M54 to M6 Link Road

TR010054

Volume 6

6.11 Outline Environmental Management Plan

Regulation 5(2)(q)

Planning Act 2008

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

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M54 to M6 Link Road

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6.11 Outline Environmental Management Plan

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1 Introduction

1.1 Purpose of the report

1.1.1 This document is the draft Outline Environmental Management Plan (OEMP) for the M54 to M6 Link Road scheme (herein referred to as 'the Scheme'). Powers to construct, operate and maintain the Scheme are being sought by Highways England through an application for a Development Consent Order (DCO) (refer to draft DCO [TR010054/APP/3.1]).

1.1.2 An Environmental Impact Assessment (EIA) has been undertaken for the Scheme and an Environmental Statement (ES) [TR010054/APP/6.1] has been prepared in accordance with the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 (as amended 2018) (the 'EIA Regulations'). In accordance with the requirements of the EIA Regulations, the ES contains the assessment of the potential significant effects on the environment that may be caused during construction, operation and maintenance of the Scheme and describes proposed mitigation measures.

1.1.3 This OEMP is based on the Scheme design for which the DCO is being applied for. It has been prepared in accordance with the Design Manual for Roads and Bridges (DMRB) LA 120 Environmental Management Plans (Ref 1.1) and GG 182 (formerly IAN 182/14) Major Schemes: Enabling Handover into Operation and Maintenance (Ref 1.2).

1.1.4 This OEMP would be developed into a more detailed Construction Environmental Management Plan (CEMP) by the Principal Contractor (PC) once the Scheme detailed design has been finalised (subject to the order for development consent being granted).

1.1.5 The purpose of this OEMP is:

- To satisfy Highways England's requirement to define mitigation measures which are proposed to be included during Scheme construction, operation and maintenance, including all of those considered in the ES.
- To provide the equivalent of a Code of Construction Practice (CoCP), a suggested item for inclusion within the DCO application (refer to The Planning Inspectorate's Advice Note 6, Appendix 1 (Ref 1.3)). The scope of this OEMP is such that it includes all of those measures that would be expected within a CoCP.
- Provide the "blueprint" for the more detailed CEMP to be prepared by the PC.
- To enable the Examining Authority and the Secretary of State to identify those mitigation measures proposed by the Scheme which are secured within this OEMP.

1.1.6 The OEMP has been prepared using an iterative process and in parallel with the development of the Scheme design, proposed construction methodologies and the EIA. Measures within this OEMP include proposed design, construction and operational mitigation measures, which have been defined in part by the requirements which arise from the technical assessments presented within the ES.

The technical assessments within the ES have taken account of the measures within the OEMP as 'embedded mitigation' prior to the definition of potential Scheme environmental effects. Proposed mitigation measures embedded in the Scheme design are shown on the Environmental Masterplans (refer to ES Figures 2.1 to 2.7 [TR010054/APP/6.2]) and detailed in Table 3.4 herein.

1.1.7 The ES and the assessments within it are based on the works proposed in the DCO Works Plans [TR010054/APP/2.4] and Engineering Sections drawings [TR010054/APP/2.10], and the maximum area of land anticipated as likely to be required, taking into account the proposed limits of deviation (LoD) (refer to ES Chapter 2: The Scheme [TR010054/APP/6.1]), and the flexibility of the detailed design provided for in the DCO [TR10054/APP/3.1]. All distances, directions, areas and lengths referred to in this document are approximate.

1.1.8 The construction of the Scheme would be subject to measures and procedures defined within a CEMP to be prepared by the PC. The CEMP would be based on, and incorporate, the requirements of this OEMP relevant to that construction phase and the PC's contractual scope. It would also include the implementation of appropriate industry standard practices and control measures for environmental impacts arising during the Scheme works.

1.1.9 Subject to the potential for alternative measures set out in para. 3.2.14, the measures defined in the PC's CEMP would be applied by the contractor as stipulated in the relevant parts of the OEMP, throughout the duration of their contract to provide planning, management and control during the construction phases of the Scheme with the aim of controlling potential impacts upon the natural and historic environment, people and businesses.

1.1.10 All contractors would be required to comply with applicable environmental legislation, together with any additional environmental controls imposed within the DCO.

1.1.11 The measures to be implemented, such as soil handling and dust management, are set out in relation to each environmental discipline of the ES [TR010054/APP/6.1] within the Register of Environmental Actions and Commitments (REAC) tables included in Section 3 of this OEMP.

1.1.12 For the purposes of the OEMP, the following definitions apply:

- **The Secretary of State** is the Secretary of State for Transport. Unless otherwise stated within the OEMP, the Secretary of State will approve the CEMP and other management plans to be appended to the CEMP defined within this OEMP following their acceptance by the Authority.
- **The Authority** is Highways England. The Authority, in consultation with the relevant stakeholders as set out in this OEMP, will determine whether to accept the CEMP, other management plans defined within this OEMP, detailed method statements required by the OEMP, and variations to these and other matters as stated within this OEMP, prior to, where relevant, their final approval by the body responsible for approving the relevant document as set out in the OEMP.

  The Principal Contractor (PC) means any contractor appointed by The

Authority to deliver the construction works (and also includes any sub-contractors appointed by the PC to carry out any part of the main construction works).

- **The maintenance authority** is a body tasked with the maintenance of the Scheme, once the Scheme is operational. Once the Scheme is complete in its entirety, this would be The Authority, in relation to trunked sections of the Scheme. Prior to full completion this would be the PC. Some components of the completed Scheme may be maintained by Staffordshire County Council (SCC) or City of Wolverhampton Council (CWC).

1.1.13 The CEMP (and any other documents that form part of it) would be a live document that would be maintained by the PC throughout the construction phase of the Scheme. As a minimum, the CEMP would be reviewed every six months to ensure that it is up to date.

1.1.14 Towards the end of construction period the PC would develop the CEMP[1] into a Handover Environmental Management Plan (HEMP) for the operational phase of the Scheme (in accordance with Requirement 4), which would be subject to approval of the Authority. The indicative contents of the HEMP are set out in the DMRB GG 182 (Enabling Handover into Operation and Maintenance). This HEMP would then be implemented by the maintenance authority responsible for the maintenance of the Scheme during the operational phase.

1.1.15 The relationship between the OEMP, CEMP and HEMP is indicated in Plate 1.1.

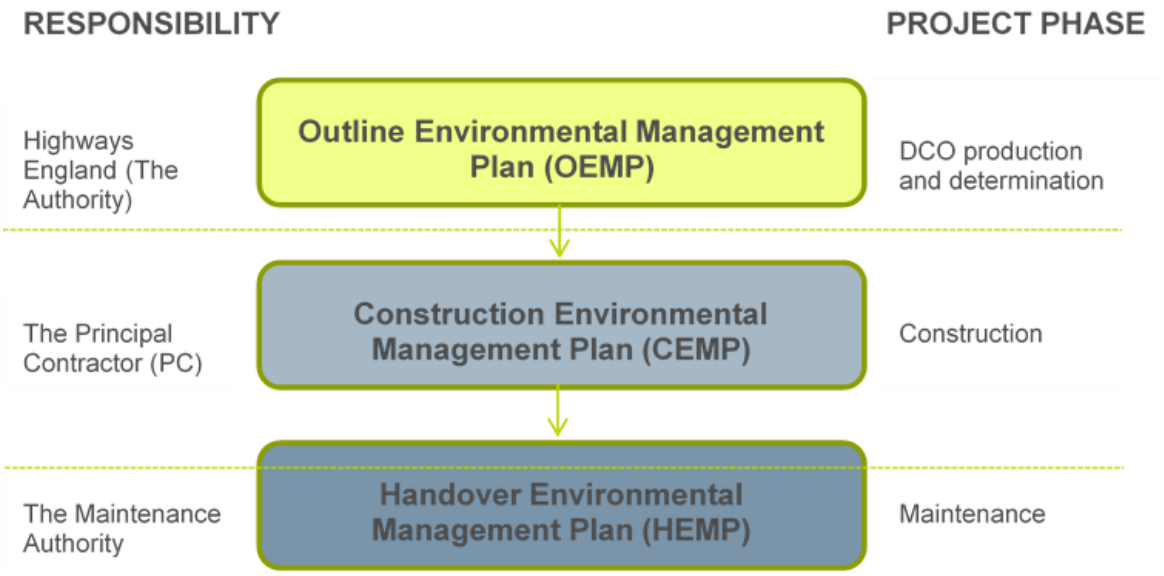


Plate 1.1: Relationship between the OEMP, CEMP and the HEMP

[1] Hereafter any reference to the CEMP is intended to refer to both the CEMP and the associated management plans that would form part of it.

1.2 The Scheme

Scheme location

1.2.1 The Scheme would be located between the national and regional routes, the M54, M6 and A460 (see Plate 1.2). Located within the administrative boundary of local authorities SCC, South Staffordshire Council (SSC) and CWC. The Scheme would be located in a predominantly rural area consisting mainly of mixed agricultural land and scattered woodland. South of Hilton Lane is an area of historic parkland associated with Hilton Hall.

1.2.2 The Development Consent Order (DCO) boundary (hereafter referred to 'the Order limits') incorporates land required temporarily and permanently for the construction, operation and maintenance of the Scheme (refer to Figure 2.8 [TR010054/APP/6.2]). The Order limits include the boundary of the main works (herein referred to as 'the Scheme boundary') and a number of isolated pockets of land required to update existing highway signs only. The replacement of existing signs would not result in a significant effect on environmental receptors alone or in-combination with the works included in the Scheme boundary so this OEMP refers to the Scheme boundary rather than the full Order limits.

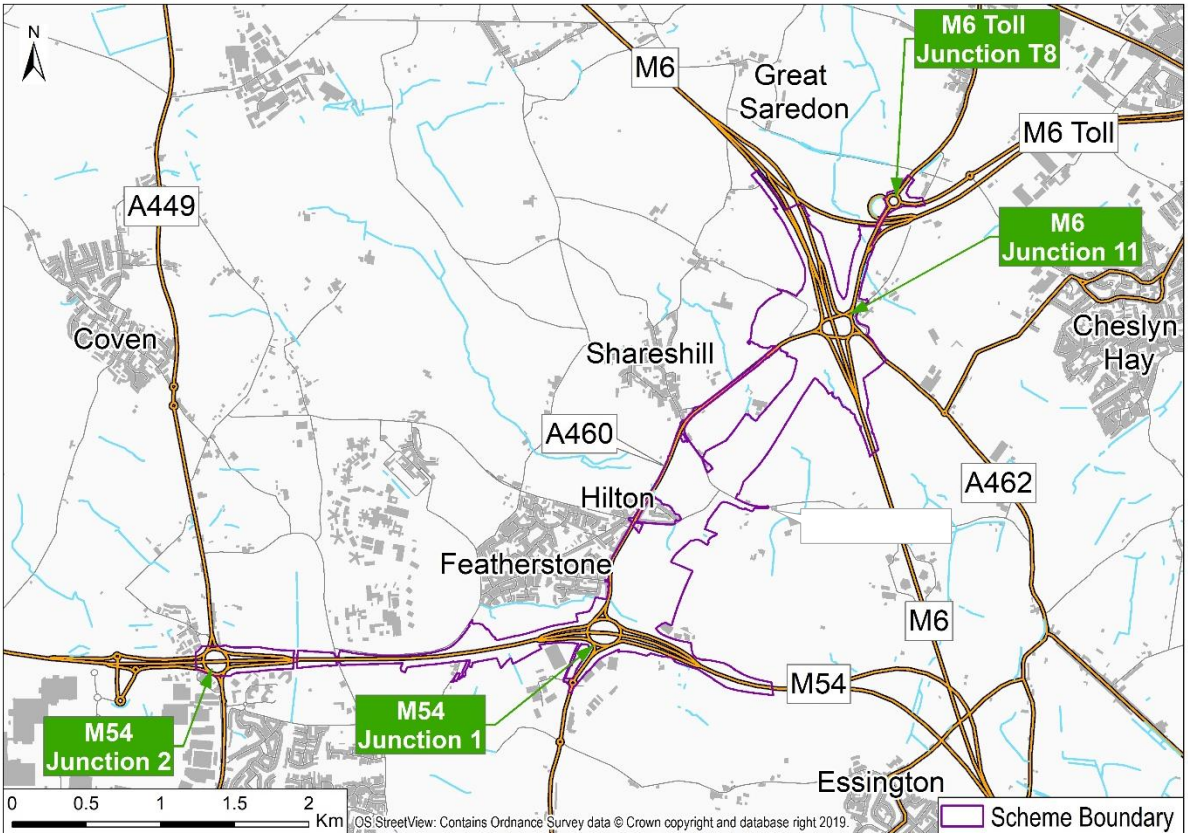


Plate 1.2: Scheme location

1.2.3 The nearest residential areas include the villages of Shareshill to the north-west, Featherstone and Hilton to the west and the hamlet of Little Saredon to the north-west of the Scheme boundary. The residential area of Bushbury, a suburb of Wolverhampton is located to the south of M54 Junction 2. There are also a number

of more isolated residential properties and farm holdings in the vicinity of the Scheme, for example a farm and a small group of residential properties at Laney Green, north of M6 Junction 11, Brookfield Farm south of M6 Junction 11 and Tower House Farm north-east of M54 Junction 1.

1.2.4 The Scheme boundary is shown in ES Figures 2.1 to 2.7 [TR010054/APP/6.2].

1.2.5 Details of environmental receptors and constraints are detailed in the ES (refer to the ES [TR010054/APP/6.1] and the associated figures within the ES [TR010054/APP/6.2]) and thus are not repeated here. However, key environmental constraints are shown on the figures provided in Appendix A.

Need for the Scheme

1.2.6 In 2001 the West Midlands Area Multi Modal Study (Ref 2.1) recommended the construction of a link road between the M54 and M6 to provide a strategic network link between the M54 and the M6 northbound. The government formerly committed to the delivery of the Scheme in 2014 in the Road Investment Strategy: 2015 to 2020 (Ref 2.2), which sets out the long term approach to improve England's motorways and major roads.

1.2.7 The M54 eastbound merges into the M6 southbound at Junction 10a. There is no strategic route from the M54 to the M6 northbound or the M6 Toll. There is also no strategic route between the M6 southbound and the M54 westbound (refer to Plate 1.1 in Chapter 1 of this Environmental Statement (ES)). Traffic wishing to make these movements has to leave the motorway network and use the regional/local road network including the A449, A5 and A460. The routes used are heavily congested, particularly during peak periods, and have relatively high accident rates (refer to the Transport Assessment Report [TR010054/APP/7.4] for further details).

1.2.8 The signed route between the M54 westbound and the M6 northbound is via two trunk roads; the A449, which is a dual carriageway that is subject to the national speed limit, and the A5 that is subject to a 50 mph speed limit travelling between M54 Junction 2 and M6 Junction 12.

1.2.9 The existing A460 Cannock Road between M54 Junction 1 and M6 Junction 11 is a single carriageway road approximately 10 m wide with no physical separation between the flows of traffic in each direction. The existing A460 is predominantly subject to a 40 mph speed limit, but is also subject to a 30 mph speed limit from the M54 Junction 1 to approximately 140 m after the junction with the A460 and Monument Drive, a total distance of approximately 840 m. In addition, the existing A460 is subject to a 50 mph speed limit south of the M6 Junction 11 for approximately 500 m. The existing A460 has eight minor roads and numerous private accesses joining it between the M54 and the M6, requiring six 'give way' priority junctions and one traffic signal signalised crossroads. These provide access to Featherstone, Shareshill, Hilton, Hilton Hall and other isolated properties. These priority junctions and accesses mean that right turning traffic is required to cross on-coming traffic to exit and enter the junctions. The A460 was not designed for the amount and type of traffic currently using it, resulting in delays.

1.2.10 The existing road network is not adequate to cope with the high volumes of traffic, often consisting of heavy goods vehicles (HGVs). There is a need to deliver a link

road to address the current levels of congestion and its impacts on local residents and motorists. Investment in additional capacity will support local economic growth for Telford, Shrewsbury, Wolverhampton, Cannock and Tamworth by improving traffic flow and enhanced east-west and north-south routes.

Brief outline of the proposed works

1.2.11 The Scheme would minimise conflict between local and strategic traffic providing a new dual two-lane carriageway between the M54 Junction 1 to the M6 Junction 11. From south to north the main components of the Scheme are:

- Replacement of the existing M54 Junction 1 with free flow slip roads between the new link road and the M54. This would allow the freeflow of traffic between the M54 and the new link road in both directions and maintain connectivity with the existing local road network, via three new roundabouts.
- Construction of a new dual carriageway between M54 Junction 1 and the M6 Junction 11. The alignment of the carriageway would be located to the east of the existing A460 and the villages of Featherstone, Hilton and Shareshill.
- Dark Lane would be stopped-up between the final property and the junction with Hilton Lane.
- The realignment of Hilton Lane on a bridge over the mainline of the Scheme. The bridge would be reconstructed on a similar alignment (within the limits of deviation) and would provide sufficient clearance for the new road.
- Provision of an accommodation bridge and access track across the mainline of the Scheme to retain access to severed land to the east of the Scheme. The route of the new link road would then continue north to the east of Brookfield Farm to link into the M6 Junction 11.
- Enlargement of the M6 Junction 11 signalised roundabout to accommodate a connection to the new link road and realign existing connections with the A460 and M6. Two replacement bridges would be required over the M6 to provide an increase in capacity from two lanes to four lanes of traffic on the roundabout. This work would raise the height of the junction by approximately 1.5m.

Preliminary works and main works

1.2.12 Subject to securing a DCO, a series of preliminary works would be delivered under the DCO or with the agreement of the landowner by the PC. These preliminary works are planned to start in Autumn 2021. The details of the preliminary works are provided in Table 1.1.

Table 1.1: List of preliminary works

Preliminary works	Envisaged activities
Utilities	Utilities surveys together with advance utilities diversion and utilities clearance works

Preliminary works	Envisaged activities
Pre-construction water quality monitoring	A programme of water quality monitoring will be undertaken prior to and during construction to ensure that no detrimental effect of the water environment occurs, and to allow any pollution incidents to be identified and remedied (refer to ES Chapter 13: Road Drainage and the Water Environment [TR010054/APP/6.1]).
Ecological surveys and ecological advance works	Undertaking of ecological pre-construction surveys and where applicable ecological advanced works (e.g. ecological clearance, invasive weed treatment or ecological mitigation in advance of main construction works).
Advanced archaeological works	Measures to protect archaeological remains in situ and to record archaeological remains through investigation, prior to the construction of the Scheme (refer to ES Chapter 6: Cultural Heritage [TR010054/APP/6.1]).
Site clearance	The clearance of vegetation required to construct the Scheme would be undertaken outside of the bird breeding season where possible to avoid adverse ecological effects (refer to ES Chapter 8: Biodiversity [TR010054/APP/6.1]).
Construction of haul roads	Works to construct the main haul road within the footprint of the proposed mainline of the Scheme.
Mobilisation to site. Establishment of main compounds and satellite compounds	Works to enable the establishment of the main compounds north-west of M6 Junction 11 and east of the A460 at Featherstone (refer to ES Figures 2.9 [TR010054/APP/6.2])

1.2.13 All other works associated with Scheme construction not listed above are considered as 'main works'.

1.2.14 Mitigation measures specific to the preliminary works phase are detailed within Table 3.2, whilst Table 3.3 defines mitigation measures to be implemented during the main works. The parties responsible for undertaking the works set out in Table 1.1 will review the measures set out in Table 3.2, 3.3 and 3.4 of this OEMP and will a create a bespoke CEMP using the appropriate measures for the activity. Where measures are not included, this will require approval by the Authority (see paragraphs 3.2.7 to 3.2.9 of the OEMP for further detail.

1.2.15 For the avoidance of doubt, the controls set out in this OEMP relate to preliminary and main works carried out pursuant to the powers set out in the DCO, and so do not apply to any works carried out outside of the remit of the DCO (including those commenced prior to the making of the DCO) using The Authority's pre-existing statutory powers.

Programme

1.2.16 Preliminary works are anticipated to commence in Autumn 2021 (subject to securing the DCO or with the agreement of the landowner) with the full main construction works planned to commence in Spring 2022 (subject to securing the DCO), with the Scheme due to be fully open to traffic in 2024. The programme includes key milestones and those relevant to the OEMP are defined in Table 1.2.

Table 1.2: Key Scheme delivery milestones

Milestone	Target Date
Secretary of State DCO Decision	October 2021
Land entry effected	Winter 2021, dependent on powers in DCO
Start of DCO preliminary works	Winter 2021
Start of main works	Spring 2022
Full Scheme open to traffic	2024

1.2.17 The target dates suggest that the activities pertinent to the milestones would be undertaken sequentially, however, in reality they may overlap. An indicative programme is illustrated in Plate 1.3.

1.2.18 As the preliminary works are programmed to take place soon after the DCO is made (subject to compulsory purchase of land); the measures set out in this OEMP in relation to those works (Table 3.2) are, in some cases, more detailed than those set out in Tables 3.3 and 3.4 which relate to the main works and the Scheme design respectively. As such, the specific measures set out in Table 3.2 would be required to be included in the CEMP for the preliminary works, unless otherwise agreed by the Authority.

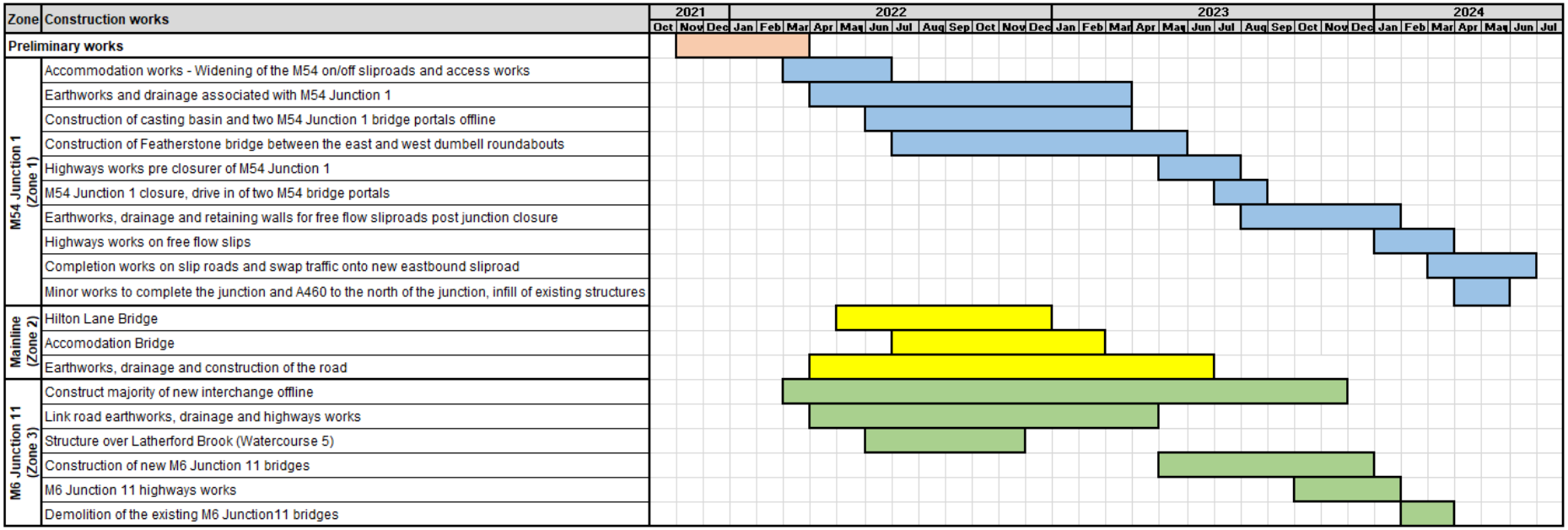


Plate 1.3: Indicative construction programme

1.3 Scheme objectives

1.3.1 The primary Scheme objectives are as follows:

- Relieve traffic congestion on the A460, A449 and A5, this will provide more reliable journey times.
- Keep the right traffic on the right roads and improve safety by separating local community traffic from long distance and business traffic.
- Reduce volumes of through-traffic in villages, improving local community access.
- Support local economic growth for Telford, Shrewsbury, Wolverhampton, Cannock and Tamworth by improving traffic flow and enhancing access to east-west and north-south routes.

2 Project team roles and responsibilities

2.1 Site roles and responsibilities

2.1.1 The roles identified in Table 2.1 define the responsibilities associated with the construction works that the PC must establish and maintain. The responsibilities defined in Table 2.1 include those relating directly to the development and implementation of the CEMP, final management plans and also the wider environmental responsibilities. The PC would be required to delegate responsibilities to onsite personnel within key areas of the site and compounds. The delegation of responsibility would be clearly identified within relevant documents and site files.

2.1.2 Individual names and contact details would need to be confirmed and inserted where applicable by The Authority and the PC once appointed and confirmed. The PC would establish a management structure that includes an organisational chart encompassing all staff responsible for delivery of environmental mitigation measures and shall include this chart within the CEMP. The chart would set out the respective roles and responsibilities with regards to the environment (refer to Table 3.3 MW-G16).

2.1.3 It is anticipated that prior to the commencement of each main phase of the construction programme, individuals would be identified to fulfil the relevant roles.

Table 2.1: Roles and responsibilities during construction

Role	Responsibilities
The Authority	**CEMP responsibilities:** • Approval of the CEMP and management plans (as required by Schedule 2 Requirements (Requirement 4) of the DCO [TR010054/APP/3.1]) and any detailed schemes required by this OEMP (for example, protected species protection, invasive species management). **Overall responsibilities:** • To monitor the contractors' performance against the contract including any environmental commitments and targets agreed for the Scheme.
Project Contractor (PC) Project Manager[2] (PM)	**CEMP responsibilities:** • Approval of the CEMP prepared by the Environment Manager (EM) for the relevant phase of the works. • Ensure that all controls specified within the CEMP and associated management plans are implemented by employees and sub-contractors. **Overall environmental responsibilities:** Responsible for the delivery of the Scheme. Has overall responsibility for the environmental performance of the Scheme and all staff. The Project Manager would be required to: • Provide information on contract requirements to the EM following contract award and prior to start of works on site. • Ensure environmental and waste requirements are included on requisitions and in subcontracts and orders. • Ensure that all required consents and licences are in place in line with the relevant project phase. • Log and monitor incidents and non-compliances. Report incidents and non-compliances to The Authority at the earliest possible opportunity. • Ensure that The Authority is informed of all environmental complaints. • Provide an initial point of contact for members of the public and local community who have queries regarding the works. • Ensure employees and sub-contractors receive Induction Training (including environmental) and tool box talks, as appropriate. • Verify actions resulting from non-compliances and observations raised during audits are completed by the deadlines set.

[2] 'Project Manager' is here defined as the senior individual (not organisation) performing the senior leadership role for the applicable phase of the project, preliminary works, main works or operation/maintenance as relevant. During 'main works construction', this role might be the 'Construction Manager'.

Role	Responsibilities
	• Undertake inspections alongside the EM to ensure that the environmental controls as set out within the CEMP are in place and working effectively. • Ensure all records are retained and readily available on site.
PC Environment Manager (EM)	**CEMP responsibilities:** • Preparing the CEMP and management plans based on the OEMP. • Undertake site inspections to monitor compliance with the environmental licences and consents for the works and the measures within the CEMP. • Prepare any changes to the CEMP in consultation with the contractor's PM. • Maintaining and updating the CEMP on an ongoing basis as required during the relevant project phase. • Managing the delivery of the various management plans defined within the appendices of the CEMP, using appropriate technical expertise as required. • Managing the delivery of the monitoring required under the CEMP, alongside relevant specialists, and reporting to relevant stakeholders at a frequency to be defined in the CEMP. **Overall responsibilities:** Responsible for ensuring that the Scheme complies with all environmental legislation, consents, objectives, targets and other environmental commitments, including those arising from the ES [TR010054/APP/6.1] throughout the relevant project phase. The EM would be required to: • Provide toolbox talks and environmental inductions to all staff involved in the relevant phase of the Scheme. • Deal with queries and correspondence on environmental issues. • Ensure that the environmental elements of the Scheme have been created and maintained in accordance with the OEMP and CEMP to the appropriate standard. The EM should and approve this by way of sign off. • Implement follow-up corrective actions to ensure compliance with UK regulations and legislation. • Keep record of all activities on site, environmental problems identified, transgressions noted and a schedule of all tasks undertaken. • Provide appropriate professional and practical advice to contractors, consultants and project team members associated with environmental and ecological issues and where appropriate resolve issues in a practical and efficient way.
PC Ecological Clerk of Works (ECoW)	**CEMP responsibilities:** • Review of relevant sections of the CEMP. • Responsible for ensuring compliance of all ecological elements of the CEMP.

Role	Responsibilities
	• Preparing a Landscape and Ecology Management Plan (LEMP), together with the Landscape Specialist. • Prepare ecological method statements and other applicable ecological management plans as identified by the OEMP e.g. Biosecurity Management Plan. **Overall responsibilities:** Responsible for ensuring that the Scheme complies with all ecological legislation and consents, including the DCO and those arising from the ES [TR010054/APP/6.1] throughout the relevant project phase. The ECoW would be required to: • Identify any new ecological constraints on site and appropriate mitigation measures for them in accordance with DCO Schedule 2, Requirement 7 (1 - 4). • Undertake watching briefs during site clearance activities, to ensure that any unanticipated discoveries of notable flora and fauna are appropriately dealt with. • Approve by way of sign off, that the ecological elements of the Scheme have been created and maintained in accordance with the CEMP to the appropriate standard. • Monitor works during construction at sensitive sites including but not limited to wildlife habitats and corridors and non-statutory designated sites, for example Brookfield Farm Site of Biological Importance (SBI) and Local Wildlife Site (LWS) and locations of ancient woodland. • Monitor and provide guidance in respect of the LEMP during the creation of ecological habitats. • Give Tool Box Talks, where required, to inform all site personnel of the ecological constraints on site.
Traffic Control Officer (PC)	**CEMP responsibilities:** • Review of relevant traffic sections of the document. • Preparing a Construction Traffic Management Plan (TMP) (including a Construction Workforce Travel Plan, a Site Access Plan and a Site Travel Plan) and submitting this for approval by the Authority. **Overall responsibilities:** The traffic control officer would ensure compliance with the contractor's traffic management plan in accordance with DCO Schedule 2, Requirement 10 (1, 2). Additional responsibilities would include: • Management and implementation of traffic management measures identified within the Construction TMP [TR010054/APP/7.5]. • Ensure compliance with all relevant health and safety (H&S) directives in liaison with the main works contractor's H&S Manager, relating to operations and live traffic. • Management of the layout of site access and egress points for all construction sites and compounds.

Role	Responsibilities
	• Arranging for site inspections at regular intervals, equipment attended to and maintained, and in the case of accidents or incidents having replacement signs, cones, bollards and lights (and any other equipment deemed necessary) would be erected immediately. • Maintain log of all complaints received in relation to traffic during Scheme construction.
Site Materials and Waste Manager (PC)	**CEMP responsibilities:** • Review of relevant sections of the CEMP, when prepared by the EM. • Responsible for ensuring that all materials and waste elements of the CEMP are complied with during construction. • Prepare the Site Waste Management Plan (SWMP). • Responsible for ensuring that a Materials Management Plan (MMP) is prepared. **Overall responsibilities:** Responsible for implementing the SWMP throughout the Scheme construction phase and to ensure that waste is disposed of economically and safely in line with the SWMP and MMP.
Archaeological Clerk of Works (ACoW) (PC)	**CEMP responsibilities:** • Review of relevant sections of the CEMP, when prepared by the EM. • Ensure compliance with DCO Schedule 2, Requirement 9 (1 - 6). • Responsible for ensuring that all archaeological elements of the CEMP are complied with during construction. • Prepares the Archaeological Management Plan (AMP) based upon the Archaeological Mitigation Strategy (AMS) and an accompanying Overarching Written Scheme of Investigation (OWSI), plus Site-Specific Written Scheme(s) of Investigation (SSWSI). **Overall responsibilities:** Responsible for ensuring that the Scheme complies with all archaeological and historic environment legislation and consents, including the DCO and those arising from the ES [TR010054/APP/6.1] throughout the relevant project phase. The ACoW would be required to: • Monitor and ensure compliance with the AMS. • Give tool box talks, where required, to inform all site personnel of the archaeological and historic environment constraints on site, the protection measures that are required and ensuring that these are put in place and complied with. • Monitor construction works to ensure that the CEMP, the AMP, AMS, OWSI and SSWSIs are carried out. • Monitor protection measures to ensure these are in place and maintained appropriately throughout the construction period in compliance with the AMS. • Liaise and consult closely with The Authority on an ongoing basis throughout the construction works and the handover to the operation phase to ensure compliance with all measures set out in the CEMP, AMP, AMS, OWSI and the SSWSIs.

Role	Responsibilities
Landscape Specialist (PC)	**CEMP responsibilities:** • Review of relevant sections of the CEMP, when prepared by the EM. • Ensure compliance with DCO Schedule 2, Requirement 5 (1 - 5). • Responsible for ensuring that landscape elements of the CEMP are complied with during construction. • Prepare the LEMP together with the ECoW. **Overall responsibilities:** • Monitor and provide guidance in respect of the LEMP during the creation of the habitats. • Approve by way of sign off, that the landscape elements of the Scheme have been created and maintained in accordance with the OEMP and CEMP (or as varied further to the process described in para. 3.2.14) to the appropriate standard.
Arboricultural Specialist (PC)	**CEMP responsibilities:** • Review of relevant sections of the CEMP, when prepared by the EM. • Responsible for ensuring that the elements of the CEMP related to tree works are complied with during construction. • Prepares the Arboricultural Mitigation Strategy for the works. **Overall responsibilities:** • Monitor and provide guidance in respect of the LEMP during the creation of habitats, with specific reference to tree establishment. • Approve, by way of sign off, that the areas of tree and scrub planting have been established and maintained in accordance with the OEMP and CEMP (or as varied further to the process described in para. 3.2.14) to the appropriate standard.
All Site Staff (PC including sub-contractors)	**CEMP responsibilities:** • Ensure adherence to all environmental policies, procedures and rules as set out in the CEMP and any supporting management plans (e.g. Water Management Plan). • Organise work to be carried out to the required standard with the aim of minimum risk to the environment. All site personnel to receive instructions on their responsibilities to ensure correct environmental practice in line with the CEMP. **Overall responsibilities:** To receive general environmental awareness training and undertake work in accordance with all works method statements and toolbox talks. Only trained personnel are to manage particular tasks such as refuelling plant and equipment, managing the stores, water quality monitoring and supervising the segregation and collection of waste. The responsibilities of all staff on site throughout the construction of the works would include the following:

Role	Responsibilities
	• All staff are to be appropriately trained to carry out their respective tasks. • Adhere to legislation and where appropriate codes of practice and guidance notes relevant to their work.
Community Relations Manager (PC)	**CEMP responsibilities:** • Review of relevant sections of the CEMP. **Overall responsibilities:** Communications with the public, stakeholders and other interested parties, outreach and education, where appropriate. The role would include the following responsibilities: • Respond to any concerns or complaints raised by the public in relation to the works. • Liaise with the PM and EM on landowner and community concerns relating to the works and act as the main interface with these stakeholders, alongside any The Authority presence that is required. • Maintain a log of complaints relating to the environment. • Ensure that the PM and the EM are informed of any complaints relating to the environment. • Keeping the public informed of project progress and any construction activities that may cause inconvenience to local communities. • Engaging with local schools and colleges to inform pupils and students about the Scheme, advise on careers within the construction industry and point out the dangers of trespassing on construction sites. • Ensuring that the needs of groups with protected characteristics as identified within the Equality Act 2010 are considered during the construction process.

3 Register of Environmental Actions and Commitments

3.1 Introduction

3.1.1 The REAC, contained in Table 3.2, Table 3.3 and Table 3.4, identifies the environmental commitments proposed to address the potential environmental effects of the preliminary works, the main works (including Scheme construction, operation and maintenance) and confirms the key Scheme design elements to which Highways England has committed (and as illustrated in the Environmental Masterplans - refer to ES Figures 2.1 to 2.7 [TR010054/APP/6.2]).

3.1.2 The REAC tables should be updated by the PC when the contractor prepares the CEMP relevant to their scope of works and then, as required, as the Scheme progresses with each CEMP or update prepared in accordance with the principles of the original OEMP and requiring approval from The Authority (see Table 3.2 PW-G1 for preliminary works and Table 3.3 MW-G5 and MW-G6 for the main works).

3.1.3 The extant version of the CEMP at the end of construction would be developed by the PC into the HEMP (see Table 3.3 MW-G11) which is the main document containing essential environmental information passed to The Authority and to the bodies responsible for the future maintenance and operation of the Scheme.

3.2 Guide to the REAC tables

3.2.1 The tables do not define general legislative requirements. It is required that in addition to compliance with the measures in these tables, that all activities would comply with applicable legislation.

3.2.2 Table 3.1 provides a summary of the scope of each column within the REAC tables.

Table 3.1: Guide to REAC tables

Column	Explanation
Reference (Ref.)	A unique identifier defined within these REAC tables to enable simple reference to individual measures.
Source reference (Source Ref.)	An identifier which is directly relevant to the action or commitment, for example a source such as a mitigation reference in the ES.
Action/ commitment (including specific location and any monitoring required)	Where no source reference is given, the measure is normally one which is relevant across a range of technical areas and is a broader control measure (e.g. working hours).
Objective	The outcome which the defined action is designed to achieve.
Assumption on which the action is based	Any assumption which is relevant to the defined action – this could include absence of suitable data or that plans and strategies already in place.
Achievement criteria and reporting requirements (if applicable)	The criteria which define the successful implementation of the action, such as a document approval or an audit which confirms the action has been undertaken.

Column	Explanation
How the action is to be implemented	The contractual or other relationship between the relevant parties, which ensure that the action would be delivered.
Responsible person(s)	The person or body responsible for delivery of the action; this would often be the contractor.

3.2.3 In order to provide for future flexibility and unless otherwise stated, the REAC tables do not typically define how the action is to be implemented or achieved, other than beyond a contractual obligation, and do not consider the risk management of individual items, unless these elements are implicit within the action.

3.2.4 The REAC tables do not include a column to define the 'source of the action' (e.g. ES, Habitat Regulations Assessment (HRA), Equality Impact Assessment), since this is generally clear from the Source Reference. However, in preparing a CEMP, the PC shall include a new column for this and include within it any confirmation of commitments agreed with stakeholders. When preparing the CEMP, the PC shall include a new column for approval and sign off of actions in accordance with IAN 183/14 Environmental Management Plans.

3.2.5 The references to guidance documents within the REAC tables are not intended to be exhaustive and in preparing the CEMP and related topic specific plans, the PC shall have due regard to any relevant technical guidance in individual subject areas and draw upon and reference these as appropriate.

3.2.6 The REAC tables are presented in three parts and defined further in the sub-sections that follow:

- Table 3.2: Scheme preliminary works (PW).
- Table 3.3: Main works – Scheme construction (MW).
- Table 3.4: Main works – Scheme design (D).

Table 3.2: Scheme preliminary works

3.2.7 This table includes those actions to be incorporated into the preliminary works for the Scheme by the relevant 'preliminary works contractor' (presumed to be under the management of the PC). These actions are either to:

(i) mitigate the effects of other work packages within the preliminary works such as ecological mitigation for utilities works; or

(ii) in some cases, deliver advanced mitigation, prior to commencement of the main construction works, such as those works required for archaeology, flood risk, habitat and protected species mitigation.

3.2.8 The preliminary works are likely to be undertaken by a number of 'preliminary works contractors', including but not limited to contractors for utilities, ground investigation, roads, archaeology and ecology. Within Table 3.2, the term 'preliminary works contractor' does not denote a single entity. Where individual actions are relevant to a limited number of the preliminary works contractors, this is denoted as appropriate. The terms preliminary works contractor (ecology), preliminary works contractor (archaeology), preliminary works contractor (utilities), preliminary works contractor (roads) and preliminary works contractor (ground investigation) are used to denote

likely owners of actions, though these would be defined further by contractual requirements.

3.2.9 In preparing a CEMP for the extent of their works and contractual extent, each preliminary works contractor should review Table 3.2 and justify, to the satisfaction of The Authority, where actions have been excluded from their CEMP. Each preliminary works CEMP requires the approval of The Authority.

Table 3.3: Main works – Scheme construction

3.2.10 Excluding the preliminary works phase (described above), The Authority intends to appoint, following the process set out in The Public Contract Regulations 2015, a main works contractor to design, build, finance, and maintain the Scheme.

3.2.11 Table 3.3 includes those actions to be incorporated into the construction, and where relevant, the maintenance of the Scheme by the main works contractor (the PC) to mitigate the construction effects.

3.2.12 In preparing a CEMP for the main construction works, the main works contractor shall update the REAC table for main works, Table 3.3. Where actions are modified, this should be justified as consistent with the principles of the OEMP to the satisfaction of The Authority. The CEMP should be approved by The Authority.

Table 3.4: Main works - Scheme design

3.2.13 This table includes those essential and embedded mitigation measures incorporated into the Scheme design in order to mitigate the environmental effects as identified and described in the ES [TR010054/APP/6.1]. Such measures are illustrated in the Environmental Masterplans (refer to ES Figures 2.1 to 2.7 [TR010054/APP/6.2]).

3.2.14 The main works contractor would deliver each mitigation measure and commitment, unless the contractor is able to define an alternative measure, or measures, which would achieve the same environmental effects at the relevant location. In each such case, the contractor would secure the written approval of The Authority prior to implementing any alternative measures and in so doing, would demonstrate to The Authority that the use of the alternative measures would not lead to any materially new or materially different adverse environmental effects compared to those as presented in the ES [TR010054/APP/6.1] (in accordance with DCO Requirement 3).

3.2.15 The main works contractor’s CEMP should include Table 3.4 or an update thereof, taking account of the Scheme detailed design.

Table 3.2: Scheme preliminary works (PW) REAC table

Ref	Source Ref	Action/ Commitment (including specific location if appropriate)	Is environmental monitoring required? Yes/ No	Objective	Assumption on which the action is based	Achievement criteria and reporting requirements (if applicable)	How the action is to be implemented	Responsible person(s)
General provisions								
PW-G1	n/a	**CEMP preparation:** The preliminary works contractor (all) shall prepare a CEMP for their works, prior to the commencement of their works. In preparing the CEMP, the preliminary works contractor (all) shall pay regard to the actions needed to minimise the risks of potential cumulative impacts.	No.	To ensure the CEMP is appropriate to the project phase and the scope of works delivered by the preliminary works contractor.	n/a	The Authority approval of CEMP.	Contractual requirement between The Authority and the preliminary works contractor. DCO Requirement 4	Preliminary works contractor (all)
PW-G2	n/a	**Single point of contact:** The preliminary works contractor (all) shall identify a person within their CEMP who would be the single point of contact for the regulatory authorities. The preliminary works contractor shall provide the regulatory authorities with relevant contact details prior to the commencement of construction and document this in the CEMP.	No.	To provide a single line of communication between the preliminary works contractor and the regulatory bodies.	n/a	The Authority approval of CEMP.	Contractual requirement between The Authority and the preliminary works contractor. DCO Requirement 4	Preliminary works contractor (all)
PW-G3	n/a	**Management structure:** The preliminary works contractor (all) shall establish a management structure that includes an organisational chart encompassing all staff responsible for delivery of environmental mitigation measures and shall include this chart within their CEMP. The chart would be set out the respective roles and responsibilities with regards to the environment.	No.	To provide a clear framework for environmental responsibilities on site.	n/a	The Authority approval.	Contractual requirement between The Authority and the preliminary works contractor. DCO Requirement 4	Preliminary works contractor (all)
PW-G4	n/a	**Core working hours:** The preliminary works contractor (all) shall adhere to the following core working hours, except in case of emergency or in respect of 'additional activities' (see below): 08:00 – 18:00 Monday to Friday; and 08:00 – 13:00 Saturday with no working on Sundays and Bank Holidays. To maximise productivity, a period of up to one hour before and up to one hour after normal working hours would be used for start-up and close down of activities, excepting Saturday afternoons where all works will cease at 13.00. This would include, but not be limited to, deliveries, movement to place of work, unloading, maintenance and general preparation works. These periods would not be considered an extension of core working hours. Any other work carried out outside the core working hours, or any extension of the core hours, may be possible with the prior agreement of the local highway authority if the activity is not materially worse than the activities assessed within the ES.	No.	To ensure working hours for surface construction works are defined, but with an opportunity to vary these with the agreement of SSC and CWC.	These working hours are as set within the ES.	n/a	Contractual requirement between The Authority and the preliminary works contractor. DCO Requirement 4	Preliminary works contractor (all)
PW-G5	n/a	**Method Statements:** The preliminary works contractor (all) shall set out the procedures to address health and wellbeing, safety, site security and	No.	To ensure working methods take into account health and	n/a	The Authority or representative	Contractual requirement between The Authority and the	Preliminary works contractor (all)

Ref	Source Ref	Action/ Commitment (including specific location if appropriate)	Is environmental monitoring required? Yes/ No	Objective	Assumption on which the action is based	Achievement criteria and reporting requirements (if applicable)	How the action is to be implemented	Responsible person(s)
		environmental issues in method statements prepared as part of their works. The method statements shall define any specific environmental control measures, to be implemented to meet the requirements of their CEMP. The preliminary works contractor shall submit the method statements and risk assessments to The Authority.		wellbeing, safety, site security and environmental issues and are of an appropriate standard.		approval of method statements.	preliminary works contractor. DCO Requirement 4	
Air quality								
PW-AIR1	ES Chapter 5, Section 5.8	**Best Practicable Means (BPM):** The preliminary works contractor (all) shall manage dust, air pollution and exhaust emission during the preliminary works in accordance with Best Practicable Means (BPM). Specific measures shall be based upon industry best practice, including the measures listed in the Institute of Air Quality Management's (IAQM) Guidance on the Assessment of Dust from Demolition and Construction (Ref 3.1). These measures shall be set out in more detail in the CEMP and examples of these measures are listed in the main works table (MW-AIR1). MW-AIR2 details measures to be implemented for high-risk sites, for example where construction would take place in close proximity to residential receptors.	No.	To ensure air quality is managed appropriately across the Scheme.	Assessment within the ES assumes BPM would be incorporated throughout the construction phase.	Implementation of BPM.	Contractual requirement between The Authority and the preliminary works contractor. DCO Requirement 4	Preliminary works contractor (all)
Cultural heritage								
PW-CH1	ES Chapter 6 Section 6.8	**Archaeological trenching:** Evaluation trenching shall be undertaken prior to the start of construction during the progression of detailed design, as agreed with the County Archaeologist. This should be undertaken early in the programme, to allow the development and implementation of mitigation measures (which will be identified in the Archaeological Management Plan – see PW-CH2), particularly where any additional archaeological features are identified.	No	To develop an appropriate methodology for mitigation to reduce impacts on archaeological assets.	Assessment within the ES assumes evaluation trenching will be undertaken to develop appropriate methodologies and mitigation.	The scope of archaeological trenching shall be prepared in consultation with SCC and approved by The Authority prior to works commencing.	Contractual requirement between The Authority and preliminary works contractor (archaeology). DCO Requirement 4 and 9	Preliminary works contractor (archaeology).
PW-CH2	ES Chapter 6, Section 6.8	**Archaeological Management Plan (AMP):** The preliminary works contractor (archaeology) shall produce an Archaeological Management Plan (AMP) based on the Archaeological Mitigation Strategy (AMS) (see PW-CH3 & Appendix B), indicating how the historic environment is to be protected in a consistent and integrated manner, coordinated with all other relevant environmental topics. The AMP shall be prepared in consultation with the SCC Archaeologist and shall address: • All temporary and permanent works, which may include, as relevant, boundary fencing, vegetation clearance, ground investigations, demolition, utility diversions, access routes/ haul roads and works compounds; • Potential indirect impacts on heritage assets from activities which may include, as relevant, ground vibration, light pollution, dust, dewatering, and the impact on buried archaeological remains of adverse ground conditions caused by weather events (rutting, compaction of soft ground etc.);	No.	To manage the historic environment and ensure it is protected in a consistent and integrated manner across the Scheme.	Certification of AMS under the DCO.	The plan shall be prepared in consultation with SCC and approved by The Authority prior to works commencing.	Contractual requirement between The Authority and preliminary works contractor (archaeology). DCO Requirement 4 and 9	Preliminary works contractor (archaeology).

