of 20m around active barn owl nests Minimise light spill through sensitive design	Negligible	Neutral
M6 Junction 40 to Kemplay Bank						
Barn owl	Disturbance	Medium	Disturbance near to nest location may cause temporary or permanent abandonment of the nesting location Disturbance associated with overnight works may disturb foraging activities	Working practices would limit the amount of light, noise and vibration levels, as well as restrict the amount of night working in sensitive areas. A buffer of 20m around active barn owl nests Minimise light spill through sensitive design	Negligible	Neutral

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
Penrith to Temple Sowerby						
Barn owl	Loss of breeding, roosting and nesting sites	Medium	One Active Roost Site (ARS) will be lost during construction	Approximately 78 nest boxes will be provided to replace lost ARS	Negligible	Neutral
	Disturbance	Medium	Disturbance near to nest location may cause temporary or permanent abandonment of the nesting location Disturbance associated with overnight works may disturb foraging activities	Working practices would limit the amount of light, noise and vibration levels, as well as restrict the amount of night working in sensitive areas. A buffer of 20m around active barn owl nests Minimise light spill through sensitive design	Negligible	Neutral
Temple Sowerby to Appleby						
Barn owl	Disturbance	Medium	Disturbance near to occupied breeding site (OBS) and ARS may cause temporary or permanent abandonment of the nesting location Disturbance associated with overnight works may disturb foraging activities	Working practices would limit the amount of light, noise and vibration levels, as well as restrict the amount of night working in sensitive areas. A buffer of 20m around active barn owl nests Minimise light spill through sensitive design	Negligible	Neutral
	Fragmentation	Medium	Fragmentation of barn owl home range due to new footprint of A66 in previously undeveloped areas	Obstacle planting to encourage barn owl to fly over the A66 at a height of 3m	Minor	Slight adverse

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
Appleby to Brough						
Barn owl	Disturbance	Medium	Disturbance near to nest location may cause temporary or permanent abandonment of the nesting location Disturbance associated with overnight works may disturb foraging activities Two ARS and four potential nesting sites (PNS) are within 100m of the scheme	Working practices would limit the amount of light, noise and vibration levels, as well as restrict the amount of night working in sensitive areas. A buffer of 20m around active barn owl nests Minimise light spill through sensitive design	Minor	Slight adverse
Bowes Bypass						
Barn owl	Disturbance	Medium	Disturbance near to nest location may cause temporary or permanent abandonment of the nesting location Disturbance associated with overnight works may disturb foraging activities One ARS and three PNS are within 190m of the scheme	Working practices would limit the amount of light, noise and vibration levels, as well as restrict the amount of night working in sensitive areas. A buffer of 20m around active barn owl nests Minimise light spill through sensitive design	Minor	Slight adverse
	Habitat loss	Medium	Temporary loss of high-quality barn owl foraging habitat Potential to impact on the breeding success of barn owl	No net loss of suitable habitat Replacement habitat to be incorporated into the design	Negligible	Neutral
Cross Lanes to Rokeby						
Barn owl	Loss of breeding,	Medium	Four PNS will be lost during construction	Re-survey prior to construction to determine potential disturbance	Negligible	Neutral

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
	roosting and nesting sites			A buffer of 20m around active barn owl nests Minimise light spill through sensitive design		
	Habitat loss	Medium	Temporary loss of high-quality barn owl foraging habitat Potential to impact on the breeding success of barn owl	No net loss of suitable habitat Replacement habitat to be incorporated into the design	Negligible	Neutral
	Disturbance	Medium	Disturbance near to nest location may cause temporary or permanent abandonment of the nesting location Disturbance associated with overnight works may disturb foraging activities Seven PNS are within 143m of the scheme	Working practices would limit the amount of light, noise and vibration levels, as well as restrict the amount of night working in sensitive areas. A buffer of 20m around active barn owl nests Minimise light spill through sensitive design	Minor	Slight adverse
	Fragmentation	Medium	Fragmentation of barn owl home range due to new footprint of A66 in previously undeveloped areas	Obstacle planting to encourage barn owl to fly over the A66 at a height of 3m	Minor	Slight adverse
Stephen Bank to Carkin Moor						
Barn owl	Loss of breeding, roosting and nesting sites	Medium	Two ARS and one PNS will be lost during construction	Nest boxes will be provided to replace lost ARS	Negligible	Neutral
	Habitat loss	Medium	Temporary loss of high-quality barn owl foraging habitat Potential to impact on the breeding success of barn owl	No net loss of suitable habitat Replacement habitat to be incorporated into the design	Negligible	Neutral

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
	Disturbance	Medium	Disturbance near to nest location may cause temporary or permanent abandonment of the nesting location Disturbance associated with overnight works may disturb foraging activities One OBS, four ARS, one TRS and one PNS are within 250m of the scheme	Working practices would limit the amount of light, noise and vibration levels, as well as restrict the amount of night working in sensitive areas. A buffer of 20m around active barn owl nests Minimise light spill through sensitive design	Minor	Slight adverse
A1(M) Junction 53 Scotch Corner						
Barn owl	Habitat loss	Medium	Temporary loss of suitable barn owl foraging habitat	No net loss of suitable habitat Replacement habitat to be incorporated into the design	Negligible	Neutral
	Disturbance	Medium	Disturbance associated with overnight works may disturb foraging activities	Working practices would limit the amount of light, noise and vibration levels, as well as restrict the amount of night working in sensitive areas. Minimise light spill through sensitive design	Negligible	Neutral

Table 6-14: Summary of non-significant effects (construction) on otter

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
Routewide						
Otter	Habitat loss	Medium	Loss of a range of habitats due to construction activities Increase in fragmentation of existing habitats	Creation of compensatory riparian habitats along watercourses Where possible, creation to occur prior to loss of existing habitats	Minor	Slight adverse
	Disturbance	Medium	Construction activities including vehicle and personnel movements, noise and vibration may cause otters to abandon breeding sites and increase predation risk and critical energy reserves	As laid out in the EMP, best practice working methods to be followed in relation to retained sensitive habitat		
	Habitat damage/degradation	Medium	Retained habitats at risk of damage such as damage to tree trunks, soil compaction or increased exposure Dust smothering sensitive habitats Quality of otter foraging habitat may be reduced	Best practice working methods to be followed in relation to dust management, pollution control and buffers around retained habitat	Negligible	Neutral
	Direct injury/mortality	Medium	Direct mortality/injury of otters from construction machinery	Wildlife crossing points incorporated into the design Otter fencing used to funnel otters to crossing points	Negligible	Neutral

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
				Any otters found during construction to be moved by the ECoW to a mitigation area		
M6 Junction 40 to Kemplay Bank						
Otter	Habitat loss	Medium	Loss of a range of habitats due to construction activities Increase in fragmentation of existing habitats	Creation of compensatory riparian habitats along watercourses Where possible, creation to occur prior to loss of existing habitats	Minor	Slight benefit
	Direct injury/mortality	Medium	Direct mortality/injury of otters from construction machinery	Addition of ledges to an existing culvert located adjacent to the Cumrbia Constabulary, to form a wildlife crossing point Otter fencing used to funnel otters to crossing points Any otters found during construction to be moved by the ECoW to a mitigation area Best practice speed limits to be followed in construction zones	Negligible	Neutral
	Habitat damage/degradation	Medium	Retained habitats at risk of damage such as damage to tree trunks, soil compaction or increased exposure Dust smothering sensitive habitats Quality of otter foraging habitat may be reduced	Best practice working methods to be followed in relation to dust management, pollution control and buffers around retained habitat	Negligible	Neutral

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
Penrith to Temple Sowerby						
Otter	Habitat loss	Medium	Loss of a range of habitats due to construction activities Increase in fragmentation of existing habitats	Creation of compensatory riparian habitats along watercourses Where possible, creation to occur prior to loss of existing habitats	Minor	Slight benefit
	Direct injury/mortality	Medium	Direct mortality/injury of otters from construction machinery	Installation of ledges to an existing box culvert of the creation of a new wildlife crossing points incorporated into the design Otter fencing used to funnel otters to crossing points Any otters found during construction to be moved by the ECoW to a mitigation area Best practice speed limits to be followed in construction zones	Negligible	Neutral
	Habitat damage/degradation	Medium	Retained habitats at risk of damage such as damage to tree trunks, soil compaction or increased exposure Dust smothering sensitive habitats Quality of otter foraging habitat may be reduced	Best practice working methods to be followed in relation to dust management, pollution control and buffers around retained habitat	Negligible	Neutral
Temple Sowerby to Appleby						

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
Otter	Habitat loss	Medium	Loss of a range of habitats due to construction activities Increase in fragmentation of existing habitats	Creation of compensatory riparian habitats along watercourses Where possible, creation to occur prior to loss of existing habitats	Minor	Slight benefit
	Direct injury/mortality	Medium	Direct mortality/injury of otters from construction machinery	Creation of one new wildlife crossing point incorporated into the design Otter fencing used to funnel otters to crossing points Any otters found during construction to be moved by the ECoW to a mitigation area Best practice speed limits to be followed in construction zones	Negligible	Neutral
	Habitat damage/degradation	Medium	Retained habitats at risk of damage such as damage to tree trunks, soil compaction or increased exposure Dust smothering sensitive habitats Quality of otter foraging habitat may be reduced	Best practice working methods to be followed in relation to dust management, pollution control and buffers around retained habitat	Negligible	Neutral
Appleby to Brough						
Otter	Loss of a natal holt	High	Permanent loss of a natal holt that is functionally linked to the River Eden SAC	Creation of two artificial holts within suitable habitat, located within 500m from the existing natal holt	Negligible	Neutral

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
				Creation of holts must occur prior to closure of the existing natal holt		
	Disturbance	High	The proximity of construction works and construction traffic to sensitive otter holts (notably natal holts) may cause disturbance through elevated noise and vibration.	Best practice working methods to be followed in relation to dust management, pollution control and buffers around retained sensitive habitat	Negligible	Neutral
	Habitat loss	Medium	Loss of a range of habitats due to construction activities Increase in fragmentation of existing habitats	Creation of compensatory riparian habitats along watercourses Where possible, creation to occur prior to loss of existing habitats	Minor	Slight benefit
	Direct injury/mortality	Medium	Direct mortality/injury of otters from construction machinery	Addition of ledges to three existing culverts and the creation of seven new wildlife crossing points incorporated into the design Otter fencing used to funnel otters to crossing points Any otters found during construction to be moved by the ECoW to a mitigation area Best practice speed limits to be followed in construction zones	Negligible	Neutral
	Habitat damage/degradation	Medium	Retained habitats at risk of damage such as damage to	Best practice working methods to be followed in relation to dust management, pollution control	Negligible	Neutral

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			tree trunks, soil compaction or increased exposure Dust smothering sensitive habitats Quality of otter foraging habitat may be reduced	and buffers around retained habitat		
Bowes Bypass						
n/a	n/a	n/a	n/a	n/a	n/a	n/a
Cross Lanes to Rokeby						
Otter	Habitat loss	Medium	Loss of a range of habitats due to construction activities Increase in fragmentation of existing habitats	Creation of compensatory riparian habitats along watercourses Where possible, creation to occur prior to loss of existing habitats	Minor	Slight benefit
	Direct injury/mortality	Medium	Direct mortality/injury of otters from construction machinery	Creation of three new wildlife crossing points incorporated into the design Otter fencing used to funnel otters to crossing points Any otters found during construction to be moved by the ECoW to a mitigation area Best practice speed limits to be followed in construction zones	Negligible	Neutral
	Habitat damage/degradation	Medium	Retained habitats at risk of damage such as damage to	Best practice working methods to be followed in relation to dust management, pollution control	Negligible	Neutral

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			tree trunks, soil compaction or increased exposure Dust smothering sensitive habitats Quality of otter foraging habitat may be reduced	and buffers around retained habitat		
Stephen Bank to Carkin Moor						
Otter	Habitat loss	Medium	Loss of a range of habitats due to construction activities Increase in fragmentation of existing habitats	Creation of compensatory riparian habitats along watercourses Where possible, creation to occur prior to loss of existing habitats	Minor	Slight benefit
	Direct injury/mortality	Medium	Direct mortality/injury of otters from construction machinery	Creation of five new wildlife crossing points incorporated into the design Otter fencing used to funnel otters to crossing points Any otters found during construction to be moved by the ECoW to a mitigation area Best practice speed limits to be followed in construction zones	Negligible	Neutral
	Habitat damage/degradation	Medium	Retained habitats at risk of damage such as damage to tree trunks, soil compaction or increased exposure Dust smothering sensitive habitats	Best practice working methods to be followed in relation to dust management, pollution control and buffers around retained habitat	Negligible	Neutral

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			Quality of otter foraging habitat may be reduced			
A1(M) Junction 53 Scotch Corner						
n/a	n/a	n/a	n/a	n/a	n/a	n/a

Table 6-15: Summary of non-significant effects (construction) on watercourses and freshwater ecology features

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
Routewide						
Watercourses	Habitat	Low – very high	**Habitat loss** The construction phase will result in the permanent shading of instream habitat and associated loss of instream and riparian vegetation as a result of new watercourse crossings, and the extension of existing culverts. Two rivers will be realigned as part of construction; Unnamed Tributary of Lowgill Beck 6.1 (Appleby to Brough) and Punder Gill/Tutta Beck (Cross Lanes to Rokeby) will be subject to minor realignment resulting in an overall loss in channel length. **Habitat degradation** Construction activities have the potential to generate water-borne pollution (e.g. dust, fine sediment, fuels and oils) which could give rise to an adverse effect on individual watercourses as well as aquatic habitats downstream. Construction activities, such as cutting, piling, temporary abstractions and discharges and floodplain utilisation, also have the potential to impact on the water environment	**Habitat loss** Direct loss of aquatic habitat Loss has been minimised through embedded designed mitigation. Open span watercourse crossings that will avoid the loss of aquatic habitat within Trout Beck, which is part of the River Eden SAC (Temple Sowerby to Appleby) and functionally linked watercourses in the Appleby to Brough scheme. This design feature is secured through the Project Design Principles (Application Document Number 5.11). **Habitat creation** Riparian habitat adjacent to Light Water (upstream of the existing A66) will be improved through woodland planting. Planting will connect areas of existing riparian woodland to the north and south of the existing A66. This will mitigate for the loss of riparian habitat associated with the extension of the existing Light Water culvert and new crossing required to enable access to the attenuation ponds. Riparian habitat adjacent to adjacent Swine Gill (both upstream and	Negligible - minor adverse	Neutral – minor adverse

