M60/M62/M66 Simister Island Interchange

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7.29 DESIGN PRINCIPLES REPORT

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DESIGN PRINCIPLES REPORT

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1. Summary

1.1.1 This document has been prepared by National Highways (the Applicant) and describes the Design Principles that are proposed to be secured by Requirement 3 of the draft Development Consent Order [REP5-005] and to be certified pursuant to article 41 and Schedule 10 of the draft Development Consent Order [REP5-005].

1.1.2 The design principles are set out in the Applicant's Scheme Design Report [APP-151]. However, to ensure that the detailed design for the Scheme is compatible with the preliminary Scheme design, subject to the commitments secured in the draft Development Consent Order [REP5-005] and relevant design standards, it is proposed that the Design Principles will be secured through the Development Consent Order in a single document which is this Design Principles Report.

2. Introduction

2.1 Purpose of this document

2.1.1 The purpose of this document is twofold. Firstly, to summarise how the detailed design of the Scheme will be delivered. Secondly, to ensure that the detailed design elements are compatible with the preliminary Scheme design, subject to the commitments secured in the draft Development Consent Order [REP5-005] and relevant design standards.

2.1.2 The Scheme Design Report [APP-151] provides an explanation of the rationale behind the Scheme design, including compliance with planning policy and consideration of stakeholder feedback, including feedback received from the Design Council.

2.2 The Design Principles

2.2.1 The National Highways Ten Design Principles are documented in the Scheme Design Report [APP-151] and have shaped the preliminary design which forms the application for development consent, and to make a commitment that these will be maintained and developed in the future detailed design and delivery phases of the Scheme in accordance with National Policy Statement for National Networks (NPS NN) (Department for Transport, 2015) requirements for 'good design'.

2.2.2 The Design Principles apply only to the Scheme's permanent works and do not apply to the temporary construction works. Design-related considerations that relate to managing the construction works are included within the First Iteration Environmental Management Plan [REP5-023].

2.2.3 The Design Principles are commitments that will be secured through Requirement 3 of the draft Development Consent Order [REP5-005] and this document will be one of those certified in accordance with article 41 and Schedule 10 of the draft Development Consent Order [REP5-005].

2.2.4 This Design Principles document is one of a suite of documents that capture the Scheme's design and environmental commitments. These documents include:

- The Environmental Statement including Figure 2.3 – Environmental Masterplan of the Environmental Statement Figures [REP5-017] which defines the spatial layout of physical mitigation proposals, the landscape planting proposals including spatial representation of the proposed environmental mitigation measures and commitments and demonstrates the application of relevant environmental commitments.
- The First Iteration Environmental Management Plan [REP5-023], including the Register of Environmental Actions and Commitments (REAC) which defines commitments on the processes that must be implemented in the delivery, management, monitoring and maintenance of the works.
- The Engineering Section Drawings [APP-011] and the General Arrangement Plans [APP-005].

2.3 Good Design

2.3.1 Paragraphs 4.28 - 4.35 of the National Policy Statement for National Networks, 2015 (NPS NN) set out the criteria for 'good design' noting that design shall be an integral consideration from the outset. In Paragraph 4.29 it states:

'Visual appearance should be a key factor in considering the design of new infrastructure, as well as functionality, fitness for purpose, sustainability and cost. Applying "good design" to national network projects should therefore produce sustainable infrastructure sensitive to place, efficient in the use of natural resources and energy used in their construction, matched by an appearance that demonstrates good aesthetics as far as possible'

2.3.2 National Highways has published 'The Road to Good Design' (Highways England, 2018), and this document alongside other relevant design guidance materials are summarised in the Scheme Design Report [APP-151]. 'The Road to Good Design' is also provided at Annex D of the Applicant's response to Action Points from CAH1 and ISH2 [REP4-028]. Furthermore, the Scheme Design Report [APP-151] provides an overview of the how the Scheme has been developed to accord and respond to these strategic principles.

2.3.3 The National Policy Statement for National Networks Accordance Table [APP-147], sets out how the Scheme complies with the NPS NN (2015) criteria for good design outlined in paragraphs 4.28 – 4.35 of the NPS NN.

3. Design Principles

3.1 Introduction

3.1.1 This section sets out the Scheme-specific Design Principles that must be complied with and how they will be applied to the detailed design of the Scheme as a whole.

- Makes roads safe and useful.
- Is inclusive.
- Makes roads understandable.
- Fits in context.
- Is restrained.
- Is environmentally sustainable.
- Is thorough.
- Is innovative.
- Is collaborative.

- Is long-lasting.

3.2 Design Principles Summary

3.2.1 The following table summarises how each of the National Highways Ten Design Principles will be delivered through the detailed design of the Scheme. The detailed design of the Scheme must be compatible with the preliminary Scheme design.

3.2.2 Table 4-1 of the Scheme Design Report [APP-151] provides an explanation of the rationale behind the preliminary Scheme design, including compliance with planning policy.

Table 3.1 – Design Principles Summary

Reference	Design Principle	How the Scheme Design Meets the Design Principle from Table 4-1 Scheme Design Report [APP-151]	How the principle will be delivered
1	Make roads safe and useful *Safety is fundamental to good road design; it is integral to both the usefulness of its function and the confidence of road users and their well-being. Good design creates safe roads which support and link to other wider imperatives, both nationally and locally, and that are fundamentally useful, meeting users' need for mobility effectively.*	STATS 19 (road safety data issued by The Department of Transport) Personal Injury Accident (PIA) data for the latest available complete pre-Covid five-year period 2015-2019 was used to identify the level of existing accidents in the study area. Between 2015 and 2019 there were a total of 829 casualties, of which 83% were slight, 15% serious and 1% were fatal casualties. The number of casualties per year are relatively consistent, on average 165 casualties occurred per year. An assessment of accident impacts has been completed using Cost and Benefits to Accidents Light Touch (COBALT), the assessment forecasted a reduction in accidents as a result of the Scheme are calculated as the difference between the number of accidents in the without and with Scheme scenarios. As the Scheme would be operational for several decades, the standard approach is to evaluate the safety of the Scheme over a 60-year period (from the year of opening, 2029). Over the 60-year appraisal period, the Scheme is forecast to lead to a reduction in 9 accidents. Further details are available in the Transport Assessment [APP-149]. Table 6-4 of the Transport Assessment [APP-149] indicates that the strategic road network is forecast to experience an increase in accidents as more people are attracted to using the strategic road network as a result of better journey reliability once the Scheme is operational, as much of the additional strategic road network traffic reroutes from the local road network. As a result of the Scheme, 61 fewer PIAs are forecast on the local roads that are included in the COBALT assessment. Table 6-3 of the Transport Assessment [APP-149] indicates that while there is a slight decrease in the overall volume of accidents, the number of fatal, serious and slight casualties increases slightly equivalent to 1.0, 1.2 and 12.7 additional fatal, serious and slight casualties over the 60-year appraisal period. However, M60 junction 18 is forecast to experience 35 fewer PIAs over 60 years due to the Scheme removing traffic from Junction 18 onto the Northern Loop. Conversely the increased traffic flows using M60 junction 17 taking advantage of the Scheme results in 14 additional PIAs forecast on this junction.	The Applicant is the Highway Authority for the Scheme and as such has robust procedures integrated throughout the Scheme's lifecycle for ensuring that the Scheme can operate safely once constructed. The Scheme will be designed in detail in accordance with the Design Manual for Roads and Bridges (DMRB) and other applicable safety regulations and standards which integrate safety with design. The preliminary Scheme design shown on the General Arrangement Plans [APP-005] and throughout the application documents has been designed in accordance with DMRB, specifically CD 109 Highway Link Design, CD 122 Layout of Grade Separated Junctions and CD 127 Cross-sections and Headrooms to provide capacity for the forecast traffic growth. The Scheme must be designed in detail and carried out so that it is compatible with the preliminary Scheme design shown on the General Arrangement Plans [APP-005], Works Plans [REP5-004] and the Engineering Section Drawings [APP-011], secured by Requirement 3 of the draft Development Consent Order [REP5-005]. The Register of Environmental Actions and Commitments within the First Iteration Environmental Management Plan [REP5-023] includes a number of commitments which are secured by Requirement 4 of the draft Development Consent Order [REP5-005]. Commitments relevant to the principle of ensuring the Scheme makes roads safe and useful are: • **GS4** - Compliance as appropriate with Construction (Design and Management) Regulations 2015 (CDM) which govern the management of risks to construction and maintenance workers. • **PHH1** - Type and quality of new or reprovisioned surfacing, crossing and access points for Public Rights of Way (PRoW) and other routes used by walkers, cyclists and/or horse riders (WCH) will be suitable for the intended use and context (e.g. rural or urban), and in accordance with relevant design and accessibility guidance. Key design considerations will include DMRB GG 142 Walking, Cycling and Horse-Riding Assessment and Review (WCHAR) standard, and the Equality Act 2010. • **PHH21** - During detailed design the Principal Designer will contact the local Director of Public Health and police and seek feedback to inform the new structures design to mitigate the risk of suicide.