Ref	Source Ref	Action/ Commitment (including specific location if appropriate)	Is environmental monitoring required? Yes/ No	Objective	Assumption on which the action is based	Achievement criteria and reporting requirements (if applicable)	How the action is to be implemented	Responsible person(s)
		• Issues of security for vulnerable sites/ areas of archaeological interest outside the normal working hours, and at weekends; and • Procedures for unexpected archaeological discoveries.						
PW-CH3	ES Chapter 6, Section 6.8	**Works in accordance with Archaeological Mitigation Strategy (AMS):** The preliminary works contractors (all) shall undertake the archaeological works, at all times, in accordance with the AMS (Appendix B) and the AMP.	No.	To ensure that all archaeological works are undertaken in accordance with an approved strategy.	Certification of detailed AMS under the DCO.	Works undertaken in accordance with the AMS.	Contractual requirement between The Authority and the preliminary works contractor. DCO Requirement 4 and 9	Preliminary works contractor (archaeology).
PW-CH4	ES Chapter 6, Section 6.8	**Site Specific Written Schemes of Investigation (SSWSI):** For sites or areas of interest that have been identified for archaeological investigation, either in the ES, the AMS, or as a result of previous and on-going evaluation surveys, the preliminary works contractor (archaeology) shall prepare a Site-Specific Written Scheme of Investigation (SSWSI) that describes the mitigation measures to be carried out.	No.	To protect individual sites and areas by ensuring that appropriate mitigation measures are identified and implemented.	Certification of the AMS.	Production of SSWSIs in consultation with SCC County archaeologist and approved by The Authority.	Contractual requirement between The Authority and the preliminary works contractor. DCO Requirement 4 and 9	Preliminary works contractor (archaeology).
PW-CH5	ES Chapter 6, Section 6.8	**Fencing of heritage assets:** The preliminary works contractor (archaeology) shall ensure all heritage assets identified in the AMS, where required, for protective fencing are securely fenced during the early stages of the preliminary works (in conjunction with other mitigation measures). The preliminary works contractor (archaeology) shall consult with SCC to determine the type of fencing to be used. The contractor shall separately prepare a method statement for all fencing works which would include details of appropriate archaeological mitigation measures (detailed mitigation requirements shall be set out in a SSWSI).	No.	To ensure that heritage assets are appropriately protected in advance of construction works.	Assessment within the ES is based on the protection of identified heritage assets Certification of AMS under the DCO.	Consultation on method statements/ SSWSIs with SCC and approval from The Authority prior to the start of the work at each location.	Contractual requirement between The Authority and the preliminary works contractor. DCO Requirement 4 and 9	Preliminary works contractor (archaeology).
PW-CH6	ES Chapter 6, Section 6.8	**Avoidance of archaeological remains:** Where service and utility corridors require excavation, the relevant preliminary works contractors (utilities) shall avoid significant archaeological remains wherever possible and implement appropriate archaeological mitigation measures where impacts are unavoidable. The contractor shall prepare a SSWSI where service utility corridors cross archaeologically sensitive areas.	No.	To ensure the appropriate identification, preservation and protection/ mitigation of archaeological remains.	Certification of the AMS under the DCO.	SSWSIs shall be developed in consultation with SCC and approved by The Authority prior to works commencing.	Contractual requirement between The Authority and the preliminary works contractor. DCO Requirement 4 and 9	Preliminary works contractor (all).
PW – CH7	ES Chapter 6, Section 6.8	**Heritage Awareness:** The preliminary works contractor shall inform construction workers and operatives as to any control and reporting procedures to be followed, should archaeological deposits be encountered during the works, for example through toolbox talks and regular briefings.	No.	To ensure that heritage assets are appropriately protected during construction works.	Assessment within the ES is based on the protection of identified heritage assets.	Awareness raised and logged by the EM and/or the ACoW.	Contractual requirement between The Authority and the preliminary works contractor. DCO Requirement 4	Preliminary works contractor (all).
Landscape and visual								

Ref	Source Ref	Action/ Commitment (including specific location if appropriate)	Is environmental monitoring required? Yes/ No	Objective	Assumption on which the action is based	Achievement criteria and reporting requirements (if applicable)	How the action is to be implemented	Responsible person(s)
PW-LAN1	ES Chapter 7, Section 7.8	**Retained vegetation:** Where trees are to be retained within or immediately adjacent to the Order limits, the preliminary works contractor (all) shall adopt the default position that the root protection area (RPA) and canopy spread would form an effective Construction Exclusion Zone, secured with robust fencing where no access would be permitted. Works within the RPA of trees would be avoided wherever practicable. However, where some works within the RPA cannot be avoided e.g. for access or stockpiling, the contractor shall use cellular confinement systems to minimise/ avoid compaction to the ground. Protection would still be required to avoid physical damage to the tree i.e. trunk, branches or crown. In addition, if works are deemed essential within the RPA the length of time of the impact shall be limited.	No.	To ensure vegetation is retained and appropriately protected during the preliminary works.	Retention of certain trees is assumed within the ES assessment.	Consultation with SCC and approval from The Authority prior to the start of the work at each location.	Contractual requirement between The Authority and the preliminary works contractor. DCO Requirement 5	Preliminary works contractor (all)
PW-LAN2	ES Chapter 7, Section 7.8	**Works in accordance with approved landscaping planting scheme:** The preliminary works contractor would ensure that any landscaping works are carried out in accordance with the approved landscaping scheme and conforms with the DCO requirement.	No.	To mitigate the landscape and visual impacts of the Scheme.	n/a	Works undertaken in accordance with DCO Requirement.	Contractual requirement between The Authority and the preliminary works contractor. DCO Requirement 5	Preliminary works contractor (all)
Biodiversity								
PW-BIO1	ES Chapter 8, Section 8.8	**Breeding birds (excluding Schedule 1):** Where practicable, the preliminary works contractor (all) shall undertake vegetation clearance (if required) between September and February inclusive, which is outside of the bird nesting season. If clearance is not possible outside of the bird nesting season, then suitable nesting habitat to be removed shall be checked for nesting birds by the preliminary works contractor (ecology) or an appropriate specialist, immediately prior to its removal. Where active bird nests are present, no works to or in the vicinity (5 m) of the bird nests would be undertaken until any young are no longer considered to be dependent on the nest.	No.	To avoid damage or destruction of an active nest. To ensure legal compliance.	n/a	No damage to nests of breeding birds. Completion/ return of working permits or other relevant approvals.	Contractual requirement between The Authority and the preliminary works contractor. DCO Requirement 7	Preliminary works contractor (all)
PW-BIO2	ES Chapter 8, Section 8.8	**Schedule 1 breeding birds:** If works are carried out at a time or location that has the potential to disturb Schedule 1 breeding birds, works should only commence within these areas once suitable mitigation is in place and has been agreed with the relevant statutory consultees. Such measures may include appropriate working buffer zones (until young have fledged) and suitable siting of alternative nesting sites (where applicable). Monitoring and reporting arrangements would be made in consultation with Natural England and approved by The Authority (if applicable).	Yes (if applicable). See Action/ commitment column.	To avoid disturbance of any species listed on Schedule 1 of the WCA 1981, while it is nest building or at a nest containing eggs or young, or to disturb the dependent young of such a bird. To ensure legal compliance.	The update surveys would inform the mitigation requirements.	Completion/ return of licences. Monitoring and reporting arrangements would be made in consultation with Natural England and approved by The Authority (if applicable).	Contractual requirement between The Authority and the preliminary works contractor. DCO Requirement 7	Preliminary works contractor (ecology)
PW-BIO3	ES Chapter 8, Section 8.8	**Badgers:** The preliminary works contractor (ecology) would apply for a Scheme-wide Natural England badger sett closure licence. This would be based upon the draft outline application already agreed	Yes	To avoid disturbing badgers within their setts during construction.	No main setts identified within the ES would require partial or permanent closure.	Natural England licence application and return.	Contractual requirement between The Authority and the	Preliminary works contractor (ecology)

Ref	Source Ref	Action/ Commitment (including specific location if appropriate)	Is environmental monitoring required? Yes/ No	Objective	Assumption on which the action is based	Achievement criteria and reporting requirements (if applicable)	How the action is to be implemented	Responsible person(s)
		with Natural England (as per the Letter of No Impediment, see ES Appendix 8.3 [TR010054/APP/6.3]). The preliminary works contractor (ecology) would be responsible for updating/ amending the licence as required. The licence would include provision for the destruction of all setts within the works area and would include a detailed method statement setting out the measures to be implemented. Once vegetation clearance has been undertaken, the preliminary works contractor (ecology) shall resurvey these areas of the site to confirm the total number and extent of known setts affected by the works. Works within 30 m of any retained badger sett would fall under the provisions of the method statement. Depending on the timings and activity of such works, an appropriate specialist may need to be present or seasonal restrictions may be required and would be defined under the conditions of the licence. The preliminary works contractor (all) shall follow best practice to avoid harm to these species using the local area during the preliminary works. This should include: • Covering of or provision of suitable egress for all excavations overnight; and • Secure storage of chemicals. **Monitoring:** Monitoring surveys would be carried out at and around any retained setts to identify any recently dug badger setts or entrances that may be affected by ongoing or planned works.		To ensure legal compliance.	Currently the creation of artificial setts is not required.		preliminary works contractor. Works undertaken under a Natural England badger sett closure licence (if required). Licence conditions and DCO Requirement 7	
PW-BIO4	ES Chapter 8, Section 8.8	**Bat roosts:** The following confirmed bat roosts would be directly impacted (lost) by the works: • noctule (from DNA analysis) day roost within a mature pedunculate oak *Quercus robur* tree (T112) within Lower Pool SBI; and • a likely Myotis sp. (based on observed droppings size and shape – none could be reached for collection and analysis) day roost within a rowan *Sorbus aucuparia* tree (T70) within Lower Pool SBI. Other locations to be confirmed following pre-construction surveys. The preliminary works contractor (ecology) would be responsible for the application of a Natural England European Protected Species Mitigation Licence (EPSML) in order to facilitate the works. This should be based upon the draft outline application already agreed with Natural England (as per the Letter of No Impediment see ES Appendix 8.3 [TR010054/APP/6.3]) and updated or amended accordingly. Any bat roosts identified or trees not previously accessed for survey would be subject to preconstruction surveys and included in the licence (where applicable). The preliminary works contractor	Yes	To update information for confirmed roosts and identify any other bat roosts present within the Scheme boundary. To prevent disturbance to bats within retained roosts. To ensure roosts are closed under a Natural England EPSML, to ensure legal compliance.	The updated surveys would be suitable to inform a Natural England EPSML. Trees which remain as negligible or low suitability for bat roosts require no further survey	Application and return of Natural England EPSML (if necessary).	Contractual requirement between The Authority and the preliminary works contractor. Natural England EPSML obtained. Licence conditions and DCO Requirement 7	Preliminary works contractor (ecology)

Ref	Source Ref	Action/ Commitment (including specific location if appropriate)	Is environmental monitoring required? Yes/ No	Objective	Assumption on which the action is based	Achievement criteria and reporting requirements (if applicable)	How the action is to be implemented	Responsible person(s)
		(ecology) (named licensee) would be responsible for ensuring that all works detailed within the licence are carried out in accordance with the method statements. The named ecologist on the ESPML to advise the licensee and supervise any works. Any works affecting bat roosts, or structure or tree hosting such roost, would follow detailed methods and precautions outlined in the EPSML Method Statement and licence conditions and under direction and supervision of the named licensed ecologist in the EPSML. Where bat roosts are being retained within 50 m of the Scheme boundary, and in respect of replacement, modified, translocated or new roosts, the following methods should be incorporated: a) Exclusion zones to be established and maintained. b) Any works within 20 m of a confirmed roost shall be carried out under the supervision of, or following the advice of, an appropriate specialist. c) Measures shall be applied to maintain dark conditions within 20 m of identified roosts, including measures to avoid light spill from construction lighting and avoiding night-time working. d) Works affecting bat roosts shall only commence on receipt of suitable method statements, licences, permits or other relevant approvals. Works involving felling or maintenance of trees with potential for bat roosts would follow best practise methods to protect bats and their roosts. This shall include the following: a) Any works within 20 m of a confirmed bat roost in a tree would follow precautions listed above. b) All trees within 20 m of the works area would be inspected by a Natural England licenced bat ecologist from the ground and categorised for their potential to support bat roosts, in accordance with the current best practice. c) Trees which have no or low suitability can be section felled. d) Trees which are moderate or high suitability would be re-inspected by a Natural England bat licensed ecologist, in line with current best practice guidance, and further surveys may be required. e) Any confirmed roosts would require a Natural England EPSML to be obtained prior to felling. f) Works affecting bat roosts shall only commence on receipt of suitable method statements, licences, permits or other relevant approvals.						
PW – BIO5	ES Chapter 8, Section 8.8	**Great crested newt:** Seven great crested newt metapopulations have been identified within 500 m of the Scheme boundary. No confirmed great crested newt ponds (34,52 and 128) would be directly affected by proposals and of the 13 ponds with assumed populations based on current 2020 data none would be directly affected by the Scheme. The preliminary works contractor	Yes	To update information for presence/likely absence in ponds to be directly and indirectly affected by the Scheme.	The updated surveys would be suitable to inform a Natural England EPSML. The ES (Version 3 of Chapter 8: Biodiversity [AS-083/6.1] assumes no ponds lost as a	Application and return of Natural England EPSML (if necessary).	Contractual requirement between The Authority and the preliminary works contractor. Natural England EPSML obtained.	Preliminary works contractor (ecology)

Ref	Source Ref	Action/ Commitment (including specific location if appropriate)	Is environmental monitoring required? Yes/ No	Objective	Assumption on which the action is based	Achievement criteria and reporting requirements (if applicable)	How the action is to be implemented	Responsible person(s)
		(ecology) would undertake a pre-commencement survey of those ponds not previously accessed or for which only incomplete survey data is available, to confirm the status of great crested newt populations. The preliminary works contractor (ecology) would be responsible for the application of a Natural England European Protected Species Mitigation Licence (EPSML) in order to facilitate the works. This should be based upon the draft outline application already agreed with Natural England (as per the Letter of No Impediment see ES Appendix 8.3 [TR010054/APP/6.3]) and updated or amended accordingly. Monitoring will be undertaken as per Natural England licences for great crested newt populations and to assess the success of habitat establishment for great crested newts.		To ensure confirmed great crested newt ponds are lost under a Natural England EPSML, in order to ensure legal compliance.	result of the Scheme support populations of great crested newts.		Licence conditions and DCO Requirement 7	
PW – BIO6	ES Chapter 8, Section 8.8	**Otter:** Otters have been recorded on Latherford Brook and across the Scheme in summer 2019; however, no holts have been recorded that will be affected by the Scheme. The preliminary works contractor (ecology) would undertake a pre-commencement survey of all watercourses and waterbodies where otter was recorded and all those identified in the Habitat Suitability Assessments (HSA) as having potential to support otter (ES Appendix 8.10 [TR010054/APP/6.3]) to assess any changes in otter distribution. These surveys would confirm presence or absence of holts and resting places within the works area. If holts are identified within the works area the preliminary works contractor (ecology) would be responsible for the application of a Natural England EPSML in order to facilitate the works. **Monitoring:** Monitoring surveys would be carried out on retained watercourse and waterbodies with suitability to support otter to identify any new holts/resting places that may be affected by ongoing or planned works.	Yes	To update information for confirmed otter presence within the Scheme boundary and ensure any additional presence is recorded. To ensure legal compliance.	The updated surveys would be suitable to inform a Natural England EPSML.	Application and return of Natural England EPSML (if necessary).	Contractual requirement between The Authority and the preliminary works contractor. DCO Requirement 7	Preliminary works contractor (ecology)
PW-BIO7	ES Chapter 8, Section 8.8	**Water vole:** Water vole field signs were observed on Latherford Brook in summer 2019. The preliminary works contractor (ecology) would undertake a pre-commencement survey of all watercourses and waterbodies where water vole was recorded and all those identified in the HSA as having potential to support otter (ES Appendix 8.10 [TR010054/APP/6.3]) to assess any changes in water vole distribution. If following the update surveys, water vole are confirmed present within the development area, a licence from Natural England will be required which the preliminary works contractor will be responsible for applying for. If translocation from the works areas required, one of the proposed ecology ponds located in close proximity to Latherford Brook would need to be created and allowed time to establish in order to allow water voles to be	Yes	To update information for confirmed water vole present within the Scheme boundary. To ensure legal compliance.	The updated surveys would be suitable to inform a Natural England EPSML.	Return of Natural England EPSML (if necessary).	Contractual requirement between The Authority and the preliminary works contractor. Natural England EPSML obtained (if required). DCO Requirement 7	Preliminary works contractor (ecology)

Ref	Source Ref	Action/ Commitment (including specific location if appropriate)	Is environmental monitoring required? Yes/ No	Objective	Assumption on which the action is based	Achievement criteria and reporting requirements (if applicable)	How the action is to be implemented	Responsible person(s)
		translocated. Fencing will likely be required in order to prevent the water vole population recolonising the works area during construction. Details will need to be provided in a method statement submitted with the licence application. **Monitoring:** Monitoring surveys would be carried out on retained watercourse and waterbodies with suitability to support water vole to identify any new holts/resting places that may be affected by ongoing or planned works.						
PW – BIO8	ES Chapter 8, Section 8.8	**Other protected species (scoped out of the assessment):** Reptiles and white-clawed crayfish have been scoped out of the ES. None were confirmed to be present across the Scheme and applicable study area during surveys. However, it is acknowledged that given the age of data and mobility/transient nature of these species groups, preconstruction surveys should be carried out to reaffirm likely absence. Surveys shall comprise the following: • eDNA surveys on all suitable waterbodies for white-clawed crayfish as identified in ES Appendix 8.14 [TR010054/APP/6.3] to confirm likely absence from the Scheme boundary; and • For any habitats that have significantly altered (e.g. from a change in management) and are considered suitable for reptiles, update surveys will be completed in advance of works commencing. If reptiles are identified, a mitigation strategy will need to be produced and implemented prior to work commencing.	No if confirmed likely absent during update surveys.	To avoid killing or injuring other protected species. To ensure legal compliance.	Preconstruction surveys to reaffirm likely absence of species scoped out of the assessment.	Implementation of the identified actions.	Contractual requirement between The Authority and the preliminary works contractor. DCO Requirement 7.	Preliminary works contractor (all)
PW – BIO9	ES Chapter 8, Section 8.8	**Other notable species:** Other notable species may be present within the Scheme boundary including hedgehog *Erinaceus europaeus* and brown hare *Lepus europaeus.* The preliminary works contractor (all) shall follow best practice to avoid harm to these species during the preliminary works. This should include: a) Covering and fencing off all open holes at the end of each day to prevent any access from wildlife, or by providing ramps to allow any wildlife to escape. Ramps should be suitable for all sizes of local wildlife. b) Further mitigation details should be incorporated into a method statement as appropriate.	No	To avoid killing or injuring other notable species.	Preconstruction surveys to reaffirm likely presence/ absence of species scoped out of the assessment.	Implementation of the identified actions.	Contractual requirement between The Authority and the preliminary works contractor. DCO Requirement 4.	Preliminary works contractor (all)
PW – BIO10	ES Chapter 8, Section 8.8	**Biosecurity:** The preliminary works contractor (all) shall prepare a Biosecurity Management Plan. The preliminary works contractor (all) shall implement measures to promote biosecurity and avoid the risk that invasive non-native species and diseases are spread as a consequence of the Scheme. This includes, toolbox talks, exclusion zones and method statements on the cleaning of equipment (including boots) and vehicles on and off site and between sites.	No	To prevent the spread of invasive species and diseases. To ensure legal compliance.	Adequate protection measures would be employed throughout the construction period.	Implementation of the identified actions as per Biosecurity Management Plan. No recorded spread of invasive species and high standards of biosecurity maintained.	Contractual requirement between The Authority and the preliminary works contractor. DCO Requirement 4.	Preliminary works contractor (all)
Geology and soils								

Ref	Source Ref	Action/ Commitment (including specific location if appropriate)	Is environmental monitoring required? Yes/ No	Objective	Assumption on which the action is based	Achievement criteria and reporting requirements (if applicable)	How the action is to be implemented	Responsible person(s)
PW–GEO1	ES Chapter 9, Section 9.8	**Unexploded ordnance (UXO) investigation:** The preliminary works contractor (all) shall undertake the following risk mitigation measures to support the proposed works to the M54 carriageway west of Junction 1.· Site specific UXO awareness briefings to all personnel conducting intrusive works (all works). UXO specialist presence on site to support shallow intrusive works.	No	To mitigate potential to encounter UXO during construction works.	n/a	UXO Specialist Report/clearance certificate.	Contractual requirement between The Authority and the preliminary works contractor. DCO Requirement 4.	Preliminary works contractor (ground investigation
PW–GEO2	ES Chapter 9, Section 9.8	**Ground investigations:** The preliminary works contractor (ground investigation) shall undertake ground investigations within the DCO limits during the detailed design phase. All ground investigation works shall be undertaken in accordance with UK best practice, including BS 5930:2015 Code of Practice for Ground Investigations (Ref 3.2) and BS 10175:2011 + A2:2017 Investigation of Potentially Contaminated Sites Code of Practice (Ref 3.3). The assessment of contaminated land should be risk-based and in accordance with Environment Agency guidance Land Contamination: Risk Management (Ref 3.4). The preliminary works contractor (ground investigation) shall produce a Remediation Strategy, which should be approved by The Authority.	No.	To mitigate for any unexpected contaminated ground.	Unexpected contamination may exist in areas not previously identified.	Completion of appropriate ground investigation works and preparation of Remediation Strategy.	Contractual requirement between The Authority and the preliminary works contractor (ground investigation). DCO Requirement 4.	Preliminary works contractor (ground investigation)
PW–GEO3	ES Chapter 9, Section 9.8	**Unexpected contamination:** In the event that contaminated land, including groundwater, is found at any time, which was not previously identified in the ES, the preliminary works contractor (all) shall follow the provisions of the remediation strategy, the OEMP and the relevant requirements of the DCO. Where contaminated land cannot be avoided, in association with part of a preliminary works, or where significant risks are identified, the relevant preliminary works contractor shall introduce appropriate mitigation (remediation) to reduce to acceptable levels the potential short and long-term health and safety and environmental risks to sensitive receptors.	Yes, if applicable as described in the relevant Remediation Strategy. See column three.	To prevent contamination related to construction of the Scheme and maintain compliance with national legislation and regulations.	Potentially contaminated land has been identified in the ES Chapter 9: Geology and Soils and ES Appendix 9.1 [TR010054/APP/6.3]. There is always a possibility that unidentified contamination may be encountered during earthworks.	Works undertaken in accordance with the Remediation Strategy/ OEMP/ DCO.	Contractual requirement between The Authority and the preliminary works contractor. DCO Requirement 4 and 6.	Preliminary works contractor (all)
PW–GEO4	ES Chapter 9, Section 9.8	**Soil Management Strategy:** The preliminary works contractor (all) shall produce a detailed Soil Management Strategy in line with (PW-GEO5). The management strategy would identify the nature and types of soil that would be affected, including the methods that would be employed for stripping soil and the restoration of agricultural land to its existing agricultural land classification where the end use of the land allows (e.g. returned to agricultural use or used for woodland planting). The preliminary works contractor shall follow the guidance in the Defra Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (Ref 3.5) when handling agricultural soils. The Soil Management Strategy will be produced in consultation with Natural England.	No.	To limit the Scheme impact on soils and agricultural land.	The ES assessment assumes the protection of agricultural soils and successful return of land to agriculture where applicable.	Production of the Soil Management Strategy.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4.	Preliminary works contractor (all)

Ref	Source Ref	Action/ Commitment (including specific location if appropriate)	Is environmental monitoring required? Yes/ No	Objective	Assumption on which the action is based	Achievement criteria and reporting requirements (if applicable)	How the action is to be implemented	Responsible person(s)
PW–GEO5	ES Chapter 9, Section 9.8	**Excavated materials management:** To form part of the Soil Management Strategy, the preliminary works contractor (all) shall develop a: • Soils handling strategy with reference Defra Construction Code of Practice for the Sustainable Use of Soils on Construction Site (Ref 3.5), BS3882: 2015 Specification for Topsoil[3] (Ref 3.6) and MAFF, Good practice guide for handling soils (Ref 3.29). • Soil Resource Plan which would confirm the soil types, the most appropriate re-use for the different types of soils and proposed methods for handling, storing and replacing soils on-site. A soil resource survey should be carried out on the site at the earliest convenience by a suitably qualified and experienced soil scientist or practitioner. The preliminary works contractor shall assess excavated soils for any potential risks posed to health and the environment from the reuse of such soils as engineering fill. This would include mitigation of the effects on soils and the spread of contamination to ensure that those soils identified as contaminated are not mixed with uncontaminated soil. All excavated materials proposed for re-use would be required to meet risk-based acceptability criteria. The main works contractor shall ensure soils would be protected from accidental contamination during storage and transit. The preliminary works contractor shall endeavour to return topsoil stripped during the construction of the Scheme as close to its source of origin as possible during restoration. Soils should be reused as soon as is practicable and stored in such a way as to minimise structural damage (so far as reasonably practicable). Additionally, the creation of bare areas of permanently exposed soil that would be vulnerable to erosion processes would be avoided. Should soils need to be stored for longer than a few weeks, topsoils and subsoils would be stored separately in mounds of typically 3-4 m, in an area with good drainage to ensure soils remain dry. Soil mounds should be of a single soil type and soils of different types as characterised by the soil resource plan (part of the Soil Management Strategy) should not be mixed. Topsoil will be removed to store subsoil, and topsoil will be stored on similar topsoil. Where soils are to be stockpiled for more than six months, the surface of stockpiles would be seeded with a grass/clover mix to minimise soil erosion and to help reduce infestation by weeds. Further details of topsoil and subsoil storage would be set out in greater detail within the Soils Management Strategy. Topsoil may need to be removed during construction in order to prevent permanent burial beneath other earthworks. Such soils would be stockpiled and re-used, subject to acceptability (to be	No.	To ensure that high standards of soil handling and material management are employed during construction.	Assessment within the ES assumes that appropriate soils and material handling would be incorporated throughout the construction phase to mitigate significant effects. ES assumes as a minimum, that land taken temporarily for construction will be restored to its existing agricultural land classification.	Development of the Soil Management Strategy and adherence to these documents.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4.	Preliminary works contractor (all)

[3] It is noted that BS3882:2015 is only applicable to the classification and composition of natural or manufactured topsoils that are moved or traded for creating soil profiles intended to support plant growth.

Ref	Source Ref	Action/ Commitment (including specific location if appropriate)	Is environmental monitoring required? Yes/ No	Objective	Assumption on which the action is based	Achievement criteria and reporting requirements (if applicable)	How the action is to be implemented	Responsible person(s)
		determined by soil scientist), in the general earthworks such as landscaping and bunds. The re-use of excavated materials shall be governed by a Materials Management Plan (refer to MW- MAT2 to MW- MAT6) developed by the preliminary works contractor in accordance with the CL:AIRE Definition of Waste: Development Industry Code of Practice (Ref 3.7). Should off-site disposal in relation to excavated soil be required, the material would be characterised to determine firstly whether it is Hazardous or Non-Hazardous waste in accordance with the Environment Agency's Technical Guidance WM3 (Ref 3.8). The appropriate disposal facility will, where required, be determined through Waste Acceptance Criteria (WAC) analysis, as required.						
PW-GEO6	ES Chapter 9, Section 9.8	**Biosecurity (agriculture):** The preliminary works contractor shall comply with the requirements of Defra and appropriate guidance to avoid, as far as possible, the spread of soil borne, crop and animal diseases. Refer to PW-BIO10 regarding the Biosecurity Management Plan. The preliminary contractor shall implement appropriate measures to control run-off to reduce any risks associated with disease transmission.	No	To limit the Scheme impact on soils and agricultural land.	The ES assessment assumes the protection of agricultural soils and successful return of land to agriculture where applicable.	Implementation of appropriate measures as per Biosecurity Management Plan.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4.	Preliminary works contractor (all)
Material assets and waste								
PW-MAT1	ES Chapter 10, Section 10.8	**Materials and waste management:** Adherence to the requirements defined for the main works contractor as detailed in MW-MAT1 to MW-MAT6 as applicable to preliminary works contractor activities.	No.	To ensure suitable management of materials and waste arising from the construction of the Scheme.	Assessment within the ES assumes materials and waste appropriately managed throughout Scheme construction phase.	The Authority approval of plans.	Contractual requirement between The Authority and the preliminary works contractor. DCO Requirement 4.	Preliminary works contractor (all)
Noise and vibration								
PW–NOI1	ES Chapter 11, Section 11.8	**Best Practicable Means:** The preliminary works contractor (all) shall minimise noise and vibration during the Preliminary Works by employing Best Practicable Means (BPM), as defined under Section 72 of the Control of Pollution Act 1974 (Ref 3.9) and Section 79 of the Environmental Protection Act 1990 (Ref 3.10), at all times. BPM shall consider the recommendations of BS 5228: 2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites Parts 1 and 2 (BSI, 2014) (Ref 3.11) and BS 7385-2: 1993 Evaluation and Measurement for Vibration in Buildings – Part 2 Guide to Damage Levels from groundborne vibration (BSI, 1993) (Ref 3.12). The preliminary works contractor shall detail the application of BPM within the CEMP or Noise and Vibration Management Plan as relevant. BPM should be included as follows: Control of noise and vibration at source - such as through the selection of working method and plant, the provision of acoustic	No.	To ensure construction noise and vibration is managed appropriately.	Assessment within the ES assumes BPM would be incorporated throughout the construction phase.	Implementation of BPM.	Contractual requirement between The Authority and the preliminary works contractor. DCO Requirement 4.	Preliminary works contractor (all)

Ref	Source Ref	Action/ Commitment (including specific location if appropriate)	Is environmental monitoring required? Yes/ No	Objective	Assumption on which the action is based	Achievement criteria and reporting requirements (if applicable)	How the action is to be implemented	Responsible person(s)
		enclosures and the use of less intrusive alarms and the screening of equipment/ activities e.g. using site hoarding. Should the application of BPM at source not prove effective and noise exposure exceeds the relevant trigger level (as defined in BS 5228-1, Table E.2), the contractor may offer noise insulation, or if that is not sufficient, temporary re-housing.						
PW–NOI2	ES Chapter 11, Section 11.8	**Section 61 Consents:** Except in the case of an emergency before any works are undertaken outside of core working hours and which comprise noise generating activities, the relevant preliminary works contractor (all) shall consider submission of an application to SCC (in a format as agreed) for prior consent under Section 61 of the Control of Pollution Act 2974 (Ref 3.9). In the event that works for which a Section 61 consent has been applied for have to be rescheduled or modified, e.g. method or working hours, for reasons not envisaged at the time of the Section 61 consent submission, the contractor shall apply for a dispensation or variation from to SCC, in advance of the start of those works.	No.	To ensure noise and vibration is managed appropriately at sensitive locations	Section 61 consents could be used in relation to the Scheme.	Agreement of Sections 61s with SCC (if required).	Contractual requirement between The Authority and the preliminary works contractor. DCO Requirement 4.	Preliminary works contractor (all)
PW–NOI3	ES Chapter 11, Section 11.8	**Noise and Vibration Management Plan:** The preliminary works contractor shall prepare a Noise and Vibration Management Plan, detailing the management and monitoring processes to be introduced across all construction sites and compounds. The plan shall include, but is not limited to, the following: a) Integration of noise control measures into the preparation of all method statements for the works. b) Details and locations of all site hoardings, screens or bunds that would provide acoustic screening during construction. c) Procedures for the installation of noise insulation (if deemed to be required) or provision of temporary re-housing (if deemed required) and to ensure such measures are in place as early as reasonably practicable. d) Noise and vibration monitoring protocols including monitoring locations, stages during construction at which monitoring would be undertaken, and methods of publishing the results. e) Details of inspection and maintenance schedules to be undertaken. f) Processes to ensure ongoing compliance with all controls and consent for the works. g) Process for implementing corrective actions that may be required to avoid or address a potential non-compliance. Consider the need for a noise insulation and temporary rehousing policy will be determined for works in close proximity which have the potential to generate noise levels exceeding the relevant trigger level (as defined in BS 5228-1, Table E.2) for at least 10 days out of any period of 15 consecutive days or alternatively 40 days in any six-month period.	No.	To ensure that the effects of noise and vibration are controlled, and that BPM are planned and employed during construction period.	The preliminary works contractor's activities are likely to generate noise and vibration which require management.	Approval of Noise and Vibration Management Plan by The Authority.	Contractual requirement between The Authority and the preliminary works contractor. DCO Requirement 4.	Preliminary works contractor (all)

Ref	Source Ref	Action/ Commitment (including specific location if appropriate)	Is environmental monitoring required? Yes/ No	Objective	Assumption on which the action is based	Achievement criteria and reporting requirements (if applicable)	How the action is to be implemented	Responsible person(s)
PW–NOI4	ES Chapter 11, Section 11.8[	**Vibration:** The preliminary works contractor shall take into account the following guidance when establishing criteria, controls and working methods for vibration management: • BS 5228: 2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites Part 2 Vibration (Ref 3.11); • ISO 4866: 2010 Mechanical vibration and shock. Vibration of fixed structures. Guidelines for the measurement of vibrations and evaluation of their effects on structures (Ref 3.13); and • BS 7385 – 2 1993 Evaluation and measurement for vibration in buildings – Part 2: Guide to damage levels from groundborne vibration (Ref 3.12). **Protection of building occupants from disturbance:** No start-up or shut down of large (approx. 13 tonnes) vibratory plant e.g. rollers or compactors, within 50 m of receptors and 15m for small vibratory plant (approx. 3.5 tonnes). The preliminary works contractor shall refer to BS 5228-2 for guidance levels in terms of Peak Particle Velocity (PPV). If predicted vibration levels exceed 1mms^{-1} component PPV at occupied residential buildings based on the prediction methodology in BS 5228-2 (Ref 3.11), those potentially affected would be notified as soon as practicably possible in advance of the works. The notification would describe the nature and duration of the works and any associated proposals for vibration monitoring. **Protection of buildings from damage:** The preliminary works contractor shall use BPM to control vibration levels so that the PPV, as measured in accordance with BS 7385-2 Evaluation and measurement for vibration in buildings – Part 2 (Ref 3.12): Guide to damage levels from groundborne vibration, are generally not exceeded. The preliminary works contractor (all) shall carry out a scoping vibration appraisal to determine whether the trigger level of 6 mms^{-1} is likely to be exceeded. Activities requiring an appraisal would include vibratory compaction and pilling. The preliminary works contractor (all) shall notify and consult SSC and CWC regarding any works predicted to generate a PPV above 6mms^{-1}. Where it is determined that there is no reasonable or practicable means to reduce predicted or measured vibration then the contractor shall: • Carry out a condition survey before and after the relevant works; • Agree and consult with SSC/ CWC regarding monitoring for vibration during the works; and • Consult occupiers of properties about: the surveys to be carried out and any consequent actions; and any additional reasonable and practicable mitigation to be provided for occupants.	Yes, see PW - NOI5	To ensure that BPM are being employed at all times, that they are sufficiently mitigating noise and vibration impacts, and to provide the opportunity to implement alternative actions should their objectives be achieved.	Monitoring would be required to ensure BPM are effectively reducing noise and vibration impacts.	Inclusion of monitoring proposal with the Noise and Vibration Management Plan. Adhering to the specified monitoring regime throughout the construction period.	Contractual requirement between The Authority and the preliminary works contractor. DCO Requirement 4.	Preliminary works contractor (all) N.B: it is noted that not all preliminary works may have monitoring requirements within the CEMP. To be approved by the Authority.

Ref	Source Ref	Action/ Commitment (including specific location if appropriate)	Is environmental monitoring required? Yes/ No	Objective	Assumption on which the action is based	Achievement criteria and reporting requirements (if applicable)	How the action is to be implemented	Responsible person(s)
		The preliminary works contractor shall identify any buildings that may be unusually vulnerable to vibration, that are located within 50 m of any activities that may give rise to significant vibration. Where the predicted vibration at the foundations of such buildings exceeds 3 mms^{-1} PPV then the contractor shall undertake an initial structural survey of the building. Based on the survey, the level of vibration above which condition surveys and vibration monitoring are required would be confirmed with the building owner and SSC and CWC.						
PW–NOI5	ES Chapter 11, Section 11.8	**Noise and vibration monitoring:** The preliminary works contractor (all) shall undertake and report noise and vibration monitoring as is necessary to ensure and demonstrate compliance with all noise and vibration commitments and the requirements of the Noise and Vibration Management Plan. The CEMP shall define noise and vibration monitoring requirements, including proposals for survey locations. The preliminary works contractor (all) shall undertake regular onsite observation monitoring and checks/ audits to ensure that BPM is being employed at all times. The site reviews would be logged and any remedial actions recorded. Such checks would include: a) Compliance with hours of working. b) Presence of mitigation measures e.g. engines doors closed, airlines not leaking, and site hording in place. c) Number and type of plant. d) Compliance with agreed working methods. e) Compliance with any specific requirements of the Noise and Vibration Management Plan. The monitoring and compliance assurance process shall be set out in the Noise and Vibration Management Plan, as part of the CEMP, including proposals for monitoring locations.	Yes. See column three.	To ensure that BPM are being employed at all times, that they are sufficiently mitigating noise and vibration impacts, and to provide the opportunity to implement alternative actions should their objectives be achieved.	Monitoring would be required to ensure BPM are effectively reducing noise and vibration impacts.	Inclusion of monitoring proposals within the Noise and Vibration Management Plan. Adhering to the specified monitoring regime throughout the construction period.	Contractual requirement between The Authority and the preliminary works contractor (all). DCO Requirement 4.	Preliminary works contractor (all) N.B: it is noted that not all preliminary works may have monitoring requirements within the CEMP. To be approved by the Authority.
Population and human health								
PW–POH1	ES Chapter 12, Section 12.8	**Notification of works:** The preliminary works contractor (all) shall liaise with landowners, occupiers and agents, as appropriate, and agree the programme of works and access routes to be used by both the construction traffic and landowners and occupiers.	No.	To reduce impacts on landowners affected by the Scheme.	Assessment within the ES assumes that appropriate measures would be incorporated to reduce effects on landowners.	Appropriate communication methods with landowners/ occupiers/ agents to be agreed with the Authority.	Contractual requirement between The Authority and the preliminary works contractor. DCO Requirement 4.	Preliminary works contractor (all)
PW-POH2	ES Chapter 12, Section 12.8	**Liaison with farm holdings:** The preliminary works contractor shall liaise with farm holdings, occupiers and agents, as appropriate, to establish: • Measures to be implemented to protect and maintain livestock water supplies which may be affected due to construction works.	No.	To reduce impacts on farm holdings affected by the Scheme.	Assessment within the ES assumes that appropriate measures would be incorporated to reduce effects on farm holdings.	Appropriate communication methods with landowners/ occupiers/ agents to be agreed with the Authority.	Contractual requirement between The Authority and the preliminary works contractor. DCO Requirement 4.	Preliminary works contractor (all)

Ref	Source Ref	Action/ Commitment (including specific location if appropriate)	Is environmental monitoring required? Yes/ No	Objective	Assumption on which the action is based	Achievement criteria and reporting requirements (if applicable)	How the action is to be implemented	Responsible person(s)
		• The protection of agricultural land adjacent to the construction site both during and post-construction, including the provision and maintenance of appropriate stock-proof fencing. • Arrangements for the maintenance of farm and field accesses affected by construction.						
PW–POH3	ES Chapter 12, Section 12.8	**Footpath, bridleways and advisory cycle routes:** The main works contractor shall plan the Scheme construction works to minimise the need to close and divert Public Rights of Way (PRoW) and advisory cycle routes; and minimise closures and diversion durations. Where the closure of PRoW and advisory cycle routes would be required, safe and appropriate alternative means of access shall be provided to ensure access would be maintained at all times in order to minimise temporary severance. The main works contractor shall agree temporary diversion routes in advance with SCC and SSC as applicable. Appropriate signage for all closures and diversion of PRoW and advisory cycle routes shall be used to inform pedestrians, equestrians cyclists, with sufficient notice of such closures and diversions being provided. The British Horse Society will be consulted on the diversion routes for bridleways during the detailed design process.	No.	To minimise disruption to pedestrians, equestrians and cyclists.	Assessment within the ES assumes appropriate provisions are put in place to minimise disruption to pedestrians, equestrians and cyclists.	Agreement of actions with SCC and SSC as applicable.	Contractual requirement between The Authority and the preliminary works contractor. DCO Requirement 4.	Preliminary works contractor (all)
Road drainage and the water environment								
PW–WAT1	ES Chapter 13, Section 13.8	**Pollution control:** The preliminary works contractor (all) shall develop and implement appropriate measures within the CEMP, including a Water Management Plan, for their works to control the risk of pollution due to construction works, materials and extreme weather events, including change to flow, flood storage volume, water levels and quality. This would be completed having regard to industry guidance. The Water Management Plan should be produced in accordance with best practice guidance presented in the Guidance on Pollution Prevention documents, Environment Agency and CIRIA guidance. The Water Management Plan will include details of actions to be taken in the event of a serious spillage. An Outline Water Management Plan is included in Appendix C.	Yes.	To ensure the protection of the water environment.	Assessment within the ES assumes adequate protection measures would be employed throughout preliminary works.	The Authority approval of the CEMP.	Contractual requirement between The Authority and the preliminary works contractor. DCO Requirement 4.	Preliminary works contractor (all)
PW-WAT2	ES Chapter 13, Section 13.10	**Surface Water Monitoring:** The preliminary works contractor (all) shall develop and implement appropriate pre-, during and post-construction surface water monitoring programmes in the form of a Surface Water Monitoring Plan to be included in the Water Management Plan. This is to ensure that during construction water quality is not polluted, and does not deteriorate post-construction. The monitoring programme should include all waterbodies that may be affected by the works (but that are not being entirely lost to the scheme) (i.e. Watercourses 1-7, Lower Pool and other ponds). Monitoring should include at least six pre-construction visits preferably over 6 months and taking in a range of different flow conditions. It should include	Yes	To ensure the protection of the water environment.	Comparison with baseline data and observations to see any water quality changes	The Authority approval of the Water Management Plan.	Development pre-construction, and then throughout construction works. DCO Requirement 4.	Preliminary works contractor (all)

Ref	Source Ref	Action/ Commitment (including specific location if appropriate)	Is environmental monitoring required? Yes/ No	Objective	Assumption on which the action is based	Achievement criteria and reporting requirements (if applicable)	How the action is to be implemented	Responsible person(s)
		visual and olfactory observations, in situ water quality monitoring, and the collection of samples for laboratory analysis. The frequency of observational and in situ monitoring will be greater during works close to or affecting water bodies and following periods of wet weather.						
PW-WAT3	ES Chapter 13, Section 13.8	**Groundwater Monitoring:** A scheme of groundwater control measures would be implemented where required to ensure water levels in adjacent water bodies are maintained and any discharge is of a suitable quality. Four monitoring boreholes would be drilled on the north-western and south-western boundaries of the borrow pit, with a fifth drilled between the upper pond of Kings Pool Fishery and the A460. Gauge boards will be installed in the fishery ponds (at Kings Pool Fishery) and on Watercourse 3 adjacent to the borrow pit at least six months before any excavation starts at the borrow pit. Water level monitoring should be carried out in all of the boreholes and of the gauge boards to establish the natural fluctuations in groundwater, stream and pond levels. Dataloggers to facilitate continuous monitoring should be installed in the boreholes and in the upper fishery pond (Kings Pool Fishery).	Yes	To ensure water levels in the adjacent water bodies are maintained and any discharge is of a suitable quality.	Comparison with baseline data and observations to see any water quality and level changes.	The Authority approval of the Water Management Plan	Development pre-construction, and then throughout construction works. DCO Requirement 4.	Preliminary works contractor (all)
Traffic management								
PW–TRA1	n/a	**Traffic management measures:** The preliminary works contractor (all) shall implement appropriate traffic management measures during any relevant preliminary works, where these works could impact on all public roads and upon pedestrians and cyclists. This shall be substantially in accordance with the Outline TMP provided in [TR010054/APP/7.5]. This includes restricting HGV movements to the strategic highway network. A notice period may be required prior to the implementation of certain temporary traffic management measures including the occupation or temporary closure of existing roads. Traffic management works would be required to comply with the provisions of the DCO and the Traffic Signs Manual: Chapter 8: Traffic Safety Measures and Signs for Road Works and Temporary Situations (Ref 3.14). Traffic signs would comply with the Traffic Signs Regulations and General Directions.	No.	To reduce the potential for impacts upon the public road network.	The Scheme cannot be constructed without traffic management.	Provision of appropriate traffic management measures to be discussed and agreed with The Authority.	Contractual requirement between The Authority and the preliminary works contractor. DCO Requirement 10.	Preliminary works contractor (all)