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			through changes in surface and groundwater quality and quantity as outlined in Chapter 14: Road drainage and the water environment (ES Volume 1, Application Document Number 3.2) and Appendix 14.3: Water Quality Assessment (ES Volume 3, Application Document Number 3.4). Watercourses will be protected during construction through the implementation of best practice construction techniques. Construction mitigation is included in the Ground and Surface Water Management Plan (Annex B7 of the EMP) and secured by a requirement of the DCO. A surface water management system using measures such as temporary silt fencing, cut off ditches, settlement ponds and bunds set up early in the construction period to capture all runoff and prevent ingress of sediments and contaminants into existing drainage ditches where necessary. This will be managed by the EMP in accordance with CIRIA guidelines and the Environment Agency's approach to groundwater protection and groundwater protection guidelines.	downstream of existing A66) will be improved through woodland planting and management. This will connect and extend areas of existing woodland and mitigate for the loss of riparian habitat associated with the extension of the existing Swine Gill culvert. **Habitat degradation** Chapter 14: Road drainage and the water environment (ES Volume 1, Application Document Number 3.2) and Appendix 14.3: Water Quality Assessment (ES Volume 3, Application Document Number 3.4) considers the potential effects on the quality and quantity of surface and groundwaters, geomorphology and flood risk that may result from construction activities, the operational road drainage, and accidental spillages. Rivers and streams will be protected during construction through the implementation of best practice construction techniques and pollution prevention. Site-specific measures, as secured in Annex B7 of the Environmental Management Plan (EMP) (Application Document Number 2.7) and will include a surface water management system		

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			Habitat alteration There will be localised alteration of the riparian habitats as a result of new discharges to watercourses which will transfer treated water from road runoff via attenuation ponds. In order to reduce riparian habitat loss (and maintain natural geomorphological processes during operation), new discharges to the River Eden SAC and functionally linked watercourses will be open ditches with no headwall where natural river banks are present under baseline conditions. Where artificial banks, or bank protection is in place under baseline conditions discharges will tie into the existing river bank structures. Introduction and/or spread of invasive non-native species (INNS) INNS constitute a major threat to river systems and could be introduced and/or spread during construction. Impacts may occur on the river habitat itself (e.g. damage to banks and consequent siltation) or directly on characteristic biota (through predation, competition and disease), or a combination of these. Of particular relevance to the project and	using measures such as temporary silt fencing, cut off ditches, settlement ponds and bunds. These will be set up early in the construction period to capture all runoff and prevent ingress of sediments and contaminants into existing drainage ditches where necessary. This will be managed by the EMP in accordance with CIRIA guidelines and the Environment Agency's approach to groundwater protection and groundwater protection guidelines. **Habitat enhancement** Remediation of the existing A66 culvert on Lowgill Beck (Appleby to Brough), immediately downstream of the Woodend Sike and Yosgill Sike confluence will improve connectivity for fish. This will be achieved by extending the culvert baffles to ensure sufficient depth through culvert and tying into the natural river bed. On smaller watercourses where new culverts are proposed, or where existing culverts are to be replaced or extended, design will be in accordance with CD 529 (Design of outfall and culvert details) and CIRIA C786 (Culvert, Screen and Operation		

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			the River Eden SAC are signal crayfish (Pacifastacus leniusculus) which have been responsible for much of the decline of native crayfish in the UK) and Himalayan balsam (Impatiens glandulifera), which grows in dense stands and can shade out and outcompete native species and cause sedimentation issues.	Manual guidance) during detailed design. Failing or redundant culverts will be replaced in line with best practice. An undersized and failed culvert associated with a farm track was identified on Light Water will be upgraded to improve fish passage to and from the River Eamont (part of the River Eden SAC). Introduction and/or spread of invasive non-native species: Introduction and/or spread of INNS Introduction and/or spread of INNS will be managed through the strict implementation of an INNS Management Plan. This plan will be produced by the Contractor(s) (in consultation with specialist contractors), as specified and secured within the EMP (Application Document Number 2.7). Toolbox talks will be given to operatives upon project induction; this will cover sites where terrestrial and aquatic INNS have been recorded during baseline surveys (e.g. Himalayan balsam, signal crayfish and other invasive non-native species) and outline key control		

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
				measures. For aquatic species, this will include a commitment to no transfer of plant from eastern schemes (without appropriate safeguards. **Enhancement** A number of pressures and potential opportunities to enhance aquatic habitats, improve water quality, and improve connectivity of for fish and other aquatic species were identified during surveys and habitat assessment. These opportunities will develop further at detailed designs stage and include: Barriers to fish migration; Thacka Beck (M6 Junction 40 to Kemplay Bank) is disconnected from the River Eamont under low flow conditions as the watercourse is significantly perched at the confluence with the River Eamont, which restricts fish migration between the two rivers under low flows. Fish passage improvements could be made locally to address this. Degradation of riparian habitats as a result of poaching (sheep) of the banks was recorded along Light Water and Unnamed Tributary of River Eamont 3.3 (Penrith to Temple		

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
				Sowerby). Improvements in riparian and instream habitat, as well as water quality improvements through reduced nutrients and fine sediment input, could be achieved through the addition of stockproof fencing and riparian planting. A small weir on Unnamed Tributary of Mire Sike 6.12 (Appleby to Brough) was assessed as likely to be impassable by all fish species under normal flow conditions. Removal or mitigation of this weir has the potential to improve connectivity of habitats locally. Removal of redundant culvert on Eastfield Sike associated with the MOD tank turning area. The current Flood Risk Assessment is based on modelling that assumes the presence of this culvert and the acceptability of this mitigation, in terms of flood risk will need to be fully assessed. Extensive poaching (sheep) was recorded along Eastfield Sike (Appleby to Brough). Improvements in riparian and instream habitat, as well as water quality improvements through reduced nutrients and fine sediment input, could be achieved		

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
				through the addition of stockproof fencing and riparian planting. A 300m length of Mains Gill is within a culvert. There is potential to daylight this section by removing the pipe culvert reconnecting habitats locally. The value of this mitigation, in terms of fish, should be assessed noting that the existing A66 culvert presents a barrier to the upper reaches of Mains Gill and that this section is ephemeral.		
Fish	Fish / fish habitat	High – Very High	The impacts of construction of relevance to fish are consistent with those described in detail for watercourses: • habitat loss • habitat degradation • habitat alteration • introduction and/or spread of invasive non-native species The following additional impacts of construction of relevance to fish are: • Species disturbance • Habitat fragmentation • Species mortality/injury **Species disturbance** Potential disturbance of fish has been significantly reduced as a result of	Essential construction mitigation to minimise and avoid habitat loss, habitat degradation and the introduction and/or spread of invasive non-native species in watercourses, as outlined above, this is equally relevant to fish. **Species disturbance** Species disturbance will be mitigation through sensitive construction practices. Night working will be avoided where practicable adjacent to watercourses and will only be implemented where traffic management on a road necessitates it for safety. Many qualifying fish species / life stages, particularly lamprey and salmon	Negligible - minor	Neutral – minor adverse

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			open span watercourse crossing design. However, culvert construction/replacement and extension, and the construction of the open span crossings in or near water could result in temporary disturbance from potential noise, vibration, and lighting. Temporary dewatering and over pumping associated with culvert construction could also present a temporary barrier disturbing fish. **Habitat fragmentation** Temporary fragmentation of fish habitat could occur as a result disturbance arising of from construction activities, or as a result of a physical barrier associated with dewatering and over pumping during culvert construction. **Species mortality/injury** In the absence of mitigation excessive vibration and dewatering activities could give rise to injury or mortality of fish. Vibration can cause damage or mortality of eggs and embryos in spawning gravels, which could have an adverse effect on the populations of conservation species that are gravel spawners, notably bullhead, brown trout, lamprey sp., and salmon. Fish may also be entrained into	smolts, are known to migrate at night. Avoiding night working will avoid disturbance to nocturnal migrants, and should lamprey, salmon and bullhead be migrating during the day, their migration will only temporally be delayed until the following evening. Construction sites will not be illuminated at night, where possible. Where this is not possible (e.g. due to security considerations in non-green field locations), lighting will be sensitive to nocturnal species using the river and riparian corridor and be directed away from watercourses, thus reducing disturbance of nocturnal migrants. Instream works, or works close to the river banks giving rise to excessive vibration will be undertaken outside of the key fish spawning and incubation period of 1st October to 31st May. **Species mortality/injury** No compaction, piling (or other activities resulting in Peak Particle Velocities - PPV of greater than 13mm/s) will be permitted with 5m of watercourses with gravel substrate that support gravel spawning species (salmon, trout, lamprey sp., bullhead) without prior consultation with the		

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			pumps, or suffocate if not translocated prior to dewatering.	Environment Agency and Natural England. Vibration modelling undertaken of construction activities indicates that planned piling does not result the PPV threshold being breached. Compaction activities at 1m from the river bank resulted in modelled PPV of 29mm/s. This reduced to an acceptable 11mm/s (under the 13mm/s threshold) when compaction activities are modelled 5m from the watercourse. If works giving rise to significant vibration are required adjacent to potential spawning gravels, redd surveys to determine whether spawning has occurred within the zone of impact would be undertaken, and the acceptability of in-channel works agreed with the Environment Agency and/or Natural England (depending on location). Fish and lamprey (and WCC) will be protected from physical harm during construction and translocated away from the construction area as required. Fish translocation will be managed by an Ecological Clerk of Works (ECoW).		
Aquatic macrophytes	-	Low	The potential construction impacts on aquatic macrophytes are consistent	**Essential mitigation**	Minor	Slight adverse

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			with those described for watercourses. The importance and corresponding sensitivity of macrophytes across all schemes is assessed as being Local (low). Permanent shading of instream habitat and associated loss of instream and riparian vegetation (as a result of the culvert extension and new watercourse crossings) is assessed, when considering the successful implementation of the proposed avoidance and mitigation measures, as Slight adverse.	Essential construction mitigation to minimise and avoid habitat loss, habitat degradation and the introduction and/or spread of invasive non-native species in watercourses, as outlined above, is equally relevant to macrophytes. **Enhancement** A number of pressures and potential opportunities to enhance aquatic habitats, improve water quality, and improve connectivity of for fish and other aquatic species were identified during surveys and habitat assessment. These opportunities will be developed further at detailed design stage and would enhance habitat and water quality for macrophytes.		
Aquatic macroinvertebrates	-	Low	The potential construction impacts on aquatic macrophytes are consistent with those described for watercourses. The importance and corresponding sensitivity of macrophytes across all schemes is assessed as being of Local (low). Permanent shading of instream habitat and associated loss of instream and riparian vegetation (as a	**Essential mitigation** Essential construction mitigation to minimise and avoid habitat loss, habitat degradation and the introduction and/or spread of invasive non-native species in watercourses, is equally relevant to aquatic invertebrates. **Enhancement** A number of pressures and potential opportunities to enhance aquatic	Minor	Slight adverse

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			result of the culvert extension and new watercourse crossings) is assessed, when considering the successful implementation of the proposed avoidance and mitigation measures, as Slight adverse.	habitats, improve water quality, and improve connectivity for fish and other aquatic species were identified during surveys and habitat assessment. These opportunities will be developed further at detailed design stage and would enhance habitat and water quality for aquatic invertebrates.		
White-clawed crayfish (WCC)	-	High – very high	Surveys (manual search and eDNA) have highlighted watercourses that support WCC in the M6 Junction 40 to Kemplay Bank, Penrith to Temple Sowerby, Temple Sowerby to Appleby and Appleby to Brough schemes. WCC have been confirmed absent from all watercourses in the Cross Lanes to Rokeby and Stephen Bank to Carkin Moor schemes. A single signal crayfish record was returned in the desk study search area for the Cross Lanes to Rokeby scheme and signal crayfish DNA was recorded Signal crayfish DNA was detected in the sample from Mains Gill (Stephen Bank to Carkin Moor), but was absent in all other samples route-wide. Full survey results are described in Appendix 6.21 White-clawed Crayfish (ES Volume 3, Application Document Number 3.4).	**Essential mitigation** Essential construction mitigation to minimise and avoid habitat loss, habitat degradation and the introduction and/or spread of invasive non-native species in watercourses, as outlined above, is equally relevant to aquatic invertebrates. **Species disturbance** WCC surveys (manual search and eDNA) and desk study records have highlighted that watercourses in the M6 Junction 40 to Kemplay Bank (River Eamont), Penrith to Temple Sowerby (River Eamont), Temple Sowerby to Appleby (Trout Beck and Keld Sike) and Appleby to Brough (Unnamed Tributary of Mire Sike 6.12, Moor Beck, Eastfield Sike, Unnamed Tributary of Lowgill Beck 6.1, Lowgill Beck, Woodend Sike and Yosgill Sike) schemes support WCC,	Minor	Slight adverse

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			The importance and corresponding sensitivity of WCC populations ranges from International (very high) to National (high). The impacts of construction of relevance to WCC are consistent with those described in detail for watercourses: • habitat loss • habitat degradation • habitat alteration • introduction and/or spread of invasive non-native species The following additional impacts of construction of relevance to WCC are: • Species disturbance • Habitat fragmentation • Species mortality/injury **Species disturbance** Potential disturbance of WCC has been significantly reduced as a result of open span watercourse crossing design. However, culvert construction/replacement and extension, and the construction of the open span crossings in or near water could result in temporary disturbance from potential noise, vibration, and lighting. Temporary dewatering and over pumping associated with culvert	Construction sites will not be illuminated at night, where possible. Where this is not possible (e.g. due to security considerations in non-green field locations), lighting will be sensitive to nocturnal species using the river and riparian corridor and be directed away from watercourses, thus reducing disturbance of nocturnal migrants. **Species mortality/injury** WCC will be protected from physical harm during construction and translocated away from the construction area as required by an appropriate Natural England licenced surveyor. WCC translocation will be managed by an Ecological Clerk of Works (ECoW) overseeing the wider fish translocation. **Enhancement** A number of pressures and potential opportunities to enhance aquatic habitats, improve water quality, and improve connectivity of for fish and other aquatic species were identified during surveys and habitat assessment. These opportunities will be developed further at detailed		