Reference	Design Principle	How the Scheme Design Meets the Design Principle from Table 4-1 Scheme Design Report [APP-151]	How the principle will be delivered
		As more people will use the Scheme this means overall there will be more users and more miles will be driven. The casualties per billion vehicle kilometres have been calculated across the assessment area, this shows that the risk of accident and the risk of a personal injury accident is reduced for each driver due to the Scheme. Further details can be found in paragraph 6.4.8 of the Transport Assessment [APP-149].	
2	Is inclusive *Inclusive environments facilitate dignified and equal use by all. An inter-disciplinary design process involves and places people's needs and views at its heart, nurturing well-being and creating a shared sense of ownership of the road. All users and communities are considered carefully in order to reduce barriers to access and participation, particularly mindful of the most vulnerable.*	The Scheme does not disproportionately affect any populations, demographics, communities, or road users. The design of the Scheme has been developed in accordance with the Equalities Act 2010 and the needs of disabled people. The Equality Impact Assessment [APP-152] discusses how the requirements of the Equalities Act 2010 have been embedded in the development of the Scheme, including design, communication and engagement strategy and mitigation strategies. The Scheme includes a modest enhancement for recreational walkers through the inclusion of a new route through an area of ecological mitigation. It would not cause any severance of existing routes for walkers, cyclists and horse riders (WCH). There would be some temporary effects on PROW experienced during construction, although appropriate diversion routes would be provided. The Scheme objectives include to reduce peak congestion, delivering journey time reliability and improving safety on this motorway section of the Strategic Road Network (SRN). There are already several formal crossing points of the M60 and M66 within the Order Limits (Sandgate Road, Castle Road, Hills Lane, and Simister Lane) as well as Old Hall Lane Footbridge just south of the Order Limits. Therefore, further WCH crossing infrastructure is not required.	The Applicant confirms that the Scheme has been designed to the current DMRB standards which considers all motorists, including those with disabilities. By way of an example, the hard shoulder width provided along the M60 corridor, is compliant with DMRB to provide a place of relative safety in the event of mechanical breakdown or an emergency, for all road users including those with disabilities. The Scheme would change the layout of junction 18, this will require changes to existing signage, and the provision of new / additional signage, which could potentially cause confusion, particularly for certain groups such as the elderly. There is likely to be a period of adjustment upon completion of construction, which may last longer for elderly people. As stated in the Equality Impact Assessment [APP-152], the Applicant will continue to seek opportunities to foster good relations with the elderly population. This includes asking for feedback from equalities officers at local authorities and age-related charities and community groups. However, the key mitigation in terms of design will be provision of clear and unambiguous signage which again, if provided in accordance with DMRB, has due regard for access and inclusion of all motorists. Details of how the Scheme will monitor actual outcomes of the policy/practice throughout the Scheme lifecycle are detailed in section G of the Equality Impact Assessment [APP-152]. Section G confirms the required monitoring actions at each stage of the Scheme's development and implementation. The Register of Environmental Actions and Commitments within the First Iteration Environmental Management Plan [REP5-023] includes a number of commitments which are secured by Requirement 4 of the draft Development Consent Order [REP5-005]. Commitments relevant to the principle of ensuring the Scheme is inclusive are: • **PHH1** - Type and quality of new or reprovisioned surfacing, crossing and access points for PRoW and other routes used by walkers, cyclists and/or horse riders (WCH) will be suitable for the intended use and context (e.g. rural or urban), and in accordance with relevant design and accessibility guidance. Key design considerations will include DMRB GG 142 Walking, Cycling and Horse-Riding Assessment and Review (WCHAR) standard, the Equality Act 2010. • **PHH21** - During detailed design the Principal Designer will contact the local Director of Public Health and police and seek feedback to inform the new structures design to mitigate the risk of suicide.
3	Make roads understandable *Easy to read, a good road is intuitive to use so as to be*	In terms of reducing clutter, the Scheme design, including signage and overhead gantries, meets the requirements to keep clutter to a minimum and comply with the relevant standards. Nine existing gantries would be retained. Seven gantries would need to be demolished due to clashes with the highways design and four gantries would receive new direction signs and electronic message signs. The leg of two existing portal gantries	The Preliminary Scheme design shown on the General Arrangement Plans [APP-005] and throughout the application documents has been designed in accordance with The Traffic Signs Regulations and General Directions 2016, Local Transport Note 1/94, BS EN 12767 2007 - Passive safety of support structures for road equipment - Requirements, classification and test methods, BS EN 12899-1 2007 - Fixed, vertical road traffic signs, IAN 144/16 Directional signs on motorway and all-purpose trunk roads, CD 122 Layout of Grade Separated Junctions, CD 146 Positioning of signalling and advance direction signs, CD 169 The design of lay-bys, maintenance hardstandings, rest areas, service areas and observation platforms to provide signage, overhead gantries including fixed signage to direct

Reference	Design Principle	How the Scheme Design Meets the Design Principle from Table 4-1 Scheme Design Report [APP-151]	How the principle will be delivered
	safe and efficient for all. 'Self-explaining roads' focus on the essentials and eliminate unnecessary and confusing clutter to make them legible, while responding to place and enhancing both environmental and economic outcomes.	located in the central reserve would receive additional protection in case of a major vehicular impact. Nine new overhead gantries would be provided in total. The locations of new major structures and gantries are shown on Figure 2.2: Scheme Design of the ES Figures [REP5-017]. Three gantries would be provided on the M60 eastbound, two on the M60 westbound and four on the M66. Two gantries (one for each direction on the M60) would span the entire motorway whereas the others would be specific to each side of the carriageway. The gantries will provide fixed signage to direct motorists as well as presenting dynamic information control such as instructing motorists of a reduced speed limit, the closure of a lane or other service updates such as warning of closures elsewhere on the SRN network. The presentation of this information is designed to ensure that customers navigate this busy section of the SRN network as safely and as quickly as possible, as well as helping manage driver stress by presenting up to date information on any impediments to people's journeys. As set out in Chapter 2, The Scheme of the ES [APP-041] the Scheme will also upgrade existing intelligent transportation systems or install new systems where required. This includes variable mandatory speed limit (VMSL) mounted on cantilever and long span cantilever gantries, Advanced Motorway Indicator (AMI) above lane signals, Highways Agency Digital Enforcement and Compliance System (HADECS) and External Aspect Verification (EAV), Closed Circuit Television (CCTV), and Motorway Incident Detection and Automatic Signalling (MIDAS). The gantries will therefore provide both fixed signage to direct motorists as well as incorporating advanced technology to present dynamic information. This enables the SRN to be controlled and for rapid and dynamic response and assists the emergency services respond to any incidents quickly.	motorists as well as incorporating advanced technology to present dynamic information to provide signage, overhead gantries including fixed signage to direct motorists as well as incorporating advanced technology to present dynamic information. The Applicant confirms that the Scheme has been designed to the current DMRB standards. The Scheme would change the layout of junction 18. This will require changes to existing signage, and the provision of clear and unambiguous signage, provided in accordance with DMRB as per the standards listed above. The Scheme must be designed in detail and carried out so that it is compatible with the preliminary Scheme design shown on the General Arrangement Plans [APP-005], Works Plans [REP5-004] and the Engineering Section Drawings [APP-011], secured by Requirement 3 of the draft Development Consent Order [REP5-005].
4	Fits in context *The aesthetic quality of a road and its design in relation to the places through which it passes, is integral to its function and the experience of those that use it. Good road design*	The Scheme landscaping has taken the Bury Unitary Development Plan land use designations into account including the Special Landscape Area and the Green Belt. For example, carefully designed groups of trees and shrubs to help integrate into the surrounding vegetation pattern. The embankments gradients for the Northern Loop have been reduced to help the road integrate into the landscape setting. The Pike Fold Viaduct and Pike Fold Bridge are prominent new structures and have been subject to a design process aimed at providing structures that acknowledge the impacts on the wider landscape. A combination of concrete and weathering steel is	The preliminary Scheme design is a combination of alterations to the existing motorway infrastructure and the introduction of new or improved free flow links at Junction 18 of the M60. The Scheme must be designed in detail and carried out so that it is compatible with the preliminary Scheme design shown on the General Arrangement Plans [APP-005], Works Plans [REP5-004] and the Engineering Section Drawings [APP-011], secured by Requirement 3 of the draft Development Consent Order [REP5-005]. The alterations to the motorway infrastructure will be designed in detail within the context of the existing infrastructure, in combination with environmental mitigation and landscape integration. The preliminary landscape design is shown in Figure 2.3, the Environmental Masterplan of the Environmental Statement Figures [REP5-017].The final landscaping scheme must be in accordance with the mitigation measures set out in the Register of Environmental Actions and Commitments with