Table 3.3: Main works – Scheme construction (MW) REAC table

Ref	Source Ref	Action/ Commitment (including specific location if appropriate)	Is monitoring required? Yes/ No	Objective	Assumption on which the action is based	Achievement criteria and reporting requirements (if applicable	How the action is to be implemented	Responsible person(s)
General provisions – Environmental Management System (EMS) and Considerate Constructors Scheme (CCS)								
MW– G1	n/a	**BS EN 14001:** The main works contractor shall have an EMS certified to BS EN ISO14001 (Ref 3.15). The main works contractor's EMS would define appropriate control measures and monitoring systems to be employed during the planning and constructing of the works for all relevant topic areas. Where the lead main works contractor is a joint venture, the EMS would be certified to cover the activities of the joint venture. The main works contractor's EMS shall cover the activities of all their sub-contractors. The main works contractor would also be required to coordinate with other contractors and relevant parties that may affect their works. This would be documented in their EMS, as appropriate. As part of their EMS, the main works contractor shall commit to planning works in advance to ensure that, in so far as is reasonably practicable, measures to reduce environmental effects are integrated into the construction methods.	No.	To ensure the main works contractor's processes and procedures are fully aligned with BS EN ISO14001, so as to ensure effective management of environmental issues in accordance with client expectations.	n/a	Project EMS certification to ISO140001, maintained for duration of construction.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4.	Main works contractor
MW– G2	n/a	**Environmental Policy:** The main works contractor shall develop a Scheme-specific environmental policy, prior to the EMS, and to be included as part of the EMS. This policy would be developed in line with Highways England's environmental policies and the scheme objectives and would set out how the main works contractor would: • Adhere to the requirements of environmental legislation during the works. • Commit to mitigating the impacts associated with the works. • Commit to good practice in environmental performance throughout the phase of works. • Identify opportunities to improve the Scheme's whole life performance in terms of environmental and social implications.	No.	To establish an environmental policy which would encapsulate the objectives and commitments for the relevant project phase.	n/a	The Authority approval of policy.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4.	Main works contractor
MW– G3	n/a	**Monitoring of actions:** The main works contractor's EMS and CEMP shall include procedures to monitor compliance with the Schemes environmental actions and requirements (as set out in these REAC tables) together with provisions for any corrective actions required.	No.	To ensure performance against the actions and requirements is monitored and corrective actions identified where required.	n/a	Inclusion of commitment in approved EMS and CEMP.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4.	Main works contractor
MW– G4	n/a	**Considerate Constructors Scheme (CCS):** The main works contractor shall sign up to and adhere to the CCS.	No.	To ensure that impacts of the Scheme are managed in accordance with a well-recognised standard.	n/a	Certification to CCS standard.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4.	Main works contractor
General provisions – CEMP and related plans, method statements								

Ref	Source Ref	Action/ Commitment (including specific location if appropriate)	Is monitoring required? Yes/ No	Objective	Assumption on which the action is based	Achievement criteria and reporting requirements (if applicable	How the action is to be implemented	Responsible person(s)
MW– G5	n/a	**Preparation of a CEMP:** The main works contractor shall prepare a CEMP, in accordance with this OEMP, prior to the commencement of the relevant project phase. In preparing the CEMP, the main works contractor shall consult with relevant local authorities and the Environment Agency. In preparing the CEMP, the main works contractor shall pay regard to the actions needed to minimise the risks of potential cumulative impacts.	No.	To ensure the CEMP is appropriate to the project phase.	n/a	The Authority approval of the CEMP.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4.	Main works contractor
MW– G6	n/a	**Revision of the CEMP:** The main works contractor shall notify the relevant local authorities and the Environment Agency if the CEMP is to be updated or revised.	No.	To discuss any changes to the approved CEMP with stakeholders and to then secure Authority approval.	n/a	The Authority approval of proposed revisions.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4.	Main works contractor
MW– G7	n/a	**Management Plans:** The main works contractor shall prepare Management Plans for certain environmental topic areas as the detailed design is developed, to include at least the following plans: • Biosecurity Management Plan. • Site Waste Management Plan (SWMP). • Emergency Preparedness and Response Plan; • Archaeological Management Plan (AMP) (Archaeological Mitigation Strategy included in Appendix B). • Archaeological Mitigation Strategy. • Arboricultural Mitigation Strategy; • Fish Rescue and Translocation Strategy; • Landscape and Ecology Management Plan (LEMP). • Noise and Vibration Management Plan. • Soil Management Strategy (Including a Soil Resource Plan and Soil Handling Strategy). • Materials Management Plan (MMP). • Asbestos Management Plan. • Water Management Plan (Outline Water Management Plan included in Appendix C). • Traffic Management Plan (Including a Site Access Plan, Site Travel Plan, and Construction Workforce Travel Plan). These plans shall be appended to the CEMP as appropriate. The plans can be submitted and approved individually and no direct inter-dependency between these plans and the CEMP should be inferred in the approval process.	Yes, if applicable. Review tables 3.2, 3.3 and 3.4.	To provide more targeted environmental management plans applicable to the relevant topic area.	Plans can be submitted individually for approval rather than in aggregate. The ES is based on the assumption that the appropriate management plans are in place.	The Authority approval of plans.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4.	Main works contractor

Ref	Source Ref	Action/ Commitment (including specific location if appropriate)	Is monitoring required? Yes/ No	Objective	Assumption on which the action is based	Achievement criteria and reporting requirements (if applicable	How the action is to be implemented	Responsible person(s)
		Some plans may require additional approvals as defined under the DCO Schedule 2, Requirements.						
MW– G8	n/a	**Method Statements:** The main works contractor shall set out the procedures to address health and wellbeing, safety, site security and environmental issues (including construction phase flood risk) in method statements prepared as part of the construction process. The method statements shall define any specific environmental control measures, to be implemented to meet the requirements of the CEMP, any relevant topic specific plans, and would consider the cumulative effects of concurrent construction activities.	No.	To ensure working methods take into account health and wellbeing, safety, site security and environmental issues and are of an appropriate standard.	n/a	The Authority or representative approval of method statement.	Contractual requirement between The Authority and the contractor. DCO Requirement 4.	Main works contractor
MW– G9	n/a	**Piling Risk Assessments:** The contractor shall undertake environmental risk assessments for piling activities which shall include consideration of the environmental constraints shown on the Environmental Constraints Plan (refer to Appendix A).	No.	To avoid adverse environmental impacts.	n/a	The Authority or representative approval of risk assessment.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4.	Main works contractor
MW– G10	ES Chapter 9, Section 9.8	**Unexploded Ordnance (UXO) Risk Assessments:** The main works contractor shall carry out risk assessments for the possibility of UXO being found within construction areas. The main works contractor shall prepare and implement an emergency response procedure to respond to the discovery of UXO (see also MW-G20). This would include notifications to SSC/ SCC and the emergency services.	No	To minimise the risks of unexploded ordnance.	Unexploded ordnance could be present in the area.	Risk Assessments approved by The Authority or representative.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4.	Main works contractor
MW– G11	n/a	**Handover Environmental Management Plan (HEMP):** During the later stages of the construction phase of the Scheme (or separate construction phase), as relevant the main works contractor shall prepare a HEMP in consultation with Highways England. This would then be implemented by the body responsible for the long-term management of the operational Scheme. The HEMP shall be based on the CEMP and the LEMP at the time and would provide the relevant information on existing and future environmental commitments and objectives that would need to be honoured and define on-going actions and risks that need to be managed. The HEMP would include as built information and other details in a form that can be utilised by the body responsible for long term management and maintenance so that body can prepare environmental management plans for the maintenance of the Scheme for the operational phase – this includes the long-term maintenance and management of landscaping, ecological and environmental mitigation features. Once all construction phases are complete, the main works contractor shall produce a consolidated HEMP, which would then be the main document containing essential environmental information passed to The Authority and the maintenance authority.	No.	To ensure that any relevant commitments and objectives defined during preceding project phases are clearly defined for the subsequent operation of the Scheme and to secure approval for these measures.	A separate EMP is required for the operational Scheme, given the environmental control measures and management requirements are very different from construction.	The Authority approval of HEMPs.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4.	Main works contractor

Ref	Source Ref	Action/ Commitment (including specific location if appropriate)	Is monitoring required? Yes/ No	Objective	Assumption on which the action is based	Achievement criteria and reporting requirements (if applicable	How the action is to be implemented	Responsible person(s)
General provisions – working hours								
MW– G12	ES Chapter 2	**Core working hours:** The preliminary works contractor (all) shall adhere to the following core working hours, except in case of emergency or in respect of 'additional activities' (see below): • 08:00 – 18:00 Monday to Friday; and • 08:00 – 13:00 Saturday with no working on Sundays and Bank Holidays. To maximise productivity, a period of up to one hour before and up to one hour after normal working hours would be used for start-up and close down of activities, excepting Saturday afternoons where all works will cease at 13.00. This would include, but not be limited to, deliveries, movement to place of work, unloading, maintenance and general preparation works. These periods would not be considered an extension of core working hours. Some activities with limited durations would be undertaken outside of the core working hours, namely: • M54 Junction 1 bridge works. • M6 Junction 11 bridge works. • Junction and slip road tie-in work. • Overnight traffic management measures; as agreed with the highway authority in advance. • Any emergency works. • Works associated with traffic management and signal changes. Any other work carried out outside the core working hours, or any extension of the core hours, may be possible with the prior agreement of the local highway authority if the activity is materially worse than the activities assessed within the ES.	No.	To ensure working hours for surface construction works are defined, but with an opportunity to vary these with the agreement of SCC. To limit the potential for impacts on residential receptors.	Working hours set out in Chapter 2 of ES.	n/a	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4.	Main works contractor
MW– G13	n/a	**Abnormal Deliveries:** The main works contractor shall seek approval from The Authority for delivery of abnormal loads or those that require a police escort if these are to be delivered outside core working hours.	No.	To limit the potential for impacts on residential receptors.	n/a	Approval from The Authority.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4.	Main works contractor
General provisions – personnel and training								
MW– G14	n/a	**Personnel:** The main works contractor shall appoint suitably qualified and experienced personnel to supervise the Main Construction Works. These shall include professionally qualified environmental management staff, with relevant experience in the environmental disciplines included in this OEMP. The roles (minimum requirements) are defined in Table 2.1 of this OEMP.	No.	To ensure staff with appropriate qualifications and experience are present to supervise works and monitor the implementation of mitigation measures.	n/a	The Authority audit finds implementation meets objectives.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4.	Main works contractor

Ref	Source Ref	Action/ Commitment (including specific location if appropriate)	Is monitoring required? Yes/ No	Objective	Assumption on which the action is based	Achievement criteria and reporting requirements (if applicable	How the action is to be implemented	Responsible person(s)
MW– G15	n/a	**Training:** The main works contractor shall develop and deliver a programme of training on environmental and social issues relevant to the project. As part of the site induction and prior to commencing work on site, all staff would be made aware of their environmental and social obligations, roles and responsibilities and any site restrictions/ requirements. The main works contractor shall be responsible for identifying the additional training needs of their personnel to enable appropriate training to be provided and engaging suitably qualified and experienced professionals for this purpose. Training would include site briefings and toolbox talks to equip relevant staff with the necessary level of knowledge on health, safety, community relations and environmental topics, and an ability to follow environmental control measures and to advise employees of changing circumstances as work progresses. The environmental scope should focus on the constraints relevant to any particular part of the works at that time and the relevant controls.	No.	To ensure all staff are briefed on relevant environmental constraints, procedures and mitigation measures.	n/a	The Authority approval of training programme.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4.	Main works contractor
MW– G16	n/a	**Management structure:** The main works contractor shall establish a management structure that includes an organisational chart encompassing all staff responsible for delivery of environmental mitigation measures and shall include this chart within the CEMP. The chart would set out the respective roles and responsibilities with regard to the environment and identify the nominated Environmental Manager, the ECoW, the Community Relations Manager and other relevant roles (see Table 2.1 for roles). In this structure, the main works contractor shall identify a person at each construction site who would be the single point of contact for the regulatory authorities. The main works contractor shall provide the regulatory authorities with relevant contact details prior to the commencement of construction and document this in the CEMP.	No.	To provide a clear framework for environmental responsibilities on site including a single line of communication between the main works contractor and the regulatory bodies.	n/a	The Authority approval of CEMP.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4.	Main works contractor
General provision – emergency preparedness and incident records								
MW– G17	n/a	**Emergency Preparedness and Response Plan:** As part of the CEMP, the main works contractor shall develop an Emergency Preparedness and Response Plan to cover incidents on site, environmental hazards (flooding, heavy rain, high winds), and other risks that may occur on site. The plan would take into account any specific requirements determined by The Authority. The plan would include the following as a minimum: • 24-hour contact details for all emergency response personnel and the emergency services. • The location of the nearest hospitals and GP practices including directions from site. • The procedures for reporting and documenting emergency incidents, including a pollution incident control plan. • The responsibilities of all staff during an emergency event. • The location of all hazardous materials located on site and within the site compounds.	No.	To ensure processes and plans are in place to deal with emergencies on site.	n/a	The Authority approval of CEMP, including the Emergency Preparedness and Response Plan.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4.	Main works contractor

Ref	Source Ref	Action/ Commitment (including specific location if appropriate)	Is monitoring required? Yes/ No	Objective	Assumption on which the action is based	Achievement criteria and reporting requirements (if applicable	How the action is to be implemented	Responsible person(s)
		The emergency procedures would be produced in consultation with the emergency services and for works on the existing highway network would be produced in accordance with established industry procedures.						
MW– G18	n/a	**Emergency Access:** The main works contractor shall ensure that the requirements of the relevant fire authority are followed for the provision of site access points. The accesses may vary over time and shall also be suitable for ambulances.	No	To ensure emergency accesses are provided in agreement with the emergency services.	n/a	Letter of agreement with relevant fire authority.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4.	Main works contractor.
MW– G19	n/a	**Fire prevention and control:** The main works contractor shall ensure all construction sites and associated accommodation and welfare facilities have in place appropriate plans and management controls to prevent fires.	No	To ensure fire prevention measures are in place.	n/a	Letter of agreement with relevant fire authority.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4.	Main works contractor.
MW– G20	n/a	**Extreme weather events:** The main works contractor shall so far as reasonably practicable ensure appropriate measures are implemented to ensure the resilience of the proposed mitigation of impacts during extreme weather events. The main works contractor shall ensure the CEMP identifies all measures deemed necessary and appropriate to manage extreme weather events and would specifically cover training of personnel and prevention and monitoring arrangements. Method statements should also consider extreme weather events where risks have been identified.	No	To minimise the impacts of extreme weather events.	n/a	The Authority approval of CEMP	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4.	Main works contractor.
MW– G21	n/a	**Non-conformance and incidents register:** As part of the CEMP, the main works contractor shall establish systems and procedures for responding to environmental incidents. As a minimum, two registers would be set up to include: • A Non-Conformance and Corrective Action Register (which forms part of the main works contractor's Quality Procedures and is not exclusively for environmental issues). • An Environmental Incidents Register.	No.	To maintain a record of incidents alongside the corrective actions, to provide a robust record and help inform future decision making.	n/a	The Authority approval of CEMP.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4.	Main works contractor
MW– G22	n/a	**Environmental documentation:** Copies of all environmental documentation relevant to the works would be filed on site and made available for internal inspection.	No.	To maintain a record of all relevant documents, to provide a robust record and help inform future decision making.	n/a	The Authority audit finds implementation meets objectives.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4.	Main works contractor

Ref	Source Ref	Action/ Commitment (including specific location if appropriate)	Is monitoring required? Yes/ No	Objective	Assumption on which the action is based	Achievement criteria and reporting requirements (if applicable	How the action is to be implemented	Responsible person(s)
General provisions – site management								
MW- G23	n/a	**Construction site management:** The main works contractor shall use the following approaches to construction site management and define the approach to site management in the CEMP.	No	To reduce the likelihood of either an environmental incident or nuisance occurring.	n/a	The Authority audit finds implementation meets objectives.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4.	Main works contractor
MW- G24	n/a	**Worksite security:** The main works contractor shall define within the CEMP the proposed approach to worksite security and trespass risk at each site and implement appropriate control measures in accordance with the approved CEMP	No	To prevent unauthorised access to the site and so reduce the potential for both accidents and crime.	n/a	The Authority approval of CEMP.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4.	Main works contractor
MW– G25	n/a	**Site hoardings around construction compounds:** The main works contractor shall define within the CEMP the proposed approach to hoardings around construction compounds, giving consideration to environmental constraints, including: • Maintenance of adequate hoardings to an acceptable condition to prevent unwanted access to the construction compounds. • Painting the side of hoardings facing away from the site, and to keep them free of graffiti or posters. • Providing site information boards. • Displaying notices on site boundaries to warn of hazards on site. • Providing signage to indicate re-routed pedestrian/ cycle paths. • Retaining existing walls, fences, hedges and earth banks for the purpose of screening as far as reasonably practicable and ensure fencing and hoarding is located such that it does not damage sensitive habitats, trees or hedgerows. • Providing hoardings around retained habitats to prevent access to retained important habitat, protect habitat, avoid accidental damage, and avoid species mortality (including areas to which species have been temporarily displaced). Consultation with the ECoW should be undertaken. In order to minimise landscape impacts of the compounds, the main works contractor shall follow the below measures in relation to construction compounds: • Buffer zones shall be created between the compounds and construction works and existing retained vegetation through construction exclusion zones and suitable perimeter fencing. • Any temporary earth bunds, created from excavated soil, shall be located around the perimeter of the compounds. • All buildings within compounds shall be restricted to one storey in height and rendered/ painted in suitable colours to aid in their integration within the landscape.	No.	To prevent unauthorised access to the site, provide appropriate signage and ensure hoarding is appropriate to the site context.	n/a	The Authority approval of CEMP.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4.	Main works contractor

Ref	Source Ref	Action/ Commitment (including specific location if appropriate)	Is monitoring required? Yes/ No	Objective	Assumption on which the action is based	Achievement criteria and reporting requirements (if applicable	How the action is to be implemented	Responsible person(s)
		• Solid hoarding shall be installed around the perimeter of the compounds, stained in suitable approved colours, to aid in its integration within the landscape. • Construction compounds and satellite compounds shall be well-managed and kept tidy. • Ensuring that materials are delivered to site on an “as and when” basis to minimise unnecessary stockpiles. • Stockpiles would be approximately 2 m to 3 m in height and may be sown with grass seed to reduce their visual impact should they be present for extended periods of time. • Lighting to be kept at a minimum luminosity necessary and make use of low energy consumption fittings. Where appropriate, lighting would be activated by motion sensors to prevent unnecessary usage. Lighting shall be directional, and positioned sympathetically, to minimise light spill and disturbance for sensitive receptors. • Fencing and hoarding shall be kept well maintained throughout construction. Where footways are required, the main works contractor shall provide footways of adequate width to facilitate pedestrian flows with signs provided to facilitate safe access around the site boundary and provide adequate lighting near hoardings to illuminate these footways. The main works contractor shall ensure that hoarding and fencing in areas at risk of flooding, would be permeable to floodwater, unless otherwise agreed with the Environment Agency, to ensure that the fluvial floodplain and areas liable to other sources of flooding continue to function effectively for storage and conveyance of floodwater.						
MW– G26	n/a	**Site lighting:** The main works contractor shall define within the CEMP the proposed approach to site lighting around construction compounds and elsewhere along the route alignment, giving consideration to environmental constraints. Lighting should be at the minimum luminosity necessary and use low energy consumption fittings and should avoid light spillage. Lighting should also be designed, positioned and directed so as not to unnecessarily intrude on adjacent buildings, ecological receptors, structures used by protected species and other land uses to prevent unnecessary disturbance, interference with local residents, or passing motorists. This provision would apply particularly to sites where night working would be required.	No.	To provide safe working areas and safe walking routes, whilst minimising light spill to minimise impacts to the people and wildlife.	n/a	The Authority approval of CEMP.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4.	Main works contractor
MW– G27	n/a	**Clearance and re-instatement of sites on completion:** The main works contractor shall ensure that on completion of construction works, plant, materials, equipment, temporary buildings and vehicles not required during subsequent activities are removed from the site and that land is restored to its former use or in accordance with the design as appropriate.	No.	To ensure the order limits are restored to the current condition, unless otherwise used as part of the hard or soft estate within the final design.	n/a	The Authority audit finds implementation meets objectives.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4.	Main works contractor
General provision – community engagement and co-ordination								

Ref	Source Ref	Action/ Commitment (including specific location if appropriate)	Is monitoring required? Yes/ No	Objective	Assumption on which the action is based	Achievement criteria and reporting requirements (if applicable	How the action is to be implemented	Responsible person(s)
MW– G28	n/a	**Community Engagement:** The main works contractor shall take reasonable steps to engage with local residents. The main works contractor shall use the following materials to engage with residents and other stakeholders: • Online: the main works contractor shall provide materials to update the Highways England's website. The sites shall be updated to reflect the status of the Scheme, including the latest information on the progress of the construction works, areas affected by construction, mitigation in place to reduce adverse effects of construction, information regarding planned construction works, road closures, works recently completed and an enquiry procedure. • Newsletter: the main works contractor shall prepare a Scheme newsletter and issue it on a regular basis to provide information covering the whole project, the progress to date and the planned construction works. • Works Notices: the main works contractor shall notify occupiers of nearby or affected properties, businesses and adjacent or affected parish councils, at least two weeks in advance, of the nature and anticipated duration of planned construction works. Information included in the notifications would include, as appropriate: – The location of the planned works. – The activities to be carried out. – The duration of the planned works and the periods within which works would be undertaken (i.e. whether during normal working hours, during the evening or overnight). – The anticipated effects of the planned works. – The measures to be implemented in line with the CEMP to mitigate the impact of the planned works.	No.	To understand the concerns of residents. To keep residents informed of forthcoming construction works.	Communities and places of business close to the Scheme.	The Authority approval of approach.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4.	Main works contractor
MW– G29	n/a	**Coordination:** The main works contractor shall co-ordinate activities outside of any individual (sub-) contractor's site boundaries, so far as is reasonably practicable, notably in respect of: • Community liaison: communicating upcoming activity to affected communities and responding to questions/concerns raised, using the role of Community Liaison Officer (see Table 2.1) and other support staff as relevant. • Emergency response: maintaining communication with emergency services and ensuring that emergency response plans do not conflict. • Traffic management: working collaboratively with the aim of avoiding potential conflict in arrangements and minimising disruption to road users. • Access to site: communication and collaboration in respect of arrangements for site access and abnormal loads with highway authorities and emergency services. • Construction workforce: monitoring the impact of the workforce on the community in its travel to and from work. • Other construction projects: maintaining communication between the works on the Scheme and those of other construction projects in the vicinity. **Environmental interface management between adjacent construction areas:**	No.	To reduce the risk of conflict and to maximise opportunities for reducing overall impact on surrounding communities and the environment.	n/a	The Authority approval.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4.	Main works contractor

Ref	Source Ref	Action/ Commitment (including specific location if appropriate)	Is monitoring required? Yes/ No	Objective	Assumption on which the action is based	Achievement criteria and reporting requirements (if applicable	How the action is to be implemented	Responsible person(s)
		The main works contractor shall put in place measures to manage any issues which are relevant to adjacent construction areas, including the boundaries between areas under the control of different (sub-) contractors or where reasonably practicable other third-party contractors. An aim of the interface management activities shall be the identification, interception and mitigation of potential cumulative effects.						
Air quality								
MW– AIR1	ES Chapter 5 Section 5.8	**Best Practicable Means (BPM):** The main works contractor shall manage dust, air pollution and exhaust emission during the construction works in accordance with BPM as set out in a Dust Management Plan. Specific measures shall be based upon industry good practice, including the measures listed in the Institute of Air Quality Management's (IAQM) Guidance on the Assessment of Dust from Demolition and Construction (Ref 3.1). These measures would be set out in more detail in the CEMP and could include: • Developing and implementing a series of dust management measures and monitoring measures. The level of detail would include as a minimum the measures set out in this table. Monitoring may include monitoring of dust deposition, dust flux, real-time PM_{10} continuous monitoring and visual inspections. • Undertaking periodic on-site inspections, where receptors are nearby, to monitor dust, record inspection results, and make the log available to the local authority etc. when asked. • Fully enclose site or specific operations where there is a high potential for dust production and the site is active for an extensive period. • Keep site fencing, barriers and scaffolding clean using wet methods where there is the risk of dust accumulation. • Remove materials that have the potential to produce dust from site as soon as possible, unless being re-used on site. If they are being re-used on-site cover as described below. • Impose and signpost a maximum-speed-limit of 15 mph on surfaced and 10 mph on un-surfaced haul roads and work areas (if long haul routes are required these speeds may be increased with suitable additional control measures provided). • Ensure all vehicles (HGVs and mobile plant) switch off engines when stationary or not in use - no idling vehicles. • All construction plant would use fuel equivalent to ultra-low sulphur diesel (ULSD). • Ensure equipment is readily available on site to clean any dry spillages and clean up spillages as soon as reasonably practicable after the event using wet cleaning methods. • Ensure effective water suppression is used during demolition operations. Hand held sprays are more effective than hoses when attached to equipment as the water can be directed to where it is needed. In addition, high volume water suppression systems, manually controlled, can produce fine water droplets that effectively bring the dust particles to the ground.	No.	To ensure air quality is managed appropriately across the Scheme.	Assessment within the ES assumes BPM would be incorporated throughout the construction phase.	Implementation of BPM.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4.	Main works contractor.

Ref	Source Ref	Action/ Commitment (including specific location if appropriate)	Is monitoring required? Yes/ No	Objective	Assumption on which the action is based	Achievement criteria and reporting requirements (if applicable	How the action is to be implemented	Responsible person(s)
		• No explosive blasting would be undertaken, manual or mechanical alternatives would be used. • Comply with measures set out in any Asbestos Management Plan if one is required. • Surfacing equipment (e.g. planer) only to be operated with any manufacturers dust abatement measures in place. • Avoid scabbling (roughening of concrete surfaces) if possible. • Ensure sand and other aggregates are stored in bunded areas and are not allowed to dry out, unless this is required for a particular process, in which case ensure that appropriate additional control measures are in place. • Use water-assisted dust sweeper(s) on access and local roads, to remove, as necessary, any material tracked out of the site. This may require the sweeper being continuously in use. • Avoid dry sweeping of large areas. • Ensure vehicles entering and leaving sites are covered to prevent escape of materials during transport. • Record all inspections of haul routes and any subsequent action in a site log book. • Implement a wheel washing system. • No bonfires or burning of waste materials. • Soft strip inside buildings before demolition.						
MW– AIR2	ES Chapter 5 Section 5.8	All high-risk site works close to sensitive receptors are to employ further best practice mitigation measures, which may include: • Display the name and contact details of person(s) accountable for air quality and dust issues on the construction site boundaries. This may be the environment manager/ engineer or the site manager. • Record all dust and air quality complaints, identify cause(s), take appropriate measures to reduce emissions in a timely manner, and record the measures taken. • Make the complaints log available to the local authority etc. as soon as reasonably practicable. • Record any exceptional incidents that cause dust or air emissions, either onsite or offsite, and the action taken to resolve the situation in the log book. • If applicable, hold regular liaison meetings with other high risk construction sites within 500 m of the site boundary, to ensure plans are co-ordinated and dust and particulate matter emissions are minimised. In particular, it is important to understand the interactions of the off-site transport/deliveries which might be using the same strategic road network routes. • Increase the frequency of site inspections by the person accountable for air quality and dust issues on site when activities with a high potential to produce dust are being carried out and during prolonged dry or windy conditions. • Plan site layout so that machinery and dust causing activities are located away from receptors, as far as is possible. • Erect solid screens or barriers around particularly dusty activities or the site boundary that are at least as high as any stockpiles on site for higher risk areas.	No.	To ensure air quality is managed appropriately across the Scheme.	Assessment within the ES assumes BPM would be incorporated throughout the construction phase.	Implementation of BPM.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4.	Main works contractor.

Ref	Source Ref	Action/ Commitment (including specific location if appropriate)	Is monitoring required? Yes/ No	Objective	Assumption on which the action is based	Achievement criteria and reporting requirements (if applicable	How the action is to be implemented	Responsible person(s)
		• Avoid site runoff of water or mud. • Avoid the use of diesel or petrol powered generators and use mains electricity or battery powered equipment where practicable. • Where stationary generators are required ensure these are sited as far from sensitive receptors as possible. • Operate stationary generators within manufacturer guidelines, under optimum load for periods of operation and regularly service equipment to maintain efficient operation. • Manage the sustainable delivery of goods and materials through careful programming of delivery. • Implement a travel plan that supports and encourages sustainable travel (e.g. public transport, cycling, walking, and car-sharing). • Only use cutting, grinding or sawing equipment fitted or in conjunction with suitable dust suppression techniques such as water sprays or local extraction (e.g. suitable local exhaust ventilation systems). • Ensure an adequate water supply on the site for effective dust/ particulate matter suppression/ mitigation, using non-potable water where possible and appropriate. • Use enclosed chutes and conveyors and covered skips. • Minimise drop heights from conveyors, loading shovels, hoppers and other loading or handling equipment and use fine water sprays on such equipment wherever appropriate. • Re-vegetate earthworks and exposed areas/ soil stockpiles to stabilise surfaces as soon as practicable. • Use hessian, mulches or tackifiers where it is not possible to re-vegetate or cover with topsoil, as soon as practicable. • Where possible, only remove the cover in small areas during work and not all at once. • Ensure bulk cement and other fine powder materials are delivered in enclosed tankers and stored in silos with suitable emission control systems to prevent escape of material and overfilling during delivery. • For smaller supplies of fine power materials ensure bags are sealed after use and stored appropriately to prevent dust. • For cement batching plants enclose as much of the plant as possible to minimise emissions of dust during preparation and identify measures to minimise emissions at loading points (e.g. pre-mixing). • Maintain and inspect on-site haul routes for integrity and operate a programme of routing maintenance and where necessary carry out repairs to the surface as soon as reasonably practicable. • Install hard surfaced haul routes if possible, which are regularly damped down with fixed or mobile sprinkler systems, or mobile water bowsers and are regularly cleaned. • Ensure there is an adequate area of hard surfaced road between the wheel wash facility and the site exit, wherever site size and layout permits. • In locations without hard standing it may be necessary to clean the vehicle bodies in addition to wheels.						

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		• Access gates to be located at least 10 m from receptors where possible. The details of the further standard best practice mitigation would be outlined in the CEMP produced by the contractor.						
MW- AIR3	ES Chapter 5, Section 5.8	**Air quality monitoring:** The main works contractor shall establish a baseline prior to construction at specific sections of the Scheme. This would be determined, where specifically required (i.e. locations of higher risk works closer to sensitive receptors). The duration of baseline monitoring, locations and techniques to be used are to be consulted upon with SSC/CWC. However, it is anticipated based on the baseline environment (i.e. low ambient particulate concentrations) that monitoring is likely to focus on dust deposition/soiling) with a minimum period of three months of data collection. The main works contractor shall ensure inspections and monitoring are carried out to assess the effectiveness of measures to prevent dust and air pollutant emissions during works. Monitoring approaches during the construction phase would be consulted upon with SSC/ CWC, including locations and techniques. Monitoring would be continued until the site is deemed to be low risk (i.e. higher risk activities have ceased). The approach to the reporting of air quality monitoring information is to be discussed with SSC/ CWC.	Yes	To identify any deterioration in air quality arising as a result of construction activities and the identification of appropriate actions to be implemented to reduce adverse effects.	Assessment within the ES assumes that appropriate dust and air quality monitoring would be incorporated throughout the construction phase.	Establishment of air quality baseline prior to construction. The Authority audit finds implementation meets objectives.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4.	Main works contractor
Cultural heritage								
MW– CH1	ES Chapter 6 Section 6.8	Areas that were unavailable at the preliminary works stage (for example due to health and safety issues or no access), where archaeological survey (evaluation) or mitigation was required, shall be subject to investigation as set out in the AMP (PW-CH2).	No.	To manage the historic environment and ensure it is protected in a consistent and integrated manner across the Scheme.	Certification of AMP and AMS under the DCO.	The works shall be prepared as set out within the AMP and AMS approved by The Authority prior to works commencing.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 9 and 4	Main works contractor.
MW– CH2	ES Chapter 6 Section 6.8	Archaeological sites, areas of sensitivity including historic structures that require protection or preservation in situ during construction or utility diversions, shall be dealt with as set out in the AMP (PW-CH2 and method statements).	No.	Consultation on Method Statements with SCC County Archaeologist and, where appropriate, Historic England and South Staffordshire Council's Conservation Officer. Approval from The Authority prior to works commencing.	ES assumes archaeological sites are protected during the works.	Consultation with SCC and approved by The Authority prior to works commencing.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 9 and 4	Main works contractor.
MW– CH3	ES Chapter 6 Section 6.8	**Archaeological monitoring:** The main works contractor shall undertake an appropriate level of monitoring of archaeological assets (designated and non-designated) within and close to the Order limits during the construction programme.	Yes.	Monitoring arrangements shall be prepared in consultation with SCC County Archaeologist and approved by The Authority prior to works commencing.	Monitoring required to ensure resources are being protected.	The works shall be prepared as set out within the AMP and AMS approved by The Authority prior to works commencing.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 9 and 4	Main works contractor.

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MW – CH4	ES Chapter 6 Section 6.8	**Fencing of heritage assets:** The main works contractor shall ensure all heritage assets identified in the AMS for protective fencing are securely fenced and signed during the main works (in conjunction with other mitigation measures). The main works contractor shall consult with SCC to determine the type of fencing to be used. The contractor shall separately prepare a method statement for all fencing works which would include details of appropriate archaeological mitigation measures (the SSWSI, completed during the preliminary works, will provide details of mitigation requirements).	No.	To ensure that heritage assets are appropriately protected in advance of construction works.	Assessment within the ES is based on the protection of identified heritage assets. Certification of AMS under the DCO.	Consultation on method statements with SCC and approval from The Authority prior to the start of the work at each location.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 9 and 4.	Main works contractor.
MW – CH5	ES Chapter 6 Section 6.8	**Protection of Hilton Park and associated buildings** No material shall be stored west of Hilton Hall within Hilton Park as part of the construction works with the exception of an area adjacent to the new M54 Junction 1 to the south of the parkland (refer to Figure 2.9 of the ES [TR010054/APP/6.2]. Although not designated, the park is of historic interest and must be maintained. Hilton park also forms the setting of a number of statutorily listed buildings including Hilton Hall.	No.	To ensure that the setting of the listed buildings within the park as well as the appearance and integrity of the park is not further affected.	Assessment within the ES is based on the protection of identified heritage assets.	The works shall be prepared as set out within the AMP and AMS approved by The Authority prior to works commencing.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4	Main works contractor.
MW – CH7	ES Chapter 6, Section 6.8	**Heritage Awareness:** The preliminary works contractor shall inform construction workers and operatives as to any control and reporting procedures to be followed, should archaeological deposits be encountered during the works, for example through toolbox talks and regular briefings.	No.	To ensure that heritage assets are appropriately protected during construction works.	Assessment within the ES is based on the protection of identified heritage assets.	Awareness raised and logged by the EM and/or the ACoW.	Contractual requirement between The Authority and the preliminary works contractor. DCO Requirement 4	Preliminary works contractor (all).
Landscape and visual								
MW–LAN1	ES Chapter 7 Section 7.8	**Landscape and Ecology Management Plan (LEMP):** The main works contractor shall prepare a Scheme-wide LEMP, developed in accordance with industry good practice. This would include information on long-term operational management of the landscape and ecological resource within the Scheme boundary. The LEMP would ensure that landscape works are undertaken in accordance with good practice and in a consistent basis across the Scheme. The LEMP, and the associated habitat and species specific management plans that form part of it, will be produced in consultation with Natural England, the SCC County Ecologist and Staffordshire Wildlife Trust. The implementation and maintenance of the landscape design – including any works to existing or new trees – would be undertaken in accordance with the Arboricultural Mitigation Strategy (which would be produced during the detailed design stage). The Arboricultural Mitigation Strategy would ensure that the existing trees to be retained and any trees planted early in the construction phase are appropriately protected during the construction works. The appointed contractor would be responsible for undertaking landscape management within the contract period (for up to five years after Scheme opening), after which the longer-term maintenance and management of the soft estate responsibilities would transfer to Highways England West Midlands Asset Delivery Team (Highways England, Area 9).	No.	To ensure landscape works are undertaken in accordance with good practice and in a consistent basis across the Scheme.	The Design Year (Year 15) assessment scenario is achieved.	The Authority approval of LEMP.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4	Main works contractor.

Ref	Source Ref	Action/ Commitment (including specific location if appropriate)	Is monitoring required? Yes/ No	Objective	Assumption on which the action is based	Achievement criteria and reporting requirements (if applicable	How the action is to be implemented	Responsible person(s)
MW–LAN2	ES Chapter 7 Section 7.8	**Arboricultural Mitigation Strategy:** The arboricultural specialist shall prepare an Arboricultural Mitigation Strategy to protect those trees retained within and immediately adjacent to the Order limits. This shall consider the following standards: • BS 3936-1: Nursery stock. Specification for trees and shrubs (Ref 3.16). • BS 3936-4: Nursery stock. Specification for forest trees, poplars and willows (Ref 3.17). • BS 3882: Specification for topsoil and requirements for use (Ref 3.18). • BS 3998: Tree Work. Recommendations (Ref 3.19). • BS 4428: Code of practice for general landscape operations (excluding hard surfaces) (Ref 3.20). • BS8545: Trees from nursery to independence in the landscape (Ref 3.21). • BS 5837: Trees in relation to design, demolition and construction (Ref 3.22). • BS 6031: Code of practice for earthworks (Ref 3.23). Alternatively, where a British Standard does not exist, works would follow industry good practice, e.g. Natural England's Advice on managing, restoring, and creating grassland. Agreement would be sought from SCC. The Arboricultural Mitigation Strategy shall also define: • The RPA and Construction Exclusion Zones (CEZ) of trees to be retained within or immediately adjacent to the order limits and wherever practicable. • The approach for working within RPAs, where this cannot reasonably be avoided required. • The approach to inspecting, maintaining and managing trees and scrub to be retained. • The approach for felling where otherwise not identified in the ES.	No.	To ensure existing trees to be retained are appropriately protected during the construction works and that newly planted trees are appropriate and successfully established.	The Design Year (Year 15) assessment scenario is achieved. Successful retention of trees and hedgerows/ vegetation is assumed within the ES. Trees not identified within the original Arboricultural Impact Assessment may require removal.	Approval of the strategy by the Authority.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4	Main works contractor.
MW–LAN3	n/a	**Planting and seeding:** In planning planting, seeding, wildflower seeding and other landscape works, the main works contractor shall consider the recommendations of the latest version of industry standards, including Natural England's Advice on managing, restoring, and creating grassland. **Early planting:** The main works contractor shall implement planting/ seeding as early as is reasonably practicable (and where there is no conflict with construction activities or other requirements of the Scheme), so as to be more established in advance of the operation of the Scheme. The main works contractor would consider where these measures can be implemented as described and programme them accordingly. This includes advanced planting of woodland either side of the Scheme and north of Hilton Lane to provide early screening of the Scheme for residents on Hilton Lane and users of Shareshill Footpath 3, as well as advance planting of woodland to the west of the construction compound located to the east of the A460, which would provide screening of the construction compound itself for residents of Featherstone refer to ES Chapter 7: Landscape and visual [TR010054/APP/6.1].	Yes	To protect and mitigate adverse effects on sensitive and valued landscape features and characteristics To ensure successful establishment of planting and seeding areas.	The successful completion of mitigation measures is assumed within the ES assessment. Early establishment of planting/ seeding areas would reduce visual impact.	Successful establishment of all planting and seeding areas, throughout the Scheme.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4 and 5.	Main works contractor.

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		Monitoring and maintenance: The main works contractor shall undertake appropriate maintenance of planting and seeding works and implementation of management measures, through the construction period as landscape works are completed. The main works contractor shall monitor the progress of these works throughout the construction period. Any failures of landscape planting and seeding would be managed via the specification and works requirements. This would ensure annual replanting and reseeding works are undertaken (as required) to achieve successful establishment of the landscape and ecology mitigation proposals at completion of the construction works and during the agreed defects liability period.						
MW–LAN4	ES Chapter 7 Section 7.8	**Landscape Planting Strategy:** The main works contractor shall ensure that landscaping works are carried out in accordance with the approved landscaping planting strategy and in conformity with DCO Requirement 5.	No.	To mitigate the landscape and visual impacts of the Scheme.	n/a	Works undertaken in accordance with DCO Requirement 5 [TR010054/APP/3.1].	Contractual requirement between The Authority and the preliminary works contractor. DCO Requirement 5.	Main works contractor.
Biodiversity								
MW– BIO1	ES Chapter 8 Section 8.8, OEMP, Table 3.2	**Protected and notable species:** The main works contractor shall review the measures identified in Table 3.2 PW-BIO1 to 9 and the results of the preliminary works contractor's pre-construction ecological surveys for the following: • Nesting birds (Schedule 1) • Bat • Water vole • Otter • Badger • Great crested newt • Reptile • White-clawed crayfish The main works contractor shall have responsibility to ensure that works for protected and notable species undertaken during the preliminary works phase, and which are intended to be maintained throughout the main works phase, are appropriately managed. Where protection measures have been identified which need to be managed, monitored and maintained throughout the main works construction period, the main works contractor shall adhere to these measures. This may include the maintenance of habitat in an unsuitable condition for species (to discourage ecological species from using such areas) and the maintenance and monitoring of exclusion zones and seasonal constraints. The main works contractor's ECoW (or appropriate specialist), shall undertake regular site surveys to determine whether any protected or notable species have recolonised sites checked/ cleared during the preliminary works. Should such species be identified, appropriate measures to ensure their protection/ prevention	No.	To ensure the protection of protected and notable species.	The ES assessment assumes protected species would be identified and adequately protected from adverse effects.	No recorded injury or mortality of protected species.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4 and 7.	Main works contractor.