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			construction could also present a temporary barrier to migration for WCC. **Habitat fragmentation** Temporary fragmentation of WCC habitat could occur as a result disturbance arising of from construction activities, or as a result of a physical barrier associated with dewatering and over pumping during culvert construction. **Species mortality/injury** In the absence of mitigation excessive vibration and dewatering activities could give rise to injury or mortality of fish. WCC may also be entrained into pumps, or suffocate if not translocated prior to dewatering.	design stage and would enhance habitat for aquatic invertebrates. Opportunities to enhance the habitat in Unnamed Tributary of Mire Sike 6.12 and Unnamed Tributary of Lowgill Beck 6.1 were identified during baseline surveys. The surveyor noted a lack of large refuges for adult WCC to utilise in these minor watercourses which is considered a potential limiting factor on WCC population structure and density. Unnamed Tributary of Lowgill Beck 6.1 will be subject to minor realignment and the addition of a new culvert. Unnamed Tributary of Mire Sike 6.12 will be subject to culvert extension. As part of the works, larger sediment sizes (such as cobbles and small bounders) will be introduced to increase the productivity of habitat in the watercourse.		
M6 Junction 40 to Kemplay Bank						
Watercourses	River habitat	High – Very high	Key features of this scheme with respect to watercourses include: Three temporary construction compound areas located between the existing A66 and the SAC boundary to the south. At their closest point the compounds are located at a distance	On smaller watercourses where new culverts are proposed, or where existing culverts are to be replaced or extended (such as Thacka Beck), design will be in accordance with CD 529 (Design of outfall and culvert details) and CIRIA C786 (Culvert,	Minor	Slight adverse

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			of approximately 225m, 115m and 25m from the SAC boundary respectively Three attenuation basins for the purposes of treating of road run-off, with associated discharges to the River Eamont, part of the River Eden SAC Extension (by approximately 26m) of Thacka Beck at Carlton Hall underpass south of existing A66 Widening of existing cuttings for the approach arms at the location of M6 Junction 40, together with new cuttings for access roads and the Kemplay Bank Roundabout underpass Despite being heavily modified, Thacka Beck is assessed as being of National importance (high value) as it supports salmon, a qualifying species of the River Eden SAC. Permanent shading of instream habitat and associated loss of loss of instream and riparian vegetation in Thacka Beck, as a result of the extension of the Carlton Hall underpass culvert is assessed, when considering the successful implementation of the	Screen and Operation Manual guidance) during detailed design. Chapter 14: Road drainage and the water environment (ES Volume 1, Application Document Number 3.2) and Appendix 14.3: Water Quality Assessment (ES Volume 3, Application Document Number 3.4) considers the potential effects on the quality and quantity of surface and groundwaters, geomorphology and flood risk that may result from construction activities, the operational road drainage, and accidental spillages. Rivers and streams will be protected during construction through the implementation of best practice construction techniques and pollution prevention. Site-specific measures, as secured in Annex B7 of the Environmental Management Plan (EMP) (Application Document Number 2.7) and will include a surface water management system using measures such as temporary silt fencing, cut off ditches, settlement ponds and bunds. These will be set up early in the construction period to capture all runoff and prevent ingress of sediments and contaminants into existing drainage ditches where		

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			proposed avoidance and mitigation measures, as Slight adverse. The River Eamont is assessed as being of International importance (very high value) as it is part of the River Eden SAC. Alteration of riparian habitats associated with new discharges from three attenuation basins (for the purposes of treating of road run-off) is assessed, when considering the successful implementation of the proposed avoidance and mitigation measures, as Slight adverse.	necessary. This will be managed by the EMP in accordance with CIRIA guidelines and the Environment Agency's approach to groundwater protection and groundwater protection guidelines. Introduction and/or spread of invasive non-native species: The introduction and/or spread of INNS will be managed through the strict implementation of an INNS Management Plan. This plan will be produced by the Contractor(s) (in consultation with specialist contractors), as specified within the EMP (Application Document Number 2.7). Toolbox talks will be given to operatives upon project induction; this will cover sites where INNS have been recorded during baseline surveys (e.g. Himalayan balsam, signal crayfish and other invasive non-native species) and outline key control measures such as no transfer of plant from eastern to western schemes without appropriate safeguards.		
Fish	Fish / fish habitat	High – Very High	The key features of this scheme in relation to fish are consistent with those described for watercourses. The potential construction impacts in	Essential mitigation for this scheme is consistent with that described for fish route-wide above.	Negligible – minor	Slight adverse

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			this scheme of relevance to fish are consistent with those described on a route-wide basis. The extension of the Thacka Beck culvert is not considered to adversely affect fish passage, as the reach is heavily culverted under the baseline scenario, as a result of the A686, the A66 and of the Cumbria Constabulary buildings. The culvert extension will be designed such that the potential for fish passage is not reduced and opportunities to improve fish passage through the culvert, and between Thacka Beck and the River Eamont will be investigated as part of the detailed design. The fish assemblage of Thacka Beck is assessed as being of National importance (high value) as it supports salmon, a qualifying species of the River Eden SAC. The fish assemblage of the River Eamont is assessed as being of International importance (very high value) as this river forms part of the River Eden SAC. When considering the essential mitigation outlined to protect fish, which includes measures to minimise disturbance to migrating species and			

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			species mortality, and best practice pollution prevention, the effect on the fish assemblage of Thacka Beck is assessed as Slight adverse. The effect on the fish assemblage of the River Eamont is also assessed as Slight adverse.			
White-clawed crayfish		High	The key features of this scheme in relation to WCC are consistent with those described for watercourses and fish. The potential construction impacts in this scheme of relevance to fish are consistent with those described on a route-wide basis. WCC were confirmed absent from Thacka Beck. When considering the essential mitigation outlined to protect WCC, which includes measures to minimise disturbance to migrating species and species mortality, best practice pollution prevention and WCC translocation, the effect on WCC in the River Eamont is also assessed as Slight adverse.	Essential mitigation for this scheme is consistent with that described for fish route-wide above.	Negligible	Slight adverse
Penrith to Temple Sowerby						
Watercourses	Habitat	Low – high	Key features of this scheme with respect to the watercourses include:	Essential mitigation for this scheme is consistent with that described for	Minor	Slight adverse

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			• Light Water: minor extension (~5m of extension to the north, ~3.5m extension to the south) of existing A66 culvert, one additional minor (~7m in length) watercourse crossing to the A66, to enable access to the attenuation ponds for maintenance, and two attenuation basins for the purposes of treating of road run-off, with associated discharges to Light Water • A temporary compound storage area and construction compound adjacent to Light Water, south of the existing A66 • Unnamed Tributary of River Eamont 3.3: Extension (~15m of extension to the north) of existing A66 culvert, a new minor watercourse crossing to enable access to the attenuation ponds for maintenance, and one attenuation basin for the treatment of road run-off with associated discharges • Unnamed Tributary of River Eamont 3.5: one attenuation basin for the treatment of road run-off, with associated discharges	watercourses at a route-wide scale above. Riparian habitat creation described for Light Water in the watercourses section above will also benefit fish through increase cover and temperature reduction. An undersized and failed culvert associated with a farm track was identified on Light Water and will be remediated as part of essential mitigation, improving fish passage between Light Water and the River Eamont (see operation mitigation). Improvements in riparian and instream habitat, as well as water quality improvements through reduced nutrients and fine sediment input, could be achieved through the addition of stockproof fencing and riparian planting. On smaller watercourses where new culverts are proposed, or where existing culverts are to be replaced or extended, design will be in accordance with CD 529 (Design of outfall and culvert details) and CIRIA C786 (Culvert, Screen and Operation Manual guidance) during detailed design.		

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			• Swine Gill: extension (~40m) of the existing A66 culvert, and one attenuation basin for the treatment of road run-off, with associated discharges The Whinfell Park Underpass which may require cutting into the underlying Penrith Sandstone in this scheme Widening of existing cuttings to provide full dualling, together with realigned and new cuttings for access roads and underpasses (such as the Whinfell Park Underpass noted above) Light Water is assessed as being of National importance (high value) as its conforms to habitat 3260: Watercourses of plain to montane levels with the Ranunculion fluitantis and Callitricho-Batrachion vegetation, and supports salmon, a qualifying species of the River Eden SAC. Permanent shading of instream habitat and associated loss of instream and riparian vegetation (as a result of the extension of the existing A66 culvert and new minor crossing) is assessed, when considering the successful implementation of the	Chapter 14: Road drainage and the water environment (ES Volume 1, Application Document Number 3.2) and Appendix 14.3: Water Quality Assessment (ES Volume 3, Application Document Number 3.4) considers the potential effects on the quality and quantity of surface and groundwaters, geomorphology and flood risk that may result from construction activities, the operational road drainage, and accidental spillages. Rivers and streams will be protected during construction through the implementation of best practice construction techniques and pollution prevention. Site-specific measures, as secured in Annex B7 of the Environmental Management Plan (EMP) (Application Document Number 2.7) and will include a surface water management system using measures such as temporary silt fencing, cut off ditches, settlement ponds and bunds. These will be set up early in the construction period to capture all runoff and prevent ingress of sediments and contaminants into existing drainage ditches where necessary. This will be managed by the EMP in accordance with CIRIA		

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			proposed avoidance and mitigation measures, as Slight adverse. All other tributaries impacted (Unnamed Tributary of River Eamont 3.3, Unnamed Tributary of River Eamont 3.5 and Swine Gill) are assessed as being of Local importance (low value) within the Order Limits. Permanent shading of instream habitat and associated loss of instream and riparian vegetation (as a result of the culvert extension and new minor crossings) is assessed, when considering the successful implementation of the proposed avoidance and mitigation measures, as Slight adverse.	guidelines and the Environment Agency's approach to groundwater protection and groundwater protection guidelines. Introduction and/or spread of invasive non-native species: The introduction and/or spread of INNS will be managed through the strict implementation of an INNS Management Plan. This plan will be produced by the Contractor(s) (in consultation with specialist contractors), as specified within the EMP (Application Document Number 2.7). Toolbox talks will be given to operatives upon project induction; this will cover sites where INNS have been recorded during baseline surveys (e.g. Himalayan balsam, signal crayfish and other invasive non-native species) and outline key control measures such as no transfer of plant from eastern to western schemes without appropriate safeguards.		
Fish	Fish / fish habitat	High – Very High	The key features of this scheme in relation to fish are consistent with those described for watercourses. The potential construction impacts in this scheme of relevance to fish are	Essential mitigation for this scheme is consistent with that described for fish at a route-wide scale above. Riparian habitat creation described for Light Water in the watercourses	Negligible	Slight adverse

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			consistent with those described on a route-wide basis. The fish assemblage of Light Water is assessed as being of National importance (high value) as it supports salmon, a qualifying species of the River Eden SAC. The fish assemblage of the River Eamont is assessed as being of International importance (very high value) as this river forms part of the River Eden SAC. When considering the essential mitigation outlined to protect fish, which includes measures to minimise disturbance to migrating species and species mortality, and best practice pollution prevention, the effect on the fish assemblage of Light Water is assessed as Slight adverse. The effect on the fish assemblage of the River Eamont is also assessed as Slight adverse. All other tributaries impacted (Unnamed Tributary of River Eamont 3.3, Unnamed Tributary of River Eamont 3.5 and Swine Gill) were considered unsuitable habitat for fish or did not support notable species during survey. On a precautionary basis, a fish assemblage value of	section above will also benefit fish through increase cover and temperature reduction. An undersized and failed culvert associated with a farm track was identified on Light Water and will be remediated as part of essential mitigation, improving fish passage between Light Water and the River Eamont (see operation mitigation).		

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			Local importance (low value) has been applied. When considering the successful implementation of the proposed avoidance and mitigation measures, the effect on the fish assemblage in these watercourses is also assessed as Slight adverse as Slight adverse.			
White-clawed crayfish (WCC)	-	Very high	The key features of this scheme in relation to WCC are consistent with those described for watercourses and fish. The potential construction impacts in this scheme of relevance to WCC are consistent with those described on a route-wide basis. WCC were confirmed absent from watercourses surveyed in this scheme, but are considered present in the River Eamont, which forms part of the River Eden SAC, for which WCC are a designated feature. The WCC assemblage of the River Eamont is assessed as being of International importance (very high value) as this river forms part of the River Eden SAC. When considering the essential mitigation outlined to protect WCC, the effect on WCC in the River	Essential mitigation for this scheme is consistent with that described for WCC at a route-wide scale above.	Negligible	Slight adverse

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			Eamont is assessed as Slight adverse.			
Temple Sowerby to Appleby						
Watercourses	Habitat	Low – very high	Key features of this scheme with respect to the watercourses include: • A multi-span viaduct over the Trout Beck and its floodplain, consisting of seven bridge piers located in the Trout Beck floodplain (three piers located to the north of the watercourse and four located to the south) • Installation of a temporary bridge to enable the construction of the Trout Beck viaduct • A cutting associated with the Kirby Thore Bypass, widening of existing cuttings, together with realigned and new cuttings for access roads, junctions and underpasses. • A number construction compounds in close proximity to the SAC, and one that lies within the SAC boundary in the vicinity of the proposed Trout Beck crossing • One attenuation basin for the treatment of road run-off, with	Direct loss of aquatic habitat Loss has been minimised through embedded designed mitigation. Open span watercourse crossings that will avoid the loss of aquatic habitat within Trout Beck, which form parts of the River Eden SAC (Temple Sowerby to Appleby) and functionally linked watercourses in the Appleby to Brough form part of the design. This design feature is secured through the Project Design Principles (Application Document Number 5.11). Habitat degradation Chapter 14: Road drainage and the water environment (ES Volume 1, Application Document Number 3.2) and Appendix 14.3: Water Quality Assessment (ES Volume 3, Application Document Number 3.4) considers the potential effects on the quality and quantity of surface and groundwaters, geomorphology and flood risk that may result from construction activities, the operational road drainage, and accidental spillages. Rivers and streams will be	Negligible	Slight adverse

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			associated discharges to Unnamed Tributary of River Eden 4.0 • Four attenuation basins for the treatment of road run-off, with associated discharges to Trout Beck • One attenuation basin for the treatment of road run-off, with associated discharges to Unnamed Tributary of Trout Beck 4.2 • One attenuation basin for the treatment of road run-off, with associated discharges to Unnamed Tributary of River Eden 4.2 • One attenuation basin for the treatment of road run-off, with associated discharges to Unnamed Tributary of River Eden 4.3 Trout Beck is assessed as being of International importance (very high value) as it forms part of the River Eden SAC and has been shown to support all qualifying features. The viaduct design, which will minimise habitat loss and disturbance during construction has been	protected during construction through the implementation of best practice construction techniques and pollution prevention. Site-specific measures, as secured in Annex B7 of the Environmental Management Plan (EMP) (Application Document Number 2.7) and will include a surface water management system using measures such as temporary silt fencing, cut off ditches, settlement ponds and bunds. These will be set up early in the construction period to capture all runoff and prevent ingress of sediments and contaminants into existing drainage ditches where necessary. This will be managed by the EMP in accordance with CIRIA guidelines and the Environment Agency's approach to groundwater protection and groundwater protection guidelines. Introduction and/or spread of invasive non-native species: The introduction and/or spread of INNS will be managed through the strict implementation of an INNS Management Plan. This plan will be produced by the Contractor(s) (in consultation with specialist contractors), as specified within the		