Reference	Design Principle	How the Scheme Design Meets the Design Principle from Table 4-1 Scheme Design Report [APP-151]	How the principle will be delivered
	demonstrates sensitivity to the landscape, heritage and local community, seeking to enhance the place while being true to structural necessities. It builds a legacy for the future.	provided for the bridge spans. Over time, as a natural orange patina forms on the weathering steel, the bridges will become recognisable gateway features along the M66 northbound and southbound. The combination of weathering steel and planting along the structure embankments will also be visually attractive and will help to physically integrate the structures into the landscape and will provide a strong design statement. The existing raised earth mound in the north-east quadrant has been used in the configuration of the Pike Fold Viaduct and Pike Fold Bridge embankments and Northern Loop to limit landscape change the Special Landscape Area. Figure 7.7, Photomontages of the ES Figures [REP4-014] have been produced to visualise the Scheme. Viewpoints have been agreed through consultation with BMBC to reflect a broad range of views from four locations around the study area. The figures show the existing views and how these will change with the Scheme in place to allow direct comparison. The landscape planting shown in the photomontages is included on Figure 2.3, The Environmental Masterplan of the ES Figures [REP5-017]. The photomontages reflect two scenarios in different seasons: • The worst case scenario (sheet 1) shown in winter in the first year of opening of the Scheme 2029 (Year 1) where the mitigation has only just been completed. More of the earthworks, structures, signage, as well as traffic will be visible in these views, therefore, reflecting views when the Scheme will be most visible. • The design year (sheet 2) is shown in summer, 15 years after completion, 2044 (Year 15). This reflects the mitigation establishment. Native woodland, trees and shrubs, new hedgerows with hedgerow tree planting will be sufficiently established to help integrate the Scheme into the surrounding landscape and also provide screening for much of the Scheme. Particular attention has been given to avoid, reduce or remediate (offset) potential effects on the Special Landscape Area. Mitigation and enhancement measures for this have been developed as presented on Figure 2.3, Environmental Masterplan of the ES Figures [REP5-017]. The Northern Loop is designed with 1 in 4 earthwork slopes to blend more efficiently with existing landscape, reducing visual impact.	the First Iteration Environmental Management Plan [REP5-023] and the Environmental Masterplan [REP5-017], secured by Requirement 5 of the draft Development Consent Order [REP5-005]. The Register of Environmental Actions and Commitments within the First Iteration Environmental Management Plan [REP5-023 includes a number of commitments which are secured by Requirement 4 of the draft Development Consent Order [REP5-005]. Commitments relevant to the principle of ensuring the Scheme fits in the local context are: • **LV1** - The Northern Loop eastern embankment is constructed in accordance with the preliminary design. • **LV2** - The ponds will be designed to provide landscape integration and planting opportunities. • **LV4** - All planting and seeding will use native species as appropriate to the location and design overseen by Ecologists and Arboriculturists. • **LV5** - New hedgerow planting will be delivered in areas adjacent to the environmental areas, along the new highway boundary and around ponds. • **LV6** - New hedgerow tree planting will be delivered to strengthen new and existing hedgerows. • **LV7** - Planting will be delivered to link existing field boundary vegetation with other areas of existing vegetation in areas around the Northern Loop. • **LV9** - Planting along the Pike Fold Simister Viaduct embankment west of the M66 for landscape integration, and visual screening or filtering for viewers within nearby residential areas of Whitefield. • **LV10** - Planting on the Pike Fold Simister Bridge embankments and Northern Loop embankments and within the Northern Loop to provide landscape and visual integration; and visual screening or filtering for viewers along Pole Lane footpath. • **LV12** - New planting of linear tree belts along the M60 northbound to M60 westbound on-slip to provide landscape and visual integration; and screening or filtering for viewers on Heywood Road and Simister Lane. • **LV13** - Existing linear tree belts necessitating removal for carriageway widening would be reinstated with a higher percentage of feathered trees and evergreen species. • **LV14** - Planting will be delivered along the eastbound and westbound M60 mainline verges and embankments between M60 J17 and M60 J18. • **LV15** - Planting of trees and shrubs, and species rich grassland creation, will be delivered within land east of the Northern Loop. • **B14** - Temporary and permanent lighting will be designed to avoid light spill on light sensitive ecological features and habitats such as watercourses, woodland and hedgerow and important bat habitats. • **B25** - Environmental mitigation areas, as well as broader landscaping, will be designed with benefits to invertebrates in mind. Designs may include the creation of new wildflower and grassland areas seeded from a species-rich seed mix, new ponds and ditches, trees and woodland, species-rich hedgerows and scrub comprising native tree, shrub and herbaceous species of local provenance. • **B30** - The detailed design of the golf ball netting at Pike Fold Golf Course will include consideration of measures to reduce the potential for effects on species of fauna (See the Register of Environmental Actions and Commitments within the First Iteration Environmental Management Plan [REP5-023] for full list of measures.) • **NV3** - A surface with a road surface influence (RSI) of 3.5dB(A) or better will be laid on all sections of carriageway within the pavement works for the Scheme excluding J18 roundabout and sections mentioned in NV4.

Reference	Design Principle	How the Scheme Design Meets the Design Principle from Table 4-1 Scheme Design Report [APP-151]	How the principle will be delivered
		The Scheme removes circa 30,000 vehicles a day away from Simister village via the Northern Loop, reducing noise and air quality impact on this large local receptor.	• **NV4** - A surface with an RSI of -6.0 dB(A) or better would be laid at the following locations: o Westbound (WB) carriageway on all lanes between M60 J17 to J18 o Eastbound (EB)carriageway on all lanes between M60 J18 to J17 o Free-flow link from M60 EB to M66 Northbound (NB). Subsequent resurfacing of these sections of the M60 would be undertaken with a surface meeting the RSI described above as a minimum. • **PHH1** - Type and quality of new or reprovisioned surfacing, crossing and access points for PRoW and other routes used by walkers, cyclists and/or horse riders (WCH) will be suitable for the intended use and context (e.g. rural or urban), and in accordance with relevant design and accessibility guidance. Key design considerations will include DMRB GG 142 Walking, Cycling and Horse-Riding Assessment and Review (WCHAR) standard, the Equality Act 2010. • **W16** - New outfalls will be installed to reduce impacts on the bed and banks. Best practice guidance will be followed as set out in DMRB CD 529 (National Highways, 2021) and CIRIA (CIRIA, 2019) in relation to design and positioning of outfalls to reduce scour to the bed and banks.
5	Is restrained *Functional, but responding positively and elegantly to the context, good road design allows for the expression of the character and identity of the places and communities through which a road passes. Good road design can enhance a sense of place and add to what we have inherited, particularly through the use of appropriate materials and traditions, but does not make unnecessary superficial or superfluous visual statements.*	Part of the Order Limits is within the Green Belt. National planning policy protects the Green Belt against inappropriate development which would harm the openness and functions of the Green Belt. As set out in the Case for the Scheme [REP3-018] the permanence and prominence of the Scheme structures would cause harm to the purposes of the Green Belt. As such, Very Special Circumstances that outweigh any harm are demonstrated. The provision of additional hard shoulder on the M60 between junction 17 and junction 18 can be delivered and constructed through the use of retaining walls. This minimises the footprint of the Scheme and reduces the land take required, especially during this constrained section where the Scheme abuts gardens of private dwellings. This increases Scheme cost, given that the alternative would be conventional 1 in 3 earthworks, but reduces the land take required.	The Preliminary Scheme design shown on the General Arrangement Plans [APP-005] and throughout the application documents has been designed in accordance with DMRB, specifically CD 109 Highway Link Design, CD 122 Layout of Grade Separated Junctions and CD 127 Cross-sections and Headrooms to ensure it can satisfy the Scheme objectives whilst being sensitive to both overall footprint and complexity. The provision of additional hard shoulder on the M60 between junction 17 and junction 18 can be delivered and constructed through the use of retaining walls, minimising the footprint of the Scheme. The Scheme must be designed in detail and carried out so that it is compatible with the preliminary Scheme design shown on the General Arrangement Plans [APP-005], Works Plans [REP5-004] and the Engineering Section Drawings [APP-011], secured by Requirement 3 of the draft Development Coset Order [REP5-005]. The Register of Environmental Actions and Commitments within the First Iteration Environmental Management Plan [REP5-023] includes a number of commitments which are secured by Requirement 4 of the draft Development Consent Order [REP5-005]. Commitments relevant to the principle of ensuring the Scheme is restrained as defined in National Highways “The road to good design”, are: • **LV1** - The Northern Loop eastern embankment is constructed in accordance with the preliminary design. • **LV5** - New hedgerow planting will be delivered in areas adjacent to the environmental areas, along the new highway boundary and around ponds. • **LV6** - New hedgerow tree planting will be delivered to strengthen new and existing hedgerows. • **LV7** - Planting will be delivered to link existing field boundary vegetation with other areas of existing vegetation in areas around the Northern Loop. • **LV9** - Planting along the Pike Fold Simister Viaduct embankment west of the M66 for landscape integration, and visual screening or filtering for viewers within nearby residential areas of Whitefield. • **LV10** - Planting on the Pike Fold Simister Bridge embankments and Northern Loop embankments and within the Northern Loop to provide landscape and visual integration; and visual screening or filtering for viewers along Pole Lane footpath.

Reference	Design Principle	How the Scheme Design Meets the Design Principle from Table 4-1 Scheme Design Report [APP-151]	How the principle will be delivered
			• **B14** - Temporary and permanent lighting will be designed to avoid light spill on light sensitive ecological features and habitats such as watercourses, woodland and hedgerow and important bat habitats.

6	Is environmentally sustainable
	
	Making an important contribution to the conservation and enhancement of the natural, built and historic environment, good road design seeks to achieve net environmental gain. It is multi-functional, resilient and sustainable, allowing for future adaptation and technical requirements, while minimising waste and the need for new materials.
		Chapter 10, Material Assets and Waste of the ES [APP-049] sets out how waste will be managed during construction and operation including how the Scheme will deliver sustainable waste management that adheres to the waste hierarchy and supports the transition to a circular economy. Section 10.9 of this chapter sets out how the Scheme will adhere to the waste hierarchy; reduce the volume of waste produced and increase the reuse and recycling of waste that cannot be avoided.
		
		A Sustainable Sourcing Plan (SSP) would be prepared for the Scheme (as set out in the Register for Environmental Actions and Commitments within the First Iteration Environmental Management Plan (EMP) [REP5-023] This sets out a clear framework to increase the procurement and use of sustainably and responsibly sourced construction materials and products. This includes secondary materials. Consideration of low carbon materials is also covered in Chapter 14, Climate of the ES [APP-053]. A mitigation measure has been included that requires consideration of how materials can be designed to be more easily adapted over the asset's lifetime and how de-constructability of elements can be increased at end of first life.
		
		An Outline Site Waste Management Plan has been prepared and can be found at Appendix C of the First Iteration EMP [APP-130] The Outline Site Waste Management Plan will be developed into the Site Waste Management Plan as part of the Second Iteration EMP and secured by Requirement 4 of the draft DCO [REP5-005]. The Outline Site Waste Management Plan sets out how the Applicant will prepare, plan, implement, monitor and review waste reduction and management during design and construction of the Scheme. The Applicant has sought to maximise biodiversity delivery, with a forecast of an overall net gain of 3.68% for habitats and 58.50% for hedgerows on-site postconstruction. This includes habitat retention, creation and enhancement. Enhancement measures include enhancements to woodland and grassland habitats. Further details can be found in Appendix 8.12 Biodiversity Net Gain Report of the ES Appendices [APP-102].
		