Ref	Source Ref	Action/ Commitment (including specific location if appropriate)	Is monitoring required? Yes/ No	Objective	Assumption on which the action is based	Achievement criteria and reporting requirements (if applicable	How the action is to be implemented	Responsible person(s)
		of recolonisation shall be adopted; this may include supervised site clearance, works under method statements or application for appropriate licences, as per the preliminary works.						
MW– BIO2	ES Chapter 8 Section 8.8	**Habitat creation:** The main works contractor shall establish new habitats identified within the Environmental Masterplans (ES Figures 2.1 to 2.7 [TR010054/APP/6.2]). These habitats shall be managed accordingly to ensure their establishment and develop to achieve their target purpose(s), through to any handover of the Scheme.	No.	To ensure habitats are established in accordance with the Environmental Masterplans.	The ES assumes establishment of specified habitats.	Successful delivery of habitats.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4 and 7.	Main works contractor.
MW– BIO3	ES Chapter 8, Section 8.8	**Lighting at important ecological sites:** The main works contractor shall, if temporary site lighting is required near Local Wildlife Sites; Sites of Biological Importance, retained ancient woodlands and linear vegetated or water corridors, adjacent to the known bat roost use directional lamps/ hoods/ cowls, to ensure that light-spill to the watercourses and their banks is minimised. LED lights and automatic sensors will be used where appropriate. These features are identified on the Environmental Constraints Plans, at Annex A of this OEMP; the Environmental Masterplans (see Figures 2.1 to 2.7 [TR010054/APP/6.2]); and Appendix 8.7 of the Environmental Statement [TR010054/APP/6.3], Figure 8.17: Bat Baseline - Confirmed Bat Roosts and Aerial Tree Inspection Survey Results (2018 and 2019) [TR010054/APP/6.2].	No	To minimise lighting of watercourses and reduce impacts on nocturnal species including otters, bats and fish.	Nocturnal species are sensitive to lighting.	Implementation of the identified actions.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4.	Main works contractor
MW– BIO4	ES Chapter 8, Section 8.8	**Biosecurity:** The main works contractor shall prepare a Biosecurity Management Plan. The main works contractor shall implement measures to promote biosecurity and avoid the risk that invasive non-native species and diseases are spread as a consequence of the project. This would include, toolbox talks, exclusion zones, method statements on the cleaning of equipment (including boots) and vehicles on and off site and between sites, and audit compliance.	No	To prevent the spread of invasive species and diseases. To ensure legal compliance.	Adequate protection measures would be employed throughout the construction period.	Implementation of the identified actions as per the Biosecurity Management Plan.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4.	Main works contractor
MW– BIO5	ES Chapter 8, Section 8.8	**Badgers:** All retained badger setts within the Scheme boundary would be subject to regular monitoring and appropriate action would be taken under the provisions of a licence to deter badgers from establishing new setts in these areas or to close newly established setts in areas which would be disturbed by further works. Suitable working methods would be employed in order to reduce the risk of harm to badgers and disturbance of badgers within their setts (as per the preliminary works).	Yes	To ensure good practice and legal compliance.	Badgers may establish new setts in locations where works are scheduled.	Application and return of Natural England EPSML (if necessary). Implementation of working methods and monitoring regime.	Contractual requirement between The Authority and the main works contractor. Licence conditions and DCO Requirement 4 and 7.	Main works contractor
MW– BIO6	ES Chapter 8, Section 8.8	**Bats:** Any works affecting bat roosts or structure or tree hosting such a roost would follow detailed methods as outlined in Table 3.2, PW-BIO4. Where bat roosts are being retained within 50 m of the Scheme boundary, and in respect of replacement, modified, translocated or new roosts would follow the methods outlined in Table 3.2, PW-BIO4.	Yes	To prevent disturbance to bats and their roosts, in order to ensure legal compliance. To ensure good practice and assess success of habitat establishment.		Application and return of Natural England EPSML (if necessary). Implementation of working methods	Contractual requirement between The Authority and the main works contractor.	Main works contractor

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		Monitoring: Monitoring as per Natural England licences for bats roosts and to assess the success of habitat establishment for foraging and commuting bats.				and monitoring regime.	Licence conditions and DCO Requirement 4 and 7.	
MW– BIO7	ES Chapter 8, Section 8.8	**Great crested newts:** Any works affecting confirmed GCN ponds and/or terrestrial habitat would follow detailed methods as outlined in Table 3.2, PW-BIO5. **Monitoring:** Monitoring as per Natural England licences for GCN populations and to assess the success of habitat establishment for GCN ponds.	Yes	To prevent disturbance to great crested newts in order to ensure legal compliance. To ensure good practice and assess success of habitat establishment.		Application and return of Natural England EPSML (if necessary). Implementation of working methods and monitoring regime.	Contractual requirement between The Authority and the main works contractor. Licence conditions and DCO Requirement 4 and 7.	Main works contractor
MW– BIO8	ES Chapter 8, Section 8.8	**Otter:** The ECoW (or an appropriate specialist) shall carry out monitoring of otter, *Lutra lutra,* to determine if there are any changes in otter distribution across the site and to determine if there are any new holts or resting places in use by otters within the Scheme boundary. Where an otter resting place or holt is present or suspected, a suitably qualified ecologist would prepare a method statement for the works to avoid disturbance of otters and ensure the works are legally compliant. Where required, a Natural England EPS licence would be obtained in order to facilitate the works (noting that at present such a license is not considered to be required, although pre-construction surveys shall confirm that this is the case). All works within proximity of suitable otter habitat would be undertaken in accordance with a method statement. Monitoring surveys in association with the newly created ditch habitats would also aim to assess the success of habitat establishment for riparian mammals.	Yes	To prevent disturbance to otters and their resting places, in order to ensure legal compliance. To ensure good practice and assess success of habitat establishment.	Otters may create new holts or resting places in locations where works are scheduled.	Application and return of Natural England EPSML (if necessary). Implementation of working methods and monitoring regime.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4 and 7.	Main works contractor
MW– BIO9	ES Chapter 8, Section 8.8	**Water vole:** Any works affecting water voles would follow detailed methods as outlined in Table 3.2, PW-BIO7. **Monitoring:** Monitoring as per Natural England licences (if required) for water vole and to assess the success of habitat establishment for water vole.	Yes	To prevent disturbance to water vole, in order to ensure legal compliance. To ensure good practice and assess success of habitat establishment.	Water vole may create new burrows in locations where works are scheduled.	Implementation of working methods and monitoring regime.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4 and 7.	Main works contractor
MW – BIO10	ES Chapter 8, Section 8.8	**Fish:** The main works contractor would be responsible for the production and implementation of a Fish Rescue and Translocation Strategy prior to any diversion/culverting of watercourses or dewatering of ponds taking place.	No	The avoid direct mortality of the known fish assemblage.	The assemblage of fish recorded is of no more than local ecological importance so assuming site conditions do not significantly change no further surveys are required.	Implementation of the identified actions as per the fish rescue and translocation strategy.	Contractual requirement between The Authority and the preliminary works contractor. Permit conditions and DCO Requirement 4 and 7.	Main works contractor

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MW–BIO11	ES Chapter 8, Section 8.8	**Botanical and terrestrial invertebrate monitoring:** The ECoW (or an appropriate specialist) would undertake a programme of botanical monitoring to assess the establishment and development particularly of species-rich grassland and woodland (including ancient woodland) within the Scheme as part of ensuring No Net Loss and potentially Net Gains in biodiversity. The ECoW (or an appropriate specialist) would liaise with consultees (namely SSC, Natural England and Staffordshire Wildlife Trust) in developing the details of methods. The results would then be made available to these consultees for review. Results of monitoring from the preliminary works period and subsequent recommendations from consultees would be used to inform habitat creation and subsequent management. Management action informed by monitoring may include, but is not restricted to, increase or decrease in the frequency, extent or duration of grazing or mowing, control of scrub, specific habitat management to create or maintain conditions **Locations:** Across the Scheme.	Yes	To ensure establishment of mitigation measures.	Management will be required to ensure habitat establishment	Implementation of monitoring regime to audit how habitats are establishing and whether /any changes to management are required.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4	Main works contractor
MW – BIO12	ES Chapter 8, Section 8.8	**Other protected and notable species (areas of signage works):** Minor highway improvement works comprising signage works within the existing highway verges are proposed in locations remote from the main construction works. Preconstruction surveys should be conducted within these areas and appropriate method statements put in place (where applicable). The preliminary works contractor (ecology) shall follow best practice to avoid harm to slow worm which are potentially present (although low risk) during the preliminary works in association with the signage locations along the M54 and M6. Pre-construction survey checks and appropriate works supervision under method statement should be followed.	No	To avoid killing or injuring other protected and notable species. To ensure legal compliance.	The assessment in the ES assumes an appropriate method statement would be in place.	Implementation of the identified actions.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4 and 7.	Main works contractor (all)
MW-BIO13	Es Chapter 8, Section 8.8	**Deterring birds from nesting:** In construction working areas, where appropriate, through either physical means to prevent establishment of nests (such as prior coppicing or pruning of vegetation) or other legal means of disturbance (such as the regular ploughing of soils or falconry). These measures would be implemented under the advice and supervision of a suitably experienced ecologist, and would not be used where there is considered to be a risk of disturbance to the active nests of Schedule 1 bird species.	No	To avoid damage or destruction of an active nest. To avoid disturbance of any species listed on Schedule 1 of the WCA 1981, while it is nest building or at a nest containing eggs or young, or to disturb the dependent young of such a bird. To ensure legal compliance.	The assessment in the ES assumes an appropriate method statement would be in place.	Implemented under the advice and supervision of a suitably experienced ecologist, signed off by the ECoW.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4 and 7.	Main works contractor (all)
Geology and soils								
MW–GEO1	ES Chapter 9, Section 9.8	**Contamination Risks:** The main works contractor shall implement measures on site, in accordance with CIRIA C741 4th Edition Environmental Good Practice (Ref 3.24), to assess and control risks to humans, e.g. construction workers, site visitors and nearby residents, resulting from the disturbance of contaminated land.	No.	To minimise the risks to construction workers and others	Potential for contaminated land ES Chapter 9: Geology and Soils [TR010054/APP/6.1] and ES Appendix 9.1 [TR010054/APP/6.3].	The Authority approval of CEMP, Method Statements (including measures to protect construction workers), and audit finds	Contractual requirement between the Authority and the main works contractor. DCO Requirement 4 and 6.	Main works contractor.

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						implementation meets objectives.		
MW–GEO2	ES Chapter 9, Section 9.8	**Unexpected contamination:** In the event that unexpected soil or groundwater contamination is encountered during construction, the main works contractor is to quantify the extent of the potential risk from the contamination and follow a risk-based approach in accordance with Environment Agency guidance Land Contamination: Risk Management (Ref 3.4). Where significant risks from soil or groundwater contamination are identified, appropriate mitigation (remediation) to reduce to acceptable levels the potential short and long-term health and safety and environmental risks to sensitive receptors would be identified and implemented. Any required additional ground investigations would be undertaken in accordance with UK good practice, including BS 5930:2015 Code of Practice for ground investigations (Ref 3.2) and BS 10175:2011 + A2:2017 Investigation of Potentially Contaminated Sites Code of Practice (Ref 3.3).	No.	To prevent contamination related to construction of the Scheme and maintain compliance with national legislation and regulations.	Potentially contaminated land has been identified ES Chapter 9: Geology and Soils. There is always a possibility that unidentified contamination may be encountered during earthworks.	Completion of appropriate GI works and remediation measures.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4 and 6.	Main works contractor.
MW–GEO3	ES Chapter 9, Section 9.8	**Hazardous substances:** The contactor shall control all potentially contaminative materials in accordance with the Control of Substances Hazardous to Health (COSHH) Regulations. All potentially contaminative materials would be properly isolated and bunded. Bunds and trays would be regularly checked and maintained. All surface water or other contaminated water, which accumulates in the bund, would be removed by manually controlled positive lift pumps and not by means of a gravity drain. This water would be discharged in an off-site public sewer in consultation with the relevant water companies.	No.	To prevent contamination related to construction of the Scheme.	Assessment within the ES assumes that preventative controls would be implemented to avoid contamination.	Agreement with water companies for the disposal of contaminated water.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4.	Main works contractor.
MW–GEO4	ES Chapter 9, Section 9.8	**Asbestos:** The main works contractor shall prepare and implement an Asbestos Management Plan to ensure asbestos can be identified, removed and disposed of in a legally compliant manner.	No	To mitigate for any asbestos encountered.	Assessment within the ES assumes that an Asbestos Management Plan would be in place.	Development of an Asbestos Management Plan.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4	Main works contractor.
MW–GEO5	ES Chapter 9, Section 9.8	**Excavated materials management:** The main works contractor shall develop a Soil Management Strategy (PW-GEO5), which would detail the areas and type of topsoil/subsoil to be stripped, stripping method, haul routes and the management of the soil stockpiles. The main works contractor shall assess excavated soils for any potential risks posed to health and the environment from the reuse of such soils as engineering fill. This would include mitigation of the effects on soils and the spread of contamination to ensure that those soils identified as contaminated are not mixed with uncontaminated soil. All excavated materials proposed for re-use would be required to meet risk-based acceptability criteria. The main works contractor shall ensure soils would be protected from accidental contamination during storage and transit. The main works contractor shall endeavour to return topsoil stripped during the construction of the Scheme as close to its source of origin as possible during restoration. Soils should be reused as soon as is practicable and stored in such a way as to minimise structural damage (so far as reasonably practicable).	No.	To ensure that high standards of soil handling and material management are employed during construction.	Assessment within the ES assumes that appropriate soils and material handling would be incorporated throughout the construction phase to mitigate significant effects.	Development of the Soils Management Strategy and adherence to the document.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4	Main works contractor.

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		Additionally, the creation of bare areas of permanently exposed soil that would be vulnerable to erosion processes would be avoided. Should soils need to be stored for longer than a few weeks, topsoils and subsoils would be stored separately in mounds of typically 3-4 m, in an area with good drainage to ensure soils remain dry. Soil mounds should be of a single soil type and soils of different types should not be mixed e.g. topsoil will be removed to store subsoil and topsoil will be stored on similar topsoil. Where soils are to be stockpiled for more than six months, the surface of stockpiles would be seeded with a grass/clover mix to minimise soil erosion and to help reduce infestation by weeds. Further details of topsoil and subsoil storage would be set out in greater detail within the Soils Management Strategy. Topsoil may need to be removed during construction in order to prevent permanent burial beneath other earthworks. Such soils would be stockpiled and re-used, subject to acceptability, in the general earthworks such as landscaping and bunds. The re-use of excavated materials shall be governed by a Materials Management Plan (MW-MAT2) developed by the main works contractor in accordance with the CL:AIRE Definition of Waste: Development Industry Code of Practice (Ref 3.7). Should off-site disposal in relation to excavated soil be required, the material would be characterised to determine firstly whether it is Hazardous or Non-Hazardous waste in accordance with the Environment Agency's Technical Guidance WM3 (Ref 3.8). The appropriate disposal facility will, where required, be determined through Waste Acceptance Criteria (WAC) analysis, as required.						
MW–GEO6	ES Chapter 9, Section 9.8	**Construction on or adjacent to land affected by contamination:** The main works contractor shall implement control measures for construction activities on or adjacent to the land identified as being affected by contamination. This would include the following, as appropriate: • Wheel wash facilities. • Redundant services near potentially contaminated areas would be either removed or cut off and sealed. • Material known or suspected to be contaminated would be stockpiled (depending on the source of the material and the nature of the contamination) and tested prior to reuse or disposal. Stockpiles would be placed on a low permeability liner, suitably protected from damage by earthmoving plant. Known or suspected contamination stockpile areas would be tested adequately prior to and after use to ensure that no cross-contamination has occurred. • Prior to reuse of site-won materials, pre- classification testing of soils would be undertaken. • Imported fill materials would be required to meet soil and leachate acceptance criteria derived in the detailed design stage. • Piled foundations and ground improvement works located within 50 m of potential or known areas of land contamination or with potential to impact Source Protections Zones would require a site-specific environmental risk assessment, and would be identified within the relevant management plans.		To prevent the spread of contaminated materials and risks to health of residents/workers of adjacent properties, controlled waters and the wider environment.	Assessment within the ES assumes that land to be restored to agriculture would be suitable for purpose and that the Scheme can be built safely.	Implementation and audit of the monitoring procedures.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4 and 6.	Main works contractor

Ref	Source Ref	Action/ Commitment (including specific location if appropriate)	Is monitoring required? Yes/ No	Objective	Assumption on which the action is based	Achievement criteria and reporting requirements (if applicable	How the action is to be implemented	Responsible person(s)
		• The main works contractor would adhere to appropriate guidance, including the Piling and Penetrative Ground Improvement Methods on Land Affected by Contamination: Guidance on Pollution Prevention. • Within areas of known or suspected contamination, measures would be introduced to ensure that buried services would be protected from the ingress of mobile and aggressive contaminants. In the case of drainage runs, the infiltration of surface water into the underlying contaminated ground would be prevented and clean or lined service corridors would be installed to provide a suitable barrier to migrating ground gases adjacent to known/potential sources. • Materials used for the Scheme would be proven 'suitable for use' by adoption of acceptance criteria and would be deposited under either environmental permitting regulations or the Definition of Waste: Development Industry Code of Practice (Ref 3.7). • Construction activities would follow good practice guidelines to avoid contamination from leaks, spillages and inappropriate storage of materials on site. Appropriate control measures would be identified and implemented through the CEMP. • Measures to prevent the dispersal of asbestos fibres would be taken in accordance with the CEMP and the Asbestos Management Plan.						
MW–GEO7	ES Chapter 9, Section 9.8	**Soil Management Strategy:** The main works contractor shall produce a detailed Soils Management Strategy in line with (PW-GEO4 and PW-GEO5). The management strategy would identify the nature and types of soil that would be affected, including the methods that would be employed for stripping soil and the restoration of agricultural land to its existing agricultural land classification where it is being returned to agricultural use. The main works contractor shall follow the guidance in Construction Code of Practice for the Sustainable Use of Soils on Construction Sites (Ref 3.5) when handling agricultural soils.		To protect soils and agricultural land impacted by the Scheme.	The ES assessment assumes the protection of agricultural soils and successful return of land to agriculture where applicable.	Production of the Soils Management Strategy.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4	Main works contractor.
MW–GEO8	ES Chapter 9, Section 9.8	**Biosecurity (agriculture):** The main works contractor shall comply with the requirements of Defra and appropriate guidance to avoid, as far as possible, the spread of soil borne, crop and animal diseases. Refer to PW- GEO6.		To limit the Scheme impact on soils and agricultural land.	The ES assessment assumes the protection of agricultural soils and successful return of land to agriculture where applicable.	Implementation of appropriate measures as per Biosecurity Management Plan.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4	Main works contractor.
MW–GEO9	ES Chapter 9, Section 9.8	**Restoration of agricultural land and aftercare:** Where land is to be restored to agriculture the main works contractor shall liaise with the landowner/ tenant and set out the detail for restoration on each specific area of farmland. The land will be restored to its existing agricultural land classification. Restoration will proceed with full consultation between the landowner/ tenant and the main works contractor including inspection of works where applicable and in accordance with requisite site health and safety procedures. Those areas of agricultural land which are not returned to agricultural use will be maintained or restored to its existing agricultural land classification where possible, this is dependent on the end use of the land.	Yes	To limit the Scheme impact on soils and agricultural land. To ensure reinstated agricultural land has been restored to its original condition or agreed condition.	The ES assessment assumes the protection of agricultural soils and that land to be restored to agriculture would be suitable for purpose.	The production of the Soil Resource Plan and adherence to measures within. Restoration as defined.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4	Main works contractor.

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		Monitoring: Land restored to agriculture would be subject to an aftercare period following completion of construction during which responsibility for the condition of the reinstated soil would remain with the main works contractor. A Scheme of management would be prepared as a supplementary document.						
Material Assets and Waste								
MW–MAT1	ES Chapter 10, Section 10.8	**Site Waste Management Plan (SWMP):** The main works contractor shall, in accordance with industry good practice, develop and implement a SWMP which would set out a recording process for the management of waste, including the storage and transport of waste on-site and a recording mechanism for required waste documentation such as Waste Transfer or Consignment Notes (dependent on the waste stream) in order to confirm the assessment of the waste impact and to implement the embedded mitigation measures. The SWMP would include procedures for monitoring the overall construction waste recovery rate and the proportion of secondary and recycled aggregate used in the Scheme, in order to confirm the assessment of materials impacts. The SWMP would: • identify and record the types, quantities and destination of waste arisings from the Scheme in the SWMP; • report this information to The Authority on a periodic basis and update the SWMP as appropriate; and • define measures in the SWMP to minimise waste arisings from the Scheme and to recover waste materials in accordance with the principles of the waste hierarchy.	No.	To ensure suitable management of waste arising from the construction of the Scheme.	A SWMP would be needed to effectively control and manage waste arisings.	The Authority approval of SWMP.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4	Main works contractor.
MW–MAT2	ES Chapter 10, Section 10.8	**Materials Management Plan (MMP):** The main works contractor shall prepare a MMP in accordance with the CL:AIRE Definition of Waste: Code of Practice (Ref 3.7). The MMP would detail the procedures and measures that would be taken to classify, track, store, reuse and dispose of all excavated materials that would be encountered during the construction phase.	No.	To reduce effects on the availability and use of secondary and recycled construction materials. To reduce effects that on-site generated materials (e.g. soils) and waste arisings have on the existing capacity of waste management facilities.	Waste would be generated and managed during construction.	The Authority approval of MMP.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4	Main works contractor.
MW–MAT3	ES Chapter 10, Section 10.8	**Recovery target:** The main works contractor shall seek to achieve a minimum recovery rate of 70% by weight for non-hazardous construction and demolition waste (excluding uncontaminated excavated soil and stones, European Waste Catalogue (EWC) code 17 05 04.	No.	To reduce effects on the availability and use of secondary and recycled construction materials. To reduce effects that on-site generated materials (e.g. soils) and waste arisings have on the existing capacity of waste management facilities.	Waste would be generated and managed during construction.	Recovery of 70% by weight of non-hazardous construction and demolition waste	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4	Main works contractor.

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MW–MAT4	ES Chapter 10, Section 10.8	**Secondary and recycled aggregates target:** The main works contractor shall seek to achieve a rate of 27% use of secondary and recycled aggregates, for those applications for which substitution of primary aggregates is technically and economically feasible.	No.	To reduce effects on the availability and use of secondary and recycled construction materials. To reduce effects that on-site generated materials (e.g. soils) and waste arisings have on the existing capacity of waste management facilities.	Waste would be generated and managed during construction.	27% use of use of secondary and recycled aggregates.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4	Main works contractor.
MW–MAT5	ES Chapter 10, Section 10.8	**Waste storage on site:** The main works contractor shall provide suitable containers for reception and temporary storage of waste on site, and shall arrange for waste to be periodically collected and transported to a suitably licensed facility for treatment or disposal. The main works contractor shall be responsible for obtaining any necessary permits or exemptions for on-site management of waste.	No.	To reduce effects on the availability and use of secondary and recycled construction materials. To reduce effects that on-site generated materials (e.g. soils) and waste arisings have on the existing capacity of waste management facilities.	Waste would be generated and managed during construction.	Provision of storage containers as described.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4	Main works contractor.
MW–MAT6	ES Chapter 10, Section 10.8	**Waste monitoring:** The main works contractor shall undertake regular audits and inspection of waste management activities to ensure compliance with the requirements of the approved SWMP, statutory controls and other Scheme policies and procedures relevant to the management of surplus excavated material and waste.	Yes, see column three.	To reduce effects on the availability and use of secondary and recycled construction materials. To reduce effects that on-site generated materials (e.g. soils) and waste arisings have on the existing capacity of waste management facilities.	Waste would be generated and managed during construction.	Implementation of the SWMP and monitoring requirements.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4	Main works contractor.
Noise and vibration								
MW– NOI1	ES Chapter 11 Section 11.8	**Best Practicable Means (BPM):** BPM as outlined in PW– NOI1 shall be applied during the main works by the main works contractor.	No.	To ensure construction noise and vibration is managed appropriately.	Assessment within the ES assumes BPM means would be incorporated throughout the construction phase.	Implementation of BPM.	Contractual requirement between The Authority and the preliminary works contractor. DCO Requirement 4	Main works contractor.
MW– NOI2	ES Chapter 11, Section 11.8	**Section 61 Consents:** Refer to PW-NOI2.	No.	To ensure noise and vibration is managed appropriately at sensitive locations	Section 61 consents could be used in relation to the Scheme.	Agreement of Sections 61 consents with SCC (if required).	Contractual requirement between The Authority and the preliminary works contractor.	Main works contractor.

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							Section 61 consents (as applicable) and DCO Requirement 4	
MW– NOI3	ES Chapter 11, Section 11.8	**Noise and Vibration Management Plan:** The main works contractor shall prepare a Noise and Vibration Management Plan detailing the management and monitoring processes to be introduced across all construction sites and compounds. Refer to PW-NO13 for details on what the plan should include.	No.	To ensure that the effects of noise and vibration are controlled, and that BPM are planned and employed during construction period.	The preliminary works contractor's activities are likely to generate noise and vibration which require management.	Approval of Noise and Vibration Management Plan by The Authority.	Contractual requirement between The Authority and the preliminary works contractor. DCO Requirement 4	Main works contractor.
MW– NOI4	ES Chapter 11, Section 11.8	**Vibration:** Details on the management of vibration to be implemented by the main works contractor during the main works are detailed in PW-NOI4.	No.	To ensure that BPM are being employed at all times, that they are sufficiently mitigating noise and vibration impacts, and to provide the opportunity to implement alternative actions should their objectives be achieved.	Monitoring would be required to ensure BPM are effectively reducing noise and vibration impacts.	Inclusion of monitoring proposal with the Noise and Vibration Management Plan. Adhering to the specified monitoring regime throughout the construction period.	Contractual requirement between The Authority and the preliminary works contractor. DCO Requirement 4	Main works contractor.
MW– NOI5	ES Chapter 11, Section 11.8	**Noise and vibration monitoring:** Noise and vibration monitoring as outlined in PW-NOI5, shall be implemented by the main works contractor during the main works, where applicable.	Yes, see column three.	To ensure that BPM are being employed at all times, that they are sufficiently mitigating noise and vibration impacts, and to provide the opportunity to implement alternative actions should their objectives be achieved.	Monitoring would be required to ensure BPM are effectively reducing noise and vibration impacts.	Inclusion of monitoring proposal with the Noise and Vibration Management Plan. Adhering to the specified monitoring regime throughout the construction period.	Contractual requirement between The Authority and the preliminary works contractor. DCO Requirement 4	Main works contractor.
MW– NOI6	ES Chapter 11, Section 11.8	**Noise insulation and temporary re-housing:** The main works contractor shall have a Noise Insulation and Temporary Rehousing Policy for the Scheme. The policy would set out all roles, responsibilities and actions required in respect of these measures. Notwithstanding the measures set out in this OEMP and any agreements with SSC, noise insulation and temporary re-housing would be offered to qualifying parties when: • Noise levels are predicted or measured by the main works contractor to exceed the relevant trigger level (as defined in BS 5228- 1 (Ref 3.11), Table E.2) for at least 10 days out of any period of fifteen consecutive days or alternatively 40 days in any six-month period at affected properties.	No.	To ensure that additional protection for residents is in place in the event that it is not practicable to mitigate airborne noise to tolerable levels during the construction works.	Insulation and temporary re-housing may be required to protect residents form significant effect.	Implementation and adherence to the policy.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4	Main works contractor.

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		• The property complies with all other requirements of the Noise Insulation (Amendment) Regulations 1988. • The property is lawfully occupied as a permanent dwelling. • Noise insulation does not already exist that is of an equivalent standard to that which would be allowed for under the Noise Insulation (Amendment) Regulations 1988. The main works contractor shall consider all applications supported by evidence for noise insulation or temporary rehousing from occupiers who may have special circumstances. Special circumstances could include night workers; those working in home occupations; local businesses or buildings that provide community facilities requiring a particularly quiet environment; those with a medical condition, which would be seriously aggravated by construction noise; and provide noise insulation or temporary re-housing where it is demonstrated that this is necessary.						
MW– NOI7	ES Chapter 11, Section 11.8	**Early installation of noise barriers:** All noise barriers included as essential operational traffic noise mitigation shall be installed as soon as is reasonably practicable in order to provide noise mitigation during the construction works.	No	To reduce construction noise impacts upon nearby receptors	-	Implementation of noise barriers, as per the specifications listed in the ES and shown on the Environmental Masterplans	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4	Main works contractor.
MW– NOI8	ES Chapter 11, Section 11.8	Non-impact piling methods will be employed during the works.	No	To minimise construction noise and vibration impacts upon nearby receptors	Assessment within the ES assumes only augured piling and sheet piling using a vibratory piling rig required	Implementation of requirement	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4	Main works contractor.
Population and human health								
MW–POH1	ES Chapter 12, Section 12.8	**Notification of works:** The main works contractor shall liaise with landowners, occupiers and agents, as appropriate, regarding the provision of accommodation works and agree the programme of works and access routes to be used by construction traffic.	No.	To reduce impacts on landowners affected by the Scheme.	Assessment within the ES assumes that appropriate measures would be incorporated to reduce impacts on landowners.	Liaison with landowners, occupiers and agents.	Contractual requirement between The Authority and the preliminary works contractor. DCO Requirement 4	Main works contractor.
MW–POH2	ES Chapter 12, Section 12.8	**Liaison with farm holdings:** The main works contractor shall liaise with farm holdings, occupiers and agents, as appropriate, to establish: • Measures to be implemented to protect and maintain livestock water supplies which may be affected due to construction works. • The protection of agricultural land adjacent to the construction site both during and post-construction, including the provision and maintenance of appropriate stock-proof fencing. • Arrangements for the maintenance of farm and field accesses affected by construction.	No.	To reduce impacts on farm holdings affected by the Scheme.	Assessment within the ES assumes that appropriate measures would be incorporated to reduce effects on farm holdings.	Appropriate communication with landowners/ occupiers/ agents.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4	Main works contractor.

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MW–POH3	ES Chapter 12, Section 12.8	**Restoration of land and aftercare:** Where land is temporarily required for construction and is to be restored to its former condition the main works contractor shall liaise with the landowner/ tenant and set out the detail for restoration on each specific area. The land restoration would proceed with full consultation between with the landowner/ tenant and the main works contractor including inspection of works where applicable and in accordance with requisite site health and safety procedures. **Monitoring of restored land:** The main works contractor shall undertake further inspections of restored land with the landowner/tenant and Highways England's experts (and valuer, if required) to assess the progress of the restoration. These would be carried out with timing appropriate to any perceived issues or concerns. Concerns would be assessed by all parties and appropriate remedial actions or compensation agreed within the parameters of the compensation code or any previous agreements made at the time of acceptance of the initial restoration works and handover to the landowner/tenant.	No.	To reduce impacts on landowners affected by the Scheme.	Assessment within the ES assumes that appropriate measures would be incorporated to reduce impacts on landowners.	Effective communication with landowners/ tenants and the production of the Soil Resource Plan and adherence to measures within.	Contractual requirement between The Authority and the preliminary works contractor. DCO Requirement 4	Main works contractor.
MW–POH4	ES Chapter 12, Section 12.8	**Footpath and cycleway diversions:** The main works contractor shall plan the Scheme construction works to minimise the need to close and divert footpaths and cycleway facilities, and minimise closures and diversion durations. Where the closure of public footpaths and cycle routes would be required, safe and appropriate alternative means of access shall be provided to ensure access would be maintained at all times in order to minimise temporary severance. The main works contractor shall agree temporary diversion routes and closures in advance with SCC as applicable. Appropriate signage for all closures and diversion of footpaths and cycleways shall be used to inform pedestrians and cyclists, with sufficient notice of such closures and diversions being provided.	No.	To minimise disruption to pedestrians and cyclists.	ES assumes appropriate provisions are put in place to minimise disruption to pedestrians and cyclists.	Agreement of actions with SCC as applicable.	Contractual requirement between The Authority and the preliminary works contractor. DCO Requirement 4	Main works contractor.
Road drainage and the water environment								
MW–WAT1	ES Chapter 13, Section 13.8	**Water Management Plan:** The main works contractor shall produce a Water Management Plan to include identification of all surface and ground waterbodies (e.g. watercourses and aquifers), and taking into account the guidance contained within the relevant information on pollution prevention provided by the Environment Agency, the Guidance for Pollution Prevention (GPPs) available on the NetRegs website (Ref 3.26) and other Construction Industry Research and Information Association (CIRIA) documents. Specific receptors in the water environment would be listed in the plan. Where appropriate, integrated aquatic ecology and water quality plans shall be developed. The Emergency Preparedness detailed in MW-G19 would also include effects on water resources. Environment Agency guidance on pollution incident response planning would be reflected in the emergency response procedures described in the Water Management Plan. The Water Management Plan will include measures to: – Managing the risk of pollution to surface waters and groundwater. – Measures to control the storage, handling and disposal of potentially polluting substances during construction.	No.	To ensure the protection of the water environment.	The main works activities are likely to generate effects on the water environment which would need to be managed.	Production of the Water Management Plan and the overarching Emergency Preparedness Plan.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4	Main works contractor.

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		– The management of activities within floodplains in the area of Watercourse 5 (i.e. kept to a minimum) with temporary land take required for construction to be located out of the floodplain as far as reasonably practicable or allowances made for floodplain control measures and contingency actions. – Management of water removed from cuttings and the borrow pit for construction dewatering activities. – Managing the risk from groundwater flooding through appropriate working practices (during excavations) and with adequate plans and equipment in place for de-watering to ensure safe dry working environments. – Pollution prevention and emergency response procedures. An Outline Water Management Plan is included in Annex C.						
MW–WAT2	ES Chapter 13, Section 13.8	**Site drainage:** The main works contractor shall utilise sustainable methods for construction discharges including site drainage, surface runoff, and dewatering discharges. This includes discharge to water courses subject to water quality, rate of discharge and scour assessments. For discharges to mains foul or combined sewers relevant permissions would be obtained from the statutory undertaker. Discharge to watercourses shall, insofar as not dealt with in the DCO, only be permitted where permits or other relevant approval has been obtained if required. Sufficient time would be made for the Environment Agency to issue permits in accordance with relevant legislation. The main works contractor shall ensure that site drainage meets the effluent and flood risk standards required by the sewerage undertaker and the Environment Agency, as appropriate, in accordance with the relevant permit, and would provide and maintain holding or settling tanks, separators and other measures as may be required to meet those standards. The main works contractor shall ensure that access is provided to the undertaker and Environment Agency so that samples of discharge can be obtained and analysed, and the flows verified as required. The main works contractor shall incorporate the following measures during the construction works: • All temporary land-take would include adequate areas of land set aside for robust control measures, for example sustainable drainage control. • Any discharge to sewers and controlled waters would be required to be in accordance with the DCO provisions, having regard to the relevant licensing body's requirements. • Water flows from sites would be limited during construction to existing runoff rates, unless otherwise agreed with the Environment Agency in accordance with relevant legislation. • The relevant sections of BS 6031: Code of Practice for Earthworks (Ref 3.25) for the general control of site drainage would be followed. • Site clearance and areas of bare earth will be kept to a minimum, and re-seeded as soon as practically possible. • A 10 m buffer strip will be maintained around all watercourses using appropriate temporary exclusion fencing other than where specific works are required closer to the channel.	No.	To ensure the protection of the water environment.	Assessment within the ES assumes adequate site drainage methods are employed throughout the construction period.	Granting of any permits/ consents (if required outside of the DCO). Adherence to the most current standards.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4	Main works contractor.

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		• When undertaking earth moving works periods of wet weather would be avoided, if possible, to minimise the risk of generating runoff contaminated with fine particulates. However, it is assumed some wet weather periods may be unavoidable, in which case other deployed mitigation measures (see below) would be implemented to control fine sediment laden runoff. • A temporary drainage system would be developed to prevent runoff contaminated with fine particulates from entering surface water drains without treatment. Measures would include drain covers, sand bags, earth bunds, geotextile silt fences, straw bales, or proprietary treatment (e.g. lamella clarifiers). The temporary drainage system shall also be designed to ensure that construction site runoff is adequately attenuated and does not result in an increase in flood risk downstream (i.e. adequate temporary storage will be provided). • Topsoil/subsoil would be stored away from watercourses and preferably on flat lying land (minimum 20 m on flat land, with increasing distance on steeper topography subject to risk assessment and appropriate controls). Where this is not possible and it is to be stockpiled for longer than a two week period, the material would, as soon as possible either be covered with geotextile mats, seeded to promote vegetation growth, or drainage provided to a suitable settlement area. • Appropriately sized runoff storage areas for the settlement of excessive fine particulates in runoff would be provided. • Mud deposits would be controlled at entry and exits to the Application Site using wheel washing facilities and / or road sweepers operating during earthworks or other times as considered necessary. • Tools and plant to be washed out and cleaned in designated areas within the Site compound where runoff can be isolated for treatment before discharge to surface water drainage under appropriate consent and / or agreement with Environment Agency and / or Seven Trent Water, or otherwise removed from site for appropriate disposal at a licenced waste facility. • Debris and other material would be prevented from entering surface water drainage, through maintenance of a clean and tidy site, provision of clearly labelled waste receptacles, grid covers and the presence of site security fencing. • During the construction process any surface water land drains or existing road gullies present on the site would be identified and covered up to ensure construction site runoff or any accidental spillages cannot enter the drainage system without appropriate treatment. • Where water would need to be removed from excavations, it would be suitably treated (e.g. settlement to remove suspended solids) and transported the minimum practical distance before discharge to a suitable water body or sewer under the appropriate consents or otherwise pumped to a tanker for off-site disposal at an appropriate licenced waste facility.						
MW–WAT3	ES Chapter 13, Section 13.8	**Spill response – Emergency Response Plan:** The main works contractor shall include within the Water Management Plan an Emergency Response Plan. This will also include cross-reference with the procedures in the Emergency Preparedness and Response Plan, which covers risks to land and air as well as water (refer to MW- G16).	No.	To ensure processes and equipment are in place to deal with oil and chemical spills on site.	Assessment within the ES assumes adequate monitoring and emergency measures would be employed	Production of the Pollution Incident Control Plan, in consultation with the identified relevant	Contractual requirement between The Authority and the	Main works contractor.

Ref	Source Ref	Action/ Commitment (including specific location if appropriate)	Is monitoring required? Yes/ No	Objective	Assumption on which the action is based	Achievement criteria and reporting requirements (if applicable	How the action is to be implemented	Responsible person(s)
		The Emergency Response Plan is in response to the fact that activities on site could lead to water pollution and pro-active management practices are required to ensure that pollution incidents are avoided where possible, but should they occur, such as a diesel spillage, that they are minimised, controlled, reported to relevant parties and remediated. The plan would define the criteria for implementing the relevant measures. Environment Agency guidance on pollution incident response planning would be reflected in the emergency plan. These procedures shall include the provision of appropriate incident response equipment, e.g. spill kits, would be available next to particularly sensitive activities or areas of a site (such as fuel storage areas). In the preparation of local pollution incident response measures, the main works contractor shall consult with relevant organisations, including, but not limited to, statutory bodies and other relevant parties, such as the Health and Safety Executive (HSE) (Construction), the Fire Authority, the Ambulance Service, the Environment Agency, Natural England, utilities companies and SSC (emergency planning and pollution control functions). Reference should also be made to the Environment Agency's Pollution Prevention Guidelines 21 (Incident Response Planning) and Construction Industry Research and Information Association's (CIRIA's) Environmental good practice – site guide.			throughout the construction period.	organisations. The Authority approval of the plan.	main works contractor. DCO Requirement 4	
MW–WAT4	ES Chapter 13, Section 13.8	**Pollution incident monitoring:** The contractor shall have in place effective arrangements to investigate and provide reports on any potential or actual significant pollution incidents, including: • A description of the pollution incident, including its location (and Ordnance Survey (OS) grid reference), the type and quantity of contaminant and the likely receptor(s). • Contributory causes. • Adverse effects. • Measures implemented to mitigate adverse effects. • Any recommendations to reduce the risk of similar incidents occurring.	Yes	To ensure processes are in place to monitor any potential or actual significant pollution incidents.	Assessment within the ES assumes adequate monitoring and emergency measures would be employed throughout the construction period.	The Authority approval of CEMP.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4	Main works contractor.
MW–WAT5	ES Chapter 13, Section 13.8	**Protection of watercourses:** The contactor shall incorporate protection measures for works in or adjacent to watercourses in accordance with requirements set out by the LLFA with advice from the Environment Agency. Insofar as it is not dealt with in the DCO, approval would be obtained in advance for all temporary and / or permanent works that may affect the flow of ordinary watercourses (e.g. crossings of, diversions to, construction of outfalls). Sufficient allowance would be made for the LLFA to issue a Land Drainage Consent before relevant works are undertaken. Insofar as it is not dealt with in the DCO, appropriate protective provisions would be agreed with the LLFA supported where necessary by the Environment Agency. Please note that there are no Main Rivers affected directly by the works and that the Environment Agency has agreed that any works on floodplains can be considered through the Land Drainage Consent application procedure. The main works contractor shall adopt measures to prevent the deposition of silt or other material in any existing watercourse, lake, borehole, aquifer or catchment area, arising from work operations. The measures would accord with the principles set out in industry guidelines, including CIRIA's reports C648 Control of	No.	To prevent the degradation and pollution of watercourses.	Assessment within the ES assumes that adequate protection of watercourses would be employed throughout the construction period.	Granting of any permits/ consents (if required outside of the DCO). Adherence to the most current standards.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4	Main works contractor.

Ref	Source Ref	Action/ Commitment (including specific location if appropriate)	Is monitoring required? Yes/ No	Objective	Assumption on which the action is based	Achievement criteria and reporting requirements (if applicable	How the action is to be implemented	Responsible person(s)
		Water Pollution from Linear Construction Sites (Ref 3.27) and C532: Control of water pollution from construction sites (Ref 3.28, and GPP 5: Works and maintenance on and near water (Ref 3.26). The main works contractor shall incorporate the following measures during the construction works: • Watercourses, including land and/ or road drainage, within the construction sites would be maintained. • Protection measures e.g. fabric silt fencing, straw bales or sand bag walls, earth bunds etc. would be in place to protect existing water features from degradation and physical damage during construction by preventing ingress of contaminated water, by isolating working areas, and creating dry working areas. • The flow in some watercourses may need to be flumed or over-pumped. Installation of temporary dams should be done under the necessary permissions (and outside of any ecological working period restrictions) and with care to avoid unnecessary physical damage to the channel. Spare pumps should be kept on site in the event of failure of the principle pump. Materials and tools should be removed from the channel after each working day and some flow returned to the channel. On completion of the works any gravels/bed material temporarily removed should be carefully reinstated in stratigraphic layers as removed in the first instance. Flows should also be released slowly and preferably from downstream to avoid sudden erosion of loosened bed and bank material. • All areas with the potential to generate contaminated water would be bunded to prevent the release of contaminants.						
MW–WAT6	ES Chapter 13, Section 13.8	**Control of pollution to waterbodies:** The main works contractor shall ensure that protection measures to control the risk of pollution are included within the Water Management Plan; these would be consistent with the Environmental Permitting (England and Wales) Regulations 2016, including: • Provision of maps showing the locations, together with address and contact details, of local emergency services facilities such as police stations, fire authorities, medical facilities and other relevant authorities. • Ensure that site drainage plans and flood risk management plans are available on site and are kept up-to-date. • Ensure that pollution shut- off valves are used in compounds with formal drainage. • Ensure staff competence, awareness and training in implementing plans (including how sources are to be isolated, and contaminated materials removed) and using pollution response kit. • Provision of contact details for the relevant authorities, such as the Environment Agency, and the persons responsible on the construction site and within the main works contractors' organisation for pollution incident response. • Provision of contacts with a competent spill response company which can be contacted at short notice for an immediate response (where appropriate).	No.	To prevent pollution of waterbodies.	Assessment within the ES assumes that adequate pollution prevention measures would be employed throughout the construction period.	Consultation with the Environment Agency where required (e,g, concrete batching plant). The Authority approval of the Water Management Plan.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4	Main works contractor.

Ref	Source Ref	Action/ Commitment (including specific location if appropriate)	Is monitoring required? Yes/ No	Objective	Assumption on which the action is based	Achievement criteria and reporting requirements (if applicable	How the action is to be implemented	Responsible person(s)
		• The main works contractor shall consult with the relevant regulatory bodies regarding specific requirements in relation to establishing and operating the concrete batching plant(s). Such plants should be located as a minimum 50 m from any waterbody and on flat, impermeable ground, with an isolated surface water drainage system that can be pumped out for offsite disposal at a licenced waste facility. Alternatively, if wash water from any batching plants is to be discharged to the water environment approval from the relevant authority would be required (i.e. a Water Activity Permit from the Environment Agency). • The main works contractor shall ensure that the handling of contaminated excavated material, treatment processes required and the storage of excavated material does not affect Controlled Waters, including surface or groundwater bodies. Measures would be put into place to prevent contaminated runoff reaching open ground. • The main works contractor shall avoid using materials in the permanent or temporary works that could result in direct or indirect discharge of hazardous substances or non-hazardous pollutants to groundwater, as defined under the Environmental Permitting (England and Wales) Regulations 2016. • The main works contractor shall incorporate the following measures during the construction works: • Any containers of contaminating substances onsite would be leak-proof and kept in a safe and secure building or compound from which they cannot leak, spill or be open to vandalism. The containers would be protected by temporary impermeable bunds (or drip trays for small containers) with a capacity of 110% of the maximum stored volume. Areas for transfer of contaminating substances (including refuelling areas) would be similarly protected. • Any permanent oil storage tanks and temporary storage of 201 litres or more of oil in drums and mobile bowsers, and ancillary pipe work, valve, filters, sight gauges and equipment requiring secondary containment, e.g. bunding or drip trays, as defined in the Control of Pollution (Oil Storage) (England) Regulations 2001. Environment Agency guidance on oil storage regulations for business and preventing groundwater pollution from underground fuel storage tanks would be complied with. • No oil would be stored within 50 m of a watercourse (and potentially further if ground is angled towards a watercourse) or within a Source Protection Zone (SPZ) 1 (nominal minimum 50 m provided around all licensed abstractions). Storage within an SPZ 2 (nominal minimum 250 m distance) or beyond requires secondary containment, e.g. secondary bunding impermeable to water and oil, with no drainage valve fitted for draining of rainwater. The secondary containment must be sufficient to contain at least 110% of the maximum contents of an oil tank, mobile bowser or intermediate bulk container. • Above-ground pipework would be properly supported, and underground pipework would be protected from physical damage and have adequate leakage detection. All mechanical joints on oil pipes must be easy to inspect. Oil and hydrocarbon underground pipes would not extend into the groundwater saturated zone, unless approval is obtained from the Environment Agency and with risk acceptably mitigated. • All refuelling, oiling and greasing would take place above drip trays or on an impermeable surface with sealed drainage or oil interceptor which provides						

Ref	Source Ref	Action/ Commitment (including specific location if appropriate)	Is monitoring required? Yes/ No	Objective	Assumption on which the action is based	Achievement criteria and reporting requirements (if applicable	How the action is to be implemented	Responsible person(s)
		protection to underground strata and watercourses and away from drains as far as is reasonably practicable. Vehicles and plant would not be left unattended during refuelling. • Only construction equipment and vehicles free of oil/fuel leaks which could cause material contamination would be permitted onsite. Drip trays would be used on all mobile plant and plant nappies placed below static mechanical plant. • Spillage kits would be stored at key locations on site (and defined within the Emergency Preparedness Plan/ Water Management Plan) and in particular at refuelling areas or close to waterbodies. Spillage kits would also be kept with mobile bowsers and staff would be trained in their use. • All wash down of vehicles (including wheel washing) and equipment would take place in designated areas, and wash water would be prevented from passing untreated into watercourses and groundwater. • Only biodegradable hydraulic oils would be used in equipment working in or over watercourses, and appropriate measures are to be taken to protect erodible earthwork surfaces. • Suitable concrete break out and plant washing areas will also be provided away from watercourses and on either impermeable ground or using suitable geotextile membranes. No concrete wash water will be allowed to drain from the site to watercourse or to ground. • The main construction compound and the various satellite compound areas shall be connected in foul water system connections. Where this is not possible a self-contained package treatment plan may be installed subject to obtaining the necessary permit from the Environment Agency. However, if this is not possible either, foul water shall be stored in double skinned tanks on site and transported to a local sewage treatment works by tanker for treatment. • An Outline Water Management Plan is included in Annex C						
MW–WAT7	ES Chapter 13, Section 13.8	**Dewatering and abstraction:** The main works contractor shall adopt construction techniques which minimise, so far as reasonably practicable, the need for and extent of dewatering and groundwater abstraction. With regards to the borrow pit water level monitoring shall be required in Watercourse 3 and Kings Pool Fishery's (refer to PW-WAT3). Compensatory flows may need to be provided. Compensatory discharges should be for the duration of the works as required, and should be sufficiently treated in advance to remove fine sediments and any other chemical pollutants that may be present. The main works contractor shall be responsible for obtaining the necessary approvals and permits to enable and abstraction and discharge of pumped water in an approved manner.	Yes.	To limit, and where required, mitigate potential impacts on water flow, level and quality from dewatering activities.	Assessment within the ES assumes that dewatering would be minimised, where possible, and where dewatering is required, adequate measures to mitigate potential impacts would be employed throughout the construction period.	Granting of any permits/licences from the Environment Agency	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4	Main works contractor.
MW–WAT8	ES Chapter 13, Section 13.8	**Flood Risk Management Plan:** The main works contractor shall prepare and submit a Flood Risk Management Plan to the Authority for approval, as part of the Water Management Plan. The plan would summarise: • Areas within Flood Zones 2 and 3, areas susceptible to surface water or groundwater flooding, and other flood risk sources, such as sewer flooding.	No.	To reduce and mitigate flood risk.	Assessment within the ES assumes that adequate flood risk measures would be employed throughout the construction period.	Consultation with the Environment Agency and SCC where required. Approval of the plan by the Authority.	Contractual requirement between The Authority and the main works contractor.	Main works contractor.