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			informed by, and tested through detailed fluvial geomorphology modelling as outlined in Chapter 14: Road drainage and the water environment (ES Volume 1, Application Document Number 3.2) and Appendix 14.9: Detailed Geomorphological Modelling (ES Volume 3, Application Document Number 3.4) is secured through the Project Design Principles (Application Document Number 5.11). This design has reduced the construction impact on Trout Beck to localised (~30m of channel length or 0.06ha) permanent shading of instream habitat and associated loss of instream and riparian vegetation.	EMP (Application Document Number 2.7). Toolbox talks will be given to operatives upon project induction; this will cover sites where INNS have been recorded during baseline surveys (e.g. Himalayan balsam, signal crayfish and other invasive non-native species) and outline key control measures such as no transfer of plant from eastern to western schemes without appropriate safeguards.		
Fish	Fish / fish habitat	High – very high	The key features of this scheme in relation to fish are consistent with those described for watercourses. The potential construction impacts in this scheme of relevance to fish are consistent with those described on a route-wide basis. The fish assemblage of Trout Beck is assessed as being of International importance (very high value) as it forms part of the River Eden SAC and	Essential mitigation for this scheme is consistent with that described for fish at a route-wide scale above.	Negligible	Slight adverse

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			has been shown to support all qualifying fish features. When considering the successful implementation of the proposed avoidance and mitigation measures, the effect on the fish assemblage of Trout Beck during construction is assessed as Slight adverse.			
White-clawed crayfish (WCC)	-	Very high	The key features of this scheme in relation to WCC are consistent with those described for watercourses and fish. The potential construction impacts in this scheme of relevance to WCC are consistent with those described on a route-wide basis. WCC were confirmed absent from Trout Beck in this vicinity of the proposed viaduct, but were confirmed in Trout Beck, downstream of the existing A66 culvert. They are also considered present in the River Eden, which forms part of the River Eden SAC, for which WCC are a designated feature. The WCC population of Trout Beck and the River Eamont are assessed as being of International importance (very high value) as these rivers form part of the River Eden SAC.	Essential mitigation for this scheme is consistent with that described for WCC at a route-wide scale above.	Negligible	Slight adverse

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			When considering the essential mitigation outlined to protect WCC, the effect on WCC is assessed as Slight adverse.			
Appleby to Brough						
Watercourses	Habitat	High	Key features of this scheme with respect to watercourses include: • Unnamed Tributary of Mire Sike 6.12: widening of the existing A66 culvert that conveys under the road, and two attenuation basins for the purposes of treating of road run-off, with associated discharges to Unnamed Tributary of Mire Sike 6.12 • Cringle Beck: new open span crossing of the watercourse and its floodplain, one attenuation basin for the purposes of treating of road run-off, with associated discharge to Cringle Beck • Moor Beck: A multi-span viaduct over the Moor Beck and its floodplain, two flood storage area adjacent to Moor Beck, north of Warcop that will fill in major flood events, one attenuation basin for the purposes of treating of road run-off, with an associated discharge to Moor Beck, two open	Permanent adverse effects upon watercourses and hydromorphology from new bridges, culverts and outfalls that will be minimised through embedded design. Watercourse crossing design will facilitates the free movement of aquatic and riparian species through bridges and culverts. On smaller watercourses where new culverts are proposed, or where existing culverts are to be replaced or extended, design will be in accordance with CD 529 (Design of outfall and culvert details) and CIRIA C786 (Culvert, Screen and Operation Manual guidance) during detailed design. Extensive poaching (sheep) was recorded along Eastfield Sike (Appleby to Brough). Improvements in riparian and instream habitat, as well as water quality improvements through reduced nutrients and fine sediment input, could be achieved	Minor	Slight adverse

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			span bridges of Moor Beck; one upstream of the heritage railway and confluence with Eastfield Sike and a second upstream of the Warcop village access road • Eastfield Sike: replacement and widening the existing A66 culvert • Lowgill Beck: two attenuation basins for the purposes of treating of road run-off, with associated discharges, a new culvert and minor channel realignment of a minor tributary (Unnamed Tributary of Lowgill Beck 6.1), one attenuation basin for the purposes of treating of road run-off, with an associated discharge to Lowgill Beck • Woodend Sike/Yosgill Sike: extension of the existing A66 culvert at the confluence with these watercourses and Lowgill Beck and associated minor channel realignment to shift the confluence of these watercourses slightly north and upstream of the extended culvert • A series of cuttings, that are typically extensions of existing cuttings associated with online widening, will be required in this	through the addition of stockproof fencing and riparian planting. **Habitat degradation** Chapter 14: Road drainage and the water environment (ES Volume 1, Application Document Number 3.2) and Appendix 14.3: Water Quality Assessment (ES Volume 3, Application Document Number 3.4) considers the potential effects on the quality and quantity of surface and groundwaters, geomorphology and flood risk that may result from construction activities, the operational road drainage, and accidental spillages. Rivers and streams will be protected during construction through the implementation of best practice construction techniques and pollution prevention. Site-specific measures, as secured in Annex B7 of the Environmental Management Plan (EMP) (Application Document Number 2.7) and will include a surface water management system using measures such as temporary silt fencing, cut off ditches, settlement ponds and bunds. These will be set up early in the construction period to capture all runoff and prevent ingress		

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			scheme. In addition, a number of realigned and new cuttings are required for access roads, junctions and underpasses With the exception of Cringle Beck, all the watercourses affected by this scheme qualify as priority river habitat as defined in the UK Biodiversity Action Plan Priority Habitat Descriptions (JNCC 2016) under Criterion 7 "Species" due to the confirmed presence of white-clawed crayfish and/or the confirmed presence of six of more criterion level B species. The watercourses are therefore considered to be of National importance (high value). In addition, the watercourses, including Cringle Beck have been shown to support qualifying species of the River Eden SAC and are therefore considered functionally linked to the SAC. Cringle Beck is therefore also considered to be of National importance (high value). Essential design mitigation includes best practice watercourse crossing design, remediation of the existing A66 culvert in the vicinity of the Woodend Sike and Yosgill Sike confluence (considered a barrier to	of sediments and contaminants into existing drainage ditches where necessary. This will be managed by the EMP in accordance with CIRIA guidelines and the Environment Agency's approach to groundwater protection and groundwater protection guidelines. Introduction and/or spread of invasive non-native species: The introduction and/or spread of INNS will be managed through the strict implementation of an INNS Management Plan. This plan will be produced by the Contractor(s) (in consultation with specialist contractors), as specified within the EMP (Application Document Number 2.7). Toolbox talks will be given to operatives upon project induction; this will cover sites where INNS have been recorded during baseline surveys (e.g. Himalayan balsam, signal crayfish and other invasive non-native species) and outline key control measures such as no transfer of plant from eastern to western schemes without appropriate safeguards. Permanent adverse effects upon watercourses and hydromorphology		

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			migration for all fish species with the exception of eel under normal low flow conditions due to insufficient water depth) and replacement of culverts in line with current best practice. When considering the design of watercourse crossings, which will minimise habitat loss and disturbance during construction and is secured through the Project Design Principles (Application Document Number 5.11), and the successful implementation of the proposed avoidance and mitigation measures, the effect on watercourses in this scheme are assessed as Slight adverse.	from new bridges, culverts and outfalls that will be minimised through embedded design. Watercourse crossing design will facilitates the free movement of aquatic and riparian species through bridges and culverts. On smaller watercourses where new culverts are proposed, or where existing culverts are to be replaced or extended, design will be in accordance with CD 529 (Design of outfall and culvert details) and CIRIA C786 (Culvert, Screen and Operation Manual guidance) during detailed design.		
Fish	Fish / fish habitat	High – very high	The key features of this scheme in relation to fish are consistent with those described for watercourses. The potential construction impacts in this scheme of relevance to fish are consistent with those described on a route-wide basis. The fish assemblage in watercourses in this scheme is assessed as being of National importance (high value) as the watercourses have been shown to support qualifying species of the River Eden SAC and are therefore	Essential mitigation for this scheme is consistent with that described for fish at a route-wide scale above. The existing A66 culvert on Lowgill Beck (Appleby to Brough), immediately downstream of the Woodend Sike and Yosgill Sike confluence, is considered to be a barrier for all fish species with the exception of eel under normal low flow conditions. Extending the baffles to create deeper water over the concrete bed upstream of the culvert and tying this into the natural riverbed	Negligible	Slight adverse

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			considered functionally linked to the SAC.	will improve fish passage to and from Woodend Sike and Yosgill Sike. A small weir on Unnamed Tributary of Mire Sike 6.12 was assessed as likely to be impassable by all fish species under normal flow conditions. Removal or mitigation of this weir has the potential to improve connectivity of habitats locally. The removal of redundant culvert on Eastfield Sike associated with the MOD tank turning area. The current Flood Risk Assessment is based on modelling that assumes the presence of this culvert and the acceptability of this mitigation, in terms of flood risk will need to be fully assessed.		
White-clawed crayfish (WCC)	-	High	The key features of this scheme in relation to WCC are consistent with those described for watercourses and fish. The potential construction impacts in this scheme of relevance to WCC are consistent with those described on a route-wide basis. Based on the results of the manual search and/or eDNA surveys, WCC were confirmed present in the following watercourses in this scheme; Unnamed Tributary of Mire	Opportunities to enhance the habitat in Unnamed Tributary of Mire Sike 6.12 and Unnamed Tributary of Lowgill Beck 6.1 were identified during baseline surveys. The surveyor noted a lack of large refuges for adult WCC to utilise in these minor watercourses which is considered a potential limiting factor on WCC population structure and density. Unnamed Tributary of Lowgill Beck 6.1 will be subject to minor	Negligible	Slight adverse

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			Sike 6.12, Moor Beck, Eastfield Sike, Unnamed Tributary of Lowgill Beck 6.1, Lowgill Beck, Woodend Sike and Yosgill Sike. The WCC populations in these watercourses are assessed as being of National importance (high value). When considering the essential mitigation outlined to protect WCC, the effect on WCC is assessed as Slight adverse.	realignment and the addition of a new culvert. Unnamed Tributary of Mire Sike 6.12 will be subject to culvert extension. As part of the works, larger sediment sizes (such as cobbles and small bounders) will be introduced to increase the productivity of habitat in the watercourse.		
Bowes Bypass						
Watercourses	Habitat	Low	This scheme crosses only Unnamed Tributary of River Greta 7.3 north of Bowes. This minor watercourse is heavily modified by numerous culverts. The watercourse is already culverted for approximately 600m (under the existing A66 and surrounding agricultural land) within the area of the alignment. This tributary is disconnected from the wider River Greta catchment due a natural waterfall approximately 50m upstream the River Greta that is considered a barrier for all species. This watercourse is considered to be of Local importance (low value). Impacts are limited to potential construction-related runoff and the	Chapter 14: Road drainage and the water environment (ES Volume 1, Application Document Number 3.2) and Appendix 14.3: Water Quality Assessment (ES Volume 3, Application Document Number 3.4) considers the potential effects on the quality and quantity of surface and groundwaters, geomorphology and flood risk that may result from construction activities, the operational road drainage, and accidental spillages. Rivers and streams will be protected during construction through the implementation of best practice construction techniques and pollution prevention. Site-specific measures, as secured in Annex B7 of the	Negligible	Neutral

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			introduction and/or spread of invasive non-native species. When considering the successful implementation of the proposed avoidance and mitigation measures, the effect on watercourses in this scheme is assessed as Neutral.	Environmental Management Plan (EMP) (Application Document Number 2.7) and will include a surface water management system using measures such as temporary silt fencing, cut off ditches, settlement ponds and bunds. These will be set up early in the construction period to capture all runoff and prevent ingress of sediments and contaminants into existing drainage ditches where necessary. The introduction and/or spread of INNS will be managed through the strict implementation of an INNS Management Plan. This plan will be produced by the Contractor(s) (in consultation with specialist contractors), as specified within the EMP (Application Document Number 2.7). Toolbox talks will be given to operatives upon project induction; this will cover sites where INNS have been recorded during baseline surveys (e.g. Himalayan balsam, signal crayfish and other invasive non-native species) and outline key control measures such as no transfer of plant from eastern to western schemes without appropriate safeguards.		