		Environmental design measures include:
		
		• Tree and shrub species would provide similar or improved habitat type to that removed. Species shall be native, or non-native in certain focus locations, and of a similar or improved species mix, overseen by competent expert ecologists and arboriculturists.
			The Register of Environmental Actions and Commitments within the First Iteration Environmental Management Plan [REP5-023] includes a number of commitments which are secured by Requirement 4 of the draft Development Consent Order [REP5-005]. Commitments relevant to the principle of ensuring the Scheme is environmentally sustainable are:
			
			• **M1** – Implementing Design for Resource Efficient (DfRE) Construction principles in a systematic manner to suit the scale of the Scheme, to identify, prioritise and select appropriate opportunities to improve Scheme resource efficiency and design out waste:
			  ○ Design for reuse and recovery: identifying, securing and using materials that already exist on site, or can be sourced from other schemes.
			  ○ Design for resource optimisation: simplifying layout and form to reduce material use, using standard design parameters, balancing cut and fill, maximising the use of renewable materials and materials with recycled content.
			  ○ Design for off-site construction: maximising the use of prefabricated structures and components, encouraging a process of assembly rather than construction.
			  ○ Design for resource-land efficient procurement, identifying and specifying materials that can be acquired responsibly, in accordance with a recognised industry standard.
			  ○ Design for the future: identify how materials can be designed to be more easily adapted over an asset lifetime and how deconstructability and demountability of elements can be increased at end of first life.
			Evidence of material resource efficiencies and waste reductions will be demonstrated in a number of ways, for example through the use of the Sustainable Procurement Plan (SPP) and Site Waste Management Plan (SWMP).
			• **M2** – Developing and implementing a SPP that sets out a clear framework to increase the procurement and use of sustainably and responsible sourced construction materials and products with proven sustainability credentials that reduce adverse impacts on people and the environment during the construction of the Scheme. The plan will specify the:
			  ○ Use of key material elements (asphalt, concrete, aggregate, steel, aluminium, and plastics) responsibly sourced from suppliers with industry recognised responsible sourcing certification for that material (e.g. Building Research Establishment (2014) BES 6001, or membership of a sector specific scheme that complies to British Standards Institution BS 8902:2009).
			  ○ Use of timber and wood-derived products that are sustainably sourced from independently verifiable legal and sustainable sources that are compliant with UK guidance for businesses trading in timber and timber-related products (Office for Product Safety and Standards and Defra, 2022).
			  ○ Use of locally sourced and alternatives to primary materials, where available and permitted by the Specification for Highway Works, and where practicable and cost-effective to do so. This could include materials that already exist on site, can be recovered from demolition activities, or can be sourced from other schemes and suppliers.
			  ○ Use of imported aggregates that comprise re-used, secondary or recycled content at levels at least in line with the Ministry of Housing, Communities & Local Government (2009) 'North-west regional guideline for aggregates provision 2005-2020' target of 30% where available for those applications and where it is technically and economically

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		• The landscape design as shown on Figure 2.3 Environmental Masterplan of the ES Figures [REP5-017]. has sought to go beyond just habitat creation required to compensate habitat loss and fragmentation by providing wider enhancement measures in the landscape. This has been achieved through planting of native trees and shrubs that link with existing woodland and wildlife corridors, to help provide greater connectivity in the landscape. For example, a linear belt of trees and shrubs, groups of trees and shrubs and hedgerows will be provided on the north side of the M60/M62 in Whitefield and in the vicinity of Pike Fold Golf Course to connect with existing woodland, ponds and grasslands. • Wherever possible, native hedgerows and tree lines have been incorporated along the highways boundary to create linear features that link areas of vegetation, improve biodiversity, strengthen the landscape pattern and help integrate the motorway infrastructure. Attenuation ponds have been planted with native marginal species, woodland and shrubs complimented by proposed new shallow scrapes for wetland habitat creation. • Reinstatement planting and seeding would use native species as appropriate to the location and would be overseen by Ecologists and Arboriculturists. New road verges would support low-nutrient grassland habitats which are of high ecological value. No topsoil would be applied to these areas which would be sown with a commercial and locally native seed mix appropriate to the geology. The Scheme design includes habitat retention, creation and enhancement to woodland and grassland habitats. Specific areas of enhancement include: • Particular attention has been given to the retention of existing vegetation. • Hedgerows and woodland in the vicinity of the Northern Loop. • Linear tree belts adjacent to Prestwich Heys FC sports ground. • Hedgerows and vegetation along Mode Hill Lane, Egypt Lane and Corday Lane. • Linear tree belts along the verge of the M60 northbound to westbound diverge.	feasible to substitute these alternatives to primary aggregates. Where primary aggregate materials are mandated within the Specification for Highways Works, they are excluded from the target. ○ Use of minimal quantities of hazardous materials that have the potential to harm human health or the environment; and that might cause problems for future reuse, recycling and recovery at end of first life. The SPP will also set out the policies that would be employed by the Principal Contractor and its subcontractors to evaluate and specify the responsible sourcing of construction materials and products, and the procedures that are to be put in place to check and verify that the SPP is being implemented and adhered to during construction. This would include setting out any measurement criteria, methodology and performance indicators to assess progress and demonstrate success; and how the chain of custody of materials would be audited and evidenced during procurement. • **LV1** - Planting will be delivered to link existing field boundary vegetation with other areas of existing vegetation in areas around the Northern Loop. • **LV3** - Existing vegetation clearance within the temporary works areas will be minimised as far as practicable. Particular attention will be given to the retention of mature vegetation including individual trees, linear tree belts and woodlands. • **LV4** - All planting and seeding will use native species as appropriate to the location and design overseen by Ecologists and Arboriculturists. • **LV5** - New hedgerow planting will be delivered in areas adjacent to the environmental areas, along the new highway boundary and around ponds • **LV7** - Planting will be delivered to link existing field boundary vegetation with other areas of existing vegetation in areas around the Northern Loop. • **B1** - New road verges will support low-nutrient grassland habitats which are of high ecological value. No topsoil will be applied to these areas which will be sown with a commercial and locally native seed mix appropriate to the geology. • **W4** – Where required, discharge rates for the permanent drainage design will be restricted to achieve the allowable discharge rates and ensure no increase in flood risk. The associated attenuation storage will be sized for the 1% (1 in 100) Annual Exceedance Probability (AEP) storm event including an allowance for climate change as described in the Drainage Strategy Report (Appendix 13.7 of the Environmental Statement Appendices [APP-122]) • **W5** – The design will provide water quality treatment and biodiversity benefits for each of the drainage networks identified as part of the drainage strategy. Features that will assist with water quality treatment include sediment forebays, vegetation in swales and attenuation ponds, filter drains, silt traps and penstock valves. Where practicable, permanently wet ponds are the preferred method of attenuation storage. • **W6** – The Scheme's road drainage system will be designed to collect any groundwater seepings that may occur within the widenings and cuttings. Long-term drainage of cuttings is required to protect flood sensitive receptors (including the new road) from groundwater flooding during the operational phase. All ponds will be lined and there will be no discharges to ground. Furthermore, the drainage development during the detailed design phase will continue to be aligned with the Environment Agency's (2018) Protect groundwater and prevent groundwater pollution guidance to protect groundwater. • **C2** – Materials will be sourced from local suppliers, where practical and cost-effective to do so, to reduce the travel distance of materials and associated GHG emissions. • **C10** - Quarterly GHG emissions reporting of operational maintenance related GHG emissions will be undertaken, using the National Highways Carbon Tool, during the operational phase.

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		• An important hedgerow and highways woodland belt west of Pond 5, near Heaton Park. • A narrow belt of trees and shrubs along the M60 verge adjoining Kenilworth Road.	The Requirements in Schedule 2 of the draft Development Consent Order [REP5-005] relevant to securing to the principle of ensuring the Scheme is environmentally sustainable are as follows; • Requirement 3 Detailed Design • Requirement 4 Environmental Management Plan • Requirement 5 Landscaping • Requirement 8 Surface and foul water drainage
7	Is thorough *The result of robust processes that create a continual cycle of improvement, good road design starts with an in-depth understanding of people, place and context; learning from best practice worldwide. The design of all elements of the road environment are considered together and integrated into a responsive design.*	The Scheme is currently at Preliminary Design stage which has followed three assessment stages. This optioneering dates back to 2015. It resulted in four options been considered and then two alternative options taken forward for further assessment. The two alternative options were called the Northern Loop and the Inner Links. An options consultation was held for the Northern Loop and Inner Links from 22 June 2020 to 17 August 2020. The consultation included posting of a consultation brochure and response form to almost 10,000 addresses, provision of on-line information and providing telephone events to replace face-to-face engagement. Following this options consultation, the Northern Loop option was chosen as the preferred option. When selecting the preferred route, the Applicant considered several criteria, including the Scheme objectives, safety, benefits, costs, environmental effects, construction and feedback from the public consultation. While both options would meet the Scheme objectives, the Northern Loop will provide greater capacity improvements and journey time savings for road users when compared to the Inner Links. These benefits, therefore, will be felt for longer into the future, as predicted traffic levels continue to grow. The option selected was also widely supported during the public consultation, with over 67% of respondents preferring the Northern Loop. A Preferred Route Announcement was made for the Northern Loop option on 27 January 2021. Further details can be found in Chapter 3, Assessment of Alternatives of the ES [APP-042] and Chapter 2, Options Consultation of the Consultation Report [APP-021]. The benefits of the Scheme are outlined in the Case for the Scheme [REP3-018]. As set out in the Consultation Report [APP-021]. statutory consultation was undertaken between February 2023 to [March 2023 to seek views on the design of the preferred option. How the Applicant has had regard to those responses can be found in Annex Q of the Consultation Report Annexes [APP-038]. In addition, a targeted non-statutory supplementary consultation was undertaken between July 2023 and August 2023 to advise on design refinements following the statutory consultation.	The Applicant ensures that a thorough process is embedded in all Scheme design activity as follows: **Analyse / Research** The Scheme design has followed extensive analysis of the site and its surroundings and has paid particular attention to finding solutions to work within the tight operational area between M60 junction 17 and junction 18. This includes reconfiguring layouts to retain important infrastructure, such as noise barriers, and siting gantries to minimise the visual impact on residential properties. New areas of environmental mitigation are provided to offset impacts. The Applicant has also undertaken extensive consultation with the community and collaborated with affected landowners to understand their needs and ongoing operational requirements. A good example of this is Pike Fold Golf Club where the Applicant is working with the Golf Club to minimise impacts during construction and operation of the Scheme. **Adverse Effects** The main adverse effects are temporary and occur during construction, rather than operation. In particular, it will be necessary at times to close the carriageway which due to the operational requirements of the motorway means this will mainly be done during the night or at weekends. During operation, environmental mitigation measures have been incorporated into the design to allow for climate change, to provide low road noise surfacing, to provide environmental screening and landscaping and to retain important biodiversity habitats and wildlife corridors. **Vision** A specific design vision for the Scheme is not set out, however, the Road to Good Design sets out that to support our vision for the network, we have established a set of principles for good road design which follow the themes of people, places and processes. These will encourage better design and provide the basis for road schemes to be objectively reviewed. For close engagement with communities, careful assessment of context, robust decision making and collaborative working, are all vital if ongoing road investment is going to truly enhance our urban and rural environments. **Skills** The Scheme is supported by an integrated multi-disciplinary team of specialists providing a wide range of skills. Examples include project management, environmental, engineering, consenting, construction, cost management, safety, operation and sustainability. The Scheme does not have a design champion as such, but there are extensive checks and balances within each discipline to ensure the best outcomes in terms of providing climate resilience, sustainability, cost and aesthetics. The Applicant also has extensive design standards which must be applied along with internal governance procedures to ensure elements such as safety are considered in the design.