Ref	Source Ref	Action/ Commitment (including specific location if appropriate)	Is monitoring required? Yes/ No	Objective	Assumption on which the action is based	Achievement criteria and reporting requirements (if applicable	How the action is to be implemented	Responsible person(s)
		• Any applications made, or likely to be made, for an environmental permit, where required in relation to flood defence, for temporary and permanent works and the status of the works. • Any specific requirements or conditions of the approval that would be obtained from the relevant consenting bodies. • Any flood risk management or mitigation measures implemented, or to be implemented, in support of temporary and permanent works proposals.					DCO Requirement 4	
MW–WAT9	ES Chapter 13, Section 13.8	**Flood Risk – general provisions:** The main works contractor shall ensure that flood risk is managed safely throughout the construction and implementation period. They should also ensure that all designs do not cause increased risk levels from those assessed in the Flood Risk Assessment (FRA) included in the ES (refer to ES Appendix 13.1 [TR010054/APP/6.3]) and include the provision of a safe refuge during a flood event. The main works contractor shall be responsible for providing and maintaining continuous flood defence provision, where relevant, for both permanent and temporary works, to the statutory flood defence level as detailed within the FRA. The main works contractor shall consider and implement appropriate measures to manage the potential risks of flooding from rivers, localised perched groundwater, overland surface water flows and sewer surcharging, in accordance with the details provided within the FRA. This would include consideration of potential flow paths within the site which could become active in the event of extreme rainfall or sewer surcharging, particularly during temporary works. Overland flow paths would be determined by site topography, therefore vulnerable operations and materials would be located within elevated parts of the site where reasonably practicable, away from potential flow paths. If this is not possible, other appropriate protection measures would be incorporated. The main works contractor shall assess potential build-up of groundwater on the upstream side of below ground structures, as this may lead to a rise in groundwater levels and in severe occurrences of groundwater flooding. Any such issues shall be mitigated where appropriate. At the end of construction, where temporary support, such as sheet piling and secant piles, do not form part of the operational structure, pile walls where required would be removed, cut-down or piped through routes provided to prevent the potential build-up of groundwater.	No.	To reduce and mitigate flood risk.	Assessment within the ES assumes that adequate flood risk measures would be employed throughout the construction period.	Implementation of stated measures.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4	Main works contractor.
MW–WAT10	ES Chapter 13, Section 13.8	The methodology for works within Lower Pool would be developed during the detailed design stage of the Scheme, and would include best practice measures outlined above. It is assumed that a temporary dam would be constructed to the west of the bridge structure, so that water in the area of the pond to be lost could be dewatered and soft sediments to be excavated within a dry working area to minimise any impact on the retained portion of the pond. It is also assumed that wet and soft organic pond sediments would be dewatered on-site in an appropriate way that captures any leachate and/ or prevents infiltration to ground. Further testing of sediments and leachates are required in accordance with waste management legislation prior to any re-use or disposal of this material. Please refer to Chapter 10: Material Assets and Waste [TR010054/APP/6.1], and this OEMP. Fish rescue and measures to prevent encouraging the spread of non-native invasive species (e.g. Canadian pondweed) will also be required.	Yes.	To avoid pollution of residual parts of Lower Pool and Watercourse 3, protect fish populations, and to prevent the spread of non-native invasive species.	n/a	Measures implemented as indicated and included in Water Management Plan.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4	Main works contractor.
Climate change								

Ref	Source Ref	Action/ Commitment (including specific location if appropriate)	Is monitoring required? Yes/ No	Objective	Assumption on which the action is based	Achievement criteria and reporting requirements (if applicable	How the action is to be implemented	Responsible person(s)
MW– CC1	ES Chapter 14, Section 14.8	**Climate change GHG mitigation:** The main works contractor shall implement measures to reduce emissions during the construction of the Scheme, for example through specification of recycled or low-carbon materials (i.e. materials that have the lowest GHG emitting life-cycle, compared with alternatives, where there are no overriding technical implications that would have a substantial impact on the timescales and budget for the construction of the Scheme) and the management and minimisation of energy use. The construction contractor shall develop and implement a plan to reduce energy consumption and associated carbon emissions. This could include the consideration of renewable and/ or low or zero carbon energy sources and record percentage of savings implemented. Where practicable, measures would be implemented to manage material resource use during construction including: • Using materials with lower embedded greenhouse gas emissions and water consumption. • Using sustainably sourced materials. • Using recycled or secondary materials. Energy consumption and materials use would be recorded and reported on an ongoing basis during the construction phase of the scheme using Highways England Carbon Reporting Tool.	No.	To minimise the impacts of the construction of the scheme on climate change	n/a	Measures implemented as indicated	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4	Main works contractor.
MW– CC1	ES Chapter 14, Section 14.8	**Climate change resilience mitigation:** The main works contractor shall improve the resilience of the Scheme to climate change through a range of design and material specification measures including where practicable: the procurement and use of construction materials with superior properties (such as increased tolerance to fluctuating temperatures), and incorporation of current road design standards and future climate change allowances.	No.	To improve the resilience of the scheme to future climate change.	n/a	Measures implemented as indicated.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4	Main works contractor.
Traffic management								
MW– TRA1	n/a	**Traffic management measures (general):** The main works contractor shall implement traffic management measures during the construction of the Scheme on all public roads and pedestrian and cyclist routes. A notice period may be required prior to the implementation of certain temporary traffic management measures including the occupation or temporary closure of existing roads. Temporary signs erected during the works would be consistent with the Traffic Signs Manual: Chapter 8: Traffic Safety Measures and Signs for Road Works and Temporary Situations (Ref 3.14). Traffic signs would comply with the Traffic Signs Regulations and General Directions and would be located where they are clearly visible to road users and cause minimum disruption.	No.	To reduce the potential for impacts upon the public road network.	The Scheme cannot be constructed without traffic management.	Provision of appropriate traffic management measures.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 10	Main works contractor.
MW– TRA2	n/a	**Traffic Management Plan (TMP):** The main works contractor shall prepare and implement a detailed Construction TMP, developed with reference to the Traffic Management Act 2004, substantially in accordance with the Outline TMP provided in [TR010054/APP/7.5].	No.	To ensure the safe transition for road users from existing roads to the traffic managed sections of road.	The Scheme cannot be constructed without traffic management.	Approval of the TMP by The Authority and	Contractual requirement between The Authority and the	Main works contractor.

Ref	Source Ref	Action/ Commitment (including specific location if appropriate)	Is monitoring required? Yes/ No	Objective	Assumption on which the action is based	Achievement criteria and reporting requirements (if applicable	How the action is to be implemented	Responsible person(s)
		The main works contractor shall consult with the following agencies/ organisations when developing the Construction TMP: • Relevant roads authorities, including Highways England, SCC/ CWC, and the emergency services. • Public transport operators. • The organisers of any major or significant local events, and owners of significant local visitor attractions (including the National Trust). • Other relevant organisations regarding traffic management and control measures to be implemented to accommodate abnormal traffic. The Construction TMP shall include: • Measures to provide for the safety of traffic, the public and construction staff during traffic management works and temporary traffic control measures. • A programme of traffic management measures to be implemented and details of traffic management proposals for the works on or adjacent to public roads. • Procedures to be followed for the temporary or permanent closure or diversion of roads or accesses, including demonstration to the relevant authorities that the construction work cannot be carried out safely without the road closure and agreed diversion routes. • Existing pedestrian, equestrian and cyclist routes, including whether the routes are used by one or more of these groups of road users. • Traffic management layouts, signing and apparatus to be implemented on all affected walkers, cyclists and horse riders (WCH) routes. • Procedures for informing local communities of all traffic management schemes in advance and the works. • Measures to be implemented to reduce construction traffic impacts or impacts associated with over-parking on residential streets. • The name and contact details of the main works contractor's Traffic Control Officer and information and advice for the public regarding ways to raise complaints or request information. • A register of applications for consents associated with temporary traffic management measures. • An organogram identifying the named Traffic Control Officer and their lines of reporting.				Staffordshire County Council.	main works contractor. DCO Requirement 10.	
MW–TRA3	n/a	**Construction Workforce Travel Plan:** The main works contractor shall prepare a Construction Workforce Travel Plan. The plan shall include: • Identification of a travel plan coordinator and a description of their responsibilities. • Key issues to consider for each compound/construction site or group of sites. • Site activities and surrounding transport network including relevant context plans. • Anticipated workforce trip generation and how it may change during the construction process. • Travel mitigation measures that would be introduced to reduce the impact of construction workforce on the transport network.	No.	To encourage the use of sustainable modes of transport to reduce the impact of workforce travel on local residents and businesses.	There is no provision of construction worker accommodation and the workforce would be travelling to site.	The Authority approval of plan.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 10	Main works contractor.

Ref	Source Ref	Action/ Commitment (including specific location if appropriate)	Is monitoring required? Yes/ No	Objective	Assumption on which the action is based	Achievement criteria and reporting requirements (if applicable	How the action is to be implemented	Responsible person(s)
		• Target to reduce individual car journeys by the construction workforce. • Methods for surveying workforce travel patterns. • The process for monitoring and reviewing the Construction Workforce Travel Plan.						
MW–TRA4	n/a	**Site Access Plan:** The main works contractor shall develop a Site Access Plan (to be included within the Construction TMP) identifying site access and egress routes that may be used by the main works contractor and the mechanisms for how they can be varied. The main works contractor shall keep site access/ egress points clear at all times and would design and construct site access/ egress points to a suitable standard to enable the smooth access/ egress of vehicles in a forward direction to limit disruption to road users due to use of the access points.	No.	To reduce the potential for impacts upon the public road network.	Assessment within the ES assumes that the majority of construction traffic would arrive to site via the strategic road network.	The Authority approval of plan.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 10	Main works contractor.
MW–TRA5	n/a	**Site Travel Plan:** The main works contractor shall develop a Site Travel Plan (to be included within the Construction TMP). The plan shall identify routes to site for materials and plant. Final agreed routes would be detailed within the Construction TMP and all sub-contractors would be provided with copies throughout the duration of the works. Access routes for construction traffic would be via special and trunk road network(s) and main roads on the local road network unless it is considered necessary for other local roads to be used. Access along residential roads would generally be prohibited unless there are clear reasons for their use. Where residential roads are to be utilised, the residents would be kept informed of the timing of the works in advance.	No.	To reduce the potential for impacts upon the public road network.	Assessment within the ES assumes that the majority of construction traffic would arrive to site via the strategic road network.	The Authority approval of plan.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 10	Main works contractor.
MW–TRA6	n/a	**Traffic management measures:** Where deemed necessary, following consultation, the main works contractor shall: • Provide speed detection cameras at temporary traffic management schemes and undertake road safety audits in accordance with DMRB. • Install CCTV cameras at agreed locations to monitor the traffic management schemes. • During construction on the line of the existing trunk road, operate a vehicle recovery system to minimise the impact of breakdowns or accidents on the flow of traffic.	No.	To ensure safety on the road network is a priority consideration.	Various bodies would have regard to traffic management and safety.	Consultation with the relevant bodies and implementation of actions (if required).	Contractual requirement between The Authority and the main works. contractor. DCO Requirement 10	Main works contractor.
MW–TRA7	n/a	**Haul routes:** The main works contractor shall provide haul routes through the works for use by construction vehicles. Site access points shall be positioned where possible to enable the use of haul routes to be maximised throughout the works, rather than using public roads. Traffic management measures would be provided by the main works contractor where the crossing of public roads is required.	No.	To reduce the potential for impacts upon the public road network	The Scheme cannot be constructed without traffic management.	Provision of haul routes within the works.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4	Main works contractor.
MW–TRA8	n/a	**Abnormal loads:** Where abnormal loads are required for the works the main works contractor shall inform the police, the highway authorities or bridge and structure owners, as	No.	To reduce the potential for impacts upon the public road network.	The Scheme is anticipated to require abnormal loads delivered to site	Development of the TMP in consultation with the identified	Contractual requirement between The Authority and the	Main works contractor.

Ref	Source Ref	Action/ Commitment (including specific location if appropriate)	Is monitoring required? Yes/ No	Objective	Assumption on which the action is based	Achievement criteria and reporting requirements (if applicable	How the action is to be implemented	Responsible person(s)
		appropriate. The procedures for the movement of abnormal loads would be set out in the Construction TMP. Movement of abnormal loads is controlled by MW – G13.				agencies and organisations	main works contractor. DCO Requirement 10	
MW–TRA9	n/a	**Temporary roads/ accesses:** Where the main works contractor proposes to provide a temporary or substitute road or access or the like, the width and standard of construction and any lighting and signage required shall be suitable for the traffic anticipated to use the route. Temporary or substitute road access shall be maintained by the main works contractor throughout the works to provide adequately for the traffic using the affected routes. The main works contractor would apply for any consent required for temporary traffic management schemes.	No.	To reduce the potential for impacts upon the public road network.	Temporary roads would be required during the construction period.	The provision of suitable temporary roads and application/ granting of required consents.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 4 and 10	Main works contractor.
MW–TRA10	n/a	**Mitigation for traffic management measures:** Where the proposed traffic management measures may affect the flow of public transport vehicles and the location of public transport stops or shelters appropriate mitigation measures would be implemented. This would take in account the particular needs of groups with protected characteristics as defined under the Equality Act 2010. Where separate routes used by WCH are affected, the main works contractor shall provide (and identify within the Construction TMP) alternative appropriate and accessible routes within the traffic management scheme being implemented. Once agreed, the specific right of way affected would be scheduled with appropriate nomenclature and diversion routes suitably signposted throughout the works.	No.	To reduce impacts on public transport and WCHs.	Assessment within the ES assumes that appropriate measures would be employed to reduce adverse effects on the public transport network and WCH.	Provision of the specified actions.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 10	Main works contractor.
MW–TRA11	n/a	**Monitoring of traffic management measures, traffic flows, and public services:** The main works contractor shall outline a monitoring regime within the Construction TMP, to include the below points: • The main works contractor shall monitor traffic management schemes, traffic levels on roads and site accesses and public roads adjacent to access points to maintain their effectiveness and condition throughout the works and to provide for the safety of traffic, the public and construction staff during traffic management works. • The main works contractor shall monitor public transport services with regards to journey times and reliability as well as location of public transport stops or shelters to determine the level of impact. The main works contractor would also liaise with bus service providers and SCC/ SSC/ CWC to identify any changes in public transport passenger numbers as a consequence of service alterations. The main works contractor would provide information regarding any delays to traffic or public transport services due to construction works to The Authority and SCC/ SSC/ CWC.	Yes, see column three.	To ensure traffic management is effective and in good condition throughout the works and to provide for the safety of traffic, the public and construction staff during traffic management works.	Assessment within the ES assumes that traffic management measures would adequately mitigate the effects of construction related traffic issues.	Application of an appropriate monitoring regime and implementation of remedial actions (if required).	Contractual requirement between The Authority and the main works contractor. DCO Requirement 10	Main works contractor.

Table 3.4: Main works – Scheme design (D) REAC table

Ref	Source Ref [TR010054/APP/6.1] [TR010054/APP/6.2]	Action/ Commitment (including specific location if appropriate)	Is monitoring required? Yes/ No	Objective	Assumption on which the action is based	Achievement criteria and reporting requirements (if applicable	How the action is to be implemented	Responsible person(s)
Cultural heritage								
D- CH1	ES Chapter 2, Section 2.5 and ES Figures 2.1 to 2.7 Environmental Masterplans	Construction of a retaining wall against the bund to the north-east of Moseley Old Hall to protect to prevent the direct loss of ancient woodland to the south of the M54 and allow retention of the existing noise bund which provides screening and noise reduction. As shown in General Arrangement Plans [TR010054/APP/2.5].	Yes – with respect to tree planting in line with D-L1	Visual screening and the integration of the Scheme into the landscape.	The ES assumes part of this bund would be retained.	Implementation and sign off by the Environment Manager.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 3.	Main works contractor
Landscape and visual								
D- L1	ES Chapter 2, Section 2.5 and ES Figures 2.1 to 2.7 Environmental Masterplans	Provision of landscape design that includes areas of amenity grassland, grassland with bulbs, species rich grassland and native tree and hedgerow planting. Refer to Environmental Masterplans Figures 2.1 to 2.7 [TR010054/APP/6.2]. Key elements of the landscape design include: areas of woodland to provide visual screening (particularly for residents of Featherstone, Dark Lane and Hilton Lane), landscape integration and ecological habitat; species rich grassland to provide landscape integration and ecological habitat; individual trees to echo the parkland character around Hilton Park.	Yes	The integration of the Scheme into the landscape.	Impacts on local landscape character and visual amenity.	Successful establishment of all planting and seeding areas. Maintenance and monitoring over a five-year period.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 3.	Main works contractor.
D- L2	ES Chapter 2, Section 2.5 and ES Figures 2.1 to 2.7 Environmental Masterplans	Landform modelling, including cuttings and embankments, has been employed locally to increase screening and integrate the Scheme more closely to the natural landform and reduce visual intrusion.	No	The integration of the Scheme into the landscape.	Impacts on local landscape character and visual amenity.	Implementation and sign off by the Environment Manager.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 5.	Main works contractor.
D- L3	ES Chapter 2, Section 2.5 and ES Figures 2.1 to 2.7 Environmental Masterplans	Provision of a false cutting to the east of Brookfield Farm to provide visual screening. As shown in General Arrangement Plans [TR010054/APP/2.5].	No	For visual screening.	Assessment within the ES, Chapter 7: Landscape and visual assumes a false cutting is provided to minimise impacts on visual amenity.	Implementation and sign off by the Environment Manager.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 3.	Main works contractor
D- L4	ES Chapter 2, Section 2.5 and ES Figures 2.1 to 2.7 Environmental Masterplans	Break out the road surface of the redundant section of the A460 and M6 Junction 11 slip roads for seeding and planting as shown on the Environmental Masterplans (ES Figures 2.1 to 2.7 [TR010054/APP/6.2]).	Yes	The integration of the Scheme into the landscape.	Impacts on local landscape character and visual amenity.	Successful establishment of all planting and seeding areas. Maintenance and monitoring over a five-year period.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 5.	Main works contractor

Ref	Source Ref [TR010054/APP/6.1] [TR010054/APP/6.2]	Action/ Commitment (including specific location if appropriate)	Is monitoring required? Yes/ No	Objective	Assumption on which the action is based	Achievement criteria and reporting requirements (if applicable	How the action is to be implemented	Responsible person(s)
D-L5	N/A	The stone wall adjacent to the southbound carriageway of the existing A460, 'Mile Wall', will be dismantled and reconstructed along the realigned section of the existing A460.	No	Maintain the existing boundary feature.	N/A	Implementation and sign off by the Environmental Manager	DCO Requirement 3.	Main works contractor
D-L6	N/A	Fencing Any permanent and temporary fencing and other means of enclosure for the authorised development must be constructed and installed in accordance with Volume 1, Series 0300 of the Manual of Contract Documents for Highway Works except where any departures from that manual are agreed in writing by the Secretary of State in connection with the authorised development.	No	Maintain the existing boundary feature.	N/A	Implementation and sign off by the Environmental Manager	DCO Requirement 3.	Main works contractor
Biodiversity								
D- BIO1	ES Chapter 8, Section 8.8 and ES Figures 2.1 to 2.7 Environmental Masterplans	**Aquatic invertebrates and fish:** Replacement ditch habitat for the loss of riparian habitat associated with the culverting of watercourses provided based on a minimum of 1:1 ratio. Within the constraints of the Scheme, mitigation for the loss of running water habitats includes a total of 483 m of watercourse habitat (exceeding the 323 m of watercourses that would be culverted). Although not proposed with ecological benefit as a primary function, ditches would be designed to provide ecological benefit as a secondary function. Where new ponds discharge to the local stream network they would be connected by new ditches rather than pipes. This avoids the need for engineered outfalls, extends existing green corridors, and provides greater connectivity with the proposed treatment and attenuation ponds. These ditches would be carefully designed so that the final form avoids a uniform cross section and maximises biodiversity opportunities. Ponds lost to the Scheme replaced on a minimum of (equivalent) 1:1 ratio. Highway runoff from the operational Scheme runoff would be collected and managed in accordance with the Drainage Strategy, Appendix 13.2 [TR010054/APP/6.3]. Such measures would manage the quantity and quality of highway runoff to the benefit of all aquatic species.	No	To mitigate for habitat loss.	Impacts on aquatic invertebrates and fish.	Implementation and sign off by ECoW.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 3 and 5.	Main works contractor
D- BIO2	ES Chapter 8, Section 8.8 and ES Figures 2.1 to 2.7 Environmental Masterplans	**Breeding and wintering birds:** Replacement habitat for breeding and wintering birds includes the creation of hedgerows, woodland, scrub and grassland habitats, which are incorporated into the Scheme design. Bird boxes would be included on retained trees across the Scheme where suitable which is in addition to the habitat creation outlined above to mitigate for lost nesting opportunity.	No	To mitigate for habitat loss.	Impacts on birds	Implementation and sign off by ECoW.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 3 and 5.	Main works contractor
D- BIO3	ES Chapter 8, Section 8.8 and ES Figures 2.1 to 2.7 Environmental Masterplans	**Terrestrial invertebrates:** Replacement habitat for terrestrial invertebrates includes, the establishment of new woodland and the retention of deadwood habitat.	No	To mitigate for habitat loss.	Impacts on local flora and fauna.	Implementation and sign off by ECoW.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 3 and 5.	Main works contractor.

Ref	Source Ref [TR010054/APP/6.1] [TR010054/APP/6.2]	Action/ Commitment (including specific location if appropriate)	Is monitoring required? Yes/ No	Objective	Assumption on which the action is based	Achievement criteria and reporting requirements (if applicable	How the action is to be implemented	Responsible person(s)
D- BIO4	ES Chapter 8, Section 8.8 and ES Figures 2.1 to 2.7 Environmental Masterplans	**Badger foraging:** Replacement foraging habitat for badgers includes, the creation and establishment of hedgerows, woodland, scrub and grassland habitats, which are incorporated into the Scheme design. **Monitoring:** Monitoring as per Natural England licence for badgers and to assess the success of habitat establishment for foraging and commuting bats.	Yes	To mitigate for habitat loss.	To mitigate for loss of foraging habitat.	Implementation and sign off by ECoW.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 3 and 5.	Main works contractor.
D- BIO5	ES Chapter 8, Section 8.8 and ES Figures 2.1 to 2.7 Environmental Masterplans	**Badger and otter:** Provision of mammal tunnels (adjacent to Watercourse 2, 3 and 4) and a mammal ledge (Watercourse 5) to be installed at four locations over the length of the Scheme, the locations of which are shown on the Environmental Masterplans. Installation of badger fencing to guide badgers and other mammals to safe crossing points and avoid badgers crossing the road and entering the highway.	Yes?	To aid the safe crossing of the road by badgers and other animals, and to mitigate the risks of increased mortality of wildlife once the road becomes operational and used by traffic.	To mitigate the risks of increased mortality of wildlife once the road becomes operational	Provision of suitable mammal fencing, to be approved by competent ecologist. Annual checks to monitor state of fencing and check for breaches in the fence. Implementation and sign off by ECoW.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 3 and 5.	Main works contractor/ Maintenance authority.
D- BIO6	ES Chapter 8, Section 8.8 and ES Figures 2.1 to 2.7 Environmental Masterplans	**Barn owl:** Planting of grassland and hedgerows with trees and foraging habitats included within the landscape design (as detailed in Figures 2.1 - 2.7 [TR010054/APP/6.2]) as well as to reduce the potential collision risks to barn owl as a result of the Scheme.	No	To minimise the collision risk for barn owl and provide foraging and commuting habitat	To mitigate the risks of increased mortality of wildlife once the road becomes operational	Implementation and sign off by ECoW.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 3 and 5.	Main works contractor/ Maintenance authority.
D- BIO7	ES Chapter 8, Section 8.8 and ES Figures 2.1 to 2.7 Environmental Masterplans	**Bat roosts:** Bat boxes would be sited on retained trees within the locality of the confirmed roosts being lost to provide alternative roosting opportunities for the local bat population, and if required (for confirmed high status roosts only), like-for-like roost replacement would be provided. **Monitoring:** Monitoring as per Natural England licence for bats and to assess the success of habitat establishment for foraging and commuting bats.	Yes	To mitigate for habitat loss.	ES assumes loss of two known bat roosts and additional assumed day roosts and potential hibernation roosts within trees within the Scheme boundary.	Implementation and sign off by ECoW.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 3.	Main works contractor
D- BIO8	ES Chapter 8, Section 8.8and ES Figures 2.1 to 2.7 Environmental Masterplans	**Bat foraging and commuting habitat:** The Scheme shall provide an appropriate lighting design to minimise impacts on bats. The length of the Scheme would be unlit with new lighting limited to the junctions with the M54 and M6, including the associated slip roads. The detailed design of bat mitigation, including consideration of the lighting design, will be undertaken in consultation with Natural England. Linear habitat features, including hedgerows, along with grassland and pond to create a habitat matrix have been incorporated into the landscape design (ES Figures 2.1 to	Yes	To minimise impacts to foraging and commuting bats.	ES assumes appropriate lighting design.	Implementation and sign off by ECoW. Monitoring as per Natural England EPSML.	Contractual requirement between The Authority and the main works contractor.	Main works contractor

Ref	Source Ref [TR010054/APP/6.1] [TR010054/APP/6.2]	Action/ Commitment (including specific location if appropriate)	Is monitoring required? Yes/ No	Objective	Assumption on which the action is based	Achievement criteria and reporting requirements (if applicable	How the action is to be implemented	Responsible person(s)
		2.7 [TR010022/APP/6.2]) to mitigate for habitats lost and ensure ecological connectivity within and across the Scheme, and into the wider landscape. **Monitoring:** Monitoring as per Natural England EPSML. Surveys required to assess the success of habitat establishment for foraging and commuting bats. Bat crossing point survey to be undertaken yearly up to a maximum of 5 years post construction.					DCO Requirement 3 and DCO Requirement 5.	
D- BIO9	ES Chapter 8, Section 8.8and ES Figures 2.1 to 2.7 Environmental Masterplans	**Great crested newt habitat:** Provision of replacement pond habitat at a ratio of 2:1 where ponds are found to support populations of GCN, and which would be lost as a direct result of the Scheme and replaced at a 1:1 ratio for those which do not support GCN. Provision of species rich grassland and hedgerows which will provide suitable terrestrial habitat for great crested newts. **Monitoring:** Monitoring as per Natural England licence for great crested newts and to assess the success of habitat establishment for foraging and commuting GCN.	Yes	To mitigate impacts on great crested newts.	The ES (Version 3 of Chapter 8: Biodiversity [AS-083/6.1] confirms that no ponds lost as a result of the Scheme support populations of great crested newts.	Implementation and sign off by ECoW. Monitoring as per Natural England EPSML.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 3 and 5.	Main works contractor
D- BIO10	ES Chapter 8, Section 8.8and ES Figures 2.1 to 2.7 Environmental Masterplans	Timber from felled trees shall be used for the creation of deadwood areas within selected areas of retained habitat for saproxylic (dead wood loving) species, with some placed in the understory of woodland blocks to enhance woodlands. Felled trees would be retained on site as whole boughs and trunks.	No	To provide habitat enhancement for a variety of fauna including invertebrates and amphibians.	Impacts on local flora and fauna.	The implementation of the landscape design/ ecological mitigation measures signed off by the ECoW.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 3.	Main works contractor
D- BIO11	ES Chapter 8, Section 8.8and ES Figures 2.1 to 2.7 Environmental Masterplans	**Ancient woodland compensation:** Ancient woodland compensation planting shall be provided adjacent to an existing area of ancient woodland (Brookfield Farm SBI and LWS) at a ratio of 7:1 (by area) for those areas of ancient woodland lost during the construction of the Scheme. Ancient woodland compensation planting shall be provided adjacent to an existing area of ancient woodland (Brookfield Farm SBI and LWS) at a ratio of 1:1 (by area) for those areas of ancient woodland for which a significant adverse effect is anticipated as a result of increases in nitrogen deposition during the operation of the Scheme. In combination with the compensatory planting, conservation led management of both ancient woodlands (Oxdon Leasow (Whitgreave's Wood) and the area within Brookfield Farm SBI and LWS) would seek to develop and improve upon the woodland structure, enhancement measures would include selective thinning. Enhancement measures for the sites of existing ancient woodland will be designed in consultation with Natural England and SWT. **Monitoring:** Monitoring undertaken as required by Natural England.	Yes	To compensate for the loss of ancient woodland.	ES assumes loss of 0.35 ha of ancient woodland during construction and a significant adverse effect on 0.87 ha of ancient woodland as a result of increases in nitrogen deposition. This would require planting of (2.44 ha + 0,87 ha) 3.31 ha of woodland to provide compensation.	Implementation and sign off by ECoW.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 3 and 5.	Main works contractor
D- BIO12	ES Chapter 8, Section 8.8and ES Figures 2.1 to 2.7	**Designated sites:** New woodland planting, new standing water habitats and species-rich grassland to be created to mitigate the loss of habitat at Lower Pool LWS and SBI and Brook Field Farm LWS and SBI sites.	No	To mitigate habitat loss.	The ES assumes replacement habitat provided in line with the Environmental Masterplans Figure	The implementation of the landscape design/ ecological mitigation	Contractual requirement between The Authority and the main works contractor.	Main works contractor

Ref	Source Ref [TR010054/APP/6.1] [TR010054/APP/6.2]	Action/ Commitment (including specific location if appropriate)	Is monitoring required? Yes/ No	Objective	Assumption on which the action is based	Achievement criteria and reporting requirements (if applicable	How the action is to be implemented	Responsible person(s)
	Environmental Masterplans	The created woodland would be managed to have a variety in structure as well as abundant standing and fallen deadwood and hedgerows would be subject to relatively infrequent, rotational management to maximise biodiversity.			2.1 to 2.7 [TR010054/APP/6.2]	measures signed off by the ECoW.	DCO Requirement 3 and 5.	
D-BIO13	ES Chapter 8, Section 8.8and ES Figures 2.1 to 2.7 Environmental Masterplans	**Grassland:** Species-poor semi-improved grassland areas within the Scheme boundary would be replaced with species-rich grassland as part of the landscape design (where highway constraints do not prevail) (refer to Environmental Masterplans [TR010054/APP/6.2]).	No	To mitigate for the loss of biodiversity.	The ES assumes species-poor semi-improved grassland areas would be replaced with species- rich grassland.	The implementation of the landscape design/ ecological mitigation measures signed off by the ECoW.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 3 and 5.	Main works contractor
D-BIO14	ES Chapter 8, Section 8.8 and ES Figures 2.1 to 2.7 Environmental Masterplans	**Retained trees:** Retained trees would be protected as per British Standard BS: 5837 in line with the Tree Protection Plans Appendix 7.1 [TR010054/APP/6.3].	No	To protect trees (including veteran trees and woodland) to be retained	The ES assumes some areas of woodland within the Scheme boundary would be retained.	Protection fencing to be approved by the Arboricultural Specialist.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 3.	Main works contractor
Noise and vibration								
D- N1	ES Chapter 11, Section 11.8.	Thin road surfacing (i.e. low noise surfacing which provides an additional 3 dB(A) benefit compared to standard hot rolled asphalt at speeds of ≥75 km/hr) installed within the Scheme extents on the mainline of the new link road and its associated slip roads, junctions and the existing A460 north of M6 Junction 11, with the exception of short sections at the approaches to junctions where high friction surfacing would be used for safety reasons.	No.	To reduce noise impacts from the Scheme.	The assessment in the ES Chapter 11, Section 11.9 assumes use of thin noise surfacing.	Implementation and sign off by the Environment Manager.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 3.	Main works contractor
D-N2	ES Chapter 11, Section 11.8 and ES Figures 2.1 to 2.7 Environmental Masterplans.	Approximately 4.0 m high reflective noise barrier on the west side of the main line as it passes close to Dark Lane.	No	To reduce noise impacts at properties on Dark Lane and Park Road.	The assessment in the ES Chapter 11, Section 11.9 assumes a reduction in noise impact based on installation of the noise barrier.	Implementation and sign off by the Environment Manager.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 3.	Main works contractor
D-N3	ES Chapter 11, Section 11.8 and ES Figures 2.1 to 2.7 Environmental Masterplans.	Approximately 1.5 m high reflective noise barrier on the east side of the existing A460 north of M6 Junction 11 in the vicinity of properties on Wolverhampton Road.	No	To reduce noise impacts at properties on Wolverhampton Road.	The assessment in the ES Chapter 11, Section 11.9 assumes a reduction in noise impact based on installation of the noise barrier.	Implementation and sign off by the Environment Manager.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 3.	Main works contractor

Ref	Source Ref [TR010054/APP/6.1] [TR010054/APP/6.2]	Action/ Commitment (including specific location if appropriate)	Is monitoring required? Yes/ No	Objective	Assumption on which the action is based	Achievement criteria and reporting requirements (if applicable	How the action is to be implemented	Responsible person(s)
D-N4	ES Chapter 11, Section 11.8 and ES Figures 2.1 to 2.7 Environmental Masterplans.	Approximately 3 m high reflective noise barrier on the west side of the main line as it passes close to Brookfield Farm.	No	To reduce noise impacts at Brookfield Farm.	The assessment in the ES Chapter 11, Section 11.9 assumes a reduction in noise impact based on installation of the noise barrier.	Implementation and sign off by the Environment Manager.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 3.	Main works contractor
D-N5	ES Chapter 11, Section 11.8 and ES Figures 2.1 to 2.7 Environmental Masterplans.	Approximately 1.5 m high reflective noise barrier on the north side of the M54 eastbound off slip on top of the existing earth bund and the proposed eastern extension of this earth bund incorporated into the design.	No	To reduce noise impacts at properties within Featherstone village.	The assessment in the ES Chapter 11, Section 11.9 assumes a reduction in noise impact based on installation of the noise barrier.	Implementation and sign off by the Environment Manager.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 3.	Main works contractor
D-N6	ES Chapter 11, Section 11.8 and ES Figures 2.1 to 2.7 Environmental Masterplans.	Approximately 3.0 m high reflective noise barrier east of the proposed earth bund on the north side of the M54 extending to the new western dumbbell roundabout.	No	To reduce noise impacts at properties within Featherstone village.	The assessment in the ES Chapter 11, Section 11.9 assumes a reduction in noise impact based on installation of the noise barrier.	Implementation and sign off by the Environment Manager.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 3.	Main works contractor
Population and human health								
D-POH1	ES Chapter 2, Section 2.5 and ES Figures 2.1 to 2.7 Environmental Masterplans.	Provision of rights of way and accommodation bridge, in accordance with the Streets, Rights of Way and Access Plans [TR010054/APP/2.7].	No.	To provide continued access across the study area.	The assessment within the ES assumes access would be maintained across the study area.	Implementation and sign off by the Environment Manager.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 3.	Main works contractor
Road drainage and the water environment								
D-WAT1	ES Chapter 13, Section 13.8, ES Appendix 13.2 [TR010054/APP/6.3] and ES Figures 2.1 to 2.7 [TR010054/APP/6.2]	Drainage treatment areas provided in accordance with ES Appendix 13.2 Drainage Strategy [TR010054/APP/6.3] and Table 13.6 of ES Chapter 13: Road Drainage and the Water Environment [TR010054/APP/6.1].	No	Provision of flood and pollution control.	Refer to Appendix 13.2 of the ES [TR010054/APP/6.3]	Implementation and sign off by the Environment Manager.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 8.	Main works contractor

Ref	Source Ref [TR010054/APP/6.1] [TR010054/APP/6.2]	Action/ Commitment (including specific location if appropriate)	Is monitoring required? Yes/ No	Objective	Assumption on which the action is based	Achievement criteria and reporting requirements (if applicable	How the action is to be implemented	Responsible person(s)
D-WAT2	ES Chapter 13, Section 13.8	Realignment and culverting of Watercourse 2 under the Scheme in a culvert, minimum size 1.2 m x 2 m. The culvert base to be set below the current channel bed by a minimum 300 mm to allow substrate conveyance, improved flow capacity and improved species passage. The detailed design of the realignment and diversion of Watercourse 2 would be undertaken within the detailed design stage and be informed by hydromorphological and ecological surveys. The design will follow best practice to maintain flow and stream processes, whilst seeking to provide morphological and ecological enhancement on current channel form, and linkages where possible with nearby ecological mitigation ponds. Uniform, artificial channels will be avoided, in favour of more natural designs (including riparian habitat). Downstream of the new junction the new channel design and riparian planting should be analogous with the existing woodland corridor, which will be retained with a depleted channel reach.	No	To provide no increase in flood risk and no deterioration of WFD watercourses.	The assessment within the ES assumes minimum culvert sizing and use of best practice when designing watercourse realignments.	Implementation and sign off by the Environment Manager. Land Drainage Consent.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 3.	Main works contractor
D-WAT3	ES Chapter 13, Section 13.8	Realignment and culverting of Watercourse 3 under the Scheme in a circular culvert, with a minimum diameter of 1.2 m. The culvert base will be set below the existing channel bed by a minimum of 300 mm (mid-point) to allow substrate conveyance, improved flow capacity and improved species passage. The detailed design of the realignment and diversion of Watercourses 3 and Lower Pool would be undertaken within the detailed design stage and be informed by hydromorphological and ecological surveys. The design will follow best practice to maintain flow, stream processes and ensuring flood risk is not worsened downstream, whilst seeking to provide morphological and ecological enhancement on current channel form (including riparian habitat). Uniform, artificial channels will be avoided, in favour of more natural designs.	No	To provide no increase in flood risk and no deterioration of WFD watercourses.	The assessment within the ES assumes minimum culvert sizing and use of best practice when designing watercourse realignments.	Implementation and sign off by the Environment Manager. Land Drainage Consent.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 3.	Main works contractor
D-WAT4	ES Chapter 13, Section 13.8	Realignment and culverting of Watercourse 4 to pass under the Scheme in a circular culvert, minimum diameter of 1.2 m. The culvert base will be set below the existing channel bed by a minimum of 300 mm (mid-point) to allow substrate conveyance, improved flow capacity and improved species passage. The detailed design of the realignment and diversion of Watercourses 4 would be undertaken within the detailed design stage and be informed by hydromorphological and ecological surveys. The design will follow best practice to maintain flow and stream processes, whilst seeking to provide morphological and ecological enhancement on current channel form (including riparian habitat). Uniform, artificial channels will be avoided, in favour of more natural designs.	No	To provide no increase in flood risk and no deterioration of WFD watercourses.	The assessment within the ES assumes minimum culvert sizing and use of best practice when designing watercourse realignments.	Implementation and sign off by the Environment Manager. Land Drainage Consent.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 3.	Main works contractor
D-WAT5	ES Chapter 13, Section 13.8	Works to the channel and possible minor realignment of Watercourse 5 (Latherford Brook) through a 10 m wide single span bridge (Latherford Brook bridge), which is to be constructed online with the watercourse. The detailed design of any minor realignment of Watercourses 5 would be undertaken within the detailed design stage and be informed by appropriate geomorphological and ecological technical input based on surveys and assessment. The design will follow best practice to maintain flow and stream processes, whilst seeking to provide morphological and ecological enhancement on current channel form in keeping with the character of the watercourse and prevailing hydromorphological processes.	No	To provide no increase in flood risk and no deterioration of WFD watercourses.	The assessment within the ES assumes 10 m span design over Watercourse 5.	Implementation and sign off by the Environment Manager. Land Drainage Consent.	Contractual requirement between The Authority and the main works contractor. DCO Requirement 3.	Main works contractor
D-WAT6	ES Chapter 13, Section 13.8	For new highway outfalls the preliminary drainage design includes new ditchcourses from Ponds 1-4 (and Pond 5 if possible – see D-WAT7) to convey treated runoff to the receiving watercourses avoiding the need for engineered pipe outfalls supported by concrete headwalls. The design of new ditches would be informed by a geomorphologist and ecologist and would include where practicable 'natural' features such as a sinuous low flow channel (albeit perhaps along a straight corridor) incorporating shallow berms and occasional sections where the channel is narrowed to	No	To provide replacement watercourse and riparian habitat.	The assessment within the ES assumes new ditchcourses will avoid trapezoidal channel profiles and include appropriate	Implementation and sign off by the Environment Manager. Land Drainage Consent.	Contractual requirement between The Authority and the main works contractor.	Main works contractor

Ref	Source Ref [TR010054/APP/6.1] [TR010054/APP/6.2]	Action/ Commitment (including specific location if appropriate)	Is monitoring required? Yes/ No	Objective	Assumption on which the action is based	Achievement criteria and reporting requirements (if applicable	How the action is to be implemented	Responsible person(s)
		improve flow. Where these ditches connect with the existing watercourse the hydromorphology of the receiving watercourse must be taken into account in the design. The ditchcourses would also be suitably landscaped and their margins planted to provide suitable riparian habitat to compensate for new culverting proposed by the Scheme. Ditchcourses will be designed so that they are sustainable and self-regulating, and so that ecology that develops in the new lengths of channels will not be impacted by future maintenance works. Future maintenance of these ditches will take into account their biodiversity function as well as drainage requirements.			geomorphic features to create morphological diversity. The ditchcourses will also be landscaped and planted to re-create riparian habitat. WFD Assessment as per Appendix 13.4 [TR010054/APP/6.3]		DCO Requirement 3.	
D-WAT7	ES Chapter 13, Section 13.8	During detailed design consideration of options to avoid an engineered outfall to Latherford Brook from Pond 5 will be considered. However, where this is not possible, and an engineered outfall is required, the location, position and orientation of any new outfall will be carefully determined and informed by a hydromorphological survey to minimise any local adverse impact on river processes, the loss of riparian habitat, the need for bed scour or hard bank protection, and localised flow disturbance or disruption to sediment transport processes. It is not recommended to recess outfalls from the banks because this can risk creation of a dead zone with sedimentation and vegetation blockage risks, and because drainage systems will be designed with treatment trains upstream of the outfalls, and thus only treated water will be discharged to the Latherford Brook. Where possible a pre-fabricated concrete headwall will be used to avoid the need to pour wet concrete into formwork close to the watercourse. The design of any new engineered outfall and the site-specific pollution prevention measures will be determined through consultation with the LLFA when making a Land Drainage Consent application.	No	To avoid loss of habitat and no deterioration of WFD watercourses whilst promoting sustainable options and biodiversity enhancement where possible.	The assessment within the ES and Appendix 13.4 WFD Assessment [APP-203/6.3] assumes a sympathetically designed and positioned engineered outfall. If this could be avoided through a ditch arrangement betterment on the ES predicted effects would be achieved.	Implementation and sign off by the Environment Manager. Land Drainage Consent.	DCO Requirement 3.	Main works contractor
D-WAT8	ES Chapter 13, and Appendix 13.1	Sensitivity testing will be undertaken during the detailed design stage, concerning the best arrangement of Lower Pool and proposed weir structure to ensure the design of this feature does not cause increased flood risk levels from those assessed in the Flood Risk Assessment (FRA) included in the ES (refer to ES Appendix 13.1 [TR010054/APP/6.3]).	No	Provision of flood control.	Flood risk modelling as per ES Appendix 13.1 [TR010054/APP/6.3]	Implementation and sign off by the Environment Manager.	DCO Requirement 3.	Main works contractor
D-WAT9	ES Chapter 13	The drainage for the Scheme will be designed in line with the Drainage Strategy, provided as Appendix 13.2 of the ES [TR010054/APP/6.3] and will ensure that the Scheme does not result in increased flood risk from groundwater above that reported in Chapter 13: Road Drainage and the Water Environment.	No	Provision of flood control.	Assessment in Chapter 13, Section 13.9 assumes the drainage design is appropriate to result in a neutral effect on groundwater flooding.	Implementation and sign off by the Environment Manager.	DCO Requirement 3.	Main works contractor
Traffic Management								
D-TRA1	n/a	**Parking Restrictions** The main works contractor with consult with the local highway authority and local residents regarding the parking restrictions to be imposed at the two turning heads created by the Scheme. These turning heads would be created through the closure of Dark Lane north of Park Road and the closure of the existing A460 where it currently ties into the existing M54 Junction 1.	No	Minimise disruption to local residents and discourage fly tipping.	n/a	Consultation with the relevant bodies and implementation of actions (if required).	DCO Requirement 4.	Main works contractor

4 Consents and permissions

4.1 Consents and agreement position statement

4.1.1 As part of the DCO application, a Consents and Agreement Position Statement (CAPS) has been prepared and submitted [TR010054/APP/3.3]. This document sets out Highways England's intended strategy for obtaining the consents and associated agreements needed to implement the Scheme.

4.1.2 This chapter identifies the consents, permissions and agreements (outside of the DCO) that would be, or are likely to be, sought by either the preliminary works contractor (all) or the main works contractor in relation to the environmental aspects of the Scheme.

4.2 Consents and permissions

4.2.1 The principal consent for the Scheme would be a DCO. The DCO provides development consent for the works and enables land acquisition and temporary possession, along with many consents and powers to be dealt with at the same time. However, there is a need to supplement the DCO with additional applications including consents that cannot be wrapped up in the DCO and those where it is not possible to obtain the consent until later in the design/ construction process. Several additional consents and permissions that relate directly to measures within the OEMP will need to be sought separately from the DCO. The consents required are outlined in the CAPS. The CAPS is updated regularly to report on progress obtaining additional consents and anticipated timescales for completion..

4.2.2 The preliminary works contractor (all) and main works contractor shall update the CAPS, to cover developments through the Scheme detailed design stage and throughout the construction phase, to ensure all relevant consents and permissions are captured.

5 Environmental asset data and as built drawings

5.1 The Authority environmental information system

5.1.1 The Authority Environmental Information System (EnvIS) consists of specific environmental data supplied by service providers, The Authority and other bodies which is collated and displayed in Highways England's Geographical Information System (HAGIS). This data is used to assist in managing the environment, within and surrounding the strategic road network, and in the review and reporting of the environmental performance of both service providers and Highways England.