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
Fish	Fish / fish habitat	Low	This scheme crosses only Unnamed Tributary of River Greta 7.3 north of Bowes. This minor watercourse is heavily modified by numerous culverts. The scheme falls entirely within a section of the watercourse that is already culverted for 600m (under the existing A66 and surrounding agricultural land). This tributary is disconnected from the wider River Greta catchment due a natural waterfall approximately 50m upstream the River Greta that is considered a barrier for all species. This watercourse is considered to be of Local importance (low value). Impacts are limited to potential construction-related runoff. When considering the successful implementation of the proposed avoidance and mitigation measures, the effect on watercourses in this scheme is assessed as Neutral.	Essential mitigation for this scheme is consistent with that described for fish at a route-wide scale above.	Negligible	Neutral
Cross Lanes to Rokeby						
Watercourses	Habitat	Low	Key features of this scheme with respect to watercourses include: • Punder Gill / Tutta Beck; two additional culverts and channel realignment through the Cross Lanes Junction, five attenuation	Permanent adverse effects upon watercourses and hydromorphology from new bridges, culverts and outfalls that will be minimised through embedded design. Watercourse crossing design will facilitates the free	Minor	Slight adverse

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			basins for the purposes of treating of road run-off, with associated discharges • Unnamed Tributary of Punder Gill 8.1: extension of the existing A66 culvert • Tutta Beck: three attenuation basins for the purposes of treating of road run-off, with associated discharges • Watercourses impacted are assessed as being as being of Local importance (low value). The realignment of Tutta Beck has been minimised through design at this location to reduce effects upon the watercourse. • Permanent shading of instream habitat and associated loss of instream and riparian vegetation (as a result of the culvert extension and new watercourse crossings) is assessed, when considering the successful implementation of the proposed avoidance and mitigation measures, as Slight adverse.	movement of aquatic and riparian species through bridges and culverts. On smaller watercourses where new culverts are proposed, or where existing culverts are to be replaced or extended, design will be in accordance with CD 529 (Design of outfall and culvert details) and CIRIA C786 (Culvert, Screen and Operation Manual guidance) during detailed design. Chapter 14: Road drainage and the water environment (ES Volume 1, Application Document Number 3.2) and Appendix 14.3: Water Quality Assessment (ES Volume 3, Application Document Number 3.4) considers the potential effects on the quality and quantity of surface and groundwaters, geomorphology and flood risk that may result from construction activities, the operational road drainage, and accidental spillages. Rivers and streams will be protected during construction through the implementation of best practice construction techniques and pollution prevention. Site-specific measures, as secured in Annex B7 of the Environmental Management Plan (EMP) (Application Document		

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
				Number 2.7) and will include a surface water management system using measures such as temporary silt fencing, cut off ditches, settlement ponds and bunds. These will be set up early in the construction period to capture all runoff and prevent ingress of sediments and contaminants into existing drainage ditches where necessary. This will be managed by the EMP in accordance with CIRIA guidelines and the Environment Agency's approach to groundwater protection and groundwater protection guidelines. Introduction and/or spread of invasive non-native species: The introduction and/or spread of INNS will be managed through the strict implementation of an INNS Management Plan. This plan will be produced by the Contractor(s) (in consultation with specialist contractors), as specified within the EMP (Application Document Number 2.7). Toolbox talks will be given to operatives upon project induction; this will cover sites where INNS have been recorded during baseline surveys (e.g. Himalayan balsam, signal crayfish and other invasive		

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
				non-native species) and outline key control measures such as no transfer of plant from eastern to western schemes without appropriate safeguards.		
Fish	Fish / fish habitat	Low	The key features of this scheme in relation to fish are consistent with those described for watercourses. The potential construction impacts in this scheme of relevance to fish are consistent with those described on a route-wide basis. Fish assemblages impacted are assessed as being as being of Local importance (low value), however, fish were confirmed absent from the upper reaches of Punder Gill / Tutta Beck. The realignment of Tutta Beck has been minimised through design at this location to reduce effects upon the watercourse. Permanent shading of instream habitat and associated loss of instream and riparian vegetation (as a result of the culvert extension and new watercourse crossings) is assessed, when considering the successful implementation of the	Essential mitigation for this scheme is consistent with that described for fish at a route-wide scale above.	Minor	Slight adverse

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			proposed avoidance and mitigation measures, as Slight adverse.			
Stephen Bank to Carkin Moor						
Watercourses	Habitat	Low	Key features of this scheme with respect to watercourses include: • Unnamed Tributary of Cottonmill Beck 9.3: two attenuation basins for the purposes of treating of road run-off, with associated discharges • Unnamed Tributary of Holme Beck 9.6: new culvert to the north of the existing A66, and one attenuation basin for the purposes of treating of road run-off, with associated discharges. • Mains Gill: new culvert to the north of the existing A66, and one attenuation basin for the purposes of treating of road run-off, with associated discharges • Unnamed Tributary of Holme Beck 9.8: new culvert to the south of the existing A66 and extension of the existing A66 culvert • Unnamed Tributary of Holme Beck 9.2: new culvert to the south of the existing A66, extension of the existing A66 culvert, and two	A 300m length of Mains Gill is within a culvert. There is potential to daylight this section by removing the pipe culvert reconnecting habitats locally. The value of this mitigation, in terms of fish, should be assessed noting that the existing A66 culvert presents a barrier to the upper reaches of Mains Gill and that this section is ephemeral. Permanent adverse effects upon watercourses and hydromorphology from new bridges, culverts and outfalls that will be minimised through embedded design. Watercourse crossing design will facilitates the free movement of aquatic and riparian species through bridges and culverts. On smaller watercourses where new culverts are proposed, or where existing culverts are to be replaced or extended, design will be in accordance with CD 529 (Design of outfall and culvert details) and CIRIA C786 (Culvert, Screen and Operation Manual guidance) during detailed design.	Minor	Slight adverse

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			attenuation basins for the purposes of treating of road run-off, with associated discharges Watercourses impacted in this scheme are assessed as being as being of Local importance (low value). Permanent shading of instream habitat and associated loss of instream and riparian vegetation (as a result of the culvert extension and new watercourse crossings) is assessed, when considering the successful implementation of the proposed avoidance and mitigation measures, as Slight adverse.	Chapter 14: Road drainage and the water environment (ES Volume 1, Application Document Number 3.2) and Appendix 14.3: Water Quality Assessment (ES Volume 3, Application Document Number 3.4) considers the potential effects on the quality and quantity of surface and groundwaters, geomorphology and flood risk that may result from construction activities, the operational road drainage, and accidental spillages. Rivers and streams will be protected during construction through the implementation of best practice construction techniques and pollution prevention. Site-specific measures, as secured in Annex B7 of the Environmental Management Plan (EMP) (Application Document Number 2.7) and will include a surface water management system using measures such as temporary silt fencing, cut off ditches, settlement ponds and bunds. These will be set up early in the construction period to capture all runoff and prevent ingress of sediments and contaminants into existing drainage ditches where necessary. This will be managed by the EMP in accordance with CIRIA		

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
				guidelines and the Environment Agency's approach to groundwater protection and groundwater protection guidelines. Introduction and/or spread of invasive non-native species: The introduction and/or spread of INNS will be managed through the strict implementation of an INNS Management Plan. This plan will be produced by the Contractor(s) (in consultation with specialist contractors), as specified within the EMP (Application Document Number 2.7). Toolbox talks will be given to operatives upon project induction; this will cover sites where INNS have been recorded during baseline surveys (e.g. Himalayan balsam, signal crayfish and other invasive non-native species) and outline key control measures such as no transfer of plant from eastern to western schemes without appropriate safeguards.		
Fish	Fish / fish habitat	Low	The key features of this scheme in relation to fish are consistent with those described for watercourses. The potential construction impacts in this scheme of relevance to fish are		Minor	Slight adverse

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			consistent with those described on a route-wide basis. Fish were absent from many watercourses impacted in this scheme; where present the fish assemblage is assessed as being of Local importance (low value). Permanent shading of instream habitat and associated loss of instream and riparian vegetation (as a result of the culvert extension and new watercourse crossings) is assessed, when considering the successful implementation of the proposed avoidance and mitigation measures, as Slight adverse.			
A1(M) Junction 53 Scotch Corner						
n/a	n/a	n/a	n/a	n/a	n/a	n/a

Table 6-16: Summary of non-significant effects (operation) on designated sites

Receptor	Attribute	Receptor sensitivity	Potential Impact before essential mitigation	Essential mitigation/ enhancement	Impact magnitude	Residual effect
Routewide						
n/a	n/a	n/a	n/a	n/a	n/a	n/a
M6 Junction 40 to Kemplay Bank						
River Eden SAC, River	All qualifying features	Very high to high	Air quality modelling recorded an increase in nitrogen deposition at	n/a	Negligible	Slight adverse

Receptor	Attribute	Receptor sensitivity	Potential Impact before essential mitigation	Essential mitigation/ enhancement	Impact magnitude	Residual effect
Eden and Tributaries SSSI			five locations. Aquatic plants that are a component of the vegetation community are submerged for the majority of the year due to their growth form, consequently they are regularly inundated and flushed during modest flood events. Local contributions to nitrogen deposition identified road transport as the smallest identified source. It is considered that any increase in nitrogen deposition as a result of the Project, even an increase in over 1000 Annual Average Daily Traffic will not make a considerable impact to the overall source of nitrogen deposition that the SAC currently received from various other sources. The contribution of nitrogen from road transport in the context of other nitrogen sources (as discussed above) is modest, especially when the flushing effect of the water is considered. The impacts are localised and therefore, it is considered that nitrogen deposition would not result in an adverse effect of this feature within the respective SSSI units. Subsequently no significant effect is predicted on the			

Receptor	Attribute	Receptor sensitivity	Potential Impact before essential mitigation	Essential mitigation/ enhancement	Impact magnitude	Residual effect
			River Eden SAC and River Eden and Tributaries SSSI.			
Penrith to Temple Sowerby						
River Eden SAC, River Eden and Tributaries SSSI	All qualifying features	Very high to high	As above	n/a	Negligible	Slight adverse
Temple Sowerby to Appleby						
River Eden SAC, River Eden and Tributaries SSSI	All qualifying features	Very high to high	As above	n/a	Negligible	Slight adverse
Appleby to Brough						
n/a	n/a	n/a	n/a	n/a	n/a	n/a
Bowes Bypass						
n/a	n/a	n/a	n/a	n/a	n/a	n/a
Cross Lanes to Rokeby						
Rokeby Park and Mortham Wood LWS	Parkland with mature trees, potential ancient woodland	High	Air quality modelling recorded a 1% change against the critical load up to 60m in the transect. The assessment concluded no significant effects. This was based on a combination of survey data where available,	n/a	Minor	Slight adverse

Receptor	Attribute	Receptor sensitivity	Potential Impact before essential mitigation	Essential mitigation/ enhancement	Impact magnitude	Residual effect
	and veteran or ancient trees.		available desk study data, DMRB LA105 standards. Professional judgement and ecological principles are then applied in concluding the assessment.			
Stephen Bank to Carkin Moor						
n/a	n/a	n/a	n/a	n/a	n/a	n/a
A1(M) Junction 53 Scotch Corner						
n/a	n/a	n/a	n/a	n/a	n/a	n/a

Table 13: Summary of non-significant effects on designated sites within 200m of the ARN (operation)

Receptor	Attribute	Receptor sensitivity	Potential Impact before essential mitigation	Essential mitigation/ enhancement	Impact magnitude	Residual effect
North Pennine Moors SAC and SPA and Bowes Moors SSSI	All qualifying features	Very high to high	Air quality modelling recorded a 1% change against the critical load up to 60m within the site north of the existing A66 and 30m within the site south of the existing A66. The assessment concluded no significant effects. This was based on a combination of survey data where available, available desk study data, DMRB LA105 standards. Professional judgement and ecological principles are then applied in concluding the assessment.	n/a	Negligible	Slight adverse

Receptor	Attribute	Receptor sensitivity	Potential Impact before essential mitigation	Essential mitigation/ enhancement	Impact magnitude	Residual effect
Oglebird Plantation PAWS	Ancient replanted woodland	High	Air quality modelling recorded a 1% change against the critical load up to 40m in the transect. The assessment concluded no significant effects. This was based on a combination of survey data where available, available desk study data, DMRB LA105 standards. Professional judgement and ecological principles are then applied in concluding the assessment.	n/a	Minor	Slight adverse
Augill Bridge Wood ASNW	Ancient and semi-natural woodland	High	Air quality modelling recorded a 1% change against the critical load up to 50m in the transect. The assessment concluded no significant effects. This was based on a combination of survey data where available, available desk study data, DMRB LA105 standards. Professional judgement and ecological principles are then applied in concluding the assessment.	n/a	Minor	Slight adverse
Stainmore Common LWS	All qualifying features	High	Air quality modelling recorded a 1% change against the critical load up to 50m in the transect. The assessment concluded no significant effects. This was based on a combination of survey data where available, available desk study data, DMRB LA105 standards. Professional judgement and ecological principles are then applied in concluding the assessment.	n/a	Minor	Slight adverse

Receptor	Attribute	Receptor sensitivity	Potential Impact before essential mitigation	Essential mitigation/ enhancement	Impact magnitude	Residual effect
Belah to Stainmore Disused Line LWS	All qualifying features	Low	Air quality modelling recorded a 1% change against the critical load up to 50m in the transect. The assessment concluded no significant effects. This was based on a combination of survey data where available, available desk study data, DMRB LA105 standards. Professional judgement and ecological principles are then applied in concluding the assessment.	n/a	Minor	Neutral
Augill Valley Pastures SSSI	All qualifying features	High	Air quality modelling recorded a 1% change against the critical load up to 50m in the transect. The assessment concluded no significant effects. This was based on a combination of survey data where available, available desk study data, DMRB LA105 standards. Professional judgement and ecological principles are then applied in concluding the assessment.	n/a	Minor	Slight adverse
Argill Woods and Pastures SSSI	All qualifying features	High	Air quality modelling recorded a 1% change against the critical load up to 20m in the transect. The assessment concluded no significant effects. This was based on a combination of survey data where available, available desk study data, DMRB LA105 standards. Professional judgement and ecological principles are then applied in concluding the assessment.	n/a	Minor	Slight adverse

Receptor	Attribute	Receptor sensitivity	Potential Impact before essential mitigation	Essential mitigation/ enhancement	Impact magnitude	Residual effect
Low Coniscliffe Tees Bank LWS	Broadleaved woodland	Low	Air quality modelling recorded a 1% change against the critical load up to 50m in the transect. The assessment concluded no significant effects. This was based on a combination of survey data where available, available desk study data, DMRB LA105 standards. Professional judgement and ecological principles are then applied in concluding the assessment.	n/a	Minor	Neutral
Roadside Verges C25 4a and 4b	Species-rich neutral grassland	Low	Air quality modelling recorded a 1% change against the critical load up to 0m in the transect. The assessment concluded no significant effects. This was based on a combination of survey data where available, available desk study data, DMRB LA105 standards. Professional judgement and ecological principles are then applied in concluding the assessment.	n/a	Minor	Neutral

Table 6-17: Summary of non-significant effects (operation) on habitats

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
Habitats	N/A	N/A	N/A	N/A	N/A	N/A

Table 6-18: Summary of non-significant effects (operation) on hedgerow

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
Hedgerow	Important hedgerows, S41 hedgerows, and all other hedgerows	Low	n/a	n/a	Negligible	Neutral

Table 6-19: Summary of non-significant effects (operation) on amphibians

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
Routewide						
Amphibians	Breeding ponds and terrestrial habitat	Low	Permanent, impermeable surfaces accumulate pollutants and deliver higher loads in runoff when compared with vegetated surfaces. The increase of impermeable surfaces as a result of the Project, in combination with the increased potential for local deposition of exhaust pollutants, dust and other chemicals (for example, salts) from road traffic and associated management will lead to higher pollutant loads entering into receiving waterbodies. This reduction in water quality will have adverse implications for amphibians sensitive to these changes.	n/a	Negligible	Neutral

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
	Individuals	Low	Direct mortality resulting from operation of the road will occur due to collisions with traffic, or amphibians becoming entrapped within drainage systems. The extent of this mortality is likely to be location dependant with higher mortalities likely to be associated in proximity to breeding habitats and migration routes.	n/a	Minor	Slight benefit

Table 6-20: Summary of non-significant effects (operation) on reptiles

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
Routewide						
Reptile	Individuals	Low	Direct mortality resulting from operation of the road will occur due to collisions with traffic as reptiles attempt to cross the live carriageway.	The incorporation of several underpasses and green bridges into the design of the Project, which comprise stretches of habitat suitable to support reptile commuting underneath or over the live carriageway.	Minor	Slight benefit