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			Independent Design Review The preliminary design for the Scheme has been subject to scrutiny from an independent design panel, which is detailed in the Scheme Design Report [APP-151]. **Delivery** The Applicant has secured this Design Principles Report to ensure that the principles set out in the application documents will be secured in the detailed design. This has been included in Requirement 3 of the draft Development Consent Order [REP5-005]. **Placemaking** The Scheme has been developed following extensive consultation and collaboration with the community to ensure that the impacts from construction and operation are minimised. As a linear infrastructure scheme two new engineered structures are required as part of the new loop road. These have been designed to be sympathetic to their surroundings which is currently an open “rural” location, albeit, this is set to change with an extensive amount of development planned on land to the north east of the junction. Areas of landscaping and ecological mitigation are planned around the new loop road to ensure it is screened and segregated from nearby receptors. **People** Extensive consultation with the local community, landowners and stakeholders has been undertaken throughout the development of the Scheme, as set out in the Consultation Report [APP-021]. This has helped shape the Scheme design and Annex Q of the Consultation Report [APP-038] sets out how the Applicant has responded to comments and where possible made changes to the Scheme design. **Integrated Design Approach** An iterative and integrated design approach has been carried out during the preliminary design including two major structures that would need to be constructed as part of the Scheme. Similarly, an integrated approach to environmental design has been adopted, where ecological, landscape and drainage features combine to provide context and screening. This contributes to the place making and overall environmental quality of the surrounding area. The Register of Environmental Actions and Commitments within the First Iteration Environmental Management Plan [REP5-023] includes a number of commitments which are secured by Requirement 4 of the draft Development Consent Order [REP5-005]. Commitments relevant to the principle of ensuring the Scheme design development is thorough are: • **LV1** - The Northern Loop eastern embankment is constructed in accordance with the preliminary design. • **LV2** - The ponds will be designed to provide landscape integration and planting opportunities. • **LV4** - All planting and seeding will use native species as appropriate to the location and design overseen by Ecologists and Arboriculturists. • **LV5** - New hedgerow planting will be delivered in areas adjacent to the environmental areas, along the new highway boundary and around ponds. • **LV6** - New hedgerow tree planting will be delivered to strengthen new and existing hedgerows. • **LV7** - Planting will be delivered to link existing field boundary vegetation with other areas of existing vegetation in areas around the Northern Loop. • **LV8** – Aquatic and marginal planting will be delivered at the ponds and swales.

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			• **LV9** - Planting along the Pike Fold Simister Viaduct embankment west of the M66 for landscape integration, and visual screening or filtering for viewers within nearby residential areas of Whitefield.
			• **LV10** - Planting on the Pike Fold Simister Bridge embankments and Northern Loop embankments and within the Northern Loop to provide landscape and visual integration; and visual screening or filtering for viewers along Pole Lane footpath.
			• **LV11** - Planting along Pole Lane to strengthen the existing hedgerow and along the nearby northbound M66 verge.
			• **LV12** - New planting of linear tree belts along the M60 northbound to M60 westbound on-slip to provide landscape and visual integration; and screening or filtering for viewers on Heywood Road and Simister Lane.
			• **LV13** - Existing linear tree belts necessitating removal for carriageway widening would be reinstated with a higher percentage of feathered trees and evergreen species.
			• **LV14** - Planting will be delivered along the eastbound and westbound M60 mainline verges and embankments between M60 J17 and M60 J18.
			• **LV15** - Planting of trees and shrubs, and species rich grassland creation, will be delivered within land east of the Northern Loop.
			• **B14** - Temporary and permanent lighting will be designed to avoid light spill on light sensitive ecological features and habitats such as watercourses, woodland and hedgerow and important bat habitats.
			• **B25** - Environmental mitigation areas, as well as broader landscaping, will be designed with benefits to invertebrates in mind. Designs may include the creation of new wildflower and grassland areas seeded from a species-rich seed mix, new ponds and ditches, trees and woodland, species-rich hedgerows and scrub comprising native tree, shrub and herbaceous species of local provenance.
			• **B30** - The detailed design of the golf ball netting at Pike Fold Golf Course will include consideration of measures to reduce the potential for effects on species of fauna (See the Register of Environmental Actions and Commitments within the First Iteration Environmental Management Plan [REP5-023] for full list of measures.)
			• **GS1** – A Detailed Quantitative Risk Assessment (DQRA) for groundwater will be completed and where unacceptable risks are identified, a remediation strategy will be developed.
			• **GS2** – If significant unforeseen / unrecorded land contamination including groundwater is encountered during detailed design or construction a Detailed Quantitative Risk Assessment (DQRA) will be completed and a remediation strategy will be developed if unacceptable risks are identified by the DQRA.
			• **GS4** – Compliance as appropriate with Construction (Design and Management) regulations 2015 (CDM) which govern the management of risks to construction and maintenance workers.
			• **M1** – Implementing Design for Resource Efficient (DfRE) Construction principles in a systematic manner to suit the scale of the Scheme, to identify, prioritise and select appropriate opportunities to improve Scheme resource efficiency and design out waste:
			  ○ Design for reuse and recovery: identifying, securing and using materials that already exist on site, or can be sourced from other schemes.
			  ○ Design for resource optimisation: simplifying layout and form to reduce material use, using standard design parameters, balancing cut and fill, maximising the use of renewable materials and materials with recycled content.
			  ○ Design for off-site construction: maximising the use of prefabricated structures and components, encouraging a process of assembly rather than construction.
			  ○ Design for resource-land efficient procurement, identifying and specifying materials that can be acquired responsibly, in accordance with a recognised industry standard.

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			○ Design for the future: identify how materials can be designed to be more easily adapted over an asset lifetime and how deconstructability and demountability of elements can be increased at end of first life. Evidence of material resource efficiencies and waste reductions will be demonstrated in a number of ways, for example through the use of the Sustainable Procurement Plan (SPP) and Site Waste Management Plan (SWMP). • **M5** – Implementing a SWMP, in a manner to suit the requirements of the Scheme, to plan, implement, monitor and review waste minimisation and management throughout the construction phase of the Scheme. The SWMP is a live document, updated on a regular basis during the design and construction phase. It will be used to forecast waste arisings and enable practical decisions to be taken at the detailed design and construction stage regarding waste prevention and the segregation of materials on-site for reuse, recycling, recovery, or disposal, as well as for the layout of site waste management storage and treatment facilities. The SWMP will: ○ Be prepared using either the good practice resources developed by WRAP or the Principal Contractor's own SWMP tools and resources. ○ Include targets or key performance indicators for waste recovery in line with prevailing Government and the Applicant targets. ○ Document the methods to be used to measure and record the quantity of waste generated during construction. ○ Be accompanied by appropriate communication between the Applicant, Designer and Principal Contractor as well as subcontractors and other members of the supply chain. • **M6** – Complying with waste 'Duty of Care' requirements and taking all reasonable steps to ensure that waste is managed safely without endangering human health or harming the environment. This includes: ○ Managing all waste in accordance with the waste hierarchy, as a priority order, to achieve the best overall environmental outcome where practicable. ○ Engaging early with sub-contractors during design to identify possible mitigation and enhancement measures, and to identify opportunities to reduce waste. ○ Correctly assessing and describing all waste before sending it for recovery or disposal; and carrying out a basic characterisation (level 1 waste assessment) for any waste destined for landfill. The basic characterisation determines which class of landfill site the waste must be sent to. The waste must meet the waste acceptance criteria (WAC) and waste acceptance procedures for that class. ○ Obtaining all necessary waste carrier registrations; environmental permits, mobile plant deployments and/or waste exemptions in relation to the storage, sorting, treatment, use, disposal, transportation of waste. ○ Preparing any documentation required of statutory and industry regulated codes of practice or end of waste quality protocols (e.g. CL:AIRE Code of Practice and Environment Agency Quality Protocol for the Production of Aggregates from Inert Waste). ○ Handling, storing, managing, re-using, recycling, recovering and disposing of waste arisings as close as practicable to the point of origin, with consideration of the proximity principle and value for money principle. ○ Ensuring that all waste is: transported by registered waste carriers; is accompanied by waste transfer notes or consignment notes; and is taken to licensed, permitted or exempt facilities which are authorised to accept that waste.