5.1.2 The aim of EnvIS is to assist Highways England and service providers in designing and managing the strategic road network in an accurate, consistent and environmentally sound manner. Specifically, it aims to achieve the following key strategic and operational objectives:

a) Enable consistent and accurate recording and retrieving of specific environmental data about the strategic road network.

b) Assist in the review and reporting of environmental performance of both The Authority and service providers.

c) Improve understanding of the environmental issues and opportunities that must be considered at different stages of trunk road and motorway management.

d) In line with ensuring a value for money approach, assist in the prioritisation of environmental management actions based on an understanding of the condition of the Element and environmental objectives.

e) Assist in the handover of environmental data from Designers to Network Management Agents (and vice versa) and the transfer of environmental data from an outgoing Network Management Agent to its successor.

f) Assist Designers and Network Management Agents in the collection of environmental data and use this information to develop specific environmental management programmes and strategies, including Environmental Management Plans (EMPs).

5.2 Collection and submission of EnvIS data

5.2.1 As stated within IAN 84/10 (Highways Agency, 2010) (Ref 5.1), the identifying and recording of EnvIS data is an ongoing process. Service providers should record and submit EnvIS data in the form of environmental inventory and environmental management information data, stored on their own systems. For designers, the frequency of EnvIS data submission to Highways England is in line with the end of the following milestones:

- **Development phase (preliminary design)**: environmental data resulting from the statutory or non-statutory assessment of the proposed project. Designers collect and submit EnvIS data for Elements that have influenced or are influenced by the design of the project (including environmental survey data).
- **Development phase (detailed design)**: – environmental data detailing the final specification of the project. Designers collect and submit EnvIS data

detailing all Elements associated with the planning and design of the project and planned environmental management actions that will be undertaken during the construction period and of the existing elements likely to be affected.

- **Construction phase (construction) – as built drawings**: environmental data detailing the completion of the project prior to handover. Designers collect and submit EnvIS data detailing all Elements associated with the construction of the project and planned environmental management actions that are required to be undertaken by the network management agent as part of operating and maintaining the network area.

5.2.2 It has been agreed with the Authority that no EnvIS submission will be required at the end of development phase (preliminary design). A partial EnvIS submission including ecology survey data only will be submitted at the end of the development phase (detailed design). A full EnvIS submission would be submitted at the end of the construction phase, this would include the submission of species data and the results of other surveys, such as the archaeological surveys and soil surveys undertaken to inform the ES.

5.2.3 This section should be updated by the main works contractor at the development phase (detailed design) milestone stage to outline the submission arrangements of EnvIS data.

6 References

Ref 1.1 Highways England (2019) Design Manual for Roads and Bridges LA 120 Environmental Management Plans.

Ref 1.2 Highways England (2019) Design Manual for Roads and Bridges GG 182 Major Schemes: Enabling Handover into Operation and Maintenance (formerly IAN 182/14) Revision 0.

Ref 1.3 The Planning Inspectorate (2016) Advice note six: Preparation and submission of application documents Advice Note 6.

Ref 2.1 Government Office for the West Midlands (2001) West Midlands Area Multi Modal Study. Available online at: https://www.gov.uk/government/publications/west-midlands-area-multi-modal-study

Ref 2.2 Department for Transport (2015) Road Investment Strategy 2015 to 2020 (2001) West Midlands Area Multi Modal StudyRef 3.1 Institute of Air Quality Management's (2014) Guidance on the Assessment of Dust from Demolition and Construction

Ref 3.1 IAQM - Guidance on the Assessment of Dust from Demolition and Construction

Ref 3.2 BS 5930:2015 Code of Practice for Ground Investigations (2015)

Ref 3.3 BS 10175:2011 + A2:2017 Investigation of Potentially Contaminated Sites Code of Practice

Ref 3.4 Environment Agency (2019) Land Contamination: Risk Management.

Ref 3.5 Department for Environment Food and Rural Affairs (2009) Construction Code of Practice for the Sustainable Use of Soils on Construction Sites.

Ref 3.6 BS3882: 2015 Specification for Topsoil

Ref 3.7 CL:AIRE (2011) Definition of Waste: Development Industry Code of Practice

Ref 3.8 Environment Agency (2018) Waste Classification: Guidance on the classification and assessment of waste.

Ref 3.9 Control of Pollution Act 1974

Ref 3.10 Environmental Protection Act 1990

Ref 3.11 British Standards Institution (2014) BS 5228: 2009+A1: 2014 'Code of Practice for Noise and Vibration Control on Construction and Open Sites'.

Ref 3.12 British Standards Institution (1993) BS 7385-2: 1993 Evaluation and measurement for vibration in buildings – Part 2: Guide to damage levels from ground borne vibration.

Ref 3.13 International Organization for Standardization (2010) ISO 4866: 2010 Mechanical vibration and shock. Vibration of fixed structures. Guidelines for the measurement of vibrations and evaluation of their effects on structures.

Ref 3.14 Department for Transport (2019) Traffic Signs Manual.

Ref 3.15 ISO14001 Environmental Management System.

Ref 3.16 BS 3936-1: Nursery stock. Specification for trees and shrubs.

Ref 3.17 BS 3936-4: Nursery stock. Specification for forest trees, poplars and willows.

Ref 3.18 BS 3882: Specification for topsoil and requirements for use.

Ref 3.19 BS 3998: Tree Work. Recommendations.

Ref 3.20 BS 4428: Code of practice for general landscape operations (excluding hard surfaces).

Ref 3.21 BS8545: Trees from nursery to independence in the landscape.

Ref 3.22 BS 5837: Trees in relation to design, demolition and construction.

Ref 3.23 BS 6031: Code of practice for earthworks.

Ref 3.24 CIRIA (2015) Environmental Good Practice on Site Guide (fourth edition).

Ref 3.25 BS 6031: Code of Practice for Earthworks for the general control of site drainage.

Ref 3.26: Environment Agency, Guidance for Pollution Prevention. Available online at: https://www.netregs.org.uk/environmental-topics/pollution-prevention-guidelines-ppgs-and-replacement-series/guidance-for-pollution-prevention-gpps-full-list/

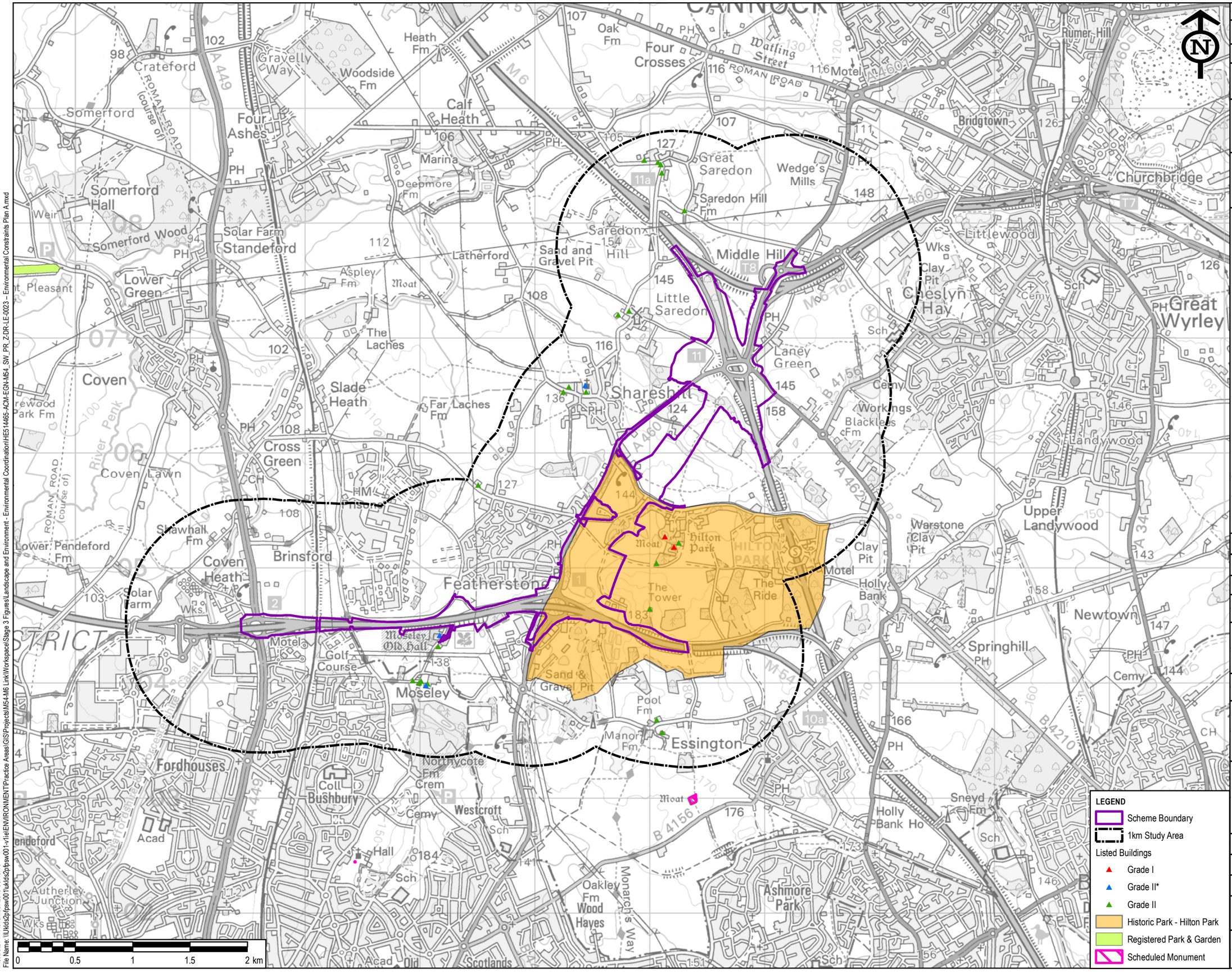
Ref 3.27 CIRIA (2006) C648 Control of Water Pollution from Linear Construction Sites

Ref 3.28 CIRIA (2001) C532: Control of water pollution from construction sites

Ref 3.29 MAFF (2000) Good Practice Guide for Handling Soils (Archived) https://webarchive.nationalarchives.gov.uk/20090317221756/http://www.defra.gov.uk/farm/environment/land-use/soilguid/index.htm

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Appendix A: Constraints Map



Plot Date: 14 November 2019 09:46:43
File Name: \\Ukkd2pfpsw001\ukkd2pfpsw001-v1\e\ENVIRONMENT\Practice Areas\GIS\Projects\M54-M6 Link\Workspace\Stage 3 Figures\Landscape and Environment - Environmental Coordination\HE514465-ACM-EGN-M54_SW_PR_Z-DR-LE-0023 – Environmental Constraints Plan A.mxd

LEGEND

- Scheme Boundary
- 1km Study Area

Listed Buildings

- Grade I
- Grade II*
- Grade II
- Historic Park - Hilton Park
- Registered Park & Garden
- Scheduled Monument

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Revision Details	By	Check	Date	Suffix
Revised Scheme Boundary	EC	AR	14/11/19	P02
First Issue	EC	AR	06/11/19	P01

Purpose of issue: DCO APPLICATION

Client: Highways England, The Cube, 199 Wharfside Street, Birmingham, B1 1RN

Working on behalf of: highways england

Development Consent Order Number: TR010054

Project Title: M54 TO M6 LINK ROAD

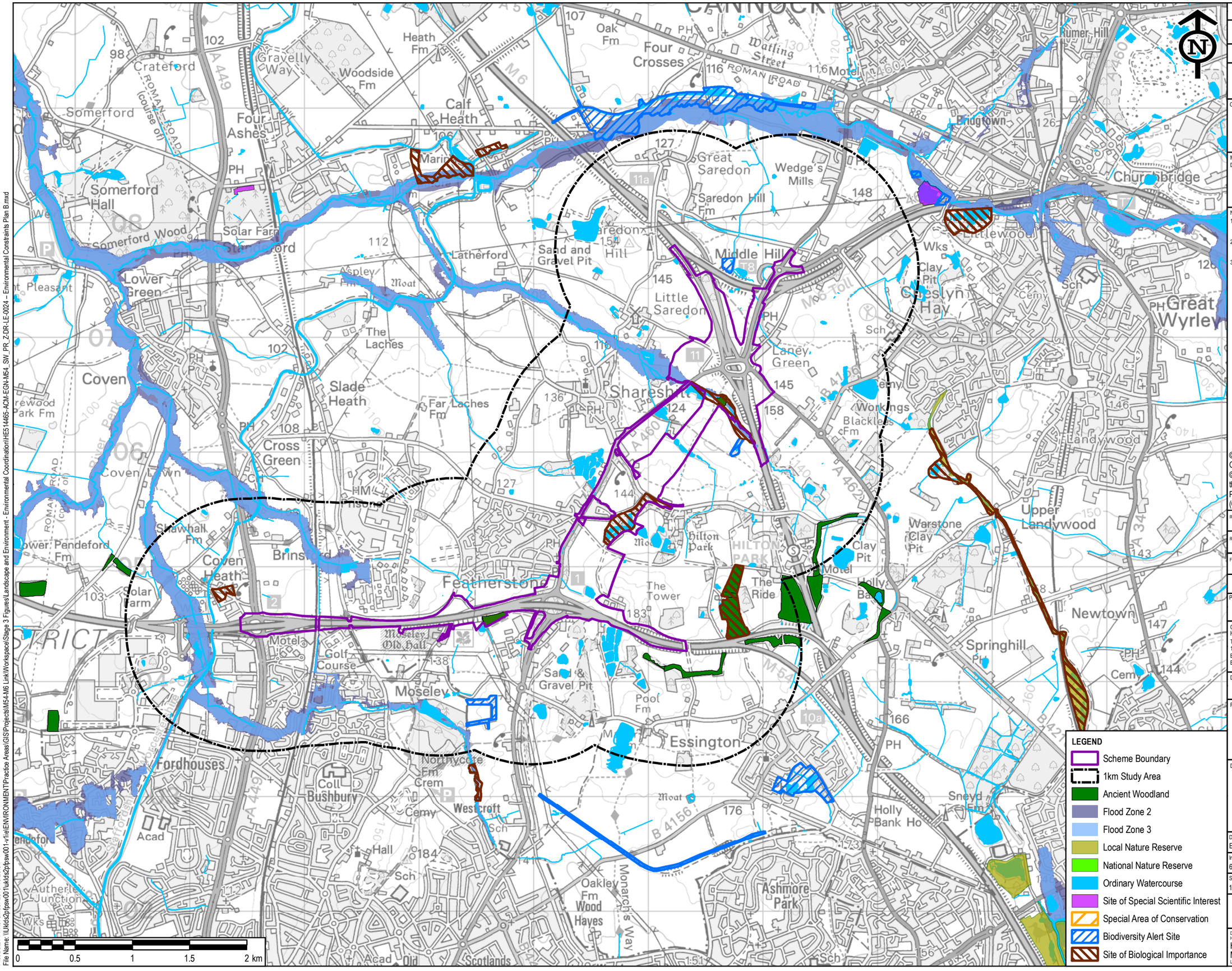
Drawing Title: ENVIRONMENTAL CONSTRAINTS PLAN A

Designed	Drawn	Checked	Approved	Date
EC	EC	AR	TP	14/11/2019

Internal Project No.	Suitability
60536736	S2
Scale @ A3: 1:30,000	Zone: M54 to M6 Link Road

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Purpose of issue: DCO APPLICATION

Client: Highways England, The Cube, 199 Wharfside Street, Birmingham, B1 1RN

Working on behalf of: highways england

Development Consent Order Number: TR010054

Project Title: M54 TO M6 LINK ROAD

Drawing Title: ENVIRONMENTAL CONSTRAINTS PLAN B

Designed	Drawn	Checked	Approved	Date
EC	EC	AR	TP	14/11/2019

Internal Project No. 60536736	Suitability S2
Scale @ A3 1:30,000	Zone M54 to M6 Link Road

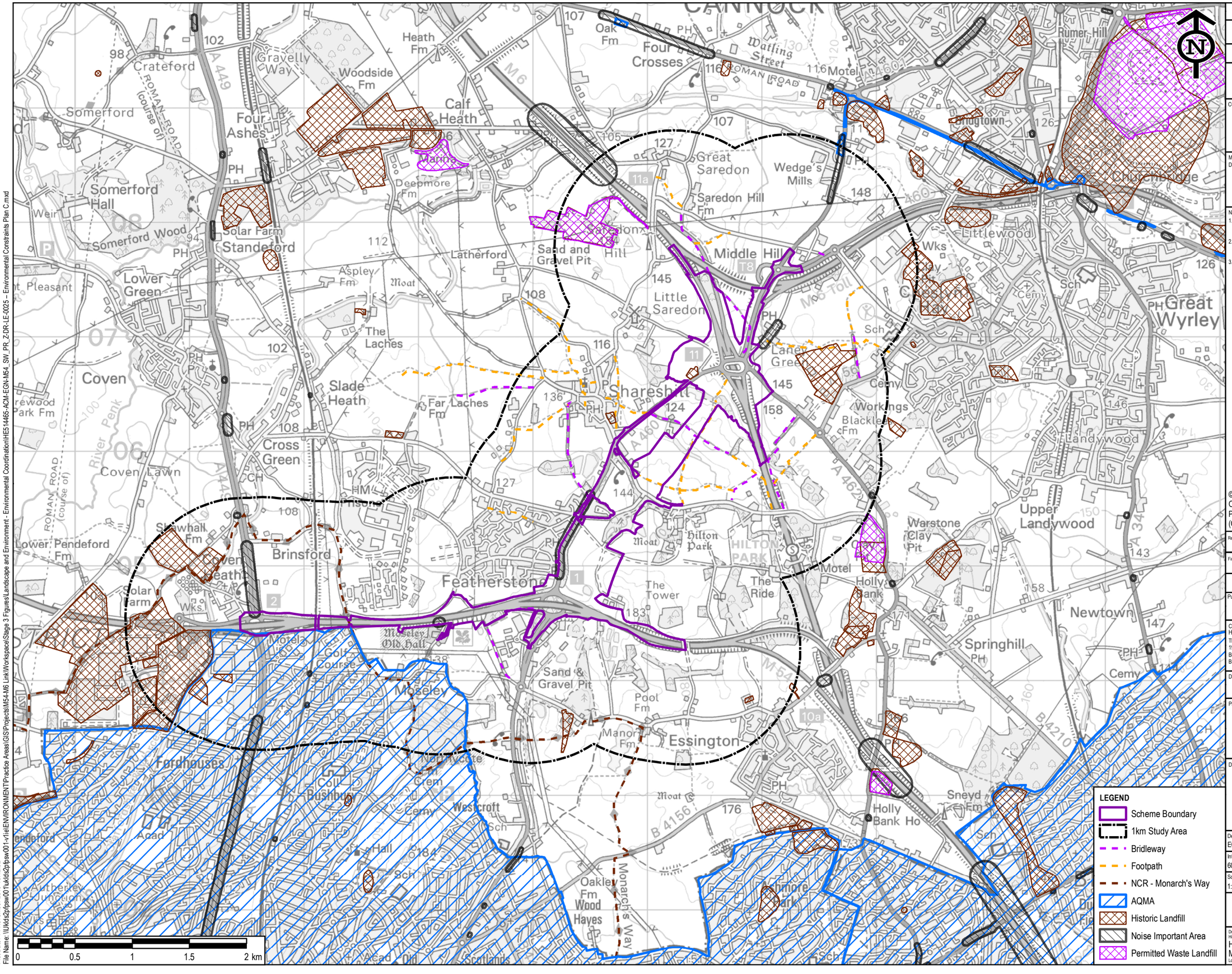
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HE514465	-ACM	-EGN	-	P03
M54_SW_PR_Z Location		-DR - LE - 0024 Type | Role | Number		

LEGEND

- Scheme Boundary
- 1km Study Area
- Ancient Woodland
- Flood Zone 2
- Flood Zone 3
- Local Nature Reserve
- National Nature Reserve
- Ordinary Watercourse
- Site of Special Scientific Interest
- Special Area of Conservation
- Biodiversity Alert Site
- Site of Biological Importance

Plot Date: 14 November 2019 10:23:31
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LEGEND

- Scheme Boundary
- 1km Study Area
- Bridleway
- Footpath
- NCR - Monarch's Way
- AQMA
- Historic Landfill
- Noise Important Area
- Permitted Waste Landfill

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Client: Highways England
The Cube
199 Wharfside Street
Birmingham
B1 1RN

Working on behalf of: highways england

Development Consent Order Number: TR010054

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Drawing Title: ENVIRONMENTAL CONSTRAINTS PLAN C

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Internal Project No.	Suitability
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HE514465	-ACM	-EGN -	P02
Location: M54_SW_PR_Z		-DR - LE - 0025 (Type | Role | Number)	

Appendix B: Archaeological Mitigation Strategy

Appendix B: Archaeological Mitigation Strategy

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1 Introduction

1.1.1 Highways England ('the Applicant') are developing a link road between the M54 and M6 to provide a link between Junction 1 of the M54, M6 North and the A460 to Cannock. The M54 to M6 Link Road ('the Scheme') aims to reduce congestion on local / regional routes, particularly the A449 and A460 and deliver improved transport links to encourage the development of the surrounding area.

1.1.2 The Scheme would pass through the western edge of the former park land of Hilton Hall. The current land use is predominantly agricultural.

1.1.3 Previous phases of archaeological investigations comprised geophysical survey and archaeological monitoring of the ground investigation (GI).

1.1.4 A gradiometer survey was undertaken by Phase Site Investigations Ltd. in March-April 2019 (Phase SI, 2019). There were 19 areas proposed for survey, although three areas were not surveyed due to livestock being present in the fields. archaeological monitoring of the GI was undertaken by ADAS in July 2019 (ADAS, 2019). A total of 19 trial pits and 31 boreholes were monitored. The results of these surveys will be made available to the Archaeological Contractor prior to future archaeological investigation and mitigation works.

1.1.5 This document forms an archaeological mitigation strategy and outlines the potential scope of works to be undertaken as part of the detailed design phase of the Scheme and in advance of the construction phase. These works will comprise, in the first instance, a programme of evaluation trenching. Further stages of mitigation will then be determined based on the results of the trenching. This work may include, but is not limited to, detailed excavation of defined area, and strip, map and record. This document contains the principals of the methodologies to be implemented, as well as broad details of the archaeological requirements.

The works specified in this document will be undertaken on behalf of the Applicant by a competent and suitably qualified Archaeological Contractor. This document provides the outline methodology, specifications and protocol to be adhered to during the completion of the archaeological fieldwork, interim reporting and preparation of the fieldwork evaluation report which will be completed by the Archaeological Contractor. In addition, the requirements and responsibilities of the Applicants archaeological advisor, the Applicant and the Principal Contractor have been set out in this methodology to assist the planning of the required archaeological evaluation.

2 Background Information

2.1 The Scheme

2.1.1 The Scheme is located to the north of the existing M54 Junction 1 and would join the A460 and the M6 at Junction 11. It would bypass the villages of Featherstone and Shareshill to the east of the existing A460.

2.1.2 The bedrock geology of the site consists of Chester formations of sandstone and conglomerate. The superficial geology consists of Devensian Till deposits with patches of alluvium (clay, silt, sand and gravel) (Geological Survey online). The soils comprise loamy and clayey soils (Soilscapes online).

2.2 Archaeological background

2.2.1 The archaeological background of the Scheme and cultural heritage study area, including previous fieldwork, has been presented in detail in Chapter 6: Cultural Heritage of the Environmental Statement (ES) [TR010054/APP/6.1]. The baseline as reported in the ES is summarised below.

2.2.2 The desk-based review of available records confirms the following heritage assets are present within the study area:

- 59 non-designated archaeological assets, dating from the prehistoric to the modern periods;
- two Grade I, three Grade II* and 21 Grade II listed buildings; and
- 13 historic buildings and structures, including seven locally listed buildings or structures.

2.2.3 No World Heritage Sites, scheduled monuments, registered battlefields, registered parks and gardens or conservation areas are present within the study area.

2.2.4 The assets are described in more detail below. Each asset has a unique record number (indicated in brackets) which cross-refers to their location and summary which is detailed in Annex 1.

Baseline

2.2.5 Evidence of early prehistoric period in this region of Britain are rare, but there are examples of Upper Palaeolithic sites at caves within the Staffordshire Peak District (Watts, 2011) as well as small Mesolithic assemblages beneath round barrows in this area (Watts, 2011). Prehistoric monuments from the Neolithic are concentrated within the Avon valley and around the Trent-Tame confluence (Watts, 2011). The evidence of the prehistoric is equally limited within the study area and is represented by only four recorded sites. The earliest of these is the find spot of a Neolithic axe (c. 4000 to 2200 BC) (A50), which was not found with any other evidence of this period.

2.2.6 Into the Bronze Age, monuments became more visible in the West Midlands, with c.900 round barrows and ring ditches recorded across the region (Watts, 2011). Concentrations of these have been noted in the Avon, middle Trent and upper Severn valleys, while very few assets are recorded in the central part of the region. During the Iron Age, however, settlement evidence became more prominent, with

funerary monuments less evident (Watts, 2011). In addition to this, the landscape was increasingly farmed and divided towards the end of the prehistoric period. A find spot of a Bronze Age (c. 2200 to 700 BC) palstave axe (A49) is also recorded. Prehistoric settlement evidence is very limited, and includes a possible burnt mound (A2), also believed to be Bronze Age in date, and the site of a possible barrow (SJ 94 05, exact location unknown). It is possible that some of the cropmarks in the area (e.g. A22, A23, A25, A27, A34 and A36), of unknown date, may have their origins in the later prehistoric period, or the early part of the Roman period.

2.2.7 Staffordshire at the time of the Roman occupation was thought to be thinly populated and dominated by woodland (Page, 1908). However, there are still various Roman sites recorded across the county. A number of forts were recorded along the western side of the county, thought to reflect the Romans' defences against the Welsh tribes. There is also a major road which ran through the county, in addition to Watling Street. This is known as Ryknield Street which ran from Yorkshire to the West Country (Watts, 2011).

2.2.8 There are two recorded assets of Roman (AD 43 to 410) date within the study area. The exact location for the discovery of these assets is unknown and they comprise the find spots of a silver denarius coin of Hadrian (A47) and a copper alloy Colchester brooch (A46). Just outside the study area, to the west, is the Roman road between Featherstone and Pennocrium, near the modern village of Penkridge, where there is a cluster of scheduled Roman settlement and military sites. This cluster of sites includes the site of the Pennocrucium, a small Roman town within a rectangular defended enclosure, covering an area of 5 ha. The town was located along Watling Street, which ran from Colchester to Wroxeter, and was mentioned in the Itinerary of Antoninus in the 3rd century AD (Cockin, 2000). Excavations within the interior of the enclosure indicated that there were timber frame buildings fronting Watling Street, along with rubbish pits, cobbled lanes and pottery dating from the 1st to the 4th century AD. Surrounding this town was a possible vexillation fortress, thought to date to the mid-1st century AD, two forts and a number of camps. These camps were thought to be located at strategic points along the Roman road system from Watling Street towards Chester, Wroxeter and Greensforge.

2.2.9 Following the Roman occupation, Staffordshire lay within the Anglo-Saxon kingdom of Mercia from the 6th century until the Danish invasion in the 9th century. The Vikings settled at Repton in AD874 and Watling Street formed the boundary between the two kingdoms. To the north of Watling Street, the area was under Danelaw and to the south it remained under Saxon control (Page, 1908). Throughout this period, settlement patterns gradually shifted towards nucleation, although small farms and hamlets still remained at the end of the early medieval period (Ref Page, 1908). There are nine sites of early medieval date (AD 410 to 1066) recorded in the study area. These include the deserted settlement of Hilton or Haltone (A56), which is centred around Hilton Park. The settlement was first recorded in the very late 10th century and it is recorded in the Domesday Book. The date of desertion is not known, and no above-ground evidence survives within the current park. Three more settlements of early medieval origin are also recorded

in the study area, at Essington/ Eseningtone (A54), Little Saredon (A57), and Shareshill / Servesed (A58). Many of these settlements are recorded in the Domesday Book (Ref Mills, 2003) and have surviving earthworks relating to the former settlements. The settlement of Featherstone/ Ferdestan (A55) may also have its origins in the early medieval period, but it is not recorded in the Domesday Book.

2.2.10 There are two moated sites recorded as dating from the early medieval period. The first is located east of the church in Shareshill (A20) and the second is recorded at Little Saredon Manor (A18). The site of the Church of St Mary, Shareshill (A5) is documented from 1213 and its use continues into the subsequent periods. The final recorded asset of early medieval date is the find spot of a fragment of a probable cast copper alloy mount with enamel decorations (A48).

2.2.11 The transition to the medieval period saw a number of changes to the social and political order. These changes included the expansion of settlement, emergence of the gentry and the increased commercialisation of society (Ref Watts, 2011). Prominent medieval industries in the region of the West Midlands include the iron industry, notably in north Staffordshire and south-east Herefordshire, as well as wool production and the cloth industry in the west and south of the region (Ref Watts).

2.2.12 There are 16 sites with evidence of medieval date (1066 to 1500). The majority of these are moated sites or those associated with farming practices. The first of the moated sites is located at Hilton Park (A11), which has been built over by the 18th century house (B2). Other moats are located across the study area, including a 14th century example to the east, Black Lees (A3), and other examples in the vicinity of Shareshill (A1, A19 and two un-located in grid square SJ 94 06).

2.2.13 The remainder of the medieval sites are related to agricultural activity and include evidence for ridge and furrow (A13, A14, A15, A28, A37, and A38), as well as earthworks interpreted as the remains of a former tenement or croft (A21). The cropmarks of a medieval field system (A24) were excavated as part of the construction works of the M6 Toll. This site also contained evidence of post-medieval field boundaries and trackways. The possible site of a church has also been identified from historic map analysis. The name ‘Church Field’ is recorded on the 1841 Tithe Map (A26). The place-name suggests a church may have been located in the vicinity, and a rectangular cropmark nearby may represent a former church building.

2.2.14 A find spot of medieval pottery is also located in the study area (A42), although some sherds were of early post-medieval date. Some of the ridge and furrow sites may also contain elements of post-medieval activity, such as site A13.

2.2.15 Thirteen recorded sites of post-medieval date (1500 to 1900) are located in the study area, in addition to those medieval sites that may have extended into this later period. These sites predominantly relate to the agricultural use of the landscape, as well as evidence for increasing industrial activity in the 18th and 19th centuries. During the post-medieval period much of the land surrounding the Scheme remained in agricultural use. The tithe maps for the surrounding townships

are dominated by arable and pasture fields interspersed with areas of meadow and woodland.

2.2.16 As well as the sites discussed in the medieval section (such as ridge and furrow, A13, and field systems, A24), agricultural evidence includes the site of Brook House Farm (A16), first shown on Yates' map of 1775, which is no longer extant. The remains of a windmill at Mill Farm are also recorded (A6). It is thought that a mill may have occupied this site from at least the 17th century. A second mill (A30) is also recorded at Little Saredon and dates to the later part of the post-medieval period. This mill is recorded as originally being wind powered and was later converted to steam. A well preserved pound (A29) is recorded at Little Saredon Dairy Farm, which may have been used to hold the cows before or after milking. Other extant agricultural buildings are discussed in the built heritage section below. A possible marl pit (A9) is also recorded, used to extract clay and lime which was used to improve agricultural land.

2.2.17 The predominant industries within Staffordshire consist of the Potteries in the north of the county, mining across the county, and iron and steel production around Walsall. Cannock Chase, located several kilometres north-east of the Scheme, is one of the main areas of coal mining in the county. Mining in this area was characterised by shallow workings and limited coal markets until the development of greater technology in the mid-19th century allowed for more extensive and intensive mining (Ref Page, 1908). Industrial sites recorded in the study area are primarily related to brick and tile production, required to fulfil the needs of the nearby growing urban areas, such as Wolverhampton to the south-west. A brick and tile works at Holly Bank Farm (A12), is recorded in the eastern part of the study area. A possible earlier tile kiln is suggested by the find spot of 16th century tile (SJ 95 08, exact location uncertain), which is similar to tiles found on the roofs of nearby churches.

2.2.18 Other industrial sites are representative of extractive industries. The location of a former quarry (A33) has been identified from field name evidence but no features have been noted on the ground. Two smithies (A31 and A32), recorded close to Little Saredon, are also recorded on the HER.

2.2.19 The Streetway and Wordsley Green Turnpike Road (A59) was established in the mid-18th century. This largely follows the line of the A460 through the study area, joining the A4601 to the north of the M6 Toll. A possible boundary marker (A10), in the form of a low bank, may have also been followed by a former road or track.

2.2.20 The churchyard to the Church of St Mary and St Luke (A4) also dates to the post-medieval period. The churchyard contains a number of grave markers, tombs and headstones all dating to this period. Excavations within the churchyard have also revealed evidence for tombs, vaults and grave cuts.

2.2.21 The final two sites of post-medieval date are the find spots of post-medieval material (A42 and A43), including a hand-made brick and pottery. The landscape park around Hilton Hall (A40) is also recorded as dating from the post-medieval

period on the HER. This is discussed in further detail in the historic buildings and historic landscapes sections below.

2.2.22 The modern period (1900 to present) is represented by 12 assets. The find spot (A42) and brickworks (A12) described in the post-medieval section above both contained evidence of modern date.

2.2.23 A colliery (A39), named as Hilton Main Colliery but originally known as Essington Wood Colliery and later as the Holly Bank Colliery is recorded. The colliery included coal shafts, a tramway and mine buildings. It is no longer extant and has since been built over.

2.2.24 The formal garden at Moseley Old Hall (A41) was established by the National Trust in the second half of the 20th century and is recorded on the HER. Further information on Moseley Old Hall can be found in the historic buildings section below.

2.2.25 Three black and white finger posts (A51, A52 and A53) are also recorded within the study area. These are believed to date to the early 20th century and provide directional information in relation to local footpaths and highways.

2.2.26 The other three sites of modern date are related to the defences of the outskirts of the urban area near Wolverhampton and Birmingham. The major site of World War II date is a Royal Ordnance Factory in Featherstone (A7). This was built between 1940 and 1942. The site was chosen due to its relatively flat topography and proximity to a railway line. The site included barracks, air raid shelters, pillboxes, workshops and a railway siding. Three other brick pillboxes are recorded. Two of these date from World War II (A8 and A44) and one from the Cold War (A45). The remains of a World War II anti-aircraft gun site are also recorded at Middle Hill, Saredon (A17). The windmill mound (A6) was used as a Home Guard observation post in World War II.

2.2.27 The remaining sites are of unknown date and all are recorded from aerial photographs. Some of these, such as cropmarks of enclosures (A23, A25 and A27) or of possible settlement activity (A34), could be of later prehistoric or Roman date, while others may represent medieval or post-medieval field systems (such as A22, A23 and A35).

2.2.28 There is potential for previously unrecorded archaeological remains to be found along the route of the Scheme. While remains of any period cannot be discounted, remains associated with the later prehistoric periods and the medieval and post-medieval landscapes are most likely to be discovered.

2.3 Previous archaeological works

2.3.1 A program of archaeological evaluation has been previously undertaken in support of the Scheme and presented in detail as Appendices to the ES. A summary of previous archaeological work is provided below.

Geophysical survey (Phase SI 2019)

2.3.2 A gradiometer survey was undertaken by Phase Site Investigations Ltd in March-April 2019 (Phase SI, 2019). There were 19 areas proposed for survey, although

three areas were not surveyed due to livestock being present in the fields. The full survey report can be found in Appendix 6.3 of the ES [TR010054/APP/6.3].

2.3.3 There were nine anomalies recorded by the survey (anomalies A-I). Anomalies A and B were recorded in Area 5, just north of Hilton Hall, and are thought to represent drainage. Areas 7 and 8 are both located to the south-east of Shareshill, and anomalies were recorded in each. Area 7 recorded anomalies C, D and E. Anomaly C is thought to represent current agricultural practices, while anomalies D and E are both likely drainage features. Area 8 recorded anomalies F and G, which were both recorded as isolated positive responses and, while it is thought they are of human origin, their function and date is unknown. Areas 11 and 16 are both located at the north-western end of the Scheme and both recorded anomalies. Anomaly H was recorded in Area 11 and consists of two curvilinear trends either representing sub-surface features or the intersection of different agricultural regimes. Anomaly I was recorded in Area 16 as an alignment of trends and it is also thought to represent a sub-surface feature of unknown function.

2.3.4 Other responses from the survey mainly consisted of strong magnetic disturbances of made ground and modern disturbances as well as relatively weaker linear responses of agricultural activity.

2.3.5 The survey concluded that the majority of the anomalies identified related to modern material or objects related to agricultural activity or geological variations. No clear patterns were identified indicating relationships between the anomalies.

Archaeological monitoring of the GI (ADSA 2019)

2.3.6 Monitoring was undertaken by ADAS in July 2019. A total of 19 trial pits and 31 boreholes were monitored. There were no archaeologically significant deposits or artefacts observed from the trial pits. Twenty of the boreholes contained made ground, which indicated the ground has been extensively landscaped and altered during the construction of modern highways. The full GI monitoring report can be found in Appendix 6.2 of the ES [TR010054/APP/6.3].

2.4 Consultation

2.4.1 Consultation undertaken with the County Archaeologist for Staffordshire has been used to determine the methodology for archaeological fieldwork to date, including the archaeological monitoring of geotechnical investigation and the geophysical survey. Subsequently, the requirement for further archaeological evaluation was discussed. It was agreed that evaluation trenching should be undertaken once the detailed design of the Scheme has progressed after the submission of the draft Development Consent Order (DCO). This will allow a more focussed and appropriate level of evaluation. However, this should be undertaken early in the programme, to allow the development and implementation of mitigation measures, particularly where any additional archaeological features are identified. This should include, where possible, preservation in situ.

3 Proposed Scope of Future Archaeological Works

3.1.1 The following section presents the mitigation strategy for the Scheme. It sets out the process and outline methodologies to be following at the detailed design stage of the Scheme and prior to the construction phase.

3.1.2 All archaeological investigations will be carried out in accordance with this mitigation strategy, and a Written Scheme of Investigation (WSI) to be prepared by the Archaeological Contractor for each phase of work, and current good practice including the Chartered Institute for Archaeologists (CIfA) Standard and Guidance for Archaeological Excavation (2014), Code of Conduct (CIfA 2019) and other current and relevant best practice and standards and guidance (refer to Annex 2).

3.2 Aims and objectives

3.2.1 The overall aim of the mitigation strategy is to ensure that processes are in place to reduce the impact of the Scheme on the archaeological resource through a programme of archaeological investigation. The archaeological evaluation will have the following aims:

- to evaluate and define the archaeological resource that will be impacted as a result of the Scheme;
- to record (where possible) the nature, depth, extent, character and date of archaeological deposits or features encountered in order to define research aims of the Scheme;
- to record and recover an adequate sample of the range, quality and quantity of artefactual and environmental evidence present in order to successfully fulfil the research aims of the Scheme; and
- to report the results of the investigations and use them to determine the requirements for and the specification of detailed archaeological mitigation.

3.2.2 The WSI (Refer to Section 7.1) should identify the specific objectives of the fieldwork with reference to the Regional Research Frameworks, the advice set out by the archaeological advisors to the Local Planning Authority and following consultation of the County Historic Environment Record.

3.3 Step 1 – Evaluation trenching

3.3.1 As agreed with the County Archaeologist the archaeological evaluation trenching will form the first phase of evaluation. The number and layout of the trenches will be developed to appropriately evaluate the land within the footprint of the Scheme including compounds, ponds, borrow pits and statutory diversions.

3.3.2 The purpose of the evaluation is to identify any archaeological remains in the areas of potential impact from construction activity so that mitigation strategies can be developed where required.

3.3.3 As part of the programme of evaluation trenching, appropriate consideration will be given to the potential for palaeoenvironmental deposits to be present. Appropriate

samples will be taken that will be used to inform any requirement for further, specialist recording.

3.3.4 An outline principles and methodology for undertaking the archaeological evaluation trenching is provided in Section 4 of this mitigation strategy. The full details of the evaluation trenching will be detailed in a WSI produced by the Archaeological Contractor and agreed with the Applicant's archaeological advisor and the County Archaeologist.

3.4 Step 2 – Pre-construction works

3.4.1 Following the programme of archaeological evaluation trenching an appropriate methodology shall be identified for mitigation, as required. Mitigation may take the form of, but not be limited to: the recording of landscape features; strip, map and record; open area excavation and palaeoenvironmental sampling. It is considered that if any of these techniques are required to mitigate the effects of the Scheme on the archaeological resource, the works will be undertaken prior to or immediately preceding the construction phase.

3.4.2 The details of this work, including the methodology and locations of the appropriate intervention will be prepared in consultation with the Applicant's archaeological advisor and the County Archaeologist and detailed in a WSI.

3.5 Step 3 – Construction phase

3.5.1 Prior to construction works commencing the Construction Contractor and the Archaeological Contractor will consult with the County Archaeologist to determine if any elements of the construction phase require archaeological monitoring, including but not limited to, topsoil stripping, earth moving activities and landscaping. This work could be undertaken as part of a watching brief, intermediate monitoring or other techniques to be determined in consultation with the County Archaeologist.

3.5.2 The details of this work, including the methodology and locations of the appropriate intervention will be determined in consultation with the County Archaeologist and detailed in a WSI.

4 Outline Works Specification for Archaeological Fieldwork

4.1 General requirements

4.1.1 All archaeological works will be undertaken to adequately evaluate the archaeological resource that will be impacted as a result of the Scheme and will be proportionate to fulfil the aims and objectives. These works will be carried out in accordance with a WSI (Refer to Section 7.1), prepared in advance with consultation with the County Archaeologist for Staffordshire. A WSI should be prepared for each phase of the Scheme, including evaluation, pre-construction and during construction. Each WSI will take account of assessment guidance in the Standard and Guidance for Archaeological Field Evaluation prepared by the CIfA (CIfA 2014); the CIfA Code of Conduct (CIfA 2019) and other current and relevant best practice and standards and guidance (refer to Annex 2).

4.1.2 The Contractor shall prepare and submit a programme, risk assessment and WSI for the works prior to the commencement of the fieldwork. The draft Archaeological Method Statement will be submitted to the Applicant, their archaeological advisor and the County Archaeologist for review.

4.1.3 To ensure the successful completion of the archaeological fieldwork, the Archaeological Contractor shall:

- provide an Archaeological Method Statement and risk assessment inclusive of a safe method of working;
- provide suitably qualified and competent staff who have valid Construction Skills Certification Scheme (CSCS) cards;
- for the evaluation trenching:
  - provide a mechanical excavator suitable to cleanly excavate the trial trenches. The machine will need to be fitted with a toothless ditching bucket to reduce each trench under the archaeological supervision of the Archaeological Contractor;
  - provide appropriate safety fencing and edge protection for each trench;
  - provide and monitor/maintain safe access into the trial trenches. No staff are to enter the trenches if it is declared unsafe by any competent person or the archaeological site supervisor;
- provide a suitably qualified archaeologist, experienced in archaeological investigation, recording and the nature of archaeological deposits which are expected on this site;
- work with the Applicant and the Principal Contractor to safely complete the archaeological site works;
- provide all hand tools and recording materials required to complete the archaeological evaluation;
- ensure that during the archaeological fieldwork the extent of any surviving archaeological deposits are mapped, and that any surviving archaeological

remains are hand cleaned, defined and sample excavated, sufficient to determine type, plan form and relationships and that these are recorded;

- have appropriate procedures in place to allow for the safe-keeping and effective tracking of all records and artefacts during all stages of assessment or analysis; and
- ensure that the investigations are suitably staffed to a level that means that there will be no delays to the completion of the investigations or to the construction programme and the Archaeological Contractor shall liaise with the Applicants archaeological advisor and the Principal Contractor to agree the level of resourcing for the duration of the work.

4.2 Environmental considerations

4.2.1 Machine excavations would be constrained by the following environmental constraints:

- a 3 m stand-off from hedgerows will be maintained;
- the stand-off area for trees will comprise the extent of the canopy plus 3 m;
- trees within hedgerows will also require the stand-off to comprise the extent of the canopy plus 3 m; and
- a 10 m stand-off will be maintained from all watercourses.

4.2.2 These considerations outweigh the location of the archaeological site. The edge of excavation will be adjusted if necessary, in order to observe the ecological and landscape considerations.

4.3 Machine excavation

4.3.1 Each stage of the archaeological fieldwork will be carried out in accordance with the Archaeological Contractor's approved WSI and Risk Assessment and Method Statement (RAMS).

4.3.2 Evaluation trenches will be excavated at the locations and in the dimensions determined in consultation with the County Archaeologist.

4.3.3 The trenches will be positioned using metric-survey equipment to an accuracy of ±100 mm of the specified trench location. Each trench will be opened under direct archaeological supervision using an appropriate mechanical excavator fitted with a toothless ditching bucket. The arisings from the archaeological works will be stored adjacent to each trench (within a safe working distance) and will be separated according to material (i.e. topsoil from subsoil) unless alternative arrangements have been agreed with the landowner.

4.3.4 The Archaeological Contractor will ensure that during the archaeological trial trench evaluation the extent of any surviving archaeological deposits are mapped, and that any surviving archaeological remains are hand cleaned, defined and sample excavated, sufficient to determine type, plan form and relationships and that these are recorded. The archaeology should be characterised, and the significance and extent of the archaeology encountered determined to adequately

inform the Applicant and the County Archaeologist of both the extent and significance of archaeological deposits

4.3.5 The Contractor shall ensure that the archaeological investigations are undertaken in an organised, efficient and professional manner.

4.3.6 Archaeological deposits will be excavated and recorded stratigraphically in accordance with a recording system detailed in the Archaeological Contractor's WSI and Method Statement and determined in consultation with the County Archaeologist. All relationships between features or deposits will be investigated and recorded. Machine-assisted excavation may be permissible by the Archaeological Contractor if large deposits are encountered but only after consultation with the Applicants archaeological advisor and County Archaeologist.

4.3.7 Areas will be recorded on a suitable digital base map / development plan and the stratigraphy and depth of excavation will be recorded. Details on recording procedures where significant archaeology is discovered are detailed in the section below.

4.3.8 Due to the possibility of encountering field drains, the Archaeological Contractor will ensure that the machine driver(s) is made aware of the situation to ensure that careful digging practices are put in place.

4.4 Hand excavation

4.4.1 Any archaeological deposits/features identified will be cleaned and hand excavated in an archaeologically controlled and stratigraphic manner, sufficient to meet the aims and objectives of the investigation.

4.4.2 Archaeological remains will be investigated and recorded. Hand excavation will initially be targeted to provide information on the form, function and date of the feature. Stratigraphic relationships between features will be investigated and recorded. Sampling strategies for specific feature types are as follows.