Table 6-21: Summary of non-significant effects (operation) on badger

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
Routewide						
Badger	Individuals	Low	Direct mortality or injury of badgers due to traffic collisions	Construction of badger fencing & wildlife culverts to prevent badgers	Minor	Slight benefit

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
				from crossing the A66 unless at a wildlife culvert		
M6 Junction 40 to Kemplay Bank						
Badger	Individuals	Low	Direct mortality or injury of badgers due to traffic collisions	Badger fencing to be constructed to encourage badger to use existing underpass	Minor	Slight benefit
Penrith to Temple Sowerby						
Badger	Individuals	Low	Direct mortality or injury of badgers due to traffic collisions	Seven wildlife culverts to be constructed Extensive fencing to ensure badger are directed to the wildlife culverts	Minor	Slight benefit
Temple Sowerby to Appleby						
Badger	Individuals	Low	Direct mortality or injury of badgers due to traffic collisions	Two wildlife culverts to be constructed. Badger will also be able to use a bridge over Trout Beck as an underpass Extensive fencing to ensure badger are directed to the wildlife culverts or the bridge over Trout Beck	Minor	Slight benefit
Appleby to Brough						
Badger	Individuals	Low	Direct mortality or injury of badgers due to traffic collisions	One wildlife culvert to be constructed. This has been sited in a location with historic badger deaths due to traffic collisions Extensive fencing to ensure badger are directed to the wildlife culverts	Minor	Slight benefit

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
Bowes Bypass						
n/a	n/a	n/a	n/a	n/a	n/a	n/a
Cross Lanes to Rokeby						
Badger	Individuals	Low	Direct mortality or injury of badgers due to traffic collisions Isolation of badger populations within and between clans	None required as no badger field signs recorded on south side of A66	Minor	Slight benefit
Stephen Bank to Carkin Moor						
Badger	Individuals	Low	Direct mortality or injury of badgers due to traffic collisions	Two wildlife culverts to be constructed. Extensive fencing to ensure badger are directed to the wildlife culverts	Minor	Slight benefit
A1(M) Junction 53 Scotch Corner						
n/a	n/a	n/a	n/a	n/a	n/a	n/a

Table 6-22: Summary of non-significant effects (operation) on red squirrel

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
Routewide						
Red squirrel	Individuals	Low	Mortality or injury due to traffic collisions	Permanent wildlife bridges and underpasses for squirrels to avoid crossing the carriageway	Negligible	Neutral

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
M6 Junction 40 to Kemplay Bank						
Red squirrel	Individuals	Low	Mortality or injury due to traffic collisions	Permanent wildlife bridges and underpasses for squirrels to avoid crossing the carriageway	Negligible	Neutral
Penrith to Temple Sowerby						
Red squirrel	Individuals	Low	Mortality or injury due to traffic collisions	Permanent wildlife bridges and underpasses for squirrels to avoid crossing the carriageway	Negligible	Neutral
Temple Sowerby to Appleby						
Red squirrel	Individuals	Low	Mortality or injury due to traffic collisions	Permanent wildlife bridges and underpasses for squirrels to avoid crossing the carriageway	Negligible	Neutral
Appleby to Brough						
n/a	n/a	n/a	n/a	n/a	n/a	n/a
Bowes Bypass						
n/a	n/a	n/a	n/a	n/a	n/a	n/a
Cross Lanes to Rokeby						
n/a	n/a	n/a	n/a	n/a	n/a	n/a
Stephen Bank to Carkin Moor						
n/a	n/a	n/a	n/a	n/a	n/a	n/a

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
A1(M) Junction 53 Scotch Corner						
n/a	n/a	n/a	n/a	n/a	n/a	n/a

Table 6-23: Summary of non-significant effects (operation) on bats

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
Routewide						
Bat Roosts	Negligible to Medium	Local - Regional	Disturbance	Where replacement roosts have been created, monitoring of the roosts would be required in compliance with the EPSL conditions. Post construction roost activity surveys will be undertaken for the maternity roosts at Eden View Cottages (roost 11), The old Stone Barn (roost 23), Streetside farm (roost 29 and Rokeby Grove (roosts 30-32).	Minor Adverse - No Change	Slight - Neutral
Bat Commuting and Foraging	Negligible to Medium	Local - Regional	Habitat fragmentation and species mortality	Habitat creation will provide connectivity between the locations where crossing provision has been incorporated into the essential mitigation in the form of greening of overbridges, planting leading from/to underbridges and creating tree canopy links across the alignment. This will also mitigate any temporal impacts to connectivity parallel with	No change – Negligible Adverse	Neutral – Neutral or Slight

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
				the project during the operational phase. These measures will also mitigate against potential RTC mortality arising from the operation of the new road alignment.		
			Habitat damage/degradation	Post construction monitoring of the habitat creation will ensure damage and degradation is minimised. Monitoring undertaken to ensure the individual target habitat condition is reached post construction will improve the habitat suitability for bats as the habitats mature.	No change – Negligible Adverse	Neutral – Neutral or Slight
			Disturbance	Temporal impacts mitigated through the embedded mitigation along with the essential mitigation outlined in section 6.8 are considered suitable to mitigate impacts to local bat populations arising from the operational phase of the project. Monitoring of activity on of features of District importance or above will be undertaken post-construction in line with current Best Practice (Berthinussen & Altringham, 2015).	No change – Negligible Adverse	Neutral – Neutral or Slight
M6 Junction 40 to Kemplay Bank						

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
Bat Roosts	Low to Medium	District - County	Disturbance	No Bat roost will be directly impacted by the operational phase of the scheme	No Change	Neutral
Bat Commuting and Foraging	Low to Medium	District - Regional	Habitat fragmentation and species mortality	Operational impacts to CP1 (Carleton Hall underpass) and RTCP1 (Wetheriggs Country Park) will be mitigated by woodland planting to maintain the current connectivity across both these locations.	Negligible Adverse	Neutral or Slight
			Habitat damage/degradation	Monitoring undertaken, and intervention as required, to ensure the target habitat condition of newly created habitats is reached post construction will improve the habitat suitability for bats as the habitats mature.	No change	Neutral
			Disturbance	The embedded mitigation outlined above, along with the remaining essential mitigation measures are considered suitable mitigation for disturbance to bats through the operational phase. Monitoring of activity on CP1 and RTCP1 will be undertaken post-construction in line with current Best Practice (Berthinussen & Altringham, 2015).	Negligible Adverse	Neutral or Slight
Penrith to Temple Sowerby						

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
Bat Roosts	Negligible - Medium	Local - County	Disturbance	Monitoring of the bat house built as a replacement roost for roost 3 (High Barn) will be required in compliance with the EPSL conditions.	Minor Adverse	Slight
Bat Commuting and Foraging	Negligible - Low	Local - District	Habitat fragmentation and species mortality	Operational impacts to CP2-5 will be mitigated by woodland planting on the approaches to the underpasses to maintain the current connectivity across the A66 at these locations. CP6 (Swinegill Plantation) will require planting close to the carriageway to ensure the high levels of bat activity will not be subject to increased RTC. Planting will also be required to the north of Whinfell House (CP7) to prevent RTC of bats utilising the roost within the farm buildings.	Negligible Adverse	Neutral or Slight
			Habitat damage/degradation	Monitoring undertaken, and intervention as required, to ensure the target habitat condition of newly created habitats is reached post construction will improve the habitat suitability for bats as the habitats mature.	No change	Neutral
			Disturbance	The embedded mitigation outlined in section 6.8, along with the remaining essential mitigation measures are considered suitable mitigation for disturbance to bats through the operational phase.	Negligible Adverse	Neutral or Slight

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
Temple Sowerby to Appleby						
Bat Roosts	Negligible - Medium	Local - Regional	Disturbance	Monitoring of the replacement roosts for roost 34 (Winthorn House) and roost 132 will be required in compliance with the EPSL conditions. Roost activity surveys will be undertaken for a minimum of 3 years post construction for the maternity roost at Eden View Cottages (roost 11), to monitor the impact of the project on these sensitive maternity roosts. Where bat numbers drop or roost abandonment is observed, retroactive action would be required to maintain activity at its pre-construction levels.	Negligible Adverse	Neutral
Bat Commuting and Foraging	Negligible - Medium	Local - Regional	Habitat fragmentation and species mortality	Operational impacts to CP9, 10, 12 and CP19-20 will be mitigated by greening of Cross Street, Fell Lane, Sleastonhow Lane and Rogerhead Farm overbridges along with associated connective planting along the road network.	Negligible Adverse	Neutral or Slight

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
				Priest Lane and Crackenthorpe underbridges will require woodland planting on the approaches to the underpasses to maintain the current connectivity beneath the A66 at these locations. Main Street Kirby Thore and Long Marton Lane will require planting close to the carriageway to ensure the high levels of bat activity will not be subject to increased RTC.		
			Habitat damage/degradation	Monitoring undertaken, and intervention as required, to ensure the target habitat condition of newly created habitats is reached post construction will improve the habitat suitability for bats as the habitats mature.	No change	Neutral
			Disturbance	The embedded mitigation outlined in section 6.8, along with the remaining essential mitigation measures are considered suitable mitigation for disturbance to bats through the operational phase.	Negligible Adverse	Neutral or Slight
Appleby to Brough						
Bat Roosts	Negligible - Low	Local - District	Disturbance	Monitoring of the replacement roost for roost 131 (Ash Tree) will be	Negligible Adverse	Neutral

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
				required in compliance with the EPSL conditions.		
Bat Commuting and Foraging	Negligible - Medium	Local - Regional	Habitat fragmentation and species mortality	Operational impacts to CP25 (Warcop Overbridge) will be mitigated by greening the structure combined with associated connective planting surrounding the road network. Sandford, Cringle Beck and Flitholme underbridges will require woodland planting on the approaches to the underpasses to maintain the current connectivity beneath the A66 at these locations.	Negligible Adverse	Neutral or Slight
			Habitat damage/degradation	Monitoring undertaken, and intervention as required, to ensure the target habitat condition of newly created habitats is reached post construction will improve the habitat suitability for bats as the habitats mature.	No change	Neutral
			Disturbance	The embedded mitigation outlined in section 6.8, along with the remaining essential mitigation measures are considered suitable mitigation for disturbance to bats through the operational phase.	Negligible Adverse	Neutral or Slight

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
Bowes Bypass						
Bat Roosts	Negligible - Medium	Local - Regional	Disturbance	Monitoring of the bat house built as a replacement roost for roost 24 (Low Broats Farm) will be required in compliance with the EPSL conditions. Roost activity surveys will be undertaken for a minimum of 3 years post construction for the maternity roosts at The Old Stone Barn (roost 23), to monitor the impact of the project on these sensitive maternity roosts. Where bat numbers drop or roost abandonment is observed, retroactive action would be required to maintain activity at its pre-construction levels.	Negligible Adverse	Neutral or Slight
Bat Commuting and Foraging	Negligible - Medium	Local - Regional	Habitat fragmentation and species mortality	Blacklodge Farm underpass will require woodland planting on the approaches to the underpasses to maintain the current connectivity beneath the A66 at these locations. Screening fencing will also be required to discourage bats flying across the open carriageway and divert the flight towards the underpass specifically to reduce the risk of RTC mortality.	Negligible Adverse	Neutral or Slight
			Habitat damage/degradation	Monitoring undertaken, and intervention as required, to ensure the	No change	Neutral

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
				target habitat condition of newly created habitats is reached post construction will improve the habitat suitability for bats as the habitats mature.		
			Disturbance	The embedded mitigation outlined in section 6.8, along with the remaining essential mitigation measures are considered suitable mitigation for disturbance to bats through the operational phase.	Negligible Adverse	Neutral or Slight
Cross Lanes to Rokeby						
Bat Roosts	Negligible - Medium	Local - County	Disturbance	Monitoring of the replacement roost for roosts 27, 60 and 129 will be required in compliance with the EPSL conditions. Roost activity surveys will be undertaken for a minimum of 3 years post construction for the maternity roost at Streetside farm (roost 29) and Rokeby Grove (roosts 30-32) to monitor the impact of the project on these sensitive maternity roosts. Where bat numbers drop or roost abandonment is observed, retroactive action would be required to maintain activity at its pre-construction levels.	Negligible Adverse	Slight - Neutral

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
Bat Commuting and Foraging	Negligible - Medium	Local - Regional	Habitat fragmentation and species mortality	Operational impacts to habitats surrounding Cross lanes junction will be mitigated by greening the overbridge structure combined with associated connective planting surrounding the road network. Rokeby Junction underbridge will require woodland planting on the approaches to the underpass to maintain the current connectivity beneath the A66 at these locations. Tree planting to create tree canopy crossing points will be required adjacent to both Streetside Farm (roost 29) and Rokeby Grove (roosts 30-32) to minimise RTC mortality to juvenile bats emerging/ re entering the maternity roosts.	Negligible Adverse	Neutral or Slight
			Habitat damage/degradation	Monitoring undertaken, and intervention as required, to ensure the target habitat condition of newly created habitats is reached post construction will improve the habitat suitability for bats as the habitats mature.	No change	Neutral
			Disturbance	The embedded mitigation outlined in section 6.8, along with the remaining essential mitigation measures are	Negligible Adverse	Neutral or Slight

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
				considered suitable mitigation for disturbance to bats through the operational phase.		
Stephen Bank to Carkin Moor						
Bat Roosts	District	Low	Disturbance	The embedded mitigation outlined above, along with the remaining essential mitigation measures are considered suitable mitigation for disturbance to bats through the operational phase.	No Change	Neutral
Bat Commuting and Foraging	Negligible - Low	Local - District	Habitat fragmentation and species mortality	Operational impacts to habitats surrounding Collier Lane will be mitigated by greening the overbridge structure combined with associated connective planting surrounding the road network. Moor Lane underbridge will require woodland planting on the approaches to the underpass to maintain the current connectivity beneath the A66 at these locations.	Negligible Adverse	Neutral or Slight
			Habitat damage/degradation	Monitoring undertaken, and intervention as required, to ensure the target habitat condition of newly created habitats is reached post construction will improve the habitat	No change	Neutral

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
				suitability for bats as the habitats mature.		
			Disturbance	The embedded mitigation outlined in section 6.8, along with the remaining essential mitigation measures are considered suitable mitigation for disturbance to bats through the operational phase.	Negligible Adverse	Neutral or Slight
A1(M) Junction 53 Scotch Corner						
Bat Roosts	Negligible	Local	Disturbance	No bat roosts will be impacted by the operation of the scheme	No Change	Neutral
Bat Commuting and Foraging	Negligible	Local	Habitat fragmentation and species mortality	No habitat fragmentation or species mortality is anticipated as a result of the operation of the scheme.	No Change	Neutral
			Habitat damage/degradation	No habitat degradation is anticipated as a result of the operation of the scheme.	No Change	Neutral
			Disturbance	No flight routes are anticipated to be impacted by the scheme.	No Change	Neutral