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			• **NV3** – A surface with a road surface influence (RSI) of -3.5dB(A) or better will be laid on all sections of carriageway within the pavement works for the Scheme excluding J18 roundabout and sections mentioned in NV4.
			• **NV4** – A surface with an RSI of -6.0 dB(A) or better would be laid at the following locations:
			  o Westbound (WB) carriageway on all lanes between M60 J17 to J18
			  o Eastbound (EB)carriageway on all lanes between M60 J18 to J17
			  o Free-flow link from M60 EB to M66 Northbound (NB).
			Subsequent resurfacing of these sections of the M60 would be undertaken with a surface meeting the RSI described above as a minimum.
			• **PHH1** - Type and quality of new or reprovisioned surfacing, crossing and access points for PRoW and other routes used by walkers, cyclists and/or horse riders (WCH) will be suitable for the intended use and context (e.g. rural or urban), and in accordance with relevant design and accessibility guidance. Key design considerations will include DMRB GG 142 Walking, Cycling and Horse-Riding Assessment and Review (WCHAR) standard, the Equality Act 2010.
			• **PHH16** – Liaison with Pike Fold Golf Club will be undertaken during detailed design and pre-construction stages.
			• **PHH21** – During detailed design the Principal Designer will contact the local Director of Public Health and police and seek feedback to inform the new structures design to mitigate the risk of suicide.
			• **W4** – Where required, discharge rates for the permanent drainage design will be restricted to achieve the allowable discharge rates and ensure no increase in flood risk. The associated attenuation storage will be sized for the 1% (1 in 100) Annual Exceedance Probability (AEP) storm event including an allowance for climate change as described in the Drainage Strategy Report (Appendix 13.7 of the Environmental Statement Appendices [APP-122].
			• **W5** – The design will provide water quality treatment and biodiversity benefits for each of the drainage networks identified as part of the drainage strategy. Features that will assist with water quality treatment include sediment forebays, vegetation in swales and attenuation ponds, filter drains, silt traps and penstock valves. Where practicable, permanently wet ponds are the preferred method of attenuation storage.
			• **W6** – The Scheme's road drainage system will be designed to collect any groundwater seepings that may occur within the widenings and cuttings. Long-term drainage of cuttings is required to protect flood sensitive receptors (including the new road) from groundwater flooding during the operational phase. All ponds will be lined and there will be no discharges to ground. Furthermore, the drainage development during the detailed design phase will continue to be aligned with the Environment Agency's (2018) Protect groundwater and prevent groundwater pollution guidance to protect groundwater.
			• **W7** – Storage and attenuation of additional runoff within the drainage network will be provided to ensure there will be no increased risk of flooding, designed to the 1 in 100 year exceedance event plus climate change allowance (30%). No out of manhole flooding from the highway drainage system during the 1 in 5 year return period rainfall event. Maintaining of existing discharge rates from existing outfalls. Limiting of discharges from new outfalls to the greenfield runoff rate or 2l/s/ha, whichever is higher. Provision of a maintenance regime for all drainage assets. Long-term drainage of embankments and sheet piles to prevent flooding at the surface. Where pre-existing groundwater conditions are known to be shallow, drainage systems will be installed to limit the build-up of water. Long-term drainage of cuttings. Groundwater seepages will be collected by the road drainage system. This is to protect flood sensitive receptors (including the new road) from groundwater flooding during the operational phase.
			• **W16** - New outfalls will be installed to reduce impacts on the bed and banks. Best practice guidance will be followed as set out in DMRB CD 529 (National Highways, 2021) and CIRIA

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			(CIRIA, 2019) in relation to design and positioning of outfalls to reduce scour to the bed and banks. • **W27** – Bored piles associated with the Simister Pike Fold Viaduct will be designed to ensure that there is no permanent residual pathway for potential groundwater contamination at Cowl Gate Farm groundwater terrestrial ecosystem (GWDTE) site. Clay bunds will be used to prevent backfilled open-cut trenches from acting as a groundwater drain within the Order Limits. This will mitigate against long term potential impacts to Cowl Gate Farm, Castle Brook South, and Egypt Lane South GWDTE sites. • **W31** – Data on ambient background copper concentrations will be obtained and applied to the detailed design screening round for HEWRAT. • **W32** – Flow rates will be attenuated from new and existing outfalls affected by the Scheme following the upgrade of the highways drainage network, to reduce the impacts on receptors. Attenuation will also act as sediment management to reduce the quantity of fine sediment entering receptors via the drainage network. • **C6** - When choosing permitted materials for sub-bases and bases at the detailed design stage, and in accordance with DMRB CD 226, the Principal Contractor will have regard to the nature of those materials and of the subgrade or any capping and the need to protect them from deterioration due to the ingress of water, the adverse effects of weather and the use of construction plant. The Requirements in Schedule 2 of the draft Development Consent Order [REP5-005] relevant to securing to the principle of ensuring the Scheme is designed thoroughly are as follows; • Requirement 3 Detailed Design • Requirement 4 Environmental Management Plan • Requirement 5 Landscaping • Requirement 8 Surface and foul water drainage
8	Is innovative *Responding positively to change, good road design captures opportunities for betterment and develops in tandem with emerging new technologies. Designing to a standard is not the same as achieving good design; an innovative and resourceful approach that is mindful of context is necessary to achieve better outcomes.*	The Scheme design has had to provide solutions to overcome difficult design challenges, particularly as this part of the SRN is within a very dense urban setting which means there is limited land available to deliver the desired improvements. Therefore, innovative design approaches to overcome these challenges have been required to ensure the improvements meet all the Scheme objectives. This includes: • The Scheme has been designed to accommodate a five lane cross section and full hard shoulder (i.e. 70% or more of a link length) which has required optimal design and use of innovative retaining structures and earthwork arrangements, all without requiring additional permanent land from adjacent landowners. • The Scheme has optimised the drainage provision through use of over-sized pipes in order to reduce land take. • Designing gantries to minimise the land required for their supports.	National Highways seeks to stimulate innovation across the highways sector by implementing the following across all its business activities: **Research** The Applicant actively engages with research institutions and universities to discover new knowledge. **Innovation** The Applicant will use this knowledge to innovate, working with wider stakeholders and enabling test trials of new applications. **Lean – continuous improvement** The Applicant's continuous improvement processes help realise efficiency and productivity opportunities. **Standards** The Applicant will embed the results of innovation improvements in new standards. During the detailed design and specification of the Scheme, the Applicant will continue to incorporate the latest innovation into the Scheme. The Applicant will engage with its wider supply chain to realise the benefits of emerging technologies and solutions and incorporate them where possible into the final design; such as exploring innovative off-site manufacturing solutions.

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		Other elements of the design where more innovation in design has been incorporated include the replacement lighting strategy. This would cover the same extents as the existing lighting and be similar in height but will be of a modern design. It will use light-emitting diode (LED) lighting with G4 luminous intensity class to reduce glare and light spill. To further reduce impact of the lighting strategy, especially during the night-time, central management system (CMS) has been used. This allows, not only to reduce the light spill, but also greatly decreases the carbon footprint and energy usage for the lighting, while reducing maintenance costs and reaction time for any potential failures.	The Register of Environmental Actions and Commitments within the First Iteration Environmental Management Plan [REP5-023] includes a number of commitments which are secured by Requirement 4 of the draft Development Consent Order [REP5-005]. Commitments relevant to the principle of innovation in design and specification are: • **G7** - A suitable lighting strategy will be developed for implementation across the Scheme in accordance with industry standards and good practice guidance on lighting with regards to protected species, including specific identified measures. • **LV2** - The ponds will be designed to provide landscape integration and planting opportunities. • **M1** - Implementing Design for Resource Efficient (DfRE) Construction principles in a systematic manner to suit the scale of the Scheme, to identify, prioritise and select appropriate opportunities to improve Scheme resource efficiency and design out waste: o Design for reuse and recovery: identifying, securing and using materials that already exist on site, or can be sourced from other schemes. o Design for resource optimisation: simplifying layout and form to reduce material use, using standard design parameters, balancing cut and fill, maximising the use of renewable materials and materials with recycled content. o Design for off-site construction: maximising the use of prefabricated structures and components, encouraging a process of assembly rather than construction. o Design for resource-land efficient procurement, identifying and specifying materials that can be acquired responsibly, in accordance with a recognised industry standard. o Design for the future: identify how materials can be designed to be more easily adapted over an asset lifetime and how deconstructability and demountability of elements can be increased at end of first life. o Evidence of material resource efficiencies and waste reductions will be demonstrated in a number of ways, for example through the use of the Sustainable Procurement Plan (SPP) and Site Waste Management Plan (SWMP). • **NV3** – A surface with a road surface influence (RSI) of -3.5dB(A) or better will be laid on all sections of carriageway within the pavement works for the Scheme excluding J18 roundabout and sections mentioned in NV4. • **NV4** – A surface with an RSI of -6.0 dB(A) or better would be laid at the following locations: o Westbound (WB) carriageway on all lanes between M60 J17 to J18 o Eastbound (EB)carriageway on all lanes between M60 J18 to J17 o Free-flow link from M60 EB to M66 Northbound (NB). Subsequent resurfacing of these sections of the M60 would be undertaken with a surface meeting the RSI described above as a minimum. • **PHH1** - Type and quality of new or reprovisioned surfacing, crossing and access points for PRoW and other routes used by walkers, cyclists and/or horse riders (WCH) will be suitable for the intended use and context (e.g. rural or urban), and in accordance with relevant design and accessibility guidance. Key design considerations will include DMRB GG 142 Walking, Cycling and Horse-Riding Assessment and Review (WCHAR) standard, the Equality Act 2010. • **W5** – The design will provide water quality treatment and biodiversity benefits for each of the drainage networks identified as part of the drainage strategy. Features that will assist with water quality treatment include sediment forebays, vegetation in swales and attenuation ponds, filter drains, silt traps and penstock valves. Where practicable, permanently wet ponds are the preferred method of attenuation storage. • **W6** – The Scheme's road drainage system will be designed to collect any groundwater seepings that may occur within the widenings and cuttings. Long-term drainage of cuttings is required to protect flood sensitive receptors (including the new road) from groundwater flooding