- Linear features: Representative sections through features will be undertaken to capture the character (type/form/state of preservation, finds, etc.) and inform and understanding of significance of the feature.
- Discrete features: Pits, post-holes and other isolated features will normally be half-sectioned. A minimum requirement to meet the project objectives will be agreed in consultation with the Applicants archaeological advisor and the County Archaeologist. If large pits or deposits (over 1.5m diameter) are encountered, then the sample excavated should be sufficient to define the extent and maximum depth of the feature and to achieve the objectives of the evaluation but should not be less than 25%.
- Structures: Each structure will be sampled sufficiently to define the extent, form, stratigraphic complexity and depth of the component features and its associated deposits to achieve the objectives of the evaluation. All intersections will be investigated to determine the relationship(s) between the component features. The remains of all upstanding walls will be hand cleaned sufficient to understand their dimensions, extent, composition, sequence and relationships.

4.4.3 The extent of the evaluation trenches will be recorded on a suitable base map, even if they reveal no archaeological remains. The depth of excavation will also be recorded, where appropriate. The stratigraphy of any evaluation trench is to be recorded, even where no archaeological deposits have been identified. All trenches will be planned at 1:50. One representative long section of each trench will be produced, at an appropriate scale. Machine-assisted excavation may be permissible if large deposits are encountered but only after consultation with the County Archaeologist.

4.4.4 A full written, drawn and photographic record will be made of all archaeological remains. Hand drawn plans and sections of features will be produced at an appropriate scale (normally 1:20 for plans and 1:10 for sections). Drawings will include spot heights relative to Ordnance Datum in metres, correct to two decimal places.

4.5 Recording

4.5.1 All archaeological remains shall be recorded to best practice standards including the CIfA Standard and Guidance for Archaeological Field Evaluation (2014a) and Standard and Guidance for Archaeological Excavation (2014b). Archaeological recording is to include as a minimum:

- A full written (on appropriate pro forma recording sheets), drawn and photographic record will be made for each element of the mitigation works, even where no archaeological features are identified. Where the stratigraphic sequence or inter-cutting features are complex the relationships between contexts shall also be compiled as 'Harris matrix' diagrams (Harris 1993).
- Hand drawn plans and sections of features will be produced at an appropriate scale (normally 1:20 for plans and 1:10 for sections). All plans and sections will include spot heights relative to Ordnance Datum in metres, correct to two decimal places.
- The photographic record shall consist of monochrome prints/negatives and colour transparencies. Digital photography is acceptable for all site photography. In addition to records of archaeological features, a number of general site photographs will also be taken to give an overview of the site. Particular attention should be paid to obtaining shots suitable for displays, exhibitions and other publicity.
- Indices of context records, drawings samples and photographs will be maintained and checked. These will form part of the project archive. These indexed registers will be fully cross-referenced.

4.5.2 On completion of the field project the site archive will be consolidated, checked to ensure it is internally consistent and ordered as a permanent archive.

4.6 Artefact recovery

4.6.1 Artefacts will be collected, stored and processed in accordance with standard methodologies and national guidelines (refer to Annex 2). Bulk finds from feature fills of deposits will be collected and recorded by context. Each 'significant find' will

be recorded three dimensionally. Similarly, if artefact scatters are encountered each individual artefact should be also recorded three dimensionally.

4.6.2 Except for modern artefacts all finds will be collected and retained. The strategy for this will be developed using the CIfA Archive Selection Toolkit (https://www.archaeologists.net/selection-toolkit). The Archaeological Contractor will clarify the details in the WSI and the Method Statement the Collection Policy and will ensure that it is in-line with local authority guidelines.

4.6.3 Where necessary the artefacts will be stabilised, conserved and stored in accordance with the guidelines of the UKIC (United Kingdom Institute of Conservators). If necessary, a conservator will visit the site to undertake 'first aid' conservation treatment. If waterlogged organic materials are encountered and appropriate cold storage facilities are not available onsite, the project manager will arrange the removal of the finds to nearby suitable facilities.

4.6.4 Artefacts will be stored in appropriate materials and conditions and monitored to minimise further deterioration.

4.7 Environmental sampling

4.7.1 The detailed WSI will outline an appropriate environmental sampling strategy that conforms to the requirements of the archaeological evaluation. If important archaeological remains are encountered the County Archaeologist and, if required, the Historic England Regional Science Advisor (RSA) will be notified and will be consulted regarding the sampling strategy proposed by the Contractor. In addition, the Archaeological Contractor's Environmental Specialist will visit the site to ensure that the sampling strategy is appropriately implemented and to offer specialist advice whenever required.

4.7.2 Appropriate provision will also be made for the recovery of material suitable for scientific dating. Any samples taken must come from appropriately cleaned surfaces and will be collected with clean tools and will be placed in clean containers. They will be adequately recorded and labelled, and a register of all samples will be kept. Once the samples have been obtained, they will be stored appropriately in a secure location prior to being sent to the appropriate specialist.

4.8 Finds processing

4.8.1 Initial processing of finds (and if appropriate other samples) will be carried out concurrent with the fieldwork.

4.8.2 The processing of finds will be finished shortly after completion of the evaluation trenching, the finds will be retained (according to the Collection Policy), washed, marked, bagged and logged on a MS Access or GIS database (or equivalent), together with their locations according to the requirements set out in the Collection

Policy (e.g. 'significant finds' will be recorded on the OS National Grid (eastings, northings) and Ordnance Datum (height) to two decimal places).

4.8.3 The finds assemblage will be treated, labelled and stored in accordance with the appropriate Historic England guidance documents, local authority guidelines (if appropriate) and the Institute of Conservation guidelines (refer to Annex 2).

4.8.4 The recipient museum is the Potteries Museum and Art Gallery. They must be contacted in advance of the fieldwork commencing to obtain a site code and accession number, and a copy of their terms and conditions/costs. The Archaeological Contractor will ensure that the processing of the assemblage is in accordance with the requirements of the recipient Museum.

4.8.5 If appropriate, each category of find or each material type will be examined by a suitably qualified archaeologist or specialist and the results incorporated into the fieldwork report.

4.9 Human remains

4.9.1 If human remains are discovered during the course of the archaeological fieldwork, the remains shall provisionally, in accordance with current best practice, be covered and protected and left in situ. The removal of human remains will only take place in accordance with a Ministry of Justice licence and under the appropriate Environmental Health regulations and the Burial Act 1857. In the event of the discovery of human remains the Archaeological Contractor will arrange to contact H.M. Coroner and will inform the Applicant or their archaeological advisor.

4.10 Treasure

4.10.1 Any artefacts which are recovered that fall within the scope of the Treasure Act 1996 and Treasure (Designation) Order 2002 will be reported to the Applicants archaeological advisor immediately. Artefacts that are defined as Treasure according to the above legislation will be vested in the franchisee (e.g. The Duke of Cornwall is franchisee for Cornwall), or if none, the Crown. The Archaeological Contractor will contact H.M. Coroner, and will ensure that the Treasure regulations are enforced and that all the relevant parties are kept informed. A list of finds that have been collected that fall under the Treasure Act and related legislation will be included in the fieldwork report.

4.10.2 Artefacts that are classified as 'treasure' will be removed to a safe place but where removal cannot be achieved on the same working day as the discovery, suitable security measures must be taken to protect the finds from damage or unauthorised removal.

5 Monitoring, Progress Reports and Meetings

5.1.1 The archaeological mitigation works will be subject to regular monitoring visits by the Applicant or their archaeological advisor and the County Archaeologist, who will have unrestricted access to the site, site records or any other information. The work will be inspected to ensure that it is being carried out to the required standards and that it will achieve the stated objectives.

5.1.2 Weekly written progress reports (via e-mail each Monday by 10.30am) will be provided to the Applicant or their archaeological advisor by the Archaeological Contractor during the archaeological investigation. In addition, the Archaeological Contractor will inform the Applicant or their archaeological advisor on the progress of the fieldwork verbally upon request.

5.1.3 Progress meetings between the Applicant and/or their archaeological advisor, the County Archaeologist and the Archaeological Contractor will be held on site during the course of the evaluation trenching. Officers from Historic England will also be invited to attend, if appropriate. These meetings will be arranged by the Applicants archaeological advisor.

5.1.4 All monitoring visits will be documented by the relevant parties. The archaeological contractor will be informed of any perceived deficiencies.

5.1.5 The County Archaeologist and the Applicant or their archaeological advisor should be informed at the earliest opportunity of any unexpected discoveries, especially where there may be a need to vary the WSI.

5.1.6 The Archaeological Contractor will only accept instruction from the Applicant or their archaeological advisor.

6 Completion of Archaeological Fieldwork

6.1.1 Evaluation trenches shall not be reinstated without the prior approval of the Applicant or their archaeological advisor. In exceptional circumstances, such as for health and safety purposes or ground stability reasons, some backfilling would be permitted. The trenches shall only be backfilled by machine under appropriate conditions and with direct archaeological supervision. Arisings will be returned strictly in the correct sequence and will not be compacted.

6.1.2 Areas required for archaeological mitigation, such as open area excavation or strip, map and record, will only be considered to be complete with the approval of the Applicant or their archaeological advisor.

6.1.3 The Archaeological Contractor shall prepare and submit a Completion Statement to the Applicant or their archaeological advisor within one working day of completing the fieldwork.

6.1.4 Each location where archaeological fieldwork is undertaken will be reinstated to the agreed levels and site will be left in a tidy condition. The Archaeological Contractor will ensure that all materials brought onto site are removed.

6.1.5 As a minimum, an Online Access to the Index of archaeological investigations (OASIS) entry shall be completed at the end of the fieldwork, irrespective of whether a formal report is required (http://ads.ahds.ac.uk/project/oasis/). If appropriate, the entry should include caveats regarding any conclusions drawn in advance of analysis. The OASIS entry may be updated and re-submitted not later than three months after the completion of a report. The Archaeological Contractor is advised to ensure that adequate time and costings are built into their tenders to complete the form to a satisfactory standard.

7 Deliverables

7.1 Written Scheme of Investigation

7.1.1 Prior to the start of each phase of archaeological fieldwork, the Archaeological Contractor shall produce a WSI for approval by the Applicant or their archaeological advisor and developed in consultation with the County Archaeologist. A WSI will be required for evaluation trenching, pre-construction mitigation, and construction phase mitigation, as required.

7.1.2 Each WSI should include the following sections as a minimum (see CIfA 2014 Standard and Guidance for Archaeological Field Evaluation for further information):

- A statement on the technical, research and ethical competences of the project team, including relevant professional accreditation;
- Site location (including map) and descriptions;
- Context of the project;
- Geological and topographical background;
- Archaeological and historical background;
- General and specific research aims of the project, with reference to Regional Research Frameworks;
- Methods;
- Details of how soil will be separated on site, where required;
- Collection and disposal strategy for artefacts, ecofacts, and all paper, graphic and digital materials;
- Arrangements for immediate conservation of artefacts;
- Details of backfilling, as required. Arisings will be returned strictly in the correct sequence and will not be compacted. Measures to ensure that any field drainage pipes damaged during the excavation are repaired prior to backfilling, where required, and that the landowner or tenant has opportunity to inspect the repairs, should be included;
- Post-fieldwork assessment and analysis of project data;
- Report preparation (including details of the section headings);
- Publication and dissemination proposals, as required;
- Copyright;
- Details of finds storage;
- Timetable;
- Staffing. Details on the expertise of the project team is also required. The project manager should be a named Member of CIfA (MCIfA) who is adequately qualified to manage the required archaeological work or who can demonstrate an equivalent level of competence. The composition and experience of the project team should be described. Specialists should be identified where required (e.g. for finds and environmental work). The availability of the environmental specialists (and laboratory) to do analysis for inclusion within the

WSI should be stated. Note: Specialists should be able to demonstrate a relevant qualification and track record of at least 3 years continuous relevant work (or equivalent) and appropriate publication. The laboratory should be ready and equipped to do analysis on all samples to fulfil the obligations within the timescale. In appropriate circumstances, less experienced staff may conduct work under the supervision of well-established and widely recognised specialists;

- A statement on compliance with relevant professional ethical and technical standards (including data standards);
- Health and Safety considerations;
- Environmental protection considerations;
- Monitoring procedures; and
- the procedures for on- and off- site security and emergency response plan (including environmental incidents).

7.2 Fieldwork Report

7.2.1 A fieldwork report will be submitted upon completion of each phase of archaeological fieldwork. For the evaluation trenching, the draft report should be submitted within one month (TBC) of the completion of the fieldwork. A programme will be agreed between the Applicant, the Principal Contractor and Archaeological Contractor for each subsequent phase of archaeological fieldwork.

7.2.2 The preparation of the site archive will be undertaken in accordance with the WSI and will follow relevant archaeological standards and national policy and guidance (refer to Annex 2).

7.2.3 The Fieldwork Report for each stage of archaeological fieldwork will include the following:

- a Quality Assurance sheet detailing as a minimum the report title, author, version, date, ‘checked by’ and ‘approved by’;
- a non-technical summary;
- site location details;
- a brief archaeological, historical and project background;
- a description of the methodology followed;
- aims and objectives;
- results of the evaluation trenching (to include full descriptions, assessment of condition, quality and significance of the remains);
- an appendix containing specialist reports;
- a list of all finds that fall within the scope of the Treasure Act 1996 and associated legislation;
- an appendix containing plates illustrating specific finds, working shots and portraits of specific features or structures or important remains;
- a stratigraphic matrix (if appropriate);

- an assessment section and, if appropriate a statement of potential with recommendations for further work and analysis;
- statements regarding the immediate and long-term storage and curation;
- statements of the significance of the results in their local, regional and national context;
- publication proposals (if warranted);
- general and detailed plans showing the location of the investigation areas accurately positioned in relation to the Ordnance Survey basemap with grid co-ordinates and a plan of the identified archaeological remains (to a known scale);
- detailed plans and sections illustrating archaeological features and / relationships between features (at an appropriate and recognised scale); and
- a cross-referenced index of the project archive.

7.2.4 The Fieldwork Report will specifically comment on the level of preservation and will comment on the character of the overlying deposits and on the potential for extrapolating the results into adjacent areas. Two bound hard copies and a digital PDF copy (complete with illustrations and plates) of the completed report will be submitted to the Applicants archaeological advisor as a draft for comment.

7.2.5 The Applicant or their archaeological advisor will submit a copy of the draft Fieldwork Report(s) to the County Archaeologist and, if appropriate, Historic England for comment. In finalising the Fieldwork Report, the comments of the Applicant or their archaeological advisor and the County Archaeologist will be taken into account. The detail of required numbers of copies of reports will be included in the WSI.

7.2.6 Details of archiving arrangements, deposition and publishing will be included in the WSI. This will include the submission of a digital copy of the final report to the Staffordshire HER.

8 Insurances and Health & Safety

8.1.1 The Archaeological Contractor will provide the Applicant or their archaeological advisor and the Principal Contractor with details of their public liability and professional indemnity insurance cover.

8.1.2 The Archaeological Contractor will have their own Health and Safety policies compiled using national guidelines, which conform to all relevant Health and Safety legislation and best practice. A copy of the Archaeological Contractor's Health and Safety policy will be submitted to the Applicant or their archaeological advisor and the Principal Contractor prior to the start of the archaeological works.

8.1.3 The Archaeological Contractor shall prepare a risk assessment and submit this to the Applicant or their archaeological advisor and the Principal Contractor for approval prior to the commencement of the fieldwork. If amendments are required to the Risk Assessment during the works, the Applicant or their archaeological advisor and any other interested party must be provided with the revised document at the earliest opportunity.

8.1.4 No works will begin on site until a satisfactory Health and Safety Plan is in place and agreed with all parties. A health and safety start-up meeting must be held with the Principal Contractor, Archaeological Contractor, the Applicants archaeological advisor and, if required, the Applicant, prior to the start of works on site.

8.1.5 All staff involved in the fieldwork should be CSCS qualified to a minimum standard as an 'Archaeologist Technician' (for Construction Related Occupation cards), Professionally Qualified Person (through accreditation with CIfA) or Academically Qualified Person (through an archaeology degree). Staff CVs will include CSCS qualifications.

8.1.6 The Applicant will provide the Archaeological Contractor with any available details for known overhead or buried services. However, it will remain the responsibility of the Principal Contractor and Archaeological Contractor to identify and avoid any buried underground or overhead services and to carry out scanning using CAT and Genny at each trench location prior to the start of the works and during the excavation of the trenches. The operator of the CAT and Genny device is expected to be in receipt of a CAT4+ qualification.

8.1.7 All site personnel will familiarise themselves with the following:

- site emergency and evacuation procedures;
- the site's health and safety coordinator;
- the first aider; and
- the location of the nearest hospital and doctor's surgery.

8.1.8 The Archaeological Contractor will maintain a record of site attendance for each day that there is a team in the field.

8.1.9 All site personnel will wear appropriate PPE in accordance with the requirements at the site. As a minimum, PPE shall consist of a hard hat, steel toe-capped boots with mid-sole protection, a high visibility jacket or vest, high visibility trousers, safety glasses and gloves. Additional PPE will be issued by the Archaeological Contractor

as required, e.g. ear defenders, masks, etc. In addition, site personnel will ensure that any visitors to the site are equipped with suitable PPE prior to entry to the site.

8.1.10 All equipment must be 'fit for purpose' and be maintained in a sound working condition that complies with all relevant Health and Safety regulations and recommendations.

8.1.11 The Archaeological Contractor shall have full regard for the safety of all personnel on site, including measures to ensure the safety of all, including any effects the archaeological works may have on neighbouring residences and the daily operations of the Applicant.

8.1.12 The Archaeological Contractor will undertake any necessary health and safety training and/ or inductions.

9 References

Ref 1 ADAS (2019) *Archaeological Monitoring and Recording Report: M54-M6 Link Road Archaeological Monitoring of Geotechnical Trial Pits*. Abingdon.

Ref 2 British Geological Survey (2001) *Wolverhampton England and Wales Sheet 153*. Solid and Drift Geology. 1:50 000

Ref 3 British Geological Survey (2019) *Online Geoindex map*. Available online at http://mapapps2.bgs.ac.uk/geoindex/home.html - accessed 03/01/2019.

Ref 4 CIfA, (2019). *Code of Conduct*. Chartered Institute for Archaeologists, Reading, 2019. Available online: https://www.archaeologists.net/sites/default/files/Code%20of%20Conduct.pdf.

Ref 5 CIfA, (2014a) *Standard and guidance for Archaeological Field Evaluation*. Chartered Institute for Archaeologists, Reading, December 2014. Available online: https://www.archaeologists.net/sites/default/files/CIfAS&GFieldevaluation_1.pdf

Ref 6 CIfA, (2014b). *Standard and guidance for Archaeological Excavation*. Chartered Institute for Archaeologists, Reading, December 2014. Available online: https://www.archaeologists.net/sites/default/files/CIfAS&GExcavation_1.pdf

Ref 7 Cockin, T. (2000) *The Staffordshire Encyclopaedia: a secondary source index on the history of the old county of Stafford, celebrating its curiosities, peculiarities and legends*. Malthouse Press, Stoke-on-Trent.

Ref 8 Harris, E (1993) *Practices of Archaeological Stratigraphy*. Academic Press.

Ref 9 Mills, A. D. (2003) *A Dictionary of British Place Names Oxford*, Oxford University Press.

Ref 10 Page, W. (1908) *The Victoria County History of the County of Stafford: Volume One*. Archibald Constable and Company Ltd, London.

Ref 11 Phase SI (2019) *M54 to M6/ M6 Toll Link Road Scheme, Staffordshire: Archaeological* Geophysical Survey. Phase Site Investigations Ltd

Ref 12 Watts, S. (2011) *The Archaeology of the West Midlands: A framework for research*.

Annex 1 – Known Heritage Assets

Asset numbers have been assigned to each heritage asset. These asset numbers can be cross referenced with the text provided in Volume 1 of the Environmental Statement, Chapter 6: Cultural Heritage [TR010054/APP/6.1] and Figures 6.1 to 6.3 provided in Volume 2 of the Environmental Statement [TR010054/APP/6.2].

Table 6.1A: Known Archaeology Assets (Refer to Figures 6.1 and 6.3 [TR010054/APP/6.2])

Asset No.	Reference	Grid Reference	Period	Description
A1	01074 - MST1072	SJ 9459 0671	Medieval	Moated site in Shareshill. Rectangular moated site excavated in 1959 before being built over. The excavation revealed the moat to have originally been constructed in the 12th century and altered and strengthened in the 13th century. The site appeared to have been destroyed by a fire in the 14th century, and there was no evidence for occupation of the site after 1350.
A2	01075 - MST1073, 76955	SJ 9484 0688	Prehistoric?	The remains of a probable Bronze Age burnt mound. The mound has been eroded by the adjacent stream.
A3	01083 - MST1081, 76944, EST1814	SJ 9650 0644	Medieval	Black Lees moated site. Site of a medieval moat which dated form at least the 14th century, based on documentary evidence. A second, possibly earlier moat, may have existed to the north. Its location is marked on the OS first edition. It has been built over by a car park for a garden centre.
A4	50033 - MST11129	SJ 9442 0664	Post-Medieval	The churchyard to the Church of St Mary and St Luke, which contains a number of post-medieval grave markers, tombs and headstones. Excavations within the churchyard have also revealed evidence for tombs, vaults and grave cuts. A Second World War memorial cross stands within the churchyard.
A5	50034 – MST11130	SJ 9443 0661	Early Medieval	The site of the Church of St Mary, Shareshill. Documentary reference to the existence of a church at Shareshill by 1213. This church is recorded to have been appropriated to Penkridge College in 1225 and raised from a chapel of ease to parochial status in 1551.

Asset No.	Reference	Grid Reference	Period	Description
A6	01118 - MST1116	SJ 9435 0368	Post-Medieval	The remains of a windmill at Mill Farm. A mill may have existed on this site from at least the late 17th century and was still working here in the late 19th century. During the Second World War it was used as a Home Guard observation post. It was destroyed by arson in the late 1950s.
A7	MST11527 - 50418	SJ 9272 0534	Modern	Royal Ordnance Factory, Cat and Kittens Lane, Featherstone. A shell filling factory from World War II. It was built between 1940 and 1942. It included barracks, air raid shelters, pillboxes (see separate entries) workshops and a railway siding, as well as the factory buildings. It is thought that the factory was used to fill heavy bombs, along with the production of anti-tank shells and 303 cartridges for Lee Enfield rifles and Bren guns. The site was chosen as it was relatively flat and was close to a railway line. Later uses included a teacher training college and a prison. It has since been redeveloped.
A8	50419 – MST11528	SJ 9238 0459	Modern	A Second World War pillbox of red brick construction with a flat concrete roof, which is located within the disused Royal Ordnance (shell filling) Factory to the west of Featherstone.
A9	50665 - MST12236	SJ 9661 0649	Post-Medieval	Possible marl pit, north of Backlees Farm. No remains survive.
A10	01674 - MST1666	SJ 9486 0450	Post-Medieval	Possible boundary marker in the form of a low earthwork bank. A former road or trackway followed the line of the bank in the 19th century.
A11	01690 - MST1682	SJ 9518 0518	Medieval	The site of a moated site at Hilton Park. The 18th century house is now built over it. A possible deserted medieval village may have been located nearby.
A12	54186 - MST17955	SJ 9673 0681	Post-Medieval/Modern	Site of brickworks which may have been known as the Holly Bush Works. It has its origins in the 19th century and was also producing tile by *c.*1900. It was disused by 1920.
A13	55268 – MST19037	SJ 9425 0643	Medieval	The earthwork remains of medieval or later ridge and furrow, identified on aerial photography from the 1960s.
A14	55320 – MST19089	SJ 9399 0645	Medieval	Ridge and furrow identified on aerial photography from the 1960s in the area to the west of Shareshill.

Asset No.	Reference	Grid Reference	Period	Description
A15	55321 - MST19090	SJ 9409 0596	Medieval & Later	Ridge and furrow identified on 1960s aerial photography. The earthworks appear to have been ploughed out.
A16	58439 - MST22307	SJ 9340 0492	Post-Medieval	Site of Brook House Farm. It was shown on Yates' map of 1775 but was demolished in the late 20th century in advance of the construction of a housing estate.
A17	58770 - MST22641	SJ 9632 0796	Modern	The remains of a Second World War anti-aircraft gun site at Middle Hill, Saredon. The remains include four octagonal gun pits with an associated oblong command post.
A18	02713 - MST2701	SJ 9471 0721	Early Medieval	Moated site at little Saredon Manor. A medieval moated site occupied by a listed timber framed building (12724) with an early 16th century core. The moat survives on three sides as a water-filled feature fed by a spring.
A19	03546 - MST3321, 76950	SJ 9467 0651	Medieval	One of four possible moated sites at Shareshill. Some remains survived as water filled features into the 1960s.
A20	03644 - MST3418	SJ 9448 0662	Early Medieval	Moated site, east of the church in Shareshill. Documentary evidence for the site of a moat with a platform measuring approximately 30 metres by 38 metres.
A21	04091 - MST3815	SJ 9505 0358	Medieval	Earthworks observed in fields under pasture, interpreted as the possible remains of former tenements or crofts which were likely to have formed part of the shrunken settlement of Essington.
A22	04534 - MST4198	SJ 9579 0704	Unknown	A number of field boundaries recorded as cropmarks.
A23	04535 - MST4199	SJ 9565 0723	Unknown	Cropmark evidence identified from an aerial photograph of a group of faint, well-defined ditched enclosure.
A24	04536 - MST4200,	SJ 9546 0770	Medieval/Post-Medieval	Cropmarks of features related to a medieval field system and/or post-medieval trackways and field boundaries. The features were excavated in advance of the construction of the M6 Toll.

Asset No.	Reference	Grid Reference	Period	Description
	1411041, EST2448			
A25	04537 - MST4201	SJ 9543 0780	Unknown	Cropmarks at Saredon Hall Farm identified on aerial photography and originally interpreted as a rectilinear enclosure containing a ring ditch, and another enclosure containing a ring ditch and linear features. Subsequent examination identified no trace of these features.
A26	04538 - MST4202	SJ 9514 0790	Medieval	Site of a possible church. The field name 'Church Field' given on a tithe map of 1841. A rectangular cropmark in this area may be the remains of a former church building.
A27	04539 - MST4203	SJ 9521 0799	Unknown	Cropmark evidence for a rectangular enclosure with a smaller enclosure on the north-west side.
A28	05416 - MST4950	SJ 9567 0805	Medieval	The earthwork remains of medieval ridge and furrow, identified from aerial photography.
A29	05417 - MST4951	SJ 9486 0724	Post-Medieval	A late 19th century pound located at Little Saredon Dairy Farm.
A30	05418 - MST4952	SJ 9486 0717	Post-Medieval	A corn mill at Little Saredon, which was extant by at least the early 19th century. Originally powered by wind, it was converted to steam power in the 1870s.
A31	05419 - MST4953	SJ 9499 0718	Post-Medieval	Smithy at Little Saredon. Documentary evidence for the site of a probable 19th century smithy. The building still appears to be extant.
A32	05420 - MST4954	SJ 9507 0764	Post-Medieval	Smithy, near Little Saredon. A smithy is marked in this location on the 1st Edition Ordnance Survey map of 1884.
A33	05422 - MST4956	SJ 9458 0770	Post-Medieval	The location of a former quarry, identified from 19th century field-name evidence. There is no evidence for any quarrying in this area by the late 19th century.
A34	05423 - MST4957	SJ 9577 0741	Unknown	Cropmark complex of unknown date. Features include ditches, pits and other cut features which may represent a settlement complex.

Asset No.	Reference	Grid Reference	Period	Description
A35	05424 - MST4958	SJ 9579 0759	Unknown	A curvilinear bank and a second, straighter bank, recorded from aerial photographs.
A36	05425 - MST4959	SJ 9551 0703	Unknown	A cropmark complex containing pits and other negative features.
A37	20391 - MST5661	SJ 9446 0621	Medieval	Earthwork remains of ridge and furrow recorded from aerial photographs from the 1960s.
A38	20393 - MST5663	SJ 9486 0702	Medieval	The remains of medieval ridge and furrow earthworks, identified on aerial photography from the 1960s in the area to the south of Little Saredon.
A39	20491 - MST5761	SJ 9418 0428	Modern	Hilton Main Colliery. Established in the early 20th century.
A40	20732 - MST5981	SJ 9524 0494	Post-Medieval	Hilton Park a landscape park around Hilton Hall, probably established in the mid to late 18th century, with some landscaping work by Repton.
A41	20733 - MST5982	SJ 93163 04418	Modern	A formal garden (knot garden) at Moseley Old Hall, established by the National Trust in the second half of the 20th century. The gardens were designed to reflect a style of circa 1640 and is an example of a 20th century 'period' garden.
A42	52072 – MST13508	SJ 945 067	Medieval/Post-Medieval	Sherds of medieval or early post-medieval pottery recovered from unstratified contexts during an archaeological watching brief to the north of 29 School Lane.
A43	52261 - MST13695, EST1874	SJ 9474 0656	Post-Medieval to Modern	The find spot of unstratified finds of late post-medieval or modern date recovered during an archaeological watching brief. Finds included pottery and a handmade brick.
A44	52323 – MST13756	SJ 9245 0491	Modern	A brick pillbox constructed in circa 1938 within the Second World War Royal Ordnance (shell filling) Factory at Featherstone.
A45	52324 – MST13757	SJ 9243 0489	Modern	A brick and concrete cold war pill box built *circa* 1955.

Asset No.	Reference	Grid Reference	Period	Description
A46	60652 – MST15861	SJ 95 07	Roman	Find spot of a copper alloy Colchester derivative Polden brooch of 1st-2nd century AD date, recovered during metal detecting.
A47	61152 – MST15941	SJ 93 04	Roman	Find spot of a silver denarius of Hadrian, minted in Rome between AD 134 and AD 138, recovered during metal detecting.
A48	60895 – MST16078	SJ 94 07	Early Medieval/Medieval	Find spot of a fragment of a probable cast copper alloy mount with enamel decoration of possible 12th-14th century date, recovered during metal detecting.
A49	01814 - MST1806	SJ 943 067	Bronze Age	A bronze, unlooped palstave reputed to have been found in the vicinity of the parish church at Shareshill. The style of the palstave suggests it is of Middle Bronze Age or later date.
A50	01915 - MST1907	SJ 9342 0492	Neolithic	Find spot of a Neolithic polished axe.
A51	56020 – MST20138	SJ 9362 0565	Modern	A black and white painted wooden finger post, situated at the junction of New Road and Featherstone Lane. The arms of the finger post point direction to Shareshill and Saredon, Moseley, Hilton and Featherstone and Coven.
A52	56021 – MST20139	SJ 9330 0520	Modern	A black and white painted wooden finger post situated on East Road, Featherstone. The arms point direction to Moseley, Coven, Shareshill and Featherstone. Possibly erected in the early to mid-20th century.
A53	56035 – MST20153	SJ 9502 0822	Modern	A black and white painted wooden finger post at the junction of Saredon Road and Saredon Lane, south of the village of Great Saredon. The finger post points direction to Shareshill, Featherstone, Calf Heath, Four Ashes (amongst other places). Of possible early to mid-20th century date.
A54	02456 - MST2446	SJ 950 036	Early Medieval	The settlement of Essington/ Eseningtone recorded in the Domesday Survey. The exact location of the settlement is uncertain, though earthworks observed in the area around Essington Hall Farm and the Manor House west of the modern settlement Essington Hall Farm

Asset No.	Reference	Grid Reference	Period	Description
A55	02459 - MST2449	SJ 935 056	Early Medieval or Medieval	The settlement of Featherstone/ Ferdestan which developed after the Domesday Survey.
A56	03784 - MST2471, 76917	SJ 952 054	Early Medieval	Hilton/ Haltone deserted settlement. The site of a settlement first recorded in 994/6AD and in the Domesday Book. The date of the desertion is unknown.
A57	02560 - MST2550	SJ 948 071	Early Medieval	Little Saredon. A settlement of probable Saxon origin. Earthworks relating to the former extent of the settlement survive to the south of the existing village, within which a moated site referred to since the 13th century also still survives.
A58	02563 - MST2553	SJ 944 065	Early Medieval	Shareshill/ Servesed settlement. A settlement with two villagers and five smallholders, recorded in the Domesday survey of 1086.
A59	58520 - MST22386	SO 9300 9752	Post-Medieval	Streetway and Wordsley Green Turnpike Road. A mid-18th century turnpike road. The route had nine main gates and four side gates and was first recorded in 1761.
-	76972	SJ 94 06	Medieval	Site of a possible moat. Exact location unknown.
-	76978	SJ 94 05	Prehistoric?	Site of a possible barrow on Low Hill, Featherstone. Not located during field survey.
-	617208	SJ 94 06	Medieval	Possible site of a moat to the south-west of Shareshill.
-	76931	SJ 95 08	Roman	Alleged site of a 'Roman tumulus'. No evidence remains.
-	61152	SJ 93 04	Roman	Find spot of a silver denarius of Hadrian, recovered by metal detector.
-	76926	SJ 95 08	Post-Medieval	Find spot of 16th century tile. It may indicate the site of a tile kiln. Similar tile has been found in neighbouring churches.

Table 6.1B: Listed buildings, locally listed buildings and non-designated historic buildings (refer to Figure 6.2 [TR010054/APP/6.2])

Asset No.	Reference	Grid Reference	Period	Description
B1	12718 - MST10262	SJ 93161 04315	Post-Medieval	Moseley Old Hall Cottage, Featherstone. A 16th century house, much rebuilt and remodelled in the 19th and late 20th centuries. The building has a timber framed core of cruck construction with the outer walls rebuilt in brick and plaster. **Grade II listed building**.
B2	09119, 76936, DST3795	SJ 95202 05194	Post-Medieval	Hilton Hall. A country house built for Henry Vernon *c.*1720-30. Built of red brick and with three storeys. It is tentatively attributed to Richard Trubshaw. **Grade I listed building**.
B3	09122, DST3797	SJ 95058 05039	Post-Medieval	A pair of early 18th century gate piers at Hilton Park. **Grade II listed building**.
B4	09121, DST3798	SJ 9512 0527	Post-Medieval	An early 19th century conservatory at Hilton Park. Circular in plan and of a half cast-iron frame and half wooden frame construction, with a hemispherical dome. It was heated by a furnace in the cellar below. **Grade I listed building**.
B5	09163 - MST10274	SJ 9530 0810	Post-Medieval	Saredon Hall Farmhouse and Cow House. A listed early 18th century farmhouse with an attached cow house which is of 16th century origin. The farmhouse and cowhouse are of red brick with tiled roofs. **Grade II listed building.**
B6	1039179	SJ 94951 08551	Post-Medieval	Great Saredon Farmhouse. An early to mid-18th century farmhouse, re-fenestrated and extensively repaired in the early 19th century. Red brick with a plain tile roof and raised verges. Brick integral end stacks. L-shaped plan. **Grade II listed building.**
B7	1039180	SJ 95069 08532	Post-Medieval	High View Cottage. A house, cottage and barn dating to the late 16th century with later alterations and additions. Timber framed with brick infill, partly rebuilt in brick with a plain tile roof. **Grade II listed building.**
B8	1039181	SJ 95095 08511	Post-Medieval	Hilltop Farmhouse. An early 19th century. Red brick, hipped plain tile roof with brick ridge stacks. **Grade II listed building.**
B9	1039182	SJ 95104 08441	Post-Medieval	Hilltop Cottages. Late 17th century timber framed cottage. **Grade II listed building.**

Asset No.	Reference	Grid Reference	Period	Description
B10	617134	SJ 9480 0718	Post-Medieval	Little Saredon Manor. A 16th century house with an earlier moat. A timber framed core with brick walls and plain tile roofs in a H-plan. Built of stone, brick and timber. Two sides of a rectangular moat and part of a third are still in existence. **Grade II listed building**.
B11	12725 - MST10281	SJ 9444 0653	Post-medieval	Woodberry House, Shareshill. An 18th century house of brick construction with a slate roof, which was remodelled in circa 1840. The 19th century cast iron gates, railings and low brick wall enclosing the front garden are included in the listing. **Grade II listed building.**
B12	12726 - MST10282, 52741 - MST14175	SJ 9427 0657	Post-Medieval	Manor Farmhouse and Malthouse at Shareshill. An early 17th century farmhouse and associated malthouse building. The house is of timber-framed construction with brick infill and a tiled roof. The cast iron railings which enclose the garden are included in the listing. **Grade II listed building.**
B13	12716	SJ 95057 03677	Post-Medieval	Pool Farmhouse. A late 17th century farmhouse, of red brick construction with a tile roof and brick end stacks. The interior has surviving timber framed partition walls and ceiling beams. **Grade II listed building**.
B14	09126, 77058, 77081DST 3803, 09126 - MST10261	SJ 93168 04414	Post-Medieval	Moseley Old Hall. A late 16th century timber framed house, later encased in brown brick with blue brick dressings in around 1870. Charles II took refuge here after the Battle of Worcester in 1651. Now owned by the National Trust **Grade II* listed building**.
B15	1187298	SJ 92993 04004	Post-Medieval	Moseley Hall Cottage. Probably early dating to the early 18th century and refurbished in the early 20th century. Brick with tile roofs and brick stacks. Single storey with an attic. 3-window range with 3-window range recessed to right. **Grade II listed building.**
B16	1201841	SJ 93066 03993	Post-Medieval	Coach house adjacent to Moseley Old Hall. Early 18th century. **Grade II listed building,**
B17	1201842	SJ 93010 04017	Post-Medieval	Gates, gatepiers and railings to northwest of Moseley Hall, Moseley Road. **Grade II listed building.**

Asset No.	Reference	Grid Reference	Period	Description
B18	1298757	SJ 93051 03977	Post-Medieval	Moseley Hall. An early 18th century house with late 19th century addition. Brick with ashlar dressings and hipped tile roof. **Grade II* listed building.**
B19	1298811	SJ 92936 04022	Post-Medieval	Gates and gatepiers to northwest of Moseley Hall Cottage, Moseley Road. **Grade II listed building.**
B20	1374099	SJ 95109 03568	Post-Medieval	Essington Hall Farmhouse. Early 19th century farmhouse incorporating the remains of a 16/17th century house to the rear. Red brick with a hipped plain tile roof and brick integral end stacks. **Grade II Listed Building.**
B21	12719 - MST10263, 1374114	SJ 93505 05720	Post-Medieval	Timber-framed farm building at Featherstone Farm. An L-plan farm building range adjacent to Featherstone Farmhouse. The range is dated to circa 1700 and has rectangular timber-framing with brick infill set on a red brick plinth. **Grade II listed building.**
B22	09120, DST3796	SJ 95260 05229	Post-Medieval	Coach house and stable block at Hilton Park. Dated to around 1830, built of red brick with a slate roof. It has four ranges surrounding a quadrangular courtyard. **Grade II listed building**.
B23	09123, DST3808	SJ 94998 04646	Post-Medieval	The Portobello Tower, Hilton Park. A tower built for Henry Vernon between 1739 and 1765 to commemorate the taking of Portobello by Admiral Edward Vernon during the 'War of Jenkin's Ear' in 1739. It may have been by Richard Trubshaw. The tower is in poor condition. **Grade II listed building**.
B24	12723 - MST10279	SJ 9481 0723	Post-Medieval	Little Saredon Dairy Farmhouse. A listed early 18th century farmhouse of red brick construction with a plain tile roof. The building is T-shaped in plan and has a main range with two parallel rear ranges containing a dairy and kitchen. **Grade II listed building.**
B25	1354557, 1443968, 1485899, 1488562, 1578726, 13796 - MST5269	SJ 9442 06258	Post-Medieval	Church of St Mary and St Luke. A parish church built *c.*1742 with a 15th to 16th century west tower. Built of red brick with ashlar tower and dressings and a plain tile roof. Archaeological investigation revealed post-medieval burial vaults, graves and a boundary wall. **Grade II* listed building**.

Asset No.	Reference	Grid Reference	Period	Description
B26	1374121,12727 - MST10283	SJ 9424 0653	Post-Medieval	A barn at Home Farmhouse. A timber-framed aisled barn of probable fifteenth century date, situated to the south-west of Home Farmhouse. The outer walls have now been almost entirely replaced in brick. **Grade II listed building.**
B27	56454, DST7925	SJ 9472 0611	Modern	An ex-Wolverhampton Corporation small timber bus shelter with a tiled roof on the junction of Cannock Road and Church Lane in Shareshill. It was probably built in the mid-20th century. **List of Buildings of Special Local Interest, Grade C**.
B28	58767, DST8288	SJ 9459 0631	Post-Medieval	The Elms Public House. A mid-19th century house converted for use as a public house in 1956. **List of Buildings of Special Local Interest, Grade A**.
B29	58768, DST8289	SJ 9457 0630	Post-Medieval	The Old Barn. A former barn, now a residential building, built around 1800. **List of Buildings of Special Local Interest**, **Grade A.**
B30	58769, DST8290	SJ 9654 0616	Post-Medieval	A three storey farmhouse at Blacklees Farm. List of Buildings of Special Local Interest, Grade B.
B31	05418 - MST4952, DST8291	SJ 9486 0717	Post-Medieval	Windmill tower incorporated into a house. Mill House has been in existence certainly by 1816 if not before. It is reputed to have had four sails and a boat cap. It is believed that it was worked by wind and sail until the 1870s when it was converted to steam working. It became derelict by 1938 after which time was converted to a residence with significant rebuilding/extension works undertaken in both 1978 and 1985. **List of Buildings of Special Local Interest, Grade A.**
B32	58770, 1412701, DST8292	SJ 9632 0796	Modern	Remains of an anti-aircraft gun site. The remains include four octagonal gun pits with an associated oblong command post. **List of Buildings of Special Local Interest, Grade C**.
B33	DST8293	SJ 9435 0368	Post-medieval	Windmill Base. Brick Base and timbers from a post mill. The remains of Essington Mill on the approach road to the village. **List of Buildings of Special Local Interest, Grade B**.
B34	MST13321	SJ 9456 0670	Post-medieval	Havergal Primary School, School Lane, Shareshill. A traditional style brick-built Victorian school, with 20th century alterations and additions.
B35	MST13586	SJ 94400 06593	Post-medieval	Vicarage, Church Road, Shareshill. A vicarage built in 1845 on land given by Lord Hatherton. The vicarage has a stucco front with 'Tudor' windows and ornamental barge boards.

Asset No.	Reference	Grid Reference	Period	Description
B36	MST13985	SJ 94246 06533	Medieval to Post-medieval	Home Farm, Shareshill. A farmstead of possible medieval origin, located within the village of Shareshill. The farmstead is laid out around a loose courtyard, with farmhouse long-side on to the yard. The farmstead is still extant and retains a 15th century aisled barn on the south side of the yard.
B37	MST17115	SJ 9438 0660	Post-medieval	Outbuilding, The Old Vicarage, Shareshill. A mid to late 19th century outbuilding associated to the Old Vicarage, which was probably originally built as an outhouse or used for garden storage.
B38	MST21506	SJ 9611 0494	Post-medieval	Ride Farm, Hilton. An isolated farmstead laid out around a regular courtyard with main U-plan range, detached farmhouse and additional detached outbuildings. The farmstead may have been established by the late 18th century and was certainly extant by the 1830s.
B39	MST22077	SJ 9439 0660	Post-medieval	Garden wall, The Old Vicarage, Shareshill. The remains of a probable mid-19th century brick-built garden wall at the Old Vicarage, Shareshill. The east-west aligned wall appears to have several phases of construction (including being heighted at some point) and also has a small, brick outbuilding

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Appendix C: Outline Water Management Plan

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List of Annexes

Annex 1: Example Silt Management Options

1 Introduction

1.1.1 This Outline Water Management Plan (OWMP) sets out the generic measures that will be used by the Principal Contractor (PC) to mitigate effects during construction on the water environment; monitor construction activities and provides an action plan that would be used in the event of a pollution incident.

1.1.2 This OWMP will be updated by the PC, as appropriate and necessary, prior to commencement of works in accordance with the Requirement 4 in Schedule 2 of the draft Development Consent Order (DCO) [TR010054/APP/3.1].

1.2 Responsibilities

1.2.1 In relation to the control and management of surface water, the PC shall establish the appropriate roles and responsibilities for site staff in accordance with the roles and responsibilities set out in Section 2 of the Outline Environmental Management Plan (OEMP) [TR010054/APP/6.11].

1.3 Purpose of the OWMP

1.3.1 The purpose of this OWMP is to detail the water management principles and procedures throughout the construction period of the Scheme.

1.3.2 The OWMP and the future detailed Water Management Plan (WMP) will ensure that the requirements of relevant environmental legislation, the measures relied upon in the assessment of effects as reported in the Environmental Statement (ES) [TR010054/APP/6.1], and any conditions of environmental permits or other permissions/licences are complied with during construction. It shall be the responsibility of the PC to ensure the Scheme is executed in a manner compliant with this OWMP.

1.3.3 This OWMP has been developed by Highways England and will be adopted and implemented by the PC. The PC will set out:

- the site and scheme-specific measures to control, manage and treat construction site runoff, and reduce the risk from chemical spillages; and
- a pollution incident response plan.

1.3.4 Any mitigation measures will be in keeping with the objectives, requirements and mitigation measures set out in this OWMP, including how clean and dirty water will be kept separate, how fine sediment will be trapped and removed from construction run-off, and how the risk of chemical spillages will be managed. The Contractor will also have a duty of care to those who benefit from Private Water Supplies (PWS).

1.3.5 Overall, the PC will implement this plan and in doing so will need to ensure that:

- The WMP is implemented in accordance with the OEMP and Pollution Control Plan.
- Construction Method Statements are prepared in line with the minimum requirements set out in this OWMP. Certain activities may require third party consultee approval of the specific construction method statement. In such cases the method statement will be submitted to the consultees for review and approval as per the requirements of the DCO.

- This WMP is reviewed regularly and under each of the specific circumstances set out later in this plan.