Table 6-24: Summary of non-significant effects (operation) on other terrestrial mammals (brown hare, polecat and hedgehog)

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
Routewide						
Other terrestrial mammals (brown hare,	Individuals	Low	Injury or death of individuals due to collisions with road traffic	Creation of wildlife crossing points (culverts, ledges and bridges)	Minor	Slight benefit

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
hedgehog and polecat)				Construction of badger/otter fencing will also assist with guiding these species to the crossing points		
M6 Junction 40 to Kemplay Bank						
Other terrestrial mammals (brown hare, hedgehog and polecat)	Individuals	Low	Injury or death of individuals due to collisions with road traffic	Creation of wildlife crossing points (culverts, ledges and bridges) Construction of badger/otter fencing will also assist with guiding these species to the crossing points	Minor	Slight benefit
Penrith to Temple Sowerby						
Other terrestrial mammals (brown hare, hedgehog and polecat)	Individuals	Low	Injury or death of individuals due to collisions with road traffic	Creation of wildlife crossing points (culverts, ledges and bridges) Construction of badger/otter fencing will also assist with guiding these species to the crossing points	Minor	Slight benefit
Temple Sowerby to Appleby						
Other terrestrial mammals (brown hare, hedgehog and polecat)	Individuals	Low	Injury or death of individuals due to collisions with road traffic	Creation of wildlife crossing points (culverts, ledges and bridges) Construction of badger/otter fencing will also assist with guiding these species to the crossing points	Minor	Slight benefit
Appleby to Brough						
Other terrestrial	Individuals	Low	Injury or death of individuals due to collisions with road traffic	Creation of wildlife crossing points (culverts, ledges and bridges)	Minor	Slight benefit

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
mammals (brown hare, hedgehog and polecat)				Construction of badger/otter fencing will also assist with guiding these species to the crossing points		
Bowes Bypass						
Other terrestrial mammals (brown hare, hedgehog and polecat)	Individuals	Low	Injury or death of individuals due to collisions with road traffic	Creation of wildlife crossing points (culverts, ledges and bridges) Construction of badger/otter fencing will also assist with guiding these species to the crossing points	Minor	Slight benefit
Cross Lanes to Rokeby						
Other terrestrial mammals (brown hare, hedgehog and polecat)	Individuals	Low	Injury or death of individuals due to collisions with road traffic	Creation of wildlife crossing points (culverts, ledges and bridges) Construction of badger/otter fencing will also assist with guiding these species to the crossing points	Minor	Slight benefit
Stephen Bank to Carkin Moor						
Other terrestrial mammals (brown hare, hedgehog and polecat)	Individuals	Low	Injury or death of individuals due to collisions with road traffic	Creation of wildlife crossing points (culverts, ledges and bridges) Construction of badger/otter fencing will also assist with guiding these species to the crossing points	Minor	Slight benefit
A1(M) Junction 53 Scotch Corner						

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
Other terrestrial mammals (brown hare, hedgehog and polecat)	Individuals	Low	Injury or death of individuals due to collisions with road traffic	Creation of wildlife crossing points (culverts, ledges and bridges) Construction of badger/otter fencing will also assist with guiding these species to the crossing points	Minor	Slight benefit

Table 6-25: Summary of non-significant effects (operation) on breeding birds

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
Routewide						
Breeding birds	Individuals and population	Medium	Direct mortality	Several habitat creation areas of suitable breeding bird habitat will be sited away from the main alignment, including large scale woodland planting for several schemes, which will be planted as soon as construction begins or in advance. This will reduce the risk of vehicle collision for a proportion of breeding birds (See Environmental Mitigation Maps (Application Document 2.7) and LEMP (Application Document 2.8) for further details).	Negligible	Slight adverse
	Habitat degradation of breeding	Medium	Habitat degradation through increased traffic noise adjacent to breeding habitat causing a reduction in territories, and through air quality	Several habitat creation areas of suitable breeding bird habitat will be sited away from the main alignment, including large scale woodland	Moderate	Slight adverse

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
	and foraging habitat		deposition or water quality issues causing a decline in invertebrate populations on which birds forage.	planting for several schemes, which will be planted as soon as construction begins or in advance as outlined in the LEMP (Application Document 2.7) The highways design of the scheme directs runoff from the alignment into a drainage system, which a combination of includes vegetated ditches, vortex separators and attenuation ponds that are designed to treat run-off prior to discharge to watercourses, as outlined in Chapter 14: Road drainage and the water environment (ES Volume 1, Application Document Number 3.2) and Appendix 14.3: Water Quality Assessment (ES Volume 3, Application Document Number 3.4).		
M6 Junction 40 to Kemplay Bank						
Breeding birds	Individuals and population	Medium	Direct mortality	As above	No change	Neutral
	Breeding and foraging areas	Medium	Habitat degradation	As above.	Negligible	Slight adverse or neutral

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
Penrith to Temple Sowerby						
Breeding birds	Individuals and population	Medium	Direct mortality	As above	No change	Neutral
	Breeding and foraging areas	Medium	Habitat degradation	As above	Negligible	Slight adverse or neutral
Temple Sowerby to Appleby						
Breeding birds	Individuals and population	Medium	Direct mortality	As above	Negligible	Slight adverse
	Breeding and foraging areas	Medium	Habitat degradation	As above.	Major	Slight adverse
Appleby to Brough						
Breeding birds	Individuals and population	Medium	Direct mortality	As above	Negligible	Slight adverse
	Breeding and foraging areas	Medium	Habitat degradation	As above.	Moderate	Slight adverse
Bowes Bypass						
Breeding birds	Individuals and population	Medium	Direct mortality	As above	Negligible	Slight adverse

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
	Breeding and foraging areas	Medium	Habitat degradation	As above.	Moderate	Slight adverse
Cross Lanes to Rokeby						
Breeding birds	Individuals and population	Medium	Direct mortality	As above	Negligible	Slight adverse
	Breeding and foraging areas	Medium	Habitat degradation	As above.	Moderate	Slight adverse
Stephen Bank to Carkin Moor						
Breeding birds	Individuals and population	Medium	Direct mortality	As above	Negligible	Slight adverse
	Breeding and foraging areas	Medium	Habitat degradation	As above.	Moderate	Slight adverse
A1(M) Junction 53 Scotch Corner						
Breeding birds	Individuals and population	Medium	Direct mortality	There will be no change is likelihood of mortality so mitigation is not required.	No change	Neutral
	Breeding and foraging areas	Medium	Habitat degradation	There will be no change is proximity of breeding bird habitat to the carriageway. Woodland planting away from the main alignment on Scheme 9 will create new breeding and foraging habitat areas.	Negligible	Slight adverse or neutral

Table 6-26: Summary of non-significant effects (operation) on wintering birds

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
Routewide						
Wintering birds	Individuals and population	Medium	Direct mortality caused by vehicle movement	Targeted habitats specifically for gulls, waders and wildfowl will be sited away from the main alignment. This will reduce the risk of vehicle collision for a proportion of wintering bird species (See Environmental Mitigation Maps (Application Document 2.7) and LEMP (Application Document 2.8) for further details).	Negligible	Slight adverse
	Habitat degradation	Medium	Habitat degradation - through increased dust and vehicle emissionsor water quality issues causing a decline in invertebrate populations and therefore reducing the availability of invertebrate food sources for wintering bird species. .	The effects arising from habitat degradation during operation would be mitigated by the incorporation of targeted habitats specifically for gulls, waders and wildfowl. Mitigation will take the form of short, grazed damp grassland which will be incorporated in areas where the Project departs significantly offline around the Kirkby Thore area and elsewhere, where lapwing and golden plover were abundant (See Environmental Mitigation Maps (Application Document 2.7) and LEMP (Application Document 2.8) for further details)The highways design of the scheme directs runoff from the alignment into a drainage system,	Moderate	Slight adverse

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
				which a combination of includes vegetated ditches, vortex separators and attenuation ponds that are designed to treat run-off prior to discharge to watercourses, as outlined in Chapter 14: Road drainage and the water environment (ES Volume 1, Application Document Number 3.2) and Appendix 14.3: Water Quality Assessment (ES Volume 3, Application Document Number 3.4).		
M6 Junction 40 to Kemplay Bank						
Wintering birds	Individuals and population	Medium	Direct mortality caused by vehicle movement	As above	No change	Neutral
	Habitat degradation	Medium	Habitat degradation - through increased dust and vehicle emissions or water quality issues causing a decline in invertebrate populations and therefore reducing the availability of invertebrate food sources for wintering bird species.	As above.	Negligible	Slight adverse or neutral
Penrith to Temple Sowerby						
Wintering birds	Individuals and population	Medium	Direct mortality caused by vehicle movement	As above	No change	Neutral

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
	Habitat degradation	Medium	Habitat degradation - through increased dust and vehicle emissions or water quality issues causing a decline in invertebrate populations and therefore reducing the availability of invertebrate food sources for wintering bird species.	As above	Negligible	Slight adverse or neutral
Temple Sowerby to Appleby						
Wintering birds	Individuals and population	Medium	Direct mortality caused by vehicle movement	As above	Negligible	Slight adverse
	Habitat degradation	Medium	• Habitat degradation - through increased dust and vehicle emissions or water quality issues causing a decline in invertebrate populations and therefore reducing the availability of invertebrate food sources for wintering bird species.	As above.	Moderate	Slight adverse
Appleby to Brough						
Wintering birds	Individuals and population	Medium	Direct mortality caused by vehicle movement	As above	Negligible	Slight adverse
	Breeding and foraging areas	Medium	• Habitat degradation - through increased dust and vehicle emissionsor water quality issues causing a decline in invertebrate populations and therefore	As above.	Moderate	Slight adverse

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
			reducing the availability of invertebrate food sources for wintering bird species.			
Bowes Bypass						
Wintering birds	Individuals and population	Medium	Direct mortality caused by vehicle movement	As above	Negligible	Slight adverse
	Habitat degradation	Medium	Habitat degradation - through increased dust and vehicle emissionsor water quality issues causing a decline in invertebrate populations and therefore reducing the availability of invertebrate food sources for wintering bird species.	As above.	Moderate	Slight adverse
Cross Lanes to Rokeby						
Wintering birds	Individuals and population	Medium	Direct mortality caused by vehicle movement	As above	Negligible	Slight adverse
	Habitat degradation	Medium	Habitat degradation - through increased dust and vehicle emissionsor water quality issues causing a decline in invertebrate populations and therefore reducing the availability of invertebrate food sources for wintering bird species.	As above.	Moderate	Slight adverse

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
Stephen Bank to Carkin Moor						
Wintering birds	Individuals and population	Medium	Direct mortality caused by vehicle movement	Several habitat creation areas of suitable breeding bird habitat will be sited away from the main alignment, including large scale woodland planting, provision of a range of grassland types.	Negligible	Slight adverse
	Habitat degradation	Medium	Habitat degradation - through increased dust and vehicle emissionsor water quality issues causing a decline in invertebrate populations and therefore reducing the availability of invertebrate food sources for wintering bird species.	As above.	Moderate	Slight adverse
A1(M) Junction 53 Scotch Corner						
Wintering birds	Individuals and population	Medium	• Direct mortality	There will be no change is likelihood of mortality so mitigation is not required.	No change	Neutral
	Habitat degradation	Medium	Habitat degradation	There will be no change is proximity of breeding bird habitat to the carriageway. Woodland planting away from the main alignment on Scheme 9 will create new breeding and foraging habitat areas.	Negligible	Slight adverse or neutral

Table 6-27: Summary of non-significant effects (operation) on otter

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
Routewide						
Otter	Individuals	Low	Direct mortality or injury of otter from road traffic collisions	Wildlife crossing points incorporated into the design Otter fencing used to funnel otters to crossing points	Negligible	Neutral
M6 Junction 40 to Kemplay Bank						
Otter	Individuals	Low	Direct mortality or injury of otter from road traffic collisions	Addition of ledges to an existing culvert located adjacent to the Cumrbia Constabulary, to form a wildlife crossing point Otter fencing used to funnel otters to crossing points	Negligible	Neutral
Penrith to Temple Sowerby						
Otter	Individuals	Low	Direct mortality or injury of otter from road traffic collisions	Installation of ledges to an existing box culvert of the creation of a new wildlife crossing points incorporated into the design Otter fencing used to funnel otters to crossing points	Negligible	Neutral
Temple Sowerby to Appleby						
Otter	Individuals	Low	Direct mortality or injury of otter from road traffic collisions	Creation of one new wildlife crossing point incorporated into the design Otter fencing used to funnel otters to crossing points	Negligible	Neutral

Receptor	Attribute	Receptor sensitivity	Potential impact before essential mitigation	Essential mitigation/enhancement	Impact magnitude	Residual effect
Appleby to Brough						
Otter	Individuals	Low	Direct mortality or injury of otter from road traffic collisions	Addition of ledges to three existing culverts and the creation of seven new wildlife crossing points incorporated into the design Otter fencing used to funnel otters to crossing points	Negligible	Neutral
Bowes Bypass						
n/a	n/a	n/a	n/a	n/a	n/a	n/a
Cross Lanes to Rokeby						
Otter	Individuals	Low	Direct mortality or injury of otter from road traffic collisions	Creation of three new wildlife crossing points incorporated into the design Otter fencing used to funnel otters to crossing points	Negligible	Neutral
Stephen Bank to Carkin Moor						
Otter	Individuals	Low	Direct mortality or injury of otter from road traffic collisions	Creation of five new wildlife crossing points incorporated into the design Otter fencing used to funnel otters to crossing points	Negligible	Neutral
A1(M) Junction 53 Scotch Corner						
n/a	n/a	n/a	n/a	n/a	n/a	n/a

Table 6-28: Summary of non-significant effects (operation) on water courses and aquatic ecology features