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			during the operational phase. All ponds will be lined and there will be no discharges to ground. Furthermore, the drainage development during the detailed design phase will continue to be aligned with the Environment Agency's (2018) Protect groundwater and prevent groundwater pollution guidance to protect groundwater. • **W7** – Storage and attenuation of additional runoff within the drainage network will be provided to ensure there will be no increased risk of flooding, designed to the 1 in 100 year exceedance event plus climate change allowance (30%). No out of manhole flooding from the highway drainage system during the 1 in 5 year return period rainfall event. Maintaining of existing discharge rates from existing outfalls. Limiting of discharges from new outfalls to the greenfield runoff rate or 2l/s/ha, whichever is higher. Provision of a maintenance regime for all drainage assets. Long-term drainage of embankments and sheet piles to prevent flooding at the surface. Where pre-existing groundwater conditions are known to be shallow, drainage systems will be installed to limit the build-up of water. Long-term drainage of cuttings. Groundwater seepages will be collected by the road drainage system. This is to protect flood sensitive receptors (including the new road) from groundwater flooding during the operational phase. • **W16** - New outfalls will be installed to reduce impacts on the bed and banks. Best practice guidance will be followed as set out in DMRB CD 529 (National Highways, 2021) and CIRIA (CIRIA, 2019) in relation to design and positioning of outfalls to reduce scour to the bed and banks. • **C2** – Materials will be sourced from local suppliers, where practical and cost-effective to do so, to reduce the travel distance of materials and associated GHG emissions. • **C6** - When choosing permitted materials for sub-bases and bases at the detailed design stage, and in accordance with DMRB CD 226, the Principal Contractor will have regard to the nature of those materials and of the subgrade or any capping and the need to protect them from deterioration due to the ingress of water, the adverse effects of weather and the use of construction plant.
9	Is collaborative *Collaboration ensures roads are useful to and accepted by the communities they serve. Collaborative working requires a rigorous process that identifies dependencies and wider opportunities, and facilitates effective communication and engagement from the start. Community engagement will be led by a local sense*	An extensive programme of options, statutory and non-statutory public consultations has been carried out, as set out in the Consultation Report [APP-021] and Consultation Report Annexes APP-022 to APP-039]. As the preliminary design developed, pre-application consultation has been undertaken. The Applicant has consulted with stakeholders such as landowners, statutory consultees (such as statutory environmental bodies including Natural England and the Environment Agency), local planning authorities and specialist bodies (such as the Greater Manchester Archaeological Advisory Service) to take into account their considerations and requirements. Statutory consultation on the Scheme, as required by the Planning Act, was undertaken between 15 February and 28 March 2023 (6 weeks). This allowed prescribed consultees, stakeholders and the wider local community to comment on the proposals and a supplementary consultation was undertaken in July to September 2023 to inform affected stakeholders of the updates and changes to the Scheme made since the statutory consultation and allow them to provide feedback. All feedback	The Applicant will continue to engage with stakeholders during the development of the detailed design. The Applicant acknowledges that the Scheme must, subject to the grant of consent, be designed in detail and carried out so that it is compatible with the preliminary Scheme design. Schedule 2 of the draft Development Consent Order [REP5-005] secures a number of Requirements that ensure the detailed design of the Scheme must be developed in consultation with consultees on matters related to their function. Prior to seeking approval to discharge the individual Requirements, the Applicant will follow a process of consultation with the specified consultees which will be recorded in the Register of Requirements. The Register of Requirements will be maintained in an electronic form, and published on the Applicant's website, for inspection by all stakeholders, including members of the public. The Register of Requirements is secured in Requirement 15 at Schedule 2 Part 2 of the draft Development Consent Order [REP5-005]. **Requirement 3: Detailed Design** The Applicant will consult with the relevant planning authority and local highway authority on matters related to their function, should the Applicant identify potential amendments to preliminary Scheme design. **Requirement 4: Environmental Management Plan** The Register of Environmental Actions and Commitments within the First Iteration Environmental Management Plan [REP5-023] includes a number of commitments (listed below) which require the Applicant to consult with specified stakeholders.

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	of culture, place and value.	from the statutory and supplementary consultations has been analysed and incorporated into the Consultation Report [APP-021] and Consultation Report Annexes [APP-022 to APP-039]. Several responses to the Statutory Consultation were received suggesting changes to the design including to lighting, the Northern Loop, drainage and other aspects of the highway layout. Table 5-14 of the Consultation Report [APP-021] lists the key design changes that have been made to the Scheme as a result of statutory consultation and targeted non-statutory supplementary consultation, such as: • Reducing the number of ponds as part of the drainage design. • Changes to the Order Limits in response to requests from Landowners. • Amendment to the landscape design at Pole Lane to maintain access for landowners.	**Requirement 5: Landscaping** The Applicant will consult with the relevant planning authority on the final landscaping scheme prior to the commencement of the Scheme. The landscaping scheme must be developed in accordance with the mitigation measures set out in the Register of Environmental Actions and Commitments within the First Iteration Environmental Management Plan [REP5-023] and Figure 2.3 Environmental Masterplan of the Environmental Statement Figures [REP5-017]. The landscaping scheme will include a large number of plans and schedules including those details specified in Paragraph 5(3) of Requirement 5 of the draft Development Consent Order [REP5-005]. **Requirement 8: Surface and foul water drainage** The Applicant will consult with the relevant planning authority on the written details of the surface and foul water drainage system prior to the commencement of the Scheme. The drainage details will developed in accordance with the mitigation measures set out in the Register of Environmental Actions and Commitments within the First Iteration Environmental Management Plan [REP5-023] and Appendix 13.7 Drainage Strategy Report of the Environmental Statement Appendices [APP-122] including means of pollution control. The Register of Environmental Actions and Commitments within the First Iteration Environmental Management Plan [REP5-023] includes a number of commitments which are secured by Requirement 4 of the draft Development Consent Order [REP5-005]. Commitments relevant to the principle of collaboration during the detailed design stages of the Scheme: • **G9** - Prior to reinstatement of Plots 1/1k and 2/1a, the Principal Contractor will consult with the relevant planning authority, Bury MBC and United Utilities to discuss and endeavour to agree retention of temporary surface treatment to improve access along the permissive path through Haweswater underpass. • **LV1** - The Northern Loop eastern embankment is constructed in accordance with the preliminary design. • **LV2** - The ponds will be designed to provide landscape integration and planting opportunities. • **LV4** - All planting and seeding will use native species as appropriate to the location and design overseen by Ecologists and Arboriculturists. • **LV5** - New hedgerow planting will be delivered in areas adjacent to the environmental areas, along the new highway boundary and around ponds. • **LV6** - New hedgerow tree planting will be delivered to strengthen new and existing hedgerows. • **LV7** - Planting will be delivered to link existing field boundary vegetation with other areas of existing vegetation in areas around the Northern Loop. • **LV8** – Aquatic and marginal planting will be delivered at the ponds and swales. • **LV9** - Planting along the Pike Fold Simister Viaduct embankment west of the M66 for landscape integration, and visual screening or filtering for viewers within nearby residential areas of Whitefield. • **LV10** - Planting on the Pike Fold Simister Bridge embankments and Northern Loop embankments and within the Northern Loop to provide landscape and visual integration; and visual screening or filtering for viewers along Pole Lane footpath. • **LV11** - Planting along Pole Lane to strengthen the existing hedgerow and along the nearby northbound M66 verge. • **LV12** - New planting of linear tree belts along the M60 northbound to M60 westbound on-slip to provide landscape and visual integration; and screening or filtering for viewers on Heywood Road and Simister Lane. • **LV13** - Existing linear tree belts necessitating removal for carriageway widening would be reinstated with a higher percentage of feathered trees and evergreen species.

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			• **LV14** - Planting will be delivered along the eastbound and westbound M60 mainline verges and embankments between M60 J17 and M60 J18. • **LV15** - Planting of trees and shrubs, and species rich grassland creation, will be delivered within land east of the Northern Loop. • **LV16** - Planting of shrubs will be delivered along Warwick Close. • **B1** - New road verges will support low-nutrient grassland habitats which are of high ecological value. No topsoil will be applied to these areas which will be sown with a commercial and locally native seed mix appropriate to the geology. • **B25** - Environmental mitigation areas, as well as broader landscaping, will be designed with benefits to invertebrates in mind. Designs may include the creation of new wildflower and grassland areas seeded from a species-rich seed mix, new ponds and ditches, trees and woodland, species-rich hedgerows and scrub comprising native tree, shrub and herbaceous species of local provenance. • **B30** - The detailed design of the golf ball netting at Pike Fold Golf Course will include consideration of measures to reduce the potential for effects on species of fauna (See the Register of Environmental Actions and Commitments within the First Iteration Environmental Management Plan [REP5-023] for full list of measures.) • **NV3** – A surface with a road surface influence (RSI) of -3.5dB(A) or better will be laid on all sections of carriageway within the pavement works for the Scheme excluding J18 roundabout and sections mentioned in NV4. • **NV4** – A surface with an RSI of -6.0 dB(A) or better would be laid at the following locations: o Westbound (WB) carriageway on all lanes between M60 J17 to J18 o Eastbound (EB)carriageway on all lanes between M60 J18 to J17 o Free-flow link from M60 EB to M66 Northbound (NB). Subsequent resurfacing of these sections of the M60 would be undertaken with a surface meeting the RSI described above as a minimum. • **PHH1** - Type and quality of new or reprovisioned surfacing, crossing and access points for PRoW and other routes used by walkers, cyclists and/or horse riders (WCH) will be suitable for the intended use and context (e.g. rural or urban), and in accordance with relevant design and accessibility guidance. Key design considerations will include DMRB GG 142 Walking, Cycling and Horse-Riding Assessment and Review (WCHAR) standard, the Equality Act 2010. • **PHH16** – Liaison with Pike Fold Golf Club will be undertaken during detailed design and pre-construction stages. • **PHH21** – During detailed design the Principal Designer will contact the local Director of Public Health and police and seek feedback to inform the new structures design to mitigate the risk of suicide. • **W4** – Where required, discharge rates for the permanent drainage design will be restricted to achieve the allowable discharge rates and ensure no increase in flood risk. The associated attenuation storage will be sized for the 1% (1 in 100) Annual Exceedance Probability (AEP) storm event including an allowance for climate change as described in the Drainage Strategy Report (Appendix 13.7 of the Environmental Statement Appendices [APP-122]). • **W5** – The design will provide water quality treatment and biodiversity benefits for each of the drainage networks identified as part of the drainage strategy. Features that will assist with water quality treatment include sediment forebays, vegetation in swales and attenuation ponds, filter drains, silt traps and penstock valves. Where practicable, permanently wet ponds are the preferred method of attenuation storage. • **W6** – The Scheme's road drainage system will be designed to collect any groundwater seepings that may occur within the widenings and cuttings. Long-term drainage of cuttings is required to protect flood sensitive receptors (including the new road) from groundwater flooding

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			during the operational phase. All ponds will be lined and there will be no discharges to ground. Furthermore, the drainage development during the detailed design phase will continue to be aligned with the Environment Agency's (2018) Protect groundwater and prevent groundwater pollution guidance to protect groundwater. • **W7** – Storage and attenuation of additional runoff within the drainage network will be provided to ensure there will be no increased risk of flooding, designed to the 1 in 100 year exceedance event plus climate change allowance (30%). No out of manhole flooding from the highway drainage system during the 1 in 5 year return period rainfall event. Maintaining of existing discharge rates from existing outfalls. Limiting of discharges from new outfalls to the greenfield runoff rate or 2l/s/ha, whichever is higher. Provision of a maintenance regime for all drainage assets. Long-term drainage of embankments and sheet piles to prevent flooding at the surface. Where pre-existing groundwater conditions are known to be shallow, drainage systems will be installed to limit the build-up of water. Long-term drainage of cuttings. Groundwater seepages will be collected by the road drainage system. This is to protect flood sensitive receptors (including the new road) from groundwater flooding during the operational phase. • **W27** – Bored piles associated with the Simister Pike Fold Viaduct will be designed to ensure that there is no permanent residual pathway for potential groundwater contamination at Cowl Gate Farm groundwater terrestrial ecosystem (GWDTE) site. Clay bunds will be used to prevent backfilled open-cut trenches from acting as a groundwater drain within the Order Limits. This will mitigate against long term potential impacts to Cowl Gate Farm, Castle Brook South, and Egypt Lane South GWDTE sites. • **C6** - When choosing permitted materials for sub-bases and bases at the detailed design stage, and in accordance with DMRB CD 226, the Principal Contractor will have regard to the nature of those materials and of the subgrade or any capping and the need to protect them from deterioration due to the ingress of water, the adverse effects of weather and the use of construction plant.
10	Is long lasting *With quality materials and careful detailing, good road design brings lasting value. The design process requires sufficient time for challenges to be resolved before delivery and is adaptable to future needs and technologies as part of the commitment to whole-life operation, management and maintenance.*	The design ensures the long-term structural stability of the operational highway. The structures will have a design life of 60 years and, as such, it is highly unlikely that the Scheme will be demolished before the end of its life as the road is likely to have become an integral part of the infrastructure in the area. Bridge beams to be weathering steel / RC composite bridge deck and bridge structures designed for long life and whole life cost. The highway will be drained by Sustainable Urban Drainage (SUDs) with a service life of 60 years and sufficient capacity to accommodate additional runoff associated with an increase in rainfall intensity due to climate change of 30%. However, there will be no increase in discharge rate from the SuDS as the additional runoff will be managed through the implementation of attenuation solutions, coupled with flow controls within all drainage networks. Overall, the Scheme has been designed to be resilient to climate change and incorporated several mitigation measures. These are set out in Chapter 14, Climate of the ES [APP-074].	The Applicant will design the Scheme in accordance with DMRB. DMRB embodies the collective experience of the Applicant, their agents, supply chain members and industry bodies. It provides requirements and advice resulting from research, practical experience of constructing and operating motorway and all-purpose trunk roads, and from delivering compliance with legislative requirements. DMRB sets out design life requirements and places whole life consideration (inc. maintenance requirements) at the centre of decision making during the development of detailed design. The Scheme design is a combination of alterations to the existing motorway infrastructure and the introduction of new or improved free flow links at Junction 18 of the M60 which incorporates sustainable and environmental design measures as well as ensuring it is resilient to variations in the climate. The Scheme design is resilient to climatic variations, for example the Sustainable Urban Drainage (SUDs) will have a service life of 60 years and sufficient capacity to accommodate additional runoff associated with an increase in rainfall intensity due to climate change of 30%. The road surface and structures are designed to withstand extreme heat or cold. In terms of materials to be specified in accordance with DMRB, the bridge decks are designed to be long lasting with an intended design life of 120 years. The typical life span of pavement layers to form part of the new road construction are between 15-40years. Towards the end of the construction period, the Applicant will develop the Third Iteration Environmental Management Plan and Landscape and Ecology Management Plan in accordance with Requirement 4 of the draft Development Consent Order [REP5-005]. The Third Iteration

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		The Scheme will also upgrade existing intelligent transportation systems or install new systems where required. This includes VMSL mounted on cantilever and long span cantilever gantries, AMI above lane signals, HADECS and EAV, CCTV and MIDAS.
		
		The street lighting will use Light Emitting Diode (LED) technology as a result of the modification of the road layout and to upgrade the current high-pressure sodium lighting in keeping with the improvements to adjacent road networks.
			Environmental Management Plan and Landscape and Ecology Management Plan will contain detailed long term operation and maintenance arrangements.
			
			The Register of Environmental Actions and Commitments within the First Iteration Environmental Management Plan [REP5-023] includes a number of commitments which are secured by Requirement 4 of the draft Development Consent Order [REP5-005]. Commitments relevant to the principle of ensuring the Scheme is long lasting are:
			
			• **M1** - Implementing Design for Resource Efficient (DfRE) Construction principles in a systematic manner to suit the scale of the Scheme, to identify, prioritise and select appropriate opportunities to improve Scheme resource efficiency and design out waste:
			  ○ Design for reuse and recovery: identifying, securing and using materials that already exist on site, or can be sourced from other schemes.
			  ○ Design for resource optimisation: simplifying layout and form to reduce material use, using standard design parameters, balancing cut and fill, maximising the use of renewable materials and materials with recycled content.
			  ○ Design for off-site construction: maximising the use of prefabricated structures and components, encouraging a process of assembly rather than construction.
			  ○ Design for resource-land efficient procurement, identifying and specifying materials that can be acquired responsibly, in accordance with a recognised industry standard.
			  ○ Design for the future: identify how materials can be designed to be more easily adapted over an asset lifetime and how deconstructability and demountability of elements can be increased at end of first life.
			  ○ Evidence of material resource efficiencies and waste reductions will be demonstrated in a number of ways, for example through the use of the Sustainable Procurement Plan (SPP) and Site Waste Management Plan (SWMP).
			• **NV3** – A surface with a road surface influence (RSI) of -3.5dB(A) or better will be laid on all sections of carriageway within the pavement works for the Scheme excluding J18 roundabout and sections mentioned in NV4.
			• **NV4** – A surface with an RSI of -6.0 dB(A) or better would be laid at the following locations:
			  ○ Westbound (WB) carriageway on all lanes between M60 J17 to J18
			  ○ Eastbound (EB)carriageway on all lanes between M60 J18 to J17
			  ○ Free-flow link from M60 EB to M66 Northbound (NB).
			Subsequent resurfacing of these sections of the M60 would be undertaken with a surface meeting the RSI described above as a minimum.
			• **W4** – Where required, discharge rates for the permanent drainage design will be restricted to achieve the allowable discharge rates and ensure no increase in flood risk. The associated attenuation storage will be sized for the 1% (1 in 100) Annual Exceedance Probability (AEP) storm event including an allowance for climate change as described in the Drainage Strategy Report (Appendix 13.7 of the Environmental Statement Appendices [APP-122]).
			• **W7** – Storage and attenuation of additional runoff within the drainage network will be provided to ensure there will be no increased risk of flooding, designed to the 1 in 100 year exceedance event plus climate change allowance (30%). No out of manhole flooding from the highway drainage system during the 1 in 5 year return period rainfall event. Maintaining of existing discharge rates from existing outfalls. Limiting of discharges from new outfalls to the greenfield runoff rate or 2l/s/ha, whichever is higher. Provision of a maintenance regime for all drainage assets. Long-term drainage of embankments and sheet piles to prevent flooding at the surface. Where pre-existing groundwater conditions are known to be shallow, drainage systems will be installed to limit the build-up of water. Long-term drainage of cuttings. Groundwater seepages

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			will be collected by the road drainage system. This is to protect flood sensitive receptors (including the new road) from groundwater flooding during the operational phase. • **W28** – Maintenance and management of the drainage network and assets will be undertaken as part of the operation of the Scheme as per standard National Highways guidance and practice as outlined in the SuDS Manual (CIRIA, 2015). • **W32** – Flow rates will be attenuated from new and existing outfalls affected by the Scheme following the upgrade of the highways drainage network, to reduce the impacts on receptors. Attenuation will also act as sediment management to reduce the quantity of fine sediment entering receptors via the drainage network. • **C6** - When choosing permitted materials for sub-bases and bases at the detailed design stage, and in accordance with DMRB CD 226, the Principal Contractor will have regard to the nature of those materials and of the subgrade or any capping and the need to protect them from deterioration due to the ingress of water, the adverse effects of weather and the use of construction plant. • **C7** - Laying and compaction of the sub-base and the subsequent pavement courses will be programmed, where practicable, and other steps considered, if necessary, to afford protection to the base, sub- base and subgrade to changes in climatic conditions, such as increases in heavy rainfall periods. • **C8** - An appropriate asset management strategy will be implemented to proactively identify and, where necessary, rectify potential climate related impacts (e.g. additional visual inspections of the Scheme's assets after extreme weather events). • **C10** - Quarterly GHG emissions reporting of operational maintenance related GHG emissions will be undertaken, using the National Highways Carbon Tool, during the operational phase.