1.4 Aims

1.4.1 Chapter 13: Road Drainage and the Water Environment of the ES [TR010054/APP/6.1] describes the principles of mitigation that will need to be delivered by the PC during all construction works where they are required. Mitigation measures will include:

- Managing the risk of pollution to surface waters and groundwater.
- Measures to control the storage, handling and disposal of potentially polluting substances during construction. Measures relating to the control of small or more significant spillages are included in this OWMP as part of the CEMP.
- The management of activities within floodplains in the area of Watercourse 5 (Latherford Brook) (i.e. kept to a minimum) with temporary land take required for construction to be located out of the floodplain as far as reasonably practicable or allowances made for floodplain control measures and contingency actions.
- Management of water removed from cuttings and the borrow pit for construction dewatering activities.
- Managing the risk from groundwater flooding through appropriate working practices (during excavations) and with adequate plans and equipment in place for de-watering to ensure safe dry working environments.

2 Baseline Conditions

2.1 Existing waterbodies

2.1.1 The following key surface waterbodies have been identified within the 1 km study area (refer to Figure 13.1 [TR010054/APP/6.2]):

- Watercourses 1 to 4; unnamed ordinary watercourses;
- Watercourse 5, Latherford Brook an ordinary watercourse and WFD designated watercourse. Tributary to the WFD designated Saredon Brook (GB 104028046740);
- Watercourse 6 and 7, unnamed ordinary watercourses;
- Watercourse 8; Waterhead Brook an ordinary watercourse;
- River Penk, a main river and WFD designated;
- Saredon Brook a main river and WFD designated;
- Staffordshire and Worcestershire Canal;
- Tower House Farm Pond (near Old Ride);
- Kings Pools Fishery Ponds;
- Lower Pool;
- Chubb Angling Club Fishing Ponds;
- Hilton Hall Pond;
- Brookfield Fishery;
- Fishing Ponds east of Brookfield Farm;
- Millride Country Sports Fishery;
- Former Sand and Gravel pits;
- Staffordshire Trent Valley – Permo Triassic Sandstone Staffordshire WFD groundwater body (GB40401G300500); and
- Staffordshire Trent Valley – Mercia Mudstone East and Coal Measures WFD groundwater body (GB40402G300300).

2.1.2 No further waterbodies with hydraulic connectivity were identified from Ordnance Survey mapping or site surveys further to those outlined above.

2.1.3 During a review of baseline information, no known socio-economic uses of the watercourses has been noted. The known fishing uses are located on specialist ponds or fisheries and not on any identified watercourses.

2.1.4 Following review of the baseline water environment, impacts to the following receptors have also been scoped out of the assessment:

- The Staffordshire and Worcestershire Canal;
- Watercourse 8;
- Former Sand and Gravel Pits; and
- Millride Country Sports Fishery.

2.1.5 Full descriptions of the watercourses that are directly crossed by the Scheme are provided in Chapter 13: Road Drainage and the Water Environment of the ES [TR010054/APP/6.1] (please also refer to Figure 13.1 [TR010054/APP/6.2]).

2.2 Flood risk

2.2.1 A Flood Risk Assessment (FRA), (Appendix 13.1 of the ES [TR010054/APP/6.2]) is provided as part of the draft DCO, which assesses the present risk of flooding from all sources including fluvial, surface water, groundwater, artificial sources and sewer and water supply infrastructure. The Scheme is mainly situated on Flood Zone 1, however some land adjacent to Latherford Brook and Watercourse 4 is within Flood Zones 2 and 3. Hydraulic modelling indicates that there is no requirement to provide flood compensatory storage mitigation.

2.2.2 The Scheme boundary is generally at low risk from surface water flooding, although there are some areas of medium and high risks associated with watercourses. The Scheme would not result in an increase in surface water flood risk. The Scheme is also classified as being at low flood risk from groundwater sources.

3 Mitigation, Monitoring and Consents

3.1 Pre- construction

Monitoring

3.1.1 In advance of any construction works, a programme of pre-construction water quality monitoring will be required to augment existing data and to provide a robust baseline against which any changes in water quality during construction works can be compared. This monitoring will include regular monitoring visits to all watercourses and major water bodies that could be impacted by the Scheme for the recording of visual and olfactory observations, in situ monitoring and collection of water samples for laboratory analysis.

3.1.2 The final scope of pre-construction (and any further) monitoring will be agreed during applications for Environmental Permits.

3.1.3 After completion of the baseline monitoring the Environmental Clerk of Works (ECoW) will prepare a Water Quality Baseline Report that will be issued to the Environment Agency and Staffordshire County Council (SCC), the Lead Local Flood Authority (LLFA), in advance of construction works commencing on site.

3.1.4 The PC should at this stage review the presence of PWS within the study area through consultation with the Local Environmental Health Officer at the relevant District Council, and if required undertake further risk assessment of any new abstractions. This should consider potential pollution sources that could affect these supplies, pollutant pathways, and the need for further monitoring (pre, during and post-construction).

Permits and consents

3.1.5 The Scheme does not intersect with a Main River, therefore no Flood Risk Activity Permits are required from the Environment Agency. During consultation with the Environment Agency on 18 July 2019, it was also confirmed that no Environment Agency permits would be required for any Flood Zone 3 works, and all flood risk permissions would be determined by the LLFA (SSC).

3.1.6 A Water Activity Environment Permit may be required for the discharge to surface waters or ground of any ‘unclean’ construction site runoff, where exemptions do not apply. This may include discharges from a self-contained treatment plant that may be required for the main construction compound.

3.1.7 The temporary diversion of a watercourse could require a transfer licence from the Environment Agency. Similarly, the need to construct a new dam across Lower Pool may require an impoundment licence from the Environment Agency. This is to be confirmed by the PC prior to construction.

3.1.8 Furthermore, during construction any significant dewatering, principally from the potential borrow pit, would be subject to an abstraction licence issued by the Environment Agency. The discharge of the dewatering water may also require a Water Activity Environment Permit from the Environment Agency where the water

is discharged to the surface water system. The Environment Agency will be consulted by the PC to obtain the necessary licences.

3.1.9 Under the Floods and Water Management Act 2010 and Section 23 of the Land Drainage Act 1991 consent will be required for certain works that may affect the flow in Ordinary Watercourses (i.e. all watercourses that are not Main Rivers) from the LLFA, SCC.

3.1.10 An initial Water Permits and Consents Register has been compiled and is provided in Table 4.1 of the OEMP. It describes where it is considered that different consents may be required and is intended as a tool to help ensure that all relevant permissions are obtained. However, it should be kept under constant review as the design develops over time and it is the responsibility of the PC to ensure that all permissions are obtained at the appropriate time.

3.2 During construction

Monitoring

3.2.1 During construction water quality monitoring will be undertaken to ensure that mitigation measures are operating as planned and preventing pollution. The purpose of the monitoring programme would also be to ensure that should pollution occur it is identified as quickly as possible and appropriate action is taken in line with the Pollution Control Plan. Although regular site visits to all water bodies that may be affected should be continued (as in the pre-construction monitoring), it is expected that regular observations by the Environmental Manager (EM)/ECoW would be carried out while works are ongoing that may cause impact, together with ad hoc sampling as required or in response to signs of pollution (for example as part of an investigation).

3.2.2 Once construction has commenced the ECoW will prepare monthly Water Quality Monitoring Reports to be issued to the PC and discussed at monthly progress meetings.

3.2.3 It is anticipated that post completion of the works water quality monitoring would continue to verify that the works have been completed without adversely affecting water quality. The monitoring period is to be confirmed but should be a minimum of three months and at least three water samples from each water body.

3.2.4 The EM/ECoW will be responsible for undertaking any investigations required as a consequence of the programme of water quality monitoring. This will include liaison with Environment Agency and SCC about the production of Incident and Lessons Learned Reports. These reports will detail actual impacts, describe the outcomes of actions taken, proposals for additional monitoring of affected site and receptors, and potentially changes to method statements, works processes and staff training.

3.2.5 The final monitoring requirements will be determined as part of the Environmental Permitting process and in consultation with the Environment Agency and SCC.

Training

3.2.6 All site staff will attend a Tool Box Talk on the risks to the water environment from construction site runoff and chemical spillages and the proposed measures set out in this OWMP.

3.2.7 Tool Box Talks will be given by a suitably qualified person (i.e. an environmental professional, the EM or ECoW. Construction workers shall not be authorised to work on site until they have received this Tool Box Talk. Technical notes shall be provided to all staff and put up on notice boards in relevant locations.

General mitigation measures

3.2.8 Mitigation measures can be considered as source control (i.e. to prevent fine sediment-laden runoff forming and to treat contaminated runoff close to where it forms), barriers and conveyance measures (i.e. to prevent site runoff draining uncontrolled into water bodies and to direct and treat it en-route to storage areas), and storage and final treatment areas (i.e. where water is stored on site and treated to the required quality prior to it being discharged from the site).

3.2.9 In any construction site temporary drainage system and treatment management scheme, it is typical for a combination of sustainable drainage systems (SuDS) or proprietary measures (i.e. engineered device for treatment such as a lamella clarifier) to be used. Measures are often used in series to make maximum use of available space and to ensure adequate removal of fine sediment prior to any discharge being made from the site (for example runoff may be initially stored in a small storage lagoon before being pumped via settlement tanks or lamella clarifiers to final treatment storage areas). Examples are provided in Annex 1.

3.2.10 Information on the type of measures that could be implemented is provided in Table 3.2 and 3.3 of the OEMP [TR010054/APP/6.11] with reference to good practice guidance C648 Control of Water Pollution from Linear Construction Projects – Technical Guidance (Ref 1). The specific treatment train will be determined by the PC and will be adapted throughout the works depending on the need and circumstances at any given time, and ensuring the same outcomes are achieved. However, measures that may be used include:

- drainage cut-off ditches with check dams and/or sediment traps;
- silt fences, sand bags and straw bales;
- earth bunds and settlement lagoons;
- settlement tanks, lamella clarifiers, and skips in series filled with clean aggregate or straw bales; and
- baffle pads or other measures to dissipate flow energy on any temporary outfalls to water bodies.

Construction site establishment and general earthworks

3.2.11 During the initial preparation works prior to the start of construction, temporary measures to control runoff draining from the construction site will be implemented, and then managed and adapted by the PC accordingly as the works progress.

3.2.12 The proposed temporary drainage system will be developed in tandem with the detailed design and construction method statement prepared by the PC. However, this will be consistent with the objectives and treatment requirements of this plan, and the intended outcomes. The following measures should be used to manage surface water:

- pre-construction drainage would be installed to intercept the existing land drainage system and divert water away from the working area;
- vehicle traffic to be limited to major path routes across the site to prevent soil compaction and associated increase in surface water runoff; and
- SuDS to be used to ensure no increase in runoff rates or volumes from the construction sites and compound area (for example compound car park) to surrounding land drainage ditches and to manage surface water flood risk. Subject to consent, the SuDS would discharge to the local watercourses, ditches or to ground within the site boundaries.

3.2.13 Runoff from the construction site would not be allowed into any existing pond. It would only be allowed to be discharged directly into any watercourse under a permit from the Environment Agency and following treatment and attenuation using a variety of measures alone or in combination, including for example:

- identification of all land drains and their sealing using purpose-built covers or sand bags (where the risk of damage is low and providing their condition is regularly checked);
- sediment barriers such as silt fences, straw bales and earth bunds (used and positioned in appropriate locations);
- proprietary treatment measures (for example lamella clarifiers); and
- temporary storage areas (for example settlement lagoons, tanks and skips in series).

3.2.14 The arrangements of such drainage infrastructure would be prepared during the detailed design and, as appropriate, agreed with the Environment Agency prior to the commencement of construction. The above measures would ensure that any sediment (including any adsorbed pollutants) carried in suspension in the surface water runoff from the Site would have settled out to an acceptable level before it can be discharged to receiving watercourses under an environmental permit from the Environment Agency. The PC will agree with the Environment Agency the acceptable suspended sediment limits in runoff discharged from the site during the application for temporary works Environmental Permits.

3.2.15 All earthworks will be undertaken in accordance with BS6031:1981 Code of Practice for Earth Works (Ref 2). Land disturbance will be kept to a minimum and

disturbed areas will be stabilised as soon as possible after construction by seeding with grass, using geotextile covers or other suitable means.

Measures to intercept and treat suspended fine sediments

3.2.16 Mitigation measures relevant to controlling surface runoff, focusing on those areas where there would be exposed soils, excavations, storage of top soil and other aggregate materials are summarised in this section. Measures could include:

- scheduling construction activities to minimise the area and period of time that soil would be exposed, particularly during the wetter months (autumn to early spring) or periods of forecast heavy or prolonged rain;
- construction areas would be demarcated from the rest of the site to minimise the direct disturbance of land not required for development;
- installation of cut-off drains around the working areas to intercept surface runoff and divert it around the working areas;
- existing land drains are to be identified and covered or protected by sand bags;
- minimising the stockpiling of materials and locating essential stockpiles as far away as possible from watercourses;
- movement of construction vehicles and plant would be strictly controlled to minimise the potential for soil compaction and erosion;
- exposed soils would be re-seeded to mitigate bare earth exposure and habitat loss as soon as possible. Rock rolls would be underlain by geotextile to prevent erosion of earth beneath the stone (which could also compromise the integrity of the armouring);
- bio-security measures will be required to ensure that no invasive species are brought onto site. Measures will include checks of plant/vehicles and footwear to ensure clean and clear of potential contaminants with best practice implemented as necessary;
- all mitigation measures would be subject to design and approval by construction managers for health and safety and environment, and by appropriate regulators for environmental compliance;
- the rate of discharges to the watercourses of construction site runoff will be at a controlled rate agreed in advance with the Environment Agency or SCC and with appropriate measures to dissipate the flow energy at the temporary outfall to prevent erosion of the bed and banks of the receiving water body (for example correct orientation of the outfall and the use of baffle pads);
- where temporary crossings of the watercourses are required, plant would not track along the channel without adequate protection being installed prior to works, and temporary clear-span crossings should be used as far as possible;
- if needing to create a dry working area in the channel, the use of sand bags will be to be avoided if possible to avoid them breaking open and polluting the channel; and
- all access roads or purpose-built haul roads shall be kept free of mud by the use of a road sweeper, and if deemed required by the PC, a vehicle wheel wash facility on the main accesses to the site.

3.2.17 In practice, the application of these measures will be a continuously adaptive process in response to site specific constraints and changing needs on site. For example, different types and levels of treatment of fine sediment in runoff may occur depending on the time of year, the location of the works, and the nature of works being undertaken at that point in time. It is therefore not appropriate to be entirely descriptive at this stage, but to focus on the range of measures that the PC can deploy to provide the necessary water environment protection.

Measures to reduce the risk of chemical spillages

3.2.18 Mitigation measures to reduce the risk of a chemical spillage:

- plant and machinery will be inspected before use to ensure they are clean and fit for operation on site, wheel wash facilities should be on site;
- all static plant or mobile plant parked for prolonged periods (for example overnight) will be fitted with 'plant nappies' or drip trays, which will be checked regularly and emptied if required by the PC in to the bunded waste oil containers;
- all mobile plant will carry spill kits with other spill kits placed in seal containers and key locations close to watercourses (when there are works nearby). Spill kits are to be checked daily and replaced immediately after use;
- all staff working on site to be trained in the use of spill kits;
- fuel oil to be stored in the secure Construction Compound on an impermeable surface and within a self-bunded container (capacity of the bund must be 110% the maximum oil storage);
- refuelling of mobile plant to be undertaken in the Construction Compound on an impermeable surface only;
- drilling fluids and additives (if used) will be stored appropriately in bunded tanks holding 110% of its capacity. Any waste or used drilling fluid will be stored and tankered off-site;
- other liquid chemicals to be used on site to be stored within a secure container;
- no equipment or materials other than those used for flow control (but excluding pumps and pipes) are to be left in the channel outside of working hours;
- where possible pre-fabricated concrete structures are to be used. Where this is not possible and wet concrete pours are to be made, extreme care is to be taken when delivering the concrete to the site and during the operation. Formworks should be secure and fixed tightly to reduce egress of concrete. Measures to catch any spillage are to be provided and removed before water is allowed back into the working area;
- implementation of site working practices to minimise the risk of concrete spillages. In particular, specific concrete wash out facilities are to be provided away from any watercourse (minimum 20 m), on flat land and operated to ensure no spillage of wet concrete to ground (for example by use of geotextiles, skips); and

- the construction site and construction compound should be kept secure at all times to prevent vandalism and anti-social behaviour that could lead to a pollution incident.

Working in and over waterbodies

3.2.19 All works in the channel of watercourses (including works to the banks) or ponds (that are not to be entirely removed) will be undertaken in a dry working area. This will require the PC over-pumping or fluming the watercourse through the working area or the creation of temporary dams and barriers (for example using sand bags, straw bales, geotextiles and pumping equipment). The PC will ensure that there are more than adequate pumps and pipes on site for the flows anticipated.

3.2.20 All works will be planned and scheduled to minimise impacts on ecology, such as nesting or migration seasons. Proposed works to Latherford Brook, Watercourse 2, and Watercourse 3 and potentially others should be programmed to minimise impacts during fish spawning (typically March – June) if possible. Please refer to Chapter 8: Biodiversity [TR010054/APP/6.1] and the OEMP [TR010054/APP/6.11] for further details. Protection of fish and the need for fish rescue etc. is not considered any further by this OWMP.

3.2.21 For small areas of work within watercourses it may be possible to isolate an area of the bed using straw bales and/or sand bags (although the latter present greater risk of sediment pollution). Works to the banks may also be undertaken on scaffolding. However, scaffolding should be lifted from the channel at the end of the working shift and any temporary dams created by straw bales or sand bags partially breached to ensure the full channel is available for flows.

3.2.22 The PC should co-ordinate any works in the channel to periods when low flows are expected by monitoring weather forecasts on a monthly, weekly and daily basis and coordinate with the EM.

3.2.23 The PC should undertake all works in accordance with the Pollution Control Plan and Contamination Land Management Plan and ensure that this includes alert workers measures and for removing equipment from the channel when high flows are expected.

3.2.24 If temporary crossings are installed for construction purposes that are not open span, then impermeable and over-long culvert or flume pipes will be used to prevent the ingress of fine sediment that may infiltrate to the watercourse from material used to form the haul road.

3.2.25 An oil boom should be positioned across watercourses downstream of sections of the watercourse to which work is undertaken and monitored on a daily basis.

3.2.26 If required, the PC should ensure that there is equipment on site for the installation of straw bale dams across the watercourses downstream of the works to trap fine sediments. However, this measure is only likely to be necessary if it is not possible to work in the dry or for in channel works that are required for longer periods and

which may experience periodic higher flows that are redirected along the main channel than via the pumped system.

3.2.27 Scaffolding or debris netting should be installed across the channel prior to the removal of any masonry walls etc. and works to the existing culverts. Any masonry material that falls into the channel should be removed by the PC.

Use of cement and wet concrete

3.2.28 It is not anticipated that large volumes of concrete batching will occur on Site. Where possible, pre-fabricated concrete structures will be used. However, where this is not possible concrete will be delivered to the site in ready mixed lorries for casting in situ. However, some mixing of small quantities of cementitious substances is likely to take place. Where this is required it should be done on impermeable hard standing away from watercourses (minimum distance of 20 m on flat land and further or sloping ground subject to site specific risk assessment).

3.2.29 Cement (and wet concrete other than when as part of proposed works set out under the Method Statement for constructing the authorised development) will be prevented from entering any water bodies. Designated areas shall be set out for the purpose of concrete wash out and care shall be taken to ensure these are sited away from sensitive receptors such as watercourses and land drains or ecological receptors. If there are shallow excavations they will be lined by a suitable geotextile membrane to prevent infiltration to groundwater.

3.2.30 The washing out of any concrete mixer and associated chute, tools or equipment will be carried out in a designated area away from drains and watercourses/bodies on impermeable hardstanding. Delivery drivers will be made aware of the requirement on arrival at site. Wash down activities will take place in designated areas consisting of impermeable and contained wash out lagoons.

3.2.31 Temporary drainage management associated with compound set ups will be addressed to site workers. The detailed CEMP should refer to the temporary drainage management plan.

Foul water

3.2.32 The design of the Site drainage for construction compounds has not been determined at the current time. It is likely that the secondary compound east of Featherstone would connect to the foul network for foul drainage, and for the main compound (west of M6 Junction 11) it may be necessary to use a small self-contained treatment plant (depending on cost, duration and practicality) for the foul drainage if connection to the public sewer is not possible. Any discharge from a self-contained treatment plant would require a Water Activity Permit from the Environment Agency for discharge of treated final effluent to a controlled water and may require a Land Drainage Consent for the temporary outfall to an Ordinary Watercourse. These applications would be made once the construction contractor has determined how foul waste water from the compounds would be managed.

Discharge to a watercourse would require adequate treatment and potential water quality monitoring during the period it is in use.

Surface water runoff

3.2.33 The main site compounds and any temporary satellite compounds should be located away from any waterbodies and not within a minimum distance of 20 m from a watercourse on flat impermeable land (and further on land sloping towards a watercourse subject to site specific risk assessment).

3.2.34 Any surface flows from compound areas that could be contaminated (for example adjacent to fuel stores) will pass through suitable attenuation and treatment measures prior to discharge to any watercourse under a permit from the Environment Agency, such as an oil separator, or otherwise pumped out for off-site disposal and a suitably licensed waste facility.

Works to Lower Pool

3.2.35 The methodology for works within Lower Pool would be developed during the detailed design stage of the Scheme, and would include best practice measures outlined within the OEMP. A temporary dam would be constructed to the west of the bridge structure, so that water in the area of the lake to be lost could be dewatered and soft sediments to be excavated within a dry working area to minimise any impact on the retained portion of the lake. It is also assumed that wet and soft organic pond sediments would be dewatered on-site in an appropriate way that captures any leachate and/ or prevents infiltration to ground. Further testing of sediments and leachates are required in accordance with waste management legislation prior to any re-use or disposal of this material. Please refer to Chapter 10: Materials Assets and Waste [TR010054/APP/6.1], and the OEMP [TR010054/APP/6.11].

3.2.36 These would ensure the area of pond to be lost would have any fish removed from the pond before construction activities begin, and measures would be put in place to ensure no sediment plumes or contaminated water (i.e. during dewatering) are released downstream into Watercourse 3 as far as is practicable. Survey of Lower Pool has confirmed the presence of populations of carp and ghost carp, therefore, the use of fish rescue procedures would be required. Canadian pondweed, a non-native invasive macrophyte is also believed to be present, and measures to minimise the risk of its spread would be required (to be described in a Biosecurity Management Plan).

3.2.37 It may be possible to discharge the water from Lower Pool at a controlled rate into Watercourse 3, subject to the agreement of the Environment Agency, and the correct permits. Lower Pool currently discharges over a weir to Watercourse 3. Due to the standing nature of the water the dissolved organic carbon within Lower Pool is higher than that within the watercourse downstream (35 mg/l compared with <2 - 15 mg/l downstream), and the pH is more alkaline within the pool (pH 9 compared with pH 7.4 - 8.1 downstream). Ammoniacal Nitrogen within the pool was higher at 0.93 mg/l compared with 0.37-0.67 mg/l downstream in Watercourse 3. Therefore, dependent on the water quality within Lower Pool at the time of construction it may or may not be possible to discharge downstream. It is assumed that the

methodology for the draining of the pool would be in accordance with, and with the agreement of, the Environment Agency.

Management of Dewatering Activities

3.2.38 In order to minimise the impact of the dewatering on groundwater and surface water resources, a scheme of groundwater control would be implemented to ensure water levels in adjacent water bodies are maintained and any discharge is of a suitable quality. This would involve a programme of water monitoring and controlled discharges. It is proposed that four monitoring boreholes are drilled on the north-western and south-western boundaries of the borrow pit and another on the opposite side of the A460 between the upper pond of Kings Pool Fishery and the A460. Gauge boards would be installed in each of the fishery ponds and on Watercourse 3 adjacent to the borrow pit at least six months before any excavation starts at the borrow pit. Water level monitoring should be carried out in all of the boreholes and of the gauge boards to establish the natural fluctuations in groundwater, stream and pond levels. Dataloggers to facilitate continuous monitoring should be installed in the boreholes and in the upper fishery pond.

3.2.39 Once dewatering starts in the borrow pit, the water should be discharged following settlement to remove suspended solids, to Watercourse 3 adjacent to the south-western corner of the borrow pit to maintain the flow in the stream downstream of the site. Although the discharge would maintain the flow in the stream, this may not maintain the water level in the Kings Pool Fishery ponds, particularly during periods of prolonged warm weather. An assessment of the results of the monitoring would establish whether the dewatering has lowered the water level in the fishery ponds. If such an impact is identified, it would be necessary to provide a compensatory water supply to the Kings Pools Fishery. It is proposed that a pumped supply from the water collecting in the base of the borrow pit is laid to the upper pond to provide a continuous supply of water to maintain the fishery. Paddle boards or similar measures would be required to dissipate the discharge to avoid any risk of erosion. The discharge would help to oxygenate the pool and ameliorate the adverse impacts of low water levels and high temperatures. This would require crossing of the A460, which may be achieved within the existing culvert carrying Watercourse 3 beneath the A460.

3.2.40 In addition, it is likely that dewatering and discharge of water from the borrow pit may require an Abstraction Licence and a Water Activity Permit from the Environment Agency. Applications for these would be made prior to construction commencement.

3.2.41 It is also expected that temporary storage basins would be required on the site of the borrow pit in the event that there is a pump failure or discharge to Watercourse 3 is not possible. The storage basins would allow for the settlement of suspended fine sediment, and in combination with other measures (e.g. straw bales) the filtration of dewaters. The bed of the temporary storage basins should be above the maximum recorded groundwater levels. Multiple storage basins may also be required to maintain storage as they would silt up over time and a basin would need to be unused in order for this silt to be dried and removed. Other measures that

could be used in combination with temporary storage may include lamella clarifiers and chemical dosing using flocculants.

3.3 Draft Action Plan

3.3.1 In the event of an incident or emergency where contaminants have entered or are at an imminent risk of entering a watercourse or drain (for example a large chemical spillage on site), the measures set out in this section will be implemented.

3.3.2 The Draft Action Plan sets out the triggers for action in the event that monitoring identifies anomalous or unusual results when compared to the baseline data and/or Environmental Quality Standards. The Draft Action Plan also describes the actions to be followed depending on the level of risk triggered. The final Action Plan will need to be prepared by the PC through consultation with the Environment Agency and SCC.

3.3.3 It is proposed to align the Action Plan with the four point risk scale of the National Incident Reporting System where an incident is defined as a specific event or occurrence, in a single location or multiple sites, that has had or has the potential to cause environmental harm, pollution of surface and groundwater, an impact on human health, or nuisance to the local community.

3.3.4 Table 1 presents the four incident categories with a description of the likely effects that may occur. The descriptions of each category are indicative and do not represent specific risks that water receptors would be exposed to from the proposed development.

3.3.5 Table 2 presents the draft Action Plan including monitoring outcomes and proposed actions for each of the four classes of incident.

3.4 Incident and Corrective Action Reporting

3.4.1 All environmental incidents shall be reported and investigated.

3.4.2 Significant environmental incidents where water borne pollution is evident shall be reported to the Environment Agency immediately using their 24 hour incident telephone number 0800 80 70 60. Copies of the incident investigation shall be provided to the Environment Agency and SCC.

3.4.3 Where problems are recognised, the corrective action will be identified by the PC in consultation with the Environment Agency and SCC and corrective actions undertaken by the PC within a defined time frame

Table 1: Incident categories

Incident category	Indicative incident description
Category 1 – major, serious, persistent and/or extensive impact or effect on the environment, people and/or property	• Persistent impact on water quality lasting at least 7 days and affecting an extensive area over several kilometres of a watercourse or large area of a water body (for example 1 to 2 kms). • Pollution of a water body by levels of dangerous substance(s) exceeding Maximum Allowable Concentration, Environmental Quality Standards or other standards known to define conditions when serious harm/death to aquatic life or dissolved oxygen levels at critical levels may occur. • Necessary closure of a strategically important potable water supply to prevent contamination or further contamination. • Deterioration in ecological status or potential of a water body or prevention of reaching its objective (including physical impacts). • Damage to a statutorily protected site or species. This may include an impact on SSSI insofar that it may prevent them from reaching or maintaining their favourable conservation status; or damage to a European protected species or its habitat that has a significant adverse effect on reaching or maintaining its favourable conservation status. • Gross and extensive contamination or coverage of the bed of the watercourse, water column or surface by fungal/bacterial/algal growths, sewage debris or particulate matter. • Fatality or serious effect on human health from direct contact/exposure to pollutants in surface waters, or through the supply of contaminated potable water following an incident affecting surface water or groundwater. • Public exposed to concentration levels over a widespread area giving rise to serious and known health risks as a result of contamination of surface waters or groundwater following a pollution or algal incident. • Supply of contaminated drinking water with levels of pollutants/pathogens exceeding toxicological limits known to cause serious health problems. • Major adverse effect on an important recreational activity or national event such as the cancellation, partial or full suspension of recreational bathing, fishing activity or an organised water sports event. • Incidents that cause extensive damage to the physical habitat of a water body that would fall under the Environmental Damage Regulations. • The destruction of a large or important area of fish habitat (particularly spawning areas), sustained damage to fish spawning, such as by actively digging or removing bed material used by spawning fish, and/or the illegal construction of an obstruction to fish migration (please refer to Environment Agency Guidance Document “Incidents and their classification: the Common Incident Classification Scheme” (ref 3) for details of guidelines on incident class thresholds for numbers of fish mortality and types).
Category 2 – significant impact or	• Significant effect on the quality or use of that water but normally localised.

Incident category	Indicative incident description
effect on the environment, people and/or property	• Typically include fine sediment (>500 mg/l compared to background levels), low dissolved oxygen levels or high ammonia along hundreds of metres to potentially kilometres of a watercourse or area of a water body. • Precautionary closure of a strategically important potable water supply to prevent contamination of source. • Necessary closure of a minor un-licensed potable water supply. • Significant action / treatment by operator to address deterioration in water quality (for example blending with uncontaminated water). • Significant but localised or temporary deterioration in ecological status or potential of a WFD water body or delaying the water body reaching its ecological objectives (including physical impacts). • Damage to a statutorily protected site or species, but no significant effect on favourable conservation status. • Significant damage to Biodiversity Action Plan (BAP) species or habitats, which affects the viability of the species locally and/or extensive/significant damage to non-statutory protected site or BAP habitat that affects the nature conservation status of the site or habitat. • Gross but localised contamination or coverage of the bed of the watercourse, water column or surface by fungal/bacterial/algal growths, sewage debris or particulate matter. • Significant effect on human health from direct contact/exposure to pollutants in surface water or groundwater, or through the supply of contaminated potable water following an incident. • Public exposed to concentration levels giving rise to minor health problems due to contamination of surface waters or groundwater following a pollution or algal incident. • Supply of contaminated drinking water with levels of pollutants or pathogens known to cause minor health problems. • Significant adverse effect on a recreational activity or event appropriate to the surface water body such as the cancellation of a local event or short lived disruption (for example less than one week). • Significant but localised destruction of fish habitats, interference with spawning fish by creating disturbance, such as by sustained paddling/moving through a spawning area, and/or incidents involving the illegal obstruction to fish migration, including illegal alteration to a fish pass (please refer to Environment Agency Guidance Ref Document “Incidents and their classification: the Common Incident Classification Scheme” (Ref 3 for details of guidelines on incident class thresholds for numbers of fish mortality and types).
Category 3 – minor or minimal impact or effect on the	• Limited and localised effect (around point of discharge but could include lower magnitude effects over a few kilometres) on a water body which has a minimal impact on the quality or use of that water. • Precautionary closure of a minor un-licensed potable water supply.

Incident category	Indicative incident description
environment, people and/or property	• Minor action/treatment by operator to address deterioration in water quality (for example blending with uncontaminated water). • Very limited or no significant effect on the status or objectives of a WFD water body. • Bed, column or surface of watercourse only marginally contaminated around point of discharge or in localised area. Such as a limited growth of sewage fungus around an outfall pipe. • Very limited impact upon nature conservation sites. • Reversible small-scale, short-term damage to non-statutorily protected sites or BAP habitats or species. • Minor effect on human health from direct contact to pollutants in surface waters or groundwater, or through the supply of contaminated potable water following an incident (for example a few individuals with temporary sore throats). Public exposed to concentration levels that present no known or minimal risk to health. • Minor impact on amenity value, recreational fishing activity and/or aesthetic quality (for example small amount of litter, thin oil film, non-harmful colour changes). • Minor loss of fish habitat and/or interference with spawning fish resulting in localised, limited damage, such as by paddling/moving through a spawning area (please refer to Environment Agency Guidance Document "Incidents and their classification: the Common Incident Classification Scheme" (Ref 3) for details of guidelines on incident class thresholds for numbers of fish mortality and types).
Category 4 – substantiated incident with no impact.	• No measurable adverse impacts.

Table 2: Incident category, monitoring evidence and actions

Incident category	Monitoring outcomes	Examples	Proposed actions
Categories 1 & 2	Significant pollution incident evident by Visual Inspection and / or water quality monitoring.	Spillage of significant volumes of fuel, construction runoff containing high levels of fine	• Fully implement Incident and Emergency Response procedure as described in the Pollution Control Plan. • Immediately stop all relevant works (that may reasonably be the source of the pollution) until investigation completed and corrective actions agreed with EA/SCC.

Incident category	Monitoring outcomes	Examples	Proposed actions
		sediment or powder cement into a watercourse.	• Inform EA/SCC immediately and seek advice regarding pollution containment and remediation. • Notify any relevant third parties immediately (for example PWS). • Prepare Incident and Lessons Learned Report and issue to EA/SCC. Report should detail actual impacts, outcomes of actions taken, and proposals for additional monitoring of affected site and receptors.
Category 3	Visual Inspections and / or water quality monitoring results deviate from baseline or now exceed EQS.	Moderate elevation in total suspended sediment levels, fine sediment deposits across river bed gravels or some minor evidence of oil sheen / odour on the surface of water.	• Investigate likely causes and pause relevant construction works. • Confirm Construction Method Statements are being implemented correctly and mitigation measures operating as required. If yes, review Construction Method Statements and adequacy of mitigation measures. • Prepare Incident and Lessons Learned Report and issue to EA/SCC to agree any remedial action if required. • Consider making additional Visual Inspections and water quality sampling.
Category 4	Water quality monitoring results slightly deviate from baseline.	No obvious visual impacts.	• No immediate actions. • Continue to monitor in accordance with monitoring plan.

4 Legislation, Policy and Guidance

4.1.1 The following legislation, national policy and guidance documents are relevant to the assessment of impacts of the Scheme on the water environment:

- The Water Act 2014 (Ref 4);
- The Floods and Water Management Act 2010 (Ref 5);
- The Land Drainage Act 1991 (as amended) (Ref 6);
- The Water Resources Act 1991 (as amended) (Ref 7);
- The Salmon and Freshwater Fisheries Act 1975 (as amended) (Ref 8);
- The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017 (Ref 9);
- The Environmental Permitting (England and Wales) Regulations 2016 (Ref 10);
- The Environmental Damage (Prevention and Remediation) Regulations 2015 (Ref 11);
- The Flood Risk Regulations 2009 (Ref 12);
- The Eels (England and Wales) Regulation 2009 (Ref 13);
- The Groundwater (England and Wales) Regulations 2009 (Ref 14);
- The Control of Substances Hazardous to Health Regulations 2002 (as amended) (Ref 15);
- The Control of Pollution (Oil Storage) (England) Regulations 2001 (Ref 16);
- National Planning Policy Framework (Ref 17);
- Flood Risk and Coastal Change National Planning Policy Guidance (Ref 18);
- Future Water (Ref 19);
- Non-statutory technical standards for SuDS (Ref 20);
- Building Regulations 2010, Drainage and Waste Disposal Approved Document H (Ref 21); and
- South Staffordshire Local Plan: Core Strategy Development Plan Document (Ref 22).

4.2 Relevant guidance documents

4.2.1 As of the 17 December 2015 all Pollution Prevention Guidance (PPG) (Ref 23) Documents published by the UK environment agencies were withdrawn. A new series of Guidance for Pollution Prevention (GPP) (Ref 24) is in development, which provides updated good practice guidance to the UK. While this is not regulatory guidance in England where the UK government website outlines regulatory requirements, it remains a useful resource for best practice. The following relevant GPPs should be considered as good practice:

- GPP 2: Above ground oil storage;
- GPP 4: Treatment and disposal of wastewater where there is no connection to the public foul sewer;

- GPP 5: Works and maintenance in or near water for construction or maintenance works near, in, or over water;
- GPP 8: Safe storage and disposal of used oils;
- GPP 13: Vehicle washing and cleaning;
- GPP 19: Vehicles: Service and Repair;
- GPP 21: Pollution Incident Response Plans;
- GPP22: Dealing with Spills; and
- GPP 26: Safe storage of Drums and Intermediate Bulk Containers (IBCs).

4.2.2 Where new GPPs are yet to be published, previous PPGs may still provide useful advice on the management of construction to avoid, minimise and reduce environmental impacts, they should not be relied upon to provide accurate details of the current legal and regulatory requirements and processes. They are referred to in this document alongside other current guidance and in the context of the proposed Scheme and site-specific mitigation measures. Construction phase operations would be carried out in accordance with guidance contained within the Environment Agency PPG, including:

- General Guide to the Prevention of Pollution: PPG1;
- Use and Design of Oil Separators in Surface Water Drainage Systems: PPG3;
- Working at Construction and Demolition Sites: PPG6; and
- Control of Spillages and Fire Fighting Runoff: PPG18.

4.2.3 Additional good practice guidance for mitigation to protect the water environment can be found in the following key CIRIA documents:

- C741 (2015, 4th Edition) Environmental good practice on site guide (Ref 25);
- C609 (2004) Sustainable Drainage Systems, hydraulic, structural and water quality advice (Ref 26);
- C624 (2004) Development and flood risk – Guidance for the construction industry (Ref 27).

5 References

Ref 1 C648 Control of Water Pollution from Linear Construction Projects – Technical Guidance

Ref 2 BS6031:1981 Code of Practice for Earth Works.

Ref 3 Environment Agency (2017) Incidents and their classification: the Common Incident Classification Scheme. Available online at: https://www.ofwat.gov.uk/wp-content/uploads/2017/12/20171129-Incidents-and-their-classification-the-Common-Incident-Classification-Scheme-CICS-23.09.16.pdf

Ref 4 The Water Act 2014;

Ref 5 The Floods and Water Management Act 2010;

Ref 6 The Land Drainage Act 1991 (as amended);

Ref 7 The Water Resources Act 1991 (as amended);

Ref 8 The Salmon and Freshwater Fisheries Act 1975 (as amended);

Ref 9 The Water Environment (Water Framework Directive) (England and Wales) Regulations 2017;

Ref 10 The Environmental Permitting (England and Wales) Regulations 2016;

Ref 11 The Environmental Damage (Prevention and Remediation) Regulations 2015;

Ref 12 The Flood Risk Regulations 2009;

Ref 13 The Eels (England and Wales) Regulation 2009;

Ref 14 The Groundwater (England and Wales) Regulations 2009

Ref 15 The Control of Substances Hazardous to Health Regulations 2002 (as amended)

Ref 16 The Control of Pollution (Oil Storage) (England) Regulations 2001

Ref 17 Department for Housing, Communities and Local Government (2018) National Planning Policy Framework

Ref 18 Department for Communities and Local Government (2015) Flood Risk and Coastal Change National Planning Policy Guidance

Ref 19 Department for Environment, Food and Rural Affairs (2011) Future Water

Ref 20 Department for Environment, Food and Rural Affairs (2015) Non-statutory technical standards for SuDS

Ref 21 HM Government (2015), Building Regulations 2010, Drainage and Waste Disposal Approved Document H

Ref 22 South Staffordshire Council (2012) South Staffordshire Local Plan: Core Strategy Development Plan Document.

Ref 23 UK environmental agencies (2018) Pollution Prevention Guidance

Ref 24 UK environmental agencies (2018) Guidance for Pollution Prevention (GPPs);

Ref 25 C741 (2015, 4th Edition) Environmental good practice on site guide;

Ref 26 C609 (2004) Sustainable Drainage Systems, hydraulic, structural and water quality advice

Ref 27 C624 (2004) Development and flood risk – Guidance for the construction industry

Annex 1 Example Silt Management Options

Fabric silt fences



These are geotextiles installed in the path of sheet flow runoff to filter out sediment. They are often installed around water bodies, below the toe of a cleared slope or around temporary earth stockpiles. Silt fences detain sediment-laden water and promote settlement and may remove 80-90% sand, 50-80% silty loam, and up to 20% silt-clay loam in runoff (CIRIA 648, 2006).

Measures to control rate of temporary discharge



If the rate and energy of temporary discharges are not controlled there is a risk of eroding the bed and banks of the receiving water body. The use of baffle pads or boulders below the outfall are both ways in which the energy of the outfall can be dispersed to avoid bank and bed erosion.

Silt bubble barriers



Bubble barriers are essentially tubes deployed on the bed of the watercourse which emit bubbles. They can control movement of silt with the additional advantage of delivering an oxygen enriched environment. Without this, silt plumes can raise oxygen demand in the waterbody, thereby causing stress to aquatic organisms. They can also be used for general aeration of lakes and ponds.

Silt mats and silt check dams



Silt mats are used to capture sediment as it drops out of suspension and should be located in areas of natural deposition where water energy is low. They are typically staked to the bed and have a natural fibre matrix to contain sediment effectively and prevent resuspension.

Silt check dams are also available (e.g. wood waste filter media or rocks within netting). They are used to reduce speed of flow in ditches and swales, and distribute flows across the channel.

Earth bunds



These are temporary barriers to conveyance of construction runoff and can be used to create temporary storage lagoons or barriers between construction works and water bodies. Care needed as earth bunds may themselves be a source of fine sediment, although this can be minimised by covering with a suitable geotextile or seeding if they are to be in place for a longer period of time and not part of topsoil storage.

Drainage grips (option to include check dams / sumps)



Drainage grips (otherwise known as cut-off or temporary drains) are temporary drains installed to intercept runoff from slopes above construction works to prevent it entering the site or cleared slopes within the site itself. They are an effective way to temporarily manage surface water runoff and convey flows contaminated with fine sediment to storage and treatment areas. Gravel and straw bale check dams can be created at regular intervals to encourage fine sediments to settle out during conveyance.

Pumps, settlement tanks and lamella clarifiers



Pre-treatment of construction site runoff can be provided by first pumping runoff through a settlement tank. These use gravity to encourage fine particulates to settle out and become trapped at the bottom of the tank. Greater levels of treatment can be achieved by using Lamella Clarifiers that include a series of inclined plates to provide a larger effective settling area for a small footprint. There are a range of products depending on application and flow rates and these can also be deployed in series and with chemical dosing tanks, if required.

Chemical treatments and dosing tanks



Chemical dosing tanks provide a way in which high concentrations of metals in runoff can be precipitated out before the treated water is discharged from the site. Chemical dosing tanks are often containerised, partly to reduce the risk of chemical spillage.

Chemical flocculation treatments are also available, often in block form that slowly release into the water. Flocculation is the process by which negatively charged particulates bind together in the presence of a positively charged flocculant.

Tanker for off-site disposal



Where it has not been possible to adequately treat construction site runoff there remains the option to pump the runoff out to a tanker for disposal off-site at a suitably licensed waste facility.

Sand bags / straw bales



Sand bags provide a flexible way to prevent sediment-laden runoff entering a watercourse by creating temporary dams and barriers to runoff. This is most effective on the face of temporary watercourses crossings and short length land depressions where there are preferential flow pathways.

Like fabric silt fences and sand bags, straw bales are a multipurpose way to manage construction site runoff to prevent untreated ingress to water bodies and to support the filtration of fine particulates from runoff.

Vegetated buffer zone



Vegetated buffer zones protect water bodies by provided a separation between the water body and the area of construction works and a means by which any overland flows can be treated before it drains to the water body. When planning the works a Contractor should minimise the area of vegetation clearance, especially around water bodies to maintain natural buffer zones.

Temporary settlement lagoon



Temporary settlement lagoons are an effective way to remove suspended fine particulates from construction site runoff by storing water and allowing the fine particulates to settle out. Where high concentrations are expected, a long retention time is required for significant settlement (due to the very fine nature of the sediment), or space is limited, a series of lagoons may be required with intervening gravel weirs, or the use of a flocculent could be considered. The storage required depends on site requirements, character of fine sediment, and the duration of works.

Silt curtains / nets



Floating silt curtains are designed to control and manage sediment flow within standing waters. It consists of a top flotation pocket below which is suspended vertically an impermeable curtain, and then a ballast at set intervals to hold the curtain in place. It is typical for a bespoke curtain to be created for the particular water body (i.e. changes in bathymetry, flow conditions can be taken into account). Similar products exist for use in low river flows, although they are generally less effective than when deployed in calmer water.

Conveyance swale (option to include check dams / sumps)



Similar to drainage grips, conveyance swales provide a way in which construction site runoff can be directed to storage and treatment areas. The wider cross sectional area of a swale when compared to a drain encourages greater settlement of fine particulates. Settlement can be enhanced by the inclusion of check dams and sediment traps, although the build-up of deposited fine material will need to be monitored and regularly cleared out.

Skips in series



Where there are constraints on space that prohibit the use of construction SuDS (i.e. settlement lagoons as described above) an alternative option might be to drain runoff through a series of skips filled with clean aggregate or straw bales to encourage filtration and settlement of suspended fine particulates.

Measure: Primary & Secondary Purpose

MEASURE	SOURCE CONTROL	CONVEYANCE	TREATMENT
Fabric silt fences	●	●	●
Earth bunds	●	●	
Sand bags & straw bales	●	●	●
Silt curtains	●		
Temporary discharge control	●	●	
Drainage grips		●	●
Vegetated buffer zones			●
Conveyance swales		●	●
Silt bubble barriers	●		●
Pumps, tanks, lamella clarifiers		●	●
Temporary settlement lagoons			●
Skips in series			●
Silt mats and check dams		●	●
Tanker for off-site disposal	●	●	●
Chemical treatments & dosing tanks			●

● Primary Purpose of Measure

● Secondary Purpose of Measure

Purpose of Issue

PURPOSE OF ISSUE

Client
Highways England
2 Colmore Square,
Birmingham.
B4 6BN.

Working on behalf of highways england

Project Title

M42 JUNCTION 6

Drawing Title

POTENTIAL FINE SEDIMENT TREATMENT MEASURES

Designed	Drawn	Checked	Approved	Date
TJ	TJ	OT	GC	15/11/18

Internal Project No	Suitability
60543032	
Scale @ A3	Zone
NA	X

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