Receptor	Attribute	Receptor sensitivity	Potential Impact before essential mitigation	Essential mitigation/ enhancement	Impact magnitude	Residual effect
Routewide						
Watercourses	Habitat	Low – very high	The impacts of operation of relevance to watercourses are habitat degradation. In the absence of mitigation, road runoff during operation has the potential to generate additional water-borne pollution which could, if untreated, give rise to an adverse effect on watercourses. There is also potential for watercourse crossings, if poorly designed, to adversely affect fluvial geomorphological process leading to habitat degradation during operation.	The highways design of the scheme directs runoff from the alignment into a drainage system, which a combination of includes vegetated ditches, vortex separators and attenuation ponds that are designed to treat run-off prior to discharge to watercourses, as outlined in Chapter 14: Road drainage and the water environment (ES Volume 1, Application Document Number 3.2) and Appendix 14.3: Water Quality Assessment (ES Volume 3, Application Document Number 3.4). Watercourse crossing design in the Temple Sowerby to Appleby and Appleby to Brough scheme has been informed by, and tested through detailed fluvial geomorphology modelling as outlined in Chapter 14: Road drainage and the water environment (ES Volume 1, Application Document Number 3.2) and Appendix 14.9: Detailed Geomorphological Modelling (ES Volume 3, Application Document Number 3.4). The results of the detailed fluvial geomorphology	No change	Neutral

Receptor	Attribute	Receptor sensitivity	Potential Impact before essential mitigation	Essential mitigation/ enhancement	Impact magnitude	Residual effect
				modelling, as described in Appendix 14.9: Detailed Geomorphological Modelling (ES Volume 3, Application Document Number 3.4) demonstrates negligible impacts to fluvial geomorpholical processes, and as a result habitat degradation, as a result of watercourse crossings during operation is not anticipated. This design is secured through the Project Design Principles (Application Document Number 5.11). Further detailed information on the impact assessment for the River Eden SAC is provided within *Habitats Regulations Assessment Stage 1: Likely Significant Effects Report* (Application Document Reference 3.5).		
Fish	Fish / fish habitat	High – Very High	The impacts of during operation of relevance to fish are consistent with those described for watercourses (i.e. habitat degradation as result of road runoff and altered fluvial geomorphological processes). In addition, poorly designed watercourse crossings have the potential to restrict the movement of fish due to insufficient water depth and/or unsuitable flow velocity.	Essential design mitigation to minimise and avoid water quality and fluvial geomorphological impacts in watercourses during operation, as outlined in Watercourses above, is equally relevant to fish. **Enhancement** A number of pressures and potential opportunities to enhance aquatic habitats, improve water quality, and improve connectivity of for fish and other aquatic species were identified	Negligible - Minor	Neutral – Slight benefit

Receptor	Attribute	Receptor sensitivity	Potential Impact before essential mitigation	Essential mitigation/ enhancement	Impact magnitude	Residual effect
				during surveys and habitat assessment as outlined in Section 6.9.36. These opportunities will develop further at detailed designs stage and would enhance habitat and habitat connectivity for fish.		
Aquatic macrophytes	-	Low	The key features of this scheme in relation to aquatic macrophytes are consistent with those described for watercourses. The potential impacts during operation in this scheme of relevance to macrophytes are consistent with those described on a route-wide basis (i.e. habitat degradation as result of road runoff and altered fluvial geomorphological processes). When considering the embedded design mitigation, the effect on aquatic macrophytes during operation is assessed as Neutral.	Essential design mitigation to minimise and avoid water quality and fluvial geomorphological impacts in watercourses during operation, as outlined in Watercourses above, is equally relevant to macrophytes and the processes that support diverse river habitats. **Enhancement** A number of pressures and potential opportunities to enhance aquatic habitats, improve water quality, and improve connectivity of for fish and other aquatic species were identified during surveys and habitat assessment. These opportunities will be developed further at detailed design stage and would enhance habitat for fish.	Negligible	Neutral
Aquatic macroinvertebrates	-	Low	The impacts of during operation of relevance to aquatic invertebrates are consistent with those described for	Essential mitigation Essential design mitigation to minimise and avoid water quality and	Negligible	Neutral

Receptor	Attribute	Receptor sensitivity	Potential Impact before essential mitigation	Essential mitigation/ enhancement	Impact magnitude	Residual effect
			watercourses (i.e. habitat degradation as result of road runoff and altered fluvial geomorphological processes). When considering the successful implementation of the proposed avoidance and embedded mitigation measures, the effect on aquatic invertebrates during operation is assessed as Neutral.	fluvial geomorphological impacts in watercourses during operation, as outlined in Watercourses above, is equally relevant to macroinvertebrates and the processes that support diverse river habitats. Enhancement A number of pressures and potential opportunities to enhance aquatic habitats, improve water quality, and improve connectivity of for fish and other aquatic species were identified during surveys and habitat assessment. These opportunities will be developed further at detailed design stage and would enhance habitat for fish.		
White-clawed crayfish (WCC)	-	High – very high	The impacts of during operation of relevance WCC are consistent with those described for watercourses (i.e. habitat degradation as result of road runoff and altered fluvial geomorphological processes). In addition, poorly designed watercourse crossings have the potential to restrict the movement and migration of WCC. When considering the successful implementation of the proposed	Essential mitigation Essential design mitigation to minimise and avoid water quality and fluvial geomorphological impacts in watercourses during operation, as outlined in Watercourses above, is equally relevant to WCC and the processes that support diverse river habitats. Enhancement A number of pressures and potential opportunities to enhance aquatic	Negligible	Neutral

Receptor	Attribute	Receptor sensitivity	Potential Impact before essential mitigation	Essential mitigation/ enhancement	Impact magnitude	Residual effect
			avoidance and embedded mitigation measures, the effect on WCC during operation is assessed as Neutral.	habitats, improve water quality, and improve connectivity of for WCC and other aquatic species were identified during surveys and habitat assessment. These opportunities will be developed further at detailed design stage and would enhance habitat for WCC.		
M6 Junction 40 to Kemplay Bank						
Watercourses	Habitat	Low – very high	Assessed route-wide	Assessed route-wide	n/a	n/a
Fish	Fish / fish habitat	High – Very High	The extension of the Thacka Beck culvert is not considered to adversely affect fish passage, as the reach is heavily culverted under the baseline scenario, as a result of the A686, the A66 and of the Cumbria Constabulary buildings. In the absence of adequate treatment, road runoff has the potential to adversely affect Thacka Beck and the River Eamont. The fish assemblage of Thacka Beck is assessed as being of National importance (high value) as it supports salmon, a qualifying species of the River Eden SAC. The fish assemblage of the River Eamont is assessed as being of International	The culvert extension will be designed such that the potential for fish passage is not reduced and opportunities to improve fish passage through the culvert. The highways design of the scheme directs runoff from the alignment into a drainage system, which a combination of includes vegetated ditches, vortex separators and attenuation ponds that are designed to treat run-off prior to discharge to watercourses.	Negligible	Neutral

Receptor	Attribute	Receptor sensitivity	Potential Impact before essential mitigation	Essential mitigation/ enhancement	Impact magnitude	Residual effect
			importance (very high value) as this river forms part of the River Eden SAC. When considering the essential design mitigation outlined to protect fish during operation, the effect on the fish assemblage of Thacka Beck is assessed as Neutral. The effect on the fish assemblage of the River Eamont is also assessed as Neutral.			
Aquatic macrophytes	-	Low	Assessed routewide	Assessed routewide	n/a	n/a
Aquatic macroinvertebrates	-	Low	Assessed routewide	Assessed routewide	n/a	n/a
White-clawed crayfish (WCC)	-	High – very high	Assessed routewide	Assessed routewide	n/a	n/a
Penrith to Temple Sowerby						
Watercourses	Habitat	Low – very high	Assessed routewide	Assessed routewide	n/a	n/a
Fish	Fish / fish habitat	High – Very High	The key features of this scheme in relation to fish are consistent with those described for watercourses. The potential impacts during operation in this scheme of relevance to fish are consistent with those described on a route-wide basis.	Assessed route-wide	Negligible - Minor	Neutral - Slight benefit

Receptor	Attribute	Receptor sensitivity	Potential Impact before essential mitigation	Essential mitigation/ enhancement	Impact magnitude	Residual effect
			The extension of the Light Water culvert and additional minor crossing is not considered to adversely affect fish passage during operation, as the culvert extension will be designed such that the potential for fish passage is not reduced and opportunities to improve fish passage through the culvert will investigated at detailed design. In addition, an undersized and failed culvert associated with a farm track was identified on Light Water and will be remediated as part of essential mitigation, improving fish passage between Light Water and the River Eamont. When considering the successful implementation of the proposed mitigation measures, the scheme is expected to result in a Slight beneficial effect on Light Water during operation. The effect on all other tributaries in this scheme (Unnamed Tributary of River Eamont 3.3, Unnamed Tributary of River Eamont 3.5 and Swine Gill) is assessed as Neutral.			

Receptor	Attribute	Receptor sensitivity	Potential Impact before essential mitigation	Essential mitigation/ enhancement	Impact magnitude	Residual effect
Aquatic macrophytes	-	Low	Assessed route-wide	Assessed route-wide	n/a	n/a
Aquatic macroinvertebrates	-	Low	Assessed route-wide	Assessed route-wide	n/a	n/a
White-clawed crayfish (WCC)	-	High – very high	Assessed route-wide	Assessed route-wide	n/a	n/a
Temple Sowerby to Appleby						
Watercourses	Habitat	Low – very high	Assessed route-wide	Assessed route-wide	n/a	n/a
Fish	Fish / fish habitat	High – Very High	The key features of this scheme in relation to fish are consistent with those described for watercourses. The potential impacts during operation in this scheme of relevance to fish are consistent with those described on a routewide basis. Detailed Geomorphological Modelling (ES Volume 3, Application Document Number 3.4) demonstrates negligible impacts to fluvial geomorphological processes in this scheme as a result of the Trout Beck viaduct and as a result impacts to fish during operation are considered negligible. This design feature is secured through the Project	Assessed route-wide	Negligible	Neutral

Receptor	Attribute	Receptor sensitivity	Potential Impact before essential mitigation	Essential mitigation/ enhancement	Impact magnitude	Residual effect
			Design Principles (Application Document Number 5.11). When considering the embedded design mitigation, the effect on the fish assemblage of Trout Beck (and the wider River Eden SAC) during operation is assessed as Neutral.			
Aquatic macrophytes	-	Low	Assessed route-wide	Assessed route-wide	n/a	n/a
Aquatic macroinvertebrates	-	Low	Assessed route-wide	Assessed route-wide	n/a	n/a
White-clawed crayfish (WCC)	-	High – very high	Assessed route-wide	Assessed route-wide	n/a	n/a
Appleby to Brough						
Watercourses	Habitat	Low – very high	Assessed route-wide	Assessed route-wide	n/a	n/a
Fish	Fish / fish habitat	High – Very High	The key features of this scheme in relation to fish are consistent with those described for watercourses. The potential impacts during operation in this scheme of relevance to fish are consistent with those described on a route-wide basis. Detailed Geomorphological Modelling (ES Volume 3, Application Document	Assessed route-wide	Negligible	Neutral

Receptor	Attribute	Receptor sensitivity	Potential Impact before essential mitigation	Essential mitigation/ enhancement	Impact magnitude	Residual effect
			Number 3.4) demonstrates negligible impacts to fluvial geomorphological processes in this scheme as a result of the additional watercourse crossings which are typically open span bridges and viaducts. These design features are secured through the Project Design Principles (Application Document Number 5.11). When considering the embedded design mitigation, the effect on the fish assemblage of Trout Beck (and the wider River Eden SAC) during operation is assessed as Neutral.			
Aquatic macrophytes	-	Low	Assessed route-wide	Assessed route-wide	n/a	n/a
Aquatic macroinvertebrates	-	Low	Assessed route-wide	Assessed route-wide	n/a	n/a
White-clawed crayfish (WCC)	-	High – very high	Assessed route-wide	Assessed route-wide	n/a	n/a
Bowes Bypass						
Watercourses	Habitat	Low – very high	Assessed route-wide	Assessed route-wide	n/a	n/a
Fish	Fish / fish habitat	High	The key features of this scheme in relation to fish are consistent with those described for watercourses.	Assessed route-wide	Negligible	Neutral

Receptor	Attribute	Receptor sensitivity	Potential Impact before essential mitigation	Essential mitigation/ enhancement	Impact magnitude	Residual effect
			The potential impacts during operation in this scheme of relevance to fish are consistent with those described on a route-wide basis. When considering the embedded design mitigation, the effect on the fish assemblage during operation is assessed as Neutral.			
Aquatic macrophytes	-	Low	Assessed route-wide	Assessed route-wide	n/a	n/a
Aquatic macroinvertebrates	-	Low	Assessed route-wide	Assessed route-wide	n/a	n/a
White-clawed crayfish (WCC)	-	High – very high	Assessed route-wide	Assessed route-wide	n/a	n/a
Cross Lanes to Rokeby						
Watercourses	Habitat	Low – very high	Assessed route-wide	Assessed route-wide	n/a	n/a
Fish	Fish / fish habitat	High	The key features of this scheme in relation to fish are consistent with those described for watercourses. The potential impacts during operation in this scheme of relevance to fish are consistent with those described on a route-wide basis. When considering the embedded design mitigation, the effect on the	Assessed route-wide	Negligible	Neutral

Receptor	Attribute	Receptor sensitivity	Potential Impact before essential mitigation	Essential mitigation/ enhancement	Impact magnitude	Residual effect
			fish assemblage during operation is assessed as Neutral.			
Aquatic macrophytes	-	Low	Assessed route-wide	Assessed route-wide	n/a	n/a
Aquatic macroinvertebrates	-	Low	Assessed route-wide	Assessed route-wide	n/a	n/a
White-clawed crayfish (WCC)	-	High – very high	Assessed route-wide	Assessed route-wide	n/a	n/a
Stephen Bank to Carkin Moor						
Watercourses	Habitat	Low – very high	Assessed route-wide	Assessed route-wide	n/a	n/a
Fish	Fish / fish habitat	High	The key features of this scheme in relation to fish are consistent with those described for watercourses. The potential impacts during operation in this scheme of relevance to fish are consistent with those described on a route-wide basis. When considering the embedded design mitigation, the effect on the fish assemblage during operation is assessed as Neutral.	Assessed route-wide	Negligible	Neutral
Aquatic macrophytes	-	Low	Assessed route-wide	Assessed route-wide	n/a	n/a

Receptor	Attribute	Receptor sensitivity	Potential Impact before essential mitigation	Essential mitigation/ enhancement	Impact magnitude	Residual effect
Aquatic macroinvertebrates	-	Low	Assessed route-wide	Assessed route-wide	n/a	n/a
White-clawed crayfish (WCC)	-	High – very high	Assessed route-wide	Assessed route-wide	n/a	n/a
A1(M) Junction 53 Scotch Corner						
n/a	n/a	n/a	n/a	n/a	n/a	n